

III. NATURAL RESOURCES INVENTORY

Environmental information must be gathered by conducting a Natural Resources Inventory (NRI) of the development site. The NRI is a complete analysis of existing natural resources and must contain specific information covering the development site and the first 100 feet of adjoining land or the width of the adjacent lot, whichever is less (Figure 1). The purpose of the NRI is to provide environmental information early in the concept development phase that will allow for more environmentally-friendly site design. In general, the inventory must be submitted before or with the earliest plan submission for a development site. The NRI is submitted as part of the Natural Resources Inventory/Forest Stand Delineation (NRI/FSD) Summary Map as detailed in *Trees: Approved Technical Manual* (M-NCPPC, 1992).

The following topics shall be addressed as part of the NRI to assure compatibility between the natural and man-made environments.

A. Streams and Floodplains

All streams and/or drainage courses located on or within 200 feet of the subject property must be shown on the NRI/FSD summary map. M-NCPPC 1"=200' scale topographic maps or applicant's field topography will be used to determine whether or not streams and/or drainage courses are present. Streams will be classified as either perennial, intermittent, or ephemeral (see glossary for definition of terms).

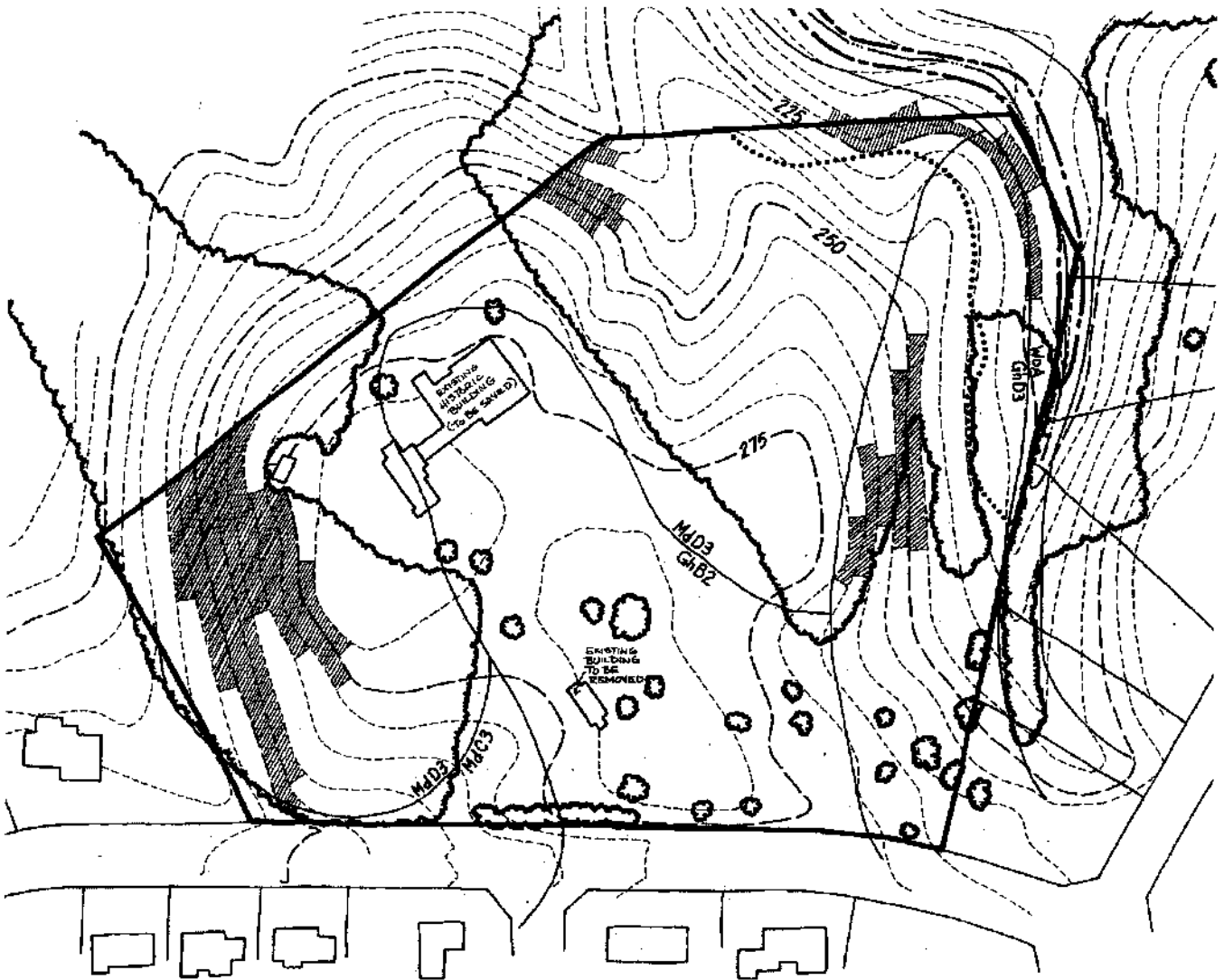
All streams shown on M-NCPPC 1"=200' topographic maps with drainage areas greater than 30 acres are assumed to have a 100-year ultimate floodplain. The floodplain must be shown on the inventory map with a 25 foot Building Restriction Line (BRL). Where M-NCPPC 100-year ultimate floodplain delineation is available, the applicant shall use and identify that information unless more accurate delineation (based on hydrologic/hydraulic computations and/or detailed topography or field survey) is provided. In the absence of M-NCPPC maps, other sources of floodplain information may include Federal Emergency Management Agency (FEMA) Flood Insurance Rate maps, Housing and Urban Development (HUD) Flood Hazard Boundary Map, and engineers' floodplain studies. Final approval of engineers' studies must be given by the Montgomery County Department of Permitting Services (MCDPS) prior to Planning Board approval of development applications.

For drainage areas fewer than 30 acres, a drainage study including delineation of flowpath and limit of flooding may be required, with concurrence from MCDPS. These cases will be determined on an individual basis.

B. Stream Buffers

Stream buffers must be shown on the inventory map in accordance with Table 1 for all perennial and intermittent streams and will include seeps and springs. Ephemeral streams do not require a stream buffer, but they should be protected as much as possible through plan layout and conditions on a voluntary basis. The slope range for use with Table 1 will be determined by taking representative 200 foot cross sections on both sides of the stream, drawn perpendicular to the direction of flow, and measuring the gradient of the slope in the steepest 100 foot horizontal run. This procedure is illustrated

Figure 1. Natural Resources Inventory



- Stream
- Floodplain
- M&D3
GH52 Soils Line
- Steep Slopes ($\geq 25\%$ or $\geq 15\%$ with severely erodible soils)
- Forest/Tree Canopy
- Stream Valley Buffer

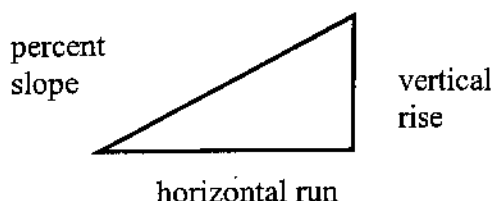
Wetland limited to stream channel.
 Areas outside forest is lawn with specimen size trees.

in Figure 2. For hypothetical examples of stream buffer delineation, see Figure 3. Stream buffers will include steep slopes (as defined in section C. Topography), 100-yr floodplains, and wetlands with wetland buffer as defined by State regulations (see section D. Wetlands). Additional buffer requirements for Special Protection Areas (SPAs) and the Patuxent Primary Management Area (PMA) are included in Chapters V and VII of this document .

C. Topography

Slopes must be classified on the inventory map and all steep slope areas must be highlighted. A slope that has a gradient equal to or greater than 25 percent will be considered steep. See Chapter V for variations to the steep slope definition in certain Special Protection Areas.

“Percent slope” is defined as vertical rise in feet divided by horizontal run in feet in the *steepest* 100 foot segment multiplied by 100 percent.



$$\text{Percent Slope} = \left[\frac{\text{vertical rise}}{\text{horizontal run in the steepest 100 foot segment}} \right] \times 100\%$$

Slopes are classified as being either (1) near stream or hydraulically adjacent, or (2) hydraulically remote. The terms "near stream" and "hydraulically adjacent" generally refer to the area lying within 200 feet of a stream's bank, which is considered to be the most environmentally sensitive or critical portion of the stream valley. If the stream buffer, as determined by the steepest 100 foot section within the hydraulically adjacent area (Table 1), encompasses the toe of a steep slope, the buffer will be expanded beyond the width in Table 1 to include the entire slope. A hydraulically remote area lies outside the stream buffer.

D. Wetlands

All wetlands, as defined by the Maryland Department of the Environment (MDE), must be shown on the preliminary/site plan overlay and the NRI/FSD summary map. Identification of wetlands at this early stage of the development process is necessary to provide flexibility in protecting wetlands. Prior to the submittal of a preliminary/site plan, special exception, or mandatory referral, an applicant must have a qualified individual perform a wetland assessment. The results of the assessment should be either a line denoting the edge of wetlands on the plan overlay or inventory map, or a note stating that no wetlands exist on the site. The name and address of the individual who conducted the wetland assessment must be shown on the plans. For plans that will undergo 59-D-3 site plan review, the U.S. Fish and Wildlife Service National Wetlands Inventory maps, Maryland Department of Natural Resources (DNR) wetlands maps, and other sources designated by MDE may be acceptable at preliminary plan, to be followed by field investigation at the site plan review stage. These instances will be determined by staff on a case-by-case basis. Additional sources of information on wetlands include

Table 1. Recommended Stream Buffer Widths* by Slope Range and State Water Use Designation** (expressed in feet from the stream bank)			
Slope Range (%)	Use I/I-P (Water Contact Rec. and Aquatic Life)	Use III/III-P (Natural Trout Waters)	Use IV/IV-P (Recreational Trout Waters)
0 to <15	100	150	125
15 to <25	125	175	150
25 and greater	150	200	175

* Stream buffer widths may be greater if floodplains, wetlands, or steep slopes extend beyond the buffer line, or as noted in Section VII. In agricultural zones, the requirements for the buffer may be waived when the land will be used for farming. This waiver will be conditioned upon the applicant getting an approved soil and water conservation plan from the Montgomery Soil Conservation District. These instances will be determined on a case-by-case basis.

** Stream Water Use will be determined by the MDE Water Use designation (for definition, listing, and map see Glossary of Terms and Appendix A.)

NOTE: These buffers apply to intermittent and perennial streams only. Plans located in Council-designated Special Protection Areas are subject to the guidelines specified in Chapter V. Plans located in the Patuxent River watershed will be subject to Primary Management Area guidelines (Chapter VII) in addition to the stream buffer widths above.

functional wetland assessments conducted by M-NCPPC staff on selected watersheds in the County and the Digital Ortho Quarter Quad (DOQQ) wetland maps recently produced by the state in cooperation with M-NCPPC based on updated aerial photography.

Wetland buffers based on the State regulations will be incorporated into the stream buffer described in section B. The State mandates a minimum 25 foot buffer around all wetlands, with expansion up to 100' where adjacent areas contain steep slopes or highly erodible soils. These guidelines also include a larger minimum buffer for wetlands on small headwater streams in sensitive Use III and IV watersheds (50 foot and 40 foot, respectively). In addition, the State requires a minimum 100 foot buffer around wetlands of special State concern. Montgomery County contains twelve wetlands unique enough to be designated as wetlands of special State concern. These twelve wetlands include: the C&O Canal bottomland, Germantown Bog, the Great Falls floodplain, the Great Falls National Historic Area, Little Bennett Regional Park, Little Falls, McKee-Beshers West Swamp, the Potomac River at Cropley, Puller Marsh, Sycamore Landing on the Potomac riverside, Unit 1 Spring, and the Violets Lock floodplain. (See COMAR 26.23.01.04 for more information.)

Table 2 shows the recommended wetland buffer widths by State water use categories, stream order, and other sensitivity factors. See Appendix A for a definition of State water use categories and Appendix B for a definition of stream order. See Figures 4 and 5 for illustrations of wetland and stream buffers. Additional wetland buffer requirements for Special Protection Areas (SPAs) are included in Chapter V of this document.

Figure 2. Stream Buffer Determination Using Steep Slopes for a Use I Stream

Cross Section Number	Maximum Slope (steepest 100 feet)	Percent Slope Range	Recommended Stream Buffer Width (feet)
Right Bank (looking downstream):			
1	30%	>25	150
2	17%	15-25	125
3	31%	>25	150
4	17%	15-25	125
Left Bank (looking downstream):			
5	7%	0-15	100
6	8%	0-15	100

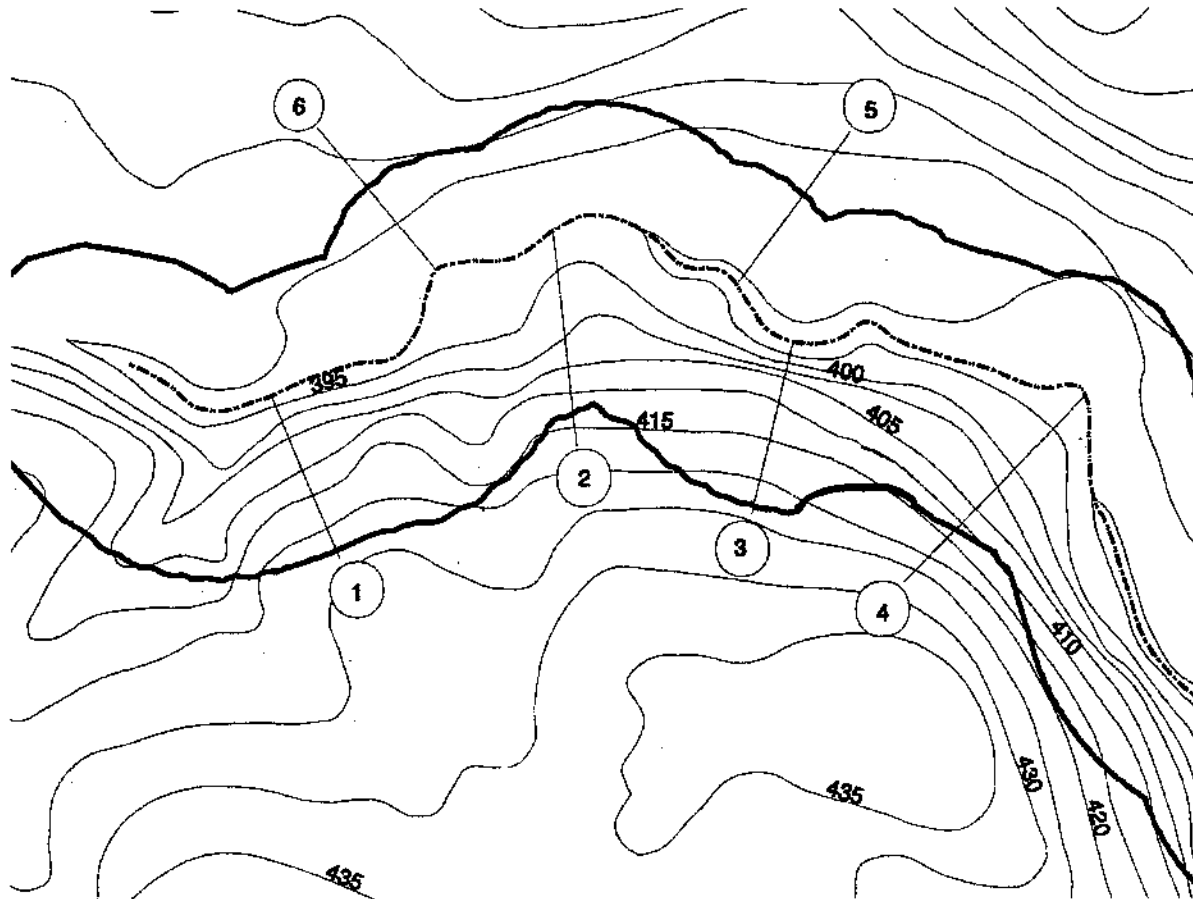
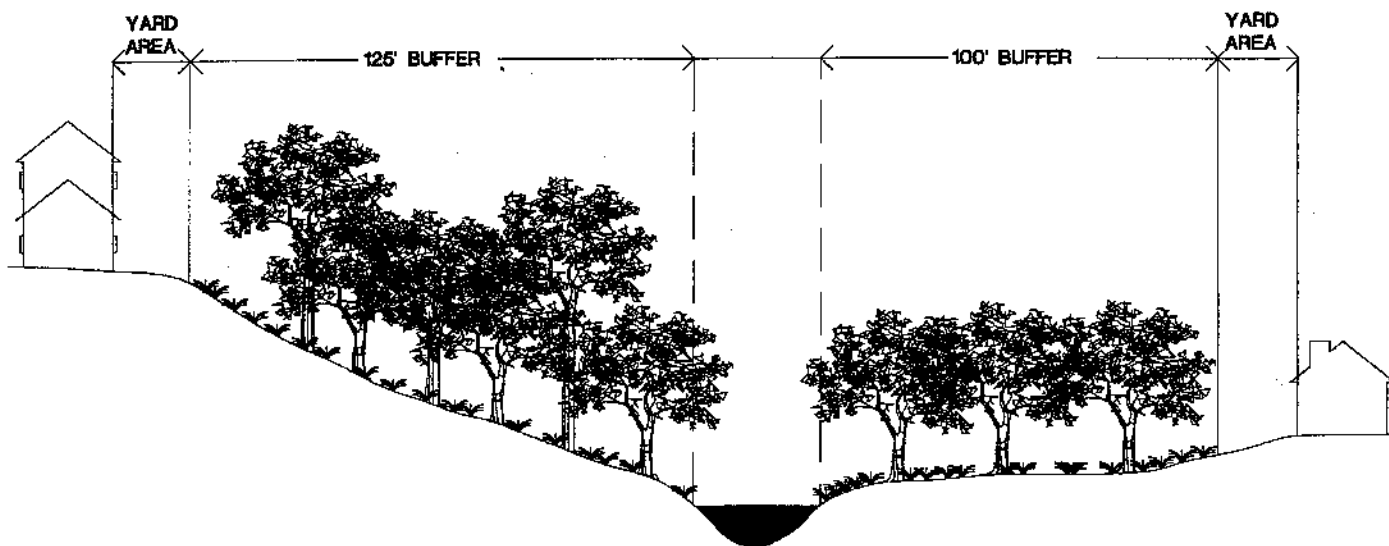
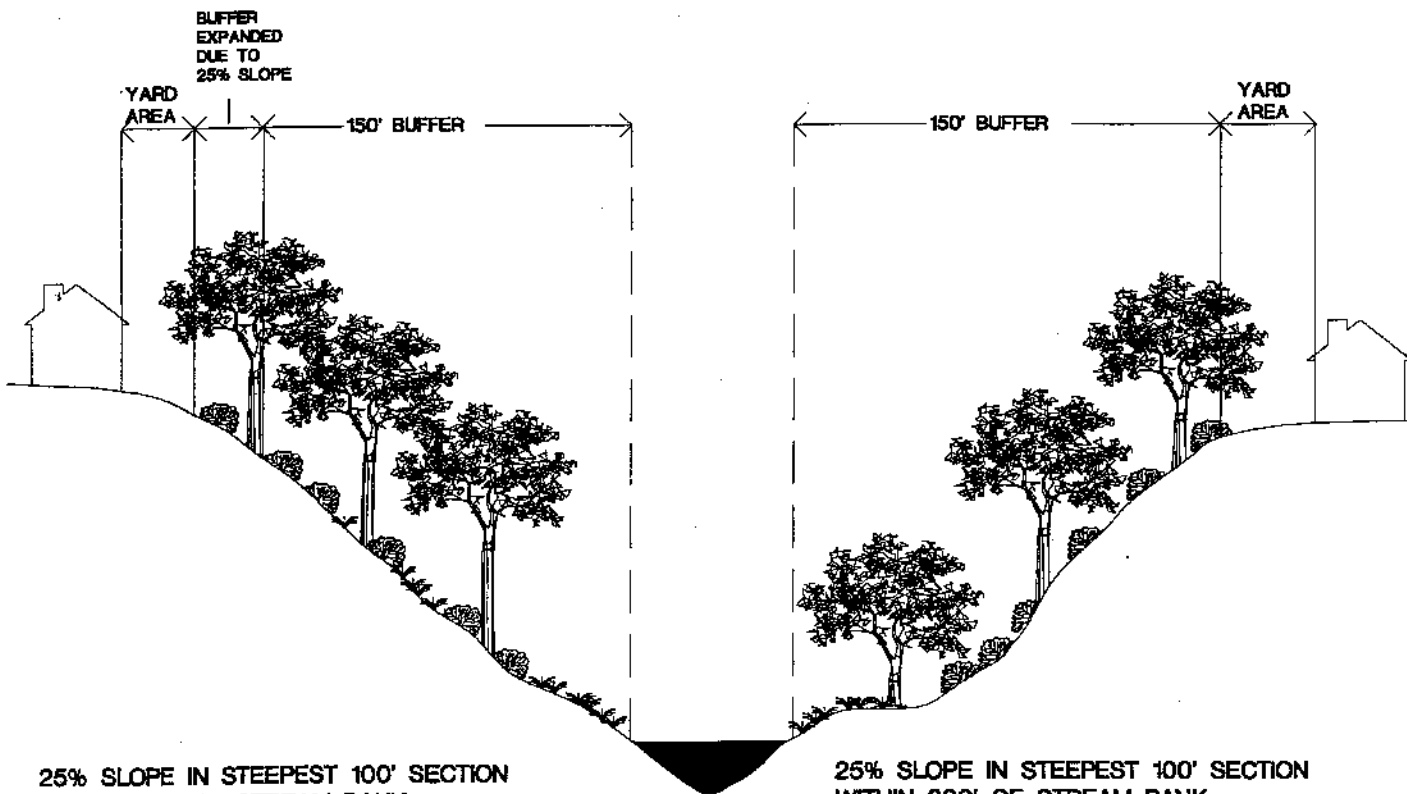


Figure 3. Hypothetical Subdivision with Stream Buffer for a Use I Stream



20% SLOPE IN STEEPEST 100' SECTION
WITHIN 200' OF STREAM BANK

8% SLOPE IN STEEPEST 100' SECTION
WITHIN 200' OF STREAM BANK



25% SLOPE IN STEEPEST 100' SECTION
WITHIN 200' OF STREAM BANK

25% SLOPE IN STEEPEST 100' SECTION
WITHIN 200' OF STREAM BANK

E. Forest and Trees

Existing forest and tree cover determined from recent aerial photos must be shown on the NRI/FSD inventory map as a circumferential line around all forest and tree stands that includes the outer perimeter of the branches of the individual trees.

A detailed delineation of forest and trees within these boundaries must also be provided. The requirements and methodology for this delineation are contained in *Trees: Approved Technical Manual* adopted as part of the Montgomery County Forest Conservation Law.

F. Unsafe and Unsuitable Land (Soils)

Environmentally sensitive site design depends on knowledge of the nature and degree of constraints and opportunities offered by a given site. Identification of unsafe or unsuitable land is an integral part of this analysis, both from the standpoint of providing safe and habitable buildings, and for providing protection and conservation of natural resources such as streams, wetlands, floodplains, forests, and trees. The primary reasons for classifying land as unsafe or unsuitable for development are problems with soils/geology, topographic constraints, and surface and subsurface water hazards.

In the past, there have been instances where failure to recognize existing soils constraints have resulted in buildings that experience severe flooding, wetness problems and/or, over the long run, structural problems. Therefore, soil boundaries must be identified on the inventory map. In addition, development limitations must be provided either in a separate report or as a note on the plan drawing. Severely limited areas must be highlighted on the plan drawing. Soils with severe limitations for development are those that have one or more of the following characteristics as identified in the most recent version of the *Soil Survey of Montgomery County, Maryland*, prepared by the United States Department of Agriculture Natural Resources Conservation Service (NRCS):

- Seasonal high water table
- Subject to flood hazard
- Poor drainage
- Wetland/hydric soil conditions
- High shrink/swell potential
- Shallow depth to bedrock
- Excessive slopes
- High susceptibility to erosion

One of the most common of these characteristics in Montgomery County is highly erodible soils. Highly erodible soils are those listed as having a "severe hazard of erosion" in the *1995 Soil Survey of Montgomery County* (see Appendix C for a complete list of highly erodible soil types). Erodeable soils on slopes over 15% must be delineated on the NRI and highlighted for potential inclusion in the protected areas of the site.

Table 2. Recommended Buffers for Wetlands, Springs and Seeps Outside SPAs

Stream Use & Order	Wetlands of Special State Concern *	Wetlands with Steep Slopes **	Wetlands with Erodible Soils***	Other Wetlands
Use III, First & Second Order Streams	100'	50-100'	50-100'	50'
Use III, Third & Higher Order Streams	100'	25-100'	25-100'	25'
Use IV, First & Second Order Streams	100'	40-100'	40-100'	40'
Use IV, Third & Higher Order Streams	100'	25-100'	25-100'	25'
Use I, First & Second Order Streams	100'	25-100'	25-100'	25'
Use I, Third & Higher Order Streams	100'	25-100'	25-100'	25'

NOTE: Isolated farm ponds, existing stormwater management ponds or man-made drainage ditches are exempt from these expanded buffer recommendations. See Appendix A for a definition of State Water Use designations and Appendix B for a definition of stream order.

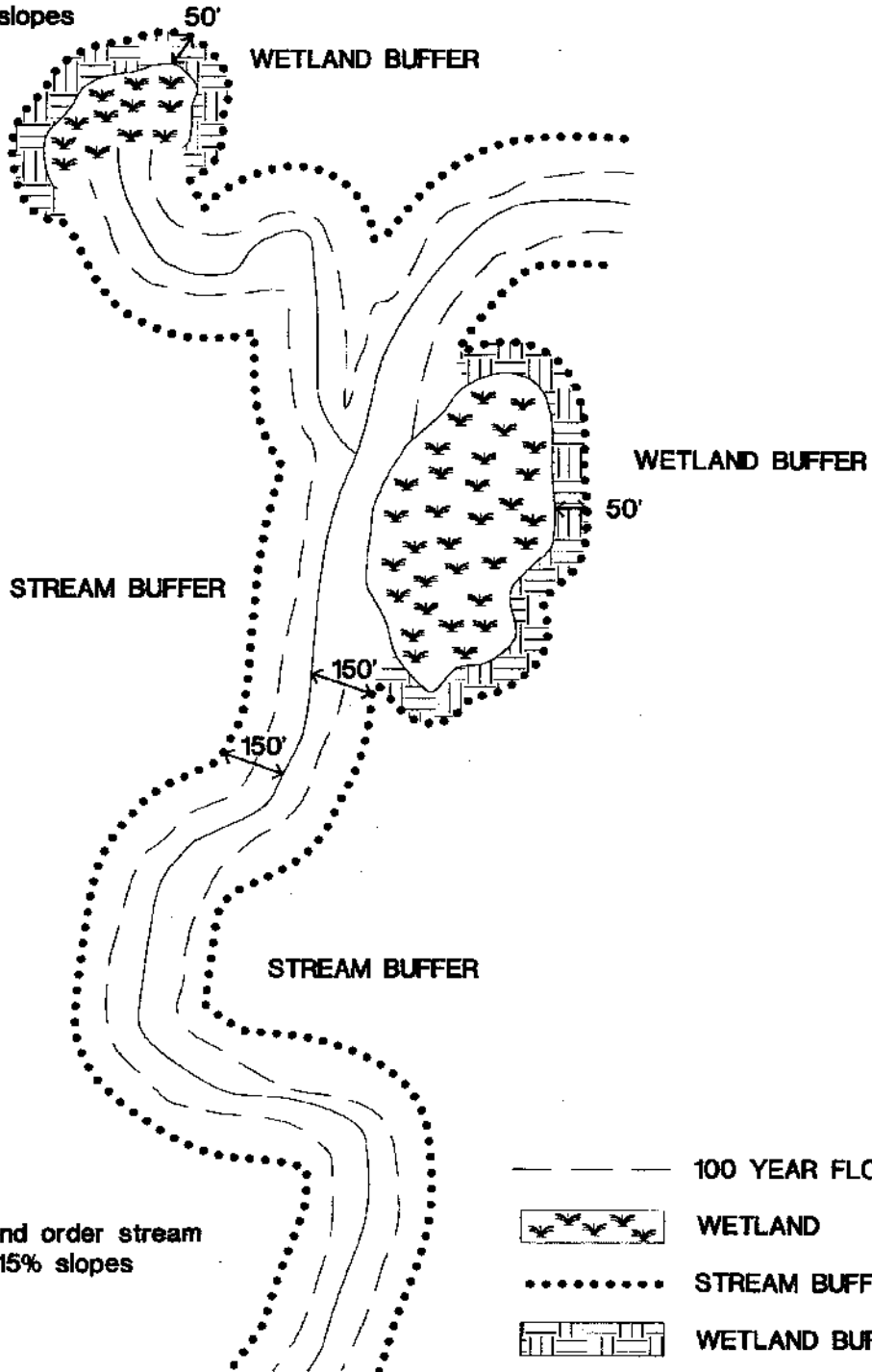
* Wetlands of special State concern, as identified by the Maryland Department of the Environment and the Maryland Department of Natural Resources, are subject to a minimum 100-foot buffer by State regulations.

** Buffer for wetlands adjacent to steep slopes will be expanded to include the steep slopes up to 100 foot maximum. For wetlands outside SPAs, steep slopes are defined as 25% or greater on the steepest 50 feet within the 100 feet adjacent to the wetland.

*** Buffer for wetlands adjacent to erodible soils will be expanded to include the erodible soils up to 100 foot maximum. Erodible soils are those soils classified as having a severe hazard of erosion in the soil profile descriptions of the *Soil Survey of Montgomery County* (July 1995), published by the Natural Resources Conservation Service (formerly SCS) (see Appendix C).

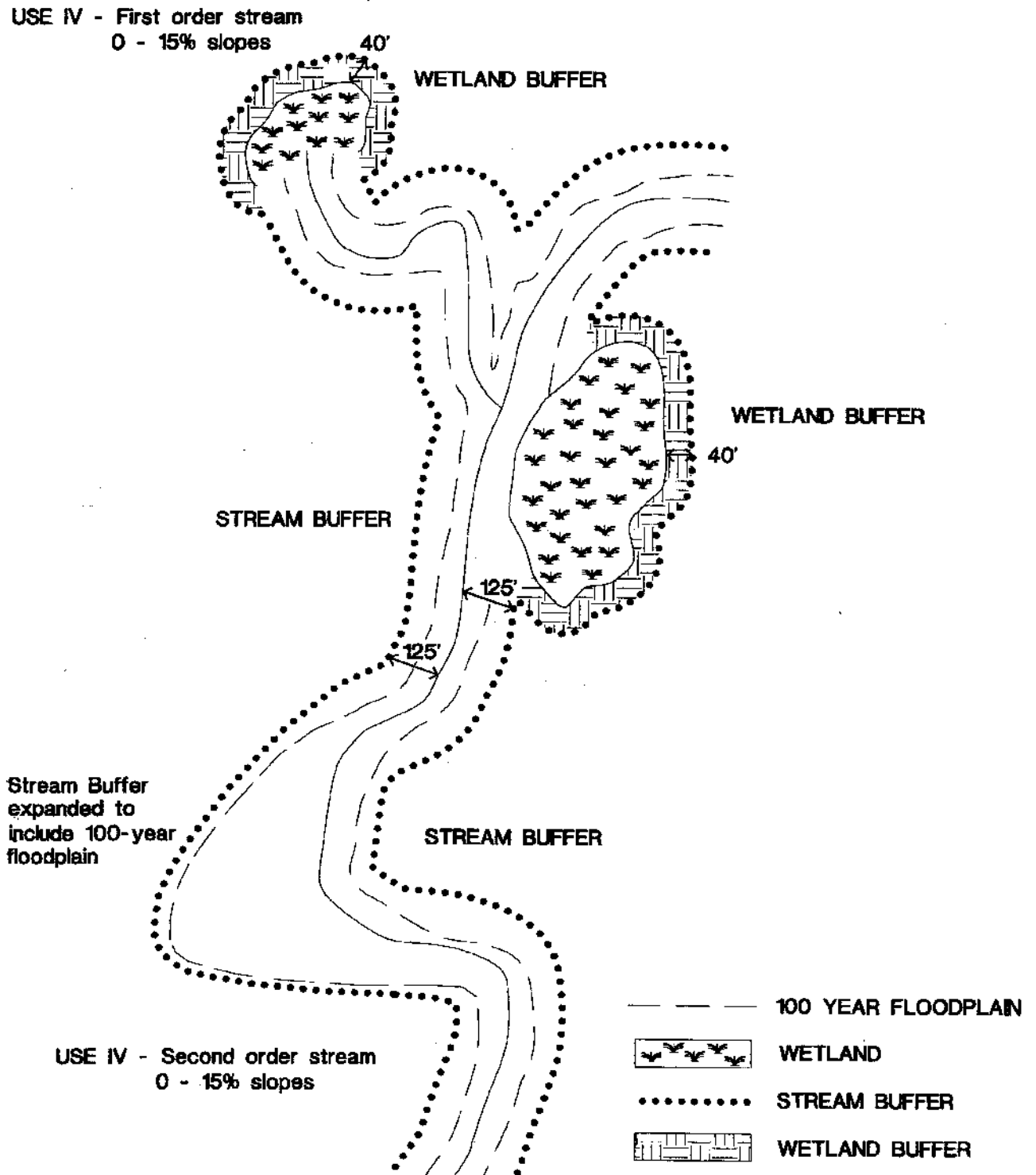
Figure 4. Illustration of Stream Buffers in a Use III Watershed with Wetlands

USE III - First order stream
0 - 15% slopes



USE III - Second order stream
0 - 15% slopes

Figure 5. Illustration of Stream Buffers in a Use IV Watershed with Wetlands and Floodplain



G. Danger Reach/Dam Break

M-NCPPC, in consultation with MCDPS and the Maryland Water Resources Administration (WRA), incorporates danger reach/dam break analysis in the NRI submittal in order to identify relevant land use issues early in the process, to protect existing structures against dam failures from new ponds, and to protect proposed subdivisions against an existing or proposed ponds' dam breach. (For proposed ponds, danger reach/dam break information, as described in this section, should be submitted with the preliminary/site plan.)

For all development applications that have a dam, subject to dam breach analysis on site, or where the property is one mile or less downstream of a dam, an applicant must show the danger reach (area inundated by the dam break flood), footprints of existing structures, and spot danger reach water surface elevations on the inventory map. MCDPS shall verify this information. M-NCPPC has maps showing the danger reaches for Little Seneca Lake, Lake Needwood, and Lake Frank.

H. Threatened and Endangered Species and Species in Need of Conservation

If identified during the development review process, the habitat location of flora and fauna that are designated as rare, threatened, endangered, in need of conservation, or as a watchlist species (as designated by the Maryland Natural Heritage Program, Department of Natural Resources), must be shown on the inventory map. To determine if a property contains any significant species, send a vicinity map with a letter requesting identification of significant species to the DNR Natural Heritage Program at the following address:

DNR Natural Heritage Program
Tawes State Office Building
580 Taylor Avenue, E-1
Annapolis, MD 21401

DNR will check their database for known occurrences of significant species and will send a response letter that can be submitted with the NRI map.

Environmental Planning staff will work with DNR and the M-NCPPC Parks Division to determine any special buffering measures to help protect known populations of such species and/or their sensitive habitat areas.