Harford County
Forest Cover Conservation
And
Replacement Manual

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Harford County
Forest Cover Conservation and Replacement Manual

HARFORD COUNTY

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Preface

The Harford County Forest Conservation Law was developed in accordance with the State of Maryland Forest Conservation Act, Natural Resources Article, 5-1601-1612 Annotated Code Of Maryland. This Section requires all units of government with planning and zoning authority to develop and submit to the State, an approved local forest conservation program by December 31, 1992. Local programs shall meet minimum requirements established by the State.

The Harford County Forest Cover Conservation and Replacement Manual is the policy document which integrates the requirements of the Harford County Forest Conservation Law, Bill 91-31, into the Harford County development review process. The Manual contains information which is used in the preparation of Forest Stand Delineations and Forest Conservation Plans. This includes methods for surveying existing forest resources, determining which forested areas should be retained and protection techniques for forest retention areas. The Manual also provides guidance on reforestation, afforestation and individual tree landscaping.

1.0 # Chapter 1
INTRODUCTION

As land use change occurs, a natural environment inclusive of trees and forested areas serves to reinforce the economic viability, and the quality-of-life in the communities of Harford County. Forests help stabilize the soil and act as natural sponges that trap and hold rain water while slowly releasing, and filtering, the trapped water into groundwater supplies. Forests also provide aesthetics, food and habitat for wildlife, recreational opportunities, lumber for building, and pulp wood for paper supplies. Forests also help improve air quality by filtering out particulate matter, absorbing carbon dioxide and releasing oxygen. By working to conserve existing forested areas, and plant new areas in trees and forests, the effect of change to the visual, as well as the environmental landscape is minimized.

1.1 Intent of the Law

To insure that tree and forest resources continue to benefit our community, the Harford County Forest Conservation Law, Bill 91-31aa, was enacted on July 18, 1991. The intent of the Law is three-fold. First, the Law requires that the natural features within a proposed development site be identified and delineated before a development plan for the site is submitted to the County. Second, the Law requires that a portion of the existing forest resources on-site be retained. Finally, the Law requires that a measure of the forest resources which are lost as a necessary element of the development process be replaced.

1.2 Development of the Manual

The Harford County Forest Cover Conservation and Replacement Manual represents the integration of the requirements established in the Harford County Forest Conservation Law into the Harford County development review process. The Harford County Department of Planning and Zoning (the Department) developed the Forest Cover Conservation and Replacement Manual to identify the development activities that are regulated by the Law, and to provide a policy framework that directs how the requirements of the Law are to be satisfied within the development review process. As of January 1, 1992, the requirements of the Harford County Forest Conservation Law, and subsequent guidelines, shall be satisfied as part of the development approval process.

The textual organization of this Manual has been designed to integrate the requirements of the Law with the implementation guidelines developed by

the Department. Additional descriptive language has also been added where clarification of the requirement, or guideline, is necessary.

1.3 Use of the Manual

The Harford County Forest Cover Conservation and Replacement Manual has been designed for planners, engineers and developers who are looking to develop a specific site and need to determine their options with regard to the on-site forest resources. Similar topical elements of the Law have been aggregated into different Chapters of the Forest Conservation Manual. A brief description of each chapter is provided below.

Chapter 2 of the Manual concentrates on the applicability of the Law. Specifically, this chapter has been designed to assist an applicant in determining if a proposed development activity is either grandfathered or exempt form the requirements of the Law.

The Forest Stand Delineation is an inventory of the existing forest and wildlife resources on-site. The Forest Stand Delineation requirements and guidelines are encompassed in Chapter 3. This Chapter outlines the methodology for collecting forest and wildlife data and the format of the Forest Stand Delineation. Chapter 4 discusses the requirements and guidelines for developing a Forest Conservation Plan. Based on the data gathered in the Forest Stand Delineation, the Forest Conservation Plan delineates the locations of significant trees and forested areas and details where retention of existing forest is proposed and where forest replacement is planned. This Chapter outlines how these areas are determined, and the format of the Forest Conservation Plan.

An Abbreviated Process for minor residential subdivisions of five (5) or fewer lots is provided under the Law. The Abbreviated Process is designed to simplify the forest conservation requirements while streamlining the review and approval process for minor residential subdivisions. The requirements and guidelines for submission under the Abbreviated Process are covered in Chapter 5.

2.0

Chapter 2
GRANDFATHERING PROVISIONS AND EXEMPTIONS

2.1 Applicability

Application made for subdivision approval, a grading permit, or a building permit on a lot or parcel of land greater than 40,000 square feet is subject to the requirements of the Harford County Forest Conservation Law (the Law). However, under certain conditions there are instances where an activity will be exempt from the requirements of the Law even though the lot or parcel on which the activity is occurring is larger than 40,000 square feet. There are also activities which may be grandfathered from the requirements of the Law, regardless of the size of the lot or parcel, based on the approval date of specific plans or permits.

An applicant may determine if a proposed activity is either grandfathered, or exempt from the Law by completing the worksheet in Figure 2.1.1 or reviewing Article VI Forest and Tree Conservation §267-34. B of the Harford County Zoning Code (Development Regulations) and Section 3 of the Law.

2.2 Declaration of Intent

The declaration of intent is the applicants way of justifying to the Department that the proposed activity is exempt under §267-34. B of the Development Regulations. A declaration of intent shall be completed by the applicant for any proposed activity that is determined to be exempt from the Development Regulations. An approved declaration of intent must be in the possession of the Department of Planning and Zoning prior to the start of any proposed activity which is determined by the Department of Planning and Zoning to be exempt from the Development Regulations

Figure 2.1.1

FOR ALL APPLICANTS WITH GREATER THAN 40,000 SQUARE FEET OF LAND.

Use this worksheet to determine the applicability of the Harford County Forest Conservation Law to your property by answering each question in the order listed. Your proposed activity must conform with the provisions of the Harford County Forest Conservation Law if: the activity you propose is not covered by a previous permit or plan approval under the grandfathering provisions of Part I below; or the activity you propose is not listed under the exemptions in Part II of this worksheet.

If your property is grandfathered, it means that the Law has no applicability to your project whatsoever. If your proposed activity is exempt, this means that your property does fall under the jurisdiction of the Law, however, your activity is not required to meet the requirements of the Law. It is very important to remember that if your activity qualifies for an exemption identified in Part II of this worksheet, you must fill-out and submit a Declaration of Intent with the Department of Planning and Zoning. If you are still uncertain of the applicability of the Law to your property or project after you have completed this worksheet, please contact a representative of the Department of Planning and Zoning at (410) 638-3103.

PART I: GRANDFATHERING PROVISIONS

1. You must first determine if your property was created through a Preliminary Subdivision Plan, or a parcel created by deed with no record plat. If your property was created by deed with no record plat then you cannot be automatically grandfathered unless your project has been issued a permit as described in 2 or 3 below. If you have determined that your property was created through a preliminary plan, you must first determine when the preliminary plan was approved.

   If your property was created by a Preliminary Plan, when was the preliminary plan approved? (This information is available at the Department of Planning and Zoning) _____

   A. If your property was the subject of a Preliminary Subdivision Plan approved prior to July 1, 1991 the Law is not applicable to your property, unless:

      i. You are proposing to subdivide your property.

2. Has a Grading Permit for the proposed project on your property been issued on, or before, December 31, 1991? _____

   If yes, when was the permit issued? _____

   A. If the Grading Permit was issued prior to July 1, 1991 the Law is not applicable to your property for work performed in accordance with the issued permit.

   B. If the Grading Permit was issued on or after July 1, 1991, and on or before December 31, 1991 the Law is not applicable to your property for work performed in accordance with the issued permit unless:

      i. You require an extension of your grading permit.

3. Has a Building Permit for the proposed project on your property been issued on, or before, December 31, 1991? _____

If yes, when was the permit issued? _____
What was the permit number? _____

A. If the Building Permit was issued prior to July 1, 1991, the Law is not applicable to your property for work performed in accordance with the issued permit.

B. If the Building Permit was issued on or after July 1, 1991, and on or before December 31, 1991, the Law is not applicable to your property for work performed in accordance with the issued permit unless:

i. The Building Permit expires. It is important to remember that Building Permit extensions are not granted. A new permit must be applied for and will be subject to the Law.

4. Is your proposed plan a subdivision utilizing the Conventional with Open Space special development option? _____

If yes, when was Concept Plan Approval granted? _____

A. If concept plan approval for the Conventional with Open Space subdivision was granted on or before December 31, 1991, the Law is not applicable to your project.

5. Is your proposed plan a subdivision utilizing the Planned Residential Development Special Development option? _____

If yes, when was your project approved by the Board of Appeals? _____

A. If Board of Appeals approval for the Planned Residential Development was received on or before December 31, 1991, the Law is not applicable to your project.

PART II: EXEMPTIONS

The exemptions in this part of the worksheet are listed in the same order as they are found in the Forest Conservation Law (Article VI Forest and Tree Conservation §267-34. B of the Harford County Zoning Code). The numbering is also consistent with the exemption numbers located on the Declaration of Intent form. If you have determined that your property is not grandfathered from the Law, you may qualify for one of the exemptions listed below. Remember if your project qualifies for one of the listed exemptions, you must fill-out a Declaration of Intent and submit it to the Department of Planning and Zoning.

1. Are you proposing to cut trees on your property, or has your property been the subject of a Forest Harvest Permit, issued under Chapter 214 of the County Code? _____

If you are proposing to cut trees on your property under a Forest Harvest Permit you are exempt from the Law. If trees have been previously cut on your property under a Forest Harvest Permit, when was cutting and clearing completed? _____

A. If the cutting and clearing was completed prior to July 1, 1991, it was exempt from the Law and will not be counted as existing forest when you apply for future permits or subdivision.

B. If the cutting and clearing was completed on or after July 1, 1991 it is also exempt, however, those trees cleared shall be counted as existing forest for five (5) years from the date above. This means that if a subdivision is proposed for your property within five years from the date the Forest Harvest Permit was granted, any trees removed as a result of the Forest Harvest Permit will be figured into the forest conservation calculations for the subdivision.

2. Is your property within, or partially within the Chesapeake Bay Critical Area Overlay District? _____

If yes, your property or that portion of your property within the Chesapeake Bay Critical Area Overlay District is exempt from the Forest Conservation Law, but subject to Article VI Forest and Tree Conservation §267-34. B of the Zoning Code.

3. Is your property currently in active agricultural use? _____

If yes, and your proposed forest clearance is for the purpose of furthering of an agricultural practice, you are exempt from the Law.

Note: If your land is proposed for development within five (5) years of the cutting and clearing, the trees cleared shall be counted as existing forest that has been removed for your proposed subdivision.

4. Is your property the subject of a Federal, State, or local forestry or woodlands incentive program?

_____

If yes, forest management activities on your property are exempt from the Law, as long as they are in accordance with your approved management program.

5. Public utilities defined as: a gas and electric company regulated by the Maryland Public Service Commission (PSC), a cable television company operating under a franchise granted by the County Council, or a telecommunications company are exempt from the Law. Rights-of-way, and land for electrical generating stations regulated by the PSC are also exempt from the Law.

6. Routine maintenance of a public utility right-of-way is exempt from the Law.

7. Are you proposing to subdivide your property to complete your development project? _____

If yes, then your property is not exempt.

A. If no, will your proposed development exceed 20,000 square feet of forest cutting, clearing or grading? _____

i. If your development will not result in more than 20,000 square feet of forest clearance, then it is exempt from the Law.

B. Was your property the subject of a previous Forest Conservation Plan or Declaration of Intent? This information is available from the Department of Planning & Zoning. _____

ii. If the answer to question 7A was no, then the answer to this question must also be no. If the answer to this question is yes then you must comply with the conditions of the previous Forest Conservation Plan, or Declaration of Intent in order for your current development to remain exempt.

8. All strip or deep mining of coal, and any surface mining of non-coal, is regulated under the Natural Resources Article, Title 7, of the Annotated Code of Maryland and not subject to the provisions of the Harford County Forest Conservation Law.

Note: If you are proposing a minor subdivision of five or fewer lots which will result in the cutting, clearing, or grading of less than 20,000 square feet of forest, please refer to Chapter 5 of this Manual as you may not be required to submit a Forest Stand Delineation or Forest Conservation Plan to the Department.

2.3 Declaration of Intent Guidelines

2.3.01 General Guidelines

A declaration of intent is effective in perpetuity.

A sketch map, to scale, shall accompany the declaration of intent which shows the total area of the parcel or lot and highlights the area of the property for which the exemption is being requested.

The existence of a declaration of intent on a particular property does not prevent:

Another exempted activity on the property subject to a declaration of intent if the activity does not conflict with the purpose of any existing declaration of intent and it complies with the applicable requirements for an exempted activity.

A regulated activity on the area covered by the declaration of intent, in which case there shall be an immediate loss of exemption, and noncompliance action will be taken by the Department as appropriate under the Law.

A regulated activity on that area of the property not covered under the declaration of intent if the requirements of the Law are satisfied.

2.3.02 Specific Guidelines

The declaration of intent must be signed by the owner of the property on which the exempted activity is to occur.

2.3.03 Penalties

The Department may require a person failing to file a declaration of intent or found in noncompliance with a declaration of intent to:

Meet the retention, afforestation and reforestation requirements established in §267-39 and §267-40 of the Development Regulations.

Pay a noncompliance fee of $1.20 per square foot for the area found to be in violation of the declaration of intent.

Be subject to other enforcement actions appropriate under §267-48 of the Development Regulations.

File a declaration of intent with the Department.

In its determination of appropriate enforcement action, the Department shall consider whether failure to file a declaration of intent by a person required to file is a knowing violation of the Law and/or Development Regulations.

2.4 Declaration of Intent Form

The content and format of the declaration of intent is provided in Figure 2.4.1. Figure 2.4.1 is provided for illustrative purposes only. The actual declaration of intent form is available from the Department of Planning and Zoning.

2.5 Grandfathering Provisions

In contrast to an exempted activity which is subject to the Law but exempt from its requirements, activities which are grandfathered are not subject to the Law. If a preliminary subdivision plan, grading permit, building permit or concept plan was approved for an activity prior to the effective date of the Law, the activity may be grandfathered.

2.5.01 Guidelines

To remain grandfathered, the development proposed shall be in accordance with the approved plan or permit.

For building and grading permits, only the activity listed on the permit shall be grandfathered from the Law.

For preliminary plans and concept plans, significant alteration of the plan (i.e., major infrastructural change, site density revisions, or subdivision design) may constitute an abandonment of the original approved plan and a loss of grandfathered status.

Site plans shall be grandfathered from the Law if either a grading permit or a building permit was issued for the site prior to the effective date of the Law and the issued permits are in conformance with the site plan.

Fig. 2.4.1

HARFORD COUNTY FOREST CONSERVATION ORDINANCE
DECLARATION OF INTENT

Permit Number_____Tax Map_____Parcel Number_____Lot Number _____

Name(s) of Property Owner _____Name of Subdivision _____

I, (We),_____, the Owner of the real property located at

_____and described in deed _____

A. hereby declare my (our) intention to meet the requirements for an exemption under §267-34.B

(1)____, (2)____, (3)____, (4)____, (5)____, (6)____, (7)____ (*check appropriate exemption*) of the Harford County Forest Conservation Ordinance in perpetuity.

If this Declaration of Intent is being filed under exemption (7) please indicate the amount of forest to be disturbed, in units of square feet: _____ square feet.

B. hereby declare my (our) intention to meet the requirements for §267-38.C; (abbreviated process) amount of proposed forest disturbance: _____ square feet.

Is the property for which this Declaration of Intent being filed subject to a previous (please indicate yes or no):

____ Forest Conservation Plan; or ____ Declaration of Intent.

Please calculate the additional information below.

Total amount of existing forest on site: _____ square feet.

Total amount of forest to be cleared: _____ square feet.

Total amount of forest to be retained: _____ square feet.

Total amount of NRD on site:_____ square feet.

Linear feet of stream located on site:_____ square feet.

Total amount of forested stream buffer area on site: _____ square feet.

Major Watershed:_____.

If the property does not continue to meet the requirements of the exemption selected above, the Owner must notify the Harford County Department of Planning and Zoning under the penalties of perjury. If the owner makes application for an activity regulated under the Harford County Forest Conservation Ordinance §267-34 - §267-48 or constructs improvements (structures) or site improvements on all or part of the property that are inconsistent with the requirements of the exemption, the Harford County Department of Planning and Zoning may require the Owner to meet the forest conservation requirements established in §267-39 and §267-40 of the Ordinance and may also assess a noncompliance fee of $1.20 per square foot for areas found to be in violation of this exemption.

I (we) declare under the penalties of perjury, that this declaration (including any accompanying forms and statements) has been examined by me (us) and the information contained herein, to the best of my (our) knowledge, information, and belief, is true, correct and complete.

Property Owner(s) Signature(s) _____ Date _____

_____ Date _____

COPIES: white -SUBDIVISION FILE/yellowSUBDIVISION REVIEW/pink- LAND OWNER

See reverse for explanation of the exemptions.

Updated 6/2009

Explanations of Exemptions

1. Forest Harvest Permit.
2. Chesapeake Critical Area Overlay District.
3. Agricultural use.
4. Federal State of Local Forestry or Woodlands Incentive Program.
5. Public utility.
6. Routine maintenance of public utility right-of-way.
7. Single parcel development.

For a detailed explanation of §267-34.B refer to Chapter 2 and for §267-38.C refer to Chapter 5 in the Harford County Forest Conservation Manual.

Updated 6/2009

3.0 # Chapter 3
FOREST STAND DELINEATION

3.1 Introduction

If the proposed activity is not grandfathered or exempt from fulfilling the requirements of the Harford County Forest Conservation Law, then a Forest Stand Delineation for the site shall be prepared and submitted to the Department.

The purpose of the Forest Stand Delineation (FSD) is to assess existing environmental features and the structural condition of the site to be developed. The FSD process involved is created through two steps; determining the level of FSD submittal necessary (simplified or full), the preparation of maps, and conducting an in-field assessment.

The FSD is intended to lay the groundwork for the Forest Conservation Plan by defining retention, reforestation and afforestation areas, thereby determining the most environmentally sound locations for the development footprint. The Forest Conservation Plan will then be submitted along with the preliminary plan, site plan, the grading permit application, or the building permit application.

3.2 Forest Stand Delineation Requirements

A Forest Stand Delineation shall be submitted before a preliminary subdivision plan, a grading permit application, or a building permit application is submitted for the lot or parcel being developed.

The delineation shall be prepared by a licensed forester, licensed landscape architect, or qualified professional approved by the State of Maryland, Department of Natural Resources, or Forest Service.

A Full Forest Stand Delineation shall contain the following elements:

A Forest Survey Map.

An Environmental Features Map.

Plot Sampling Data Forms.

Stand Summary Forms.

Stand Condition Narrative and Synopsis.

Completed FSD checklist.

A Simplified Forest Stand Delineation shall contain the following elements:

A Forest Survey Map (plots not required).

An Environmental Features Map.

A Stand Condition Narrative and Synopsis (may be included as notes on forest survey map).

Completed FSD checklist.

3.3 Forest Stand Delineation Preparation

3.3.01 Guidelines

A Forest Stand Delineation shall be submitted before a concept plan is submitted for the lot or parcel being developed.

For linear projects that involve right-of-way acquisition, or an easement, a modified Forest Stand Delineation procedure shall be utilized by the applicant

Depending on the existing site conditions and the proposed development, one of two levels of FSD will be required, the simplified or full FSD. The Applicant shall use the required FSD submittal level for the project. Once the necessary requirements are determined, the Applicant shall refer to the appropriate manual section and its checklist of requirements for guidance.

Remember that an Applicant may always choose to meet the requirements of a more detailed submittal. This is particularly encouraged if the Development Plan may change, triggering a more detailed submittal further into the review process.

3.3.02 Map Preparation

The first step in developing an FSD involves the preparation of two maps: the Environmental Features Map and portions of the Forest Survey Map. Both maps incorporate a base that includes property boundaries, topographic contours, and, if present, streams and wetlands.

The Environmental Features Map consists of soils, steep slopes and buffers, and should be completed in-house prior to the field assessment. The Forest Survey Map involves the mapping of special habitats and historic areas in-house, and collecting tree and forest structure data during the field assessment. Additional information including map notation and map symbology is needed to make these maps useful tools for field work and to aid in reviewing the FSD.

The information from the Environmental Features Map and the Forest Survey Map may be combined, provided that the resulting map is clear and readable to Departmental staff.

A 50' or 100' scale will be used for these maps, though a different scale may be used with the consent of the Department. The scale selected shall be maintained throughout the development review process.

3.3.03 Environmental Features Map

The Environmental Features Map contains information including steep slopes, hydric soils, adjacent land uses, and buffers for non-tidal wetlands, 100-year floodplain and the Natural Resource District. This map will be used as a reference tool for the Forest Survey Map. An example Environmental Features Map is shown in Figure 3.3.1.

The following items shall be displayed on the Environmental Features Map.

Proposed subdivision name - This should include any pertinent phasing or sectional information regarding this subdivision.

Name and address of the individual or firm preparing the FSD.

The seal and signature of a licensed forester or licensed landscape architect, if applicable.

Tax map, parcel number and deed reference number.

Date of the drawing.

Zoning.

North arrow.

Acreage of the lot or parcel.

Site vicinity map - This map should show the location of the lot or parcel and the adjacent surroundings, including major roads, at an appropriate scale.

Owner's name and zoning designation of the adjacent properties.

Property boundaries.

Topographic contours at intervals not greater than five feet - This information is available for limited areas in Harford County at a scale of 1" = 200' from the Department, however, the use of field run topography is strongly encouraged.

Soils - The following soils shall be highlighted on the map: hydric and potentially hydric soils, highly erodible soils, and prime agricultural soils (Appendix A). Also, soils with any structural limitations shall be highlighted. A table shall be placed on the map which lists the highlighted soils and the applicable constraints.

The following items and priority retention areas shall be displayed on the Environmental Features Map if they are applicable to the site.

Board of Appeals case number(s).

Location of existing buildings - This can be determined from 1" = 200' air photography available from the Department of Planning and Zoning or field surveys.

Existing easements or rights of way.

Perennial and intermittent streams - All streams shall be verified through field reconnaissance. Any associated floodplain or Natural Resource District areas shall also be included.

Nontidal wetlands - Floodplain and Natural Resource District (§267-63.D.) areas shall be included. Acreage of these areas shall be provided as well.

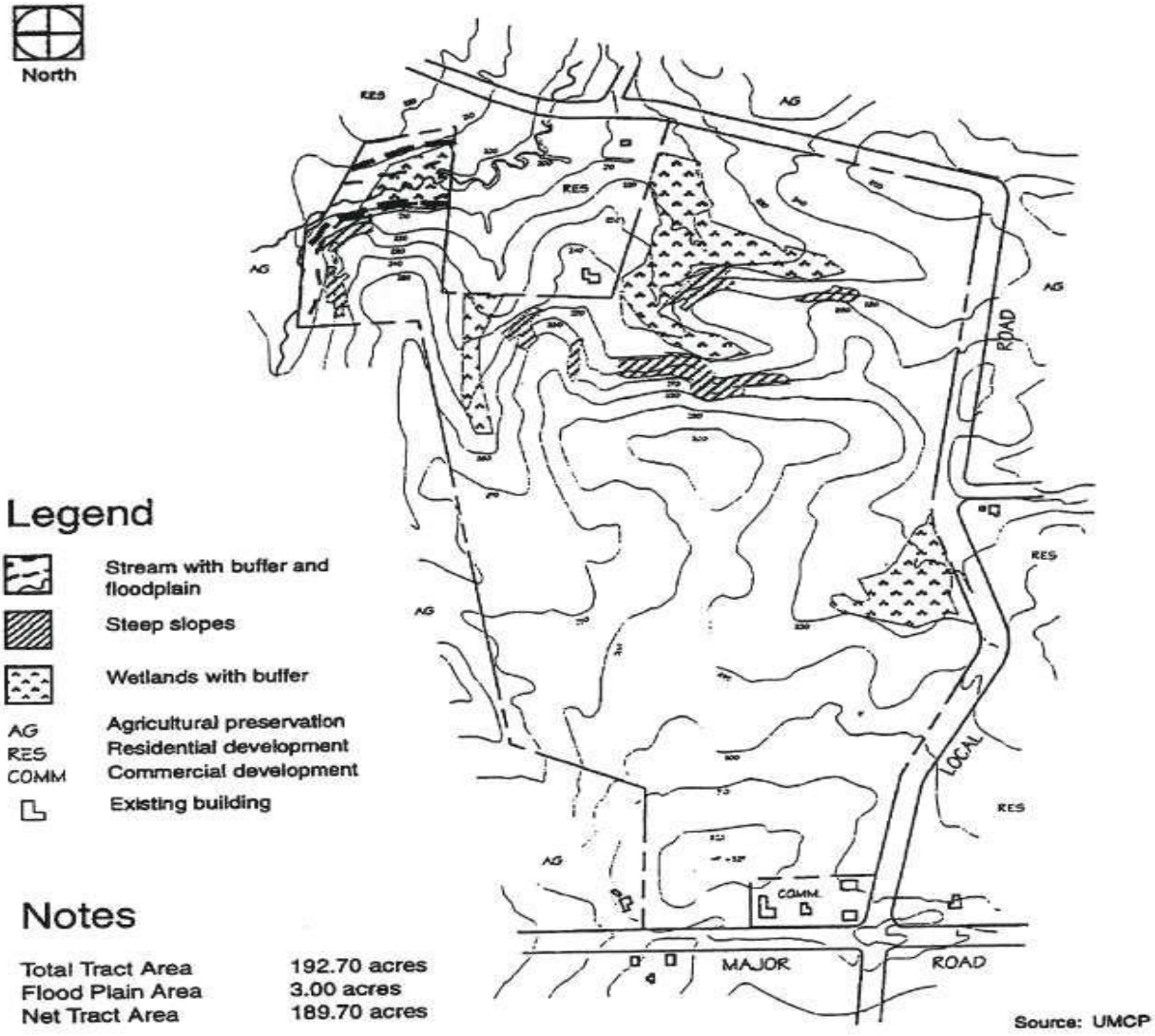
Slopes greater than 15% and less than 25% - This information shall be determined based on topographic contours and shaded on the map. Acreage of these areas shall also be provided. Natural Resource District areas shall also be included. Acreage of these areas shall also

be provided.

Slopes greater than 25% - This information shall be determined based on topographic contours and cross hatched on the map. Any associated Natural Resource District areas shall be included. Acreage of these areas shall also be provided.

Limits of the Harford County Chesapeake Bay Critical Area Overlay District. Any associated natural features and/or required buffers shall also be included. Acreage of these areas shall also be provided.

Figure 3.3.1 Sample Environmental Features Map



Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

3.3.04 Forest Survey Map

The Forest Survey Map shows the delineation of forest stand structure and trees on the site. It contains information concerning the existing forest obtained from the field assessment. An example Forest Survey Map is shown in Figure 3.3.2.

Some items such as tree lines, historic buildings and significant plant and wildlife habitat areas must be delineated in-house before the field assessment is conducted. For Full Forest Stand Delineations, sample plot locations shall also be delineated on the Forest Survey Map during map preparation for use during the field assessment.

The following items shall be displayed on the Forest Survey Map.

The name and address of the individual or firm preparing the FSD.

The seal and signature of a licensed forester or licensed landscape architect, if applicable.

Date of the drawing.

Property boundaries.

North arrow.

Net Tract Area - This area shall be determined based on the definition of "Net Tract Area" within §267-4 Definitions of the Development Regulations .

The following items shall be included on the Forest Survey Map if they are displayed on the Environmental Features Map.

Perennial and intermittent streams.

Nontidal wetlands.

Limits of the Harford County Chesapeake Bay Critical Area Overlay District - Any required buffers shall also be included.

The following items and priority retention areas shall be displayed on the Forest Survey Map if they are applicable to the site.

Forested and unforested areas - A circumferential tree line shall be

delineated around all tree stands of similar type or species characteristics. This line, at a minimum, shall be based on the perimeter of the drip line of individual trees although the use of critical root zone (CRZ) to identify the tree, stand, or edge is strongly encouraged by the Department. By using CRZ as a realistic limit of disturbance, tree roots can be avoided and the number of trees that can be lost through root damage will be reduced. For isolated specimen trees, 1" diameter breast height (DBH) = 1.5' radius of the CRZ. For the edges of large areas, use 1" DBH = 1' radius of the CRZ, or an 8' radius around the tree trunk, whichever is greater. Forested areas should be distinguished from non-forested areas. Forested areas are defined in the Law as, "a biological community dominated by trees and other woody plants covering a land area of 10,000 or more square feet." `Forest' additionally includes, "an area having at least 100 trees per acre, if at least 50% of the trees have a DBH of 2 inches or more, and forest that has been cut but not cleared," however, `forest' "does not include orchards." Other features such as old fields, specimen trees, and hedgerows shall also be identified.

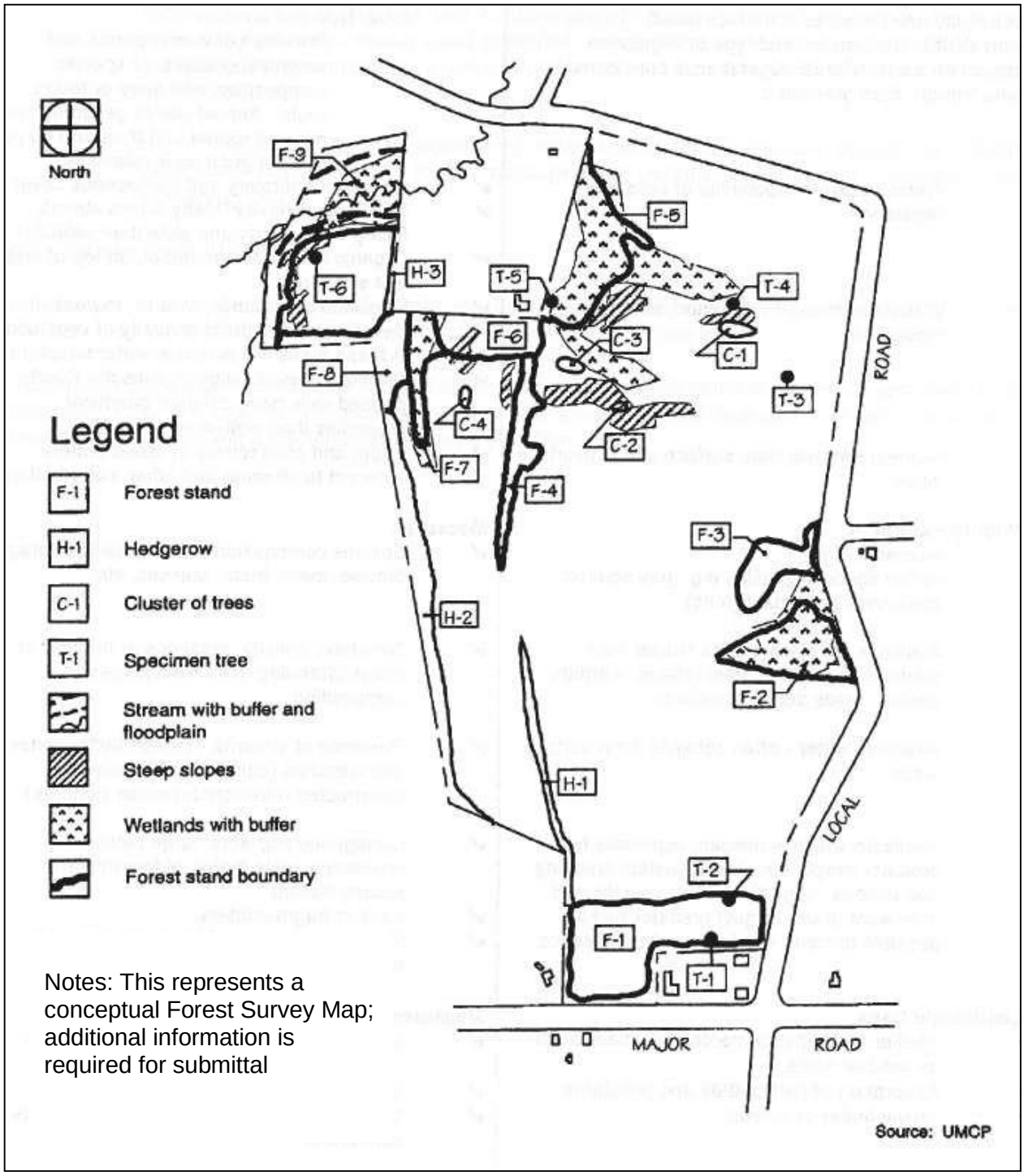
Historic sites - Historic sites identified on-site shall be delineated on the map. Information regarding forested areas, trees, shrubs, plants and gardens shall be provided in the narrative for an area of 200 yards around the historic structure. Historic sites on adjacent properties shall be noted on the map.

Sample plot locations - These sites shall be represented by points on the map and identified by a number which corresponds to the appropriate plot description in the full FSD narrative.

National, state or local Champion trees, trees with a DBH of 75% of DBH of the current state Champion of that species, and individual trees over 30" diameter at breast height - Tree boundaries shall be delineated on the map using the dripline. Trees shall be identified within a chart on the map by scientific (*Latin*) name. Common tree names may be included also.

Rare, threatened and endangered trees, shrubs, plant and animal species, communities and habitat areas - A dot map (Figure 3.3.5) shows the general location of these areas in Harford County. If the location of the FSD appears to be in proximity to one of the dots on the map, please contact the Harford County Department of Planning and Zoning. The boundaries of these areas shall be delineated and labeled on the Forest Survey Map.

Figure 3.3.2 Sample Forest Survey Map



Source: Adopted from Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Trees designated as national, state or county champions and/or trees which have a DBH of 75% of a designated champion - Tree locations shall be highlighted and labeled as a champion or 75% of a champion. The scientific and common name of the tree shall also be noted on the Forest Survey Map. Lists of State and County champion trees can be referenced and/or purchased at the front counter of the Department of Planning and Zoning.

Forest stands extending off-site - Tree lines shall be delineated a minimum of 100' off-site to show the general size and area of these stands.

3.3.05 Field Assessment

The purpose of the field assessment is to supplement and verify the data compiled on the Forest Survey Map and Environmental Features Map, noting any discrepancies. Depending on the type of FSD required, the field assessment shall include the following: plot sampling within forest stands, an inventory of forested stand characteristics and a survey of individual specimen trees.

Plot sampling is not required in Natural Resource District (NRD) areas, or in forested floodplain areas that are not to be disturbed. Where these areas will be disturbed, NRD and forested 100-year floodplain areas need only be field-assessed for specimen trees and forest structure. A 50' expanse on either side of the area to be disturbed shall be included in the field assessment.

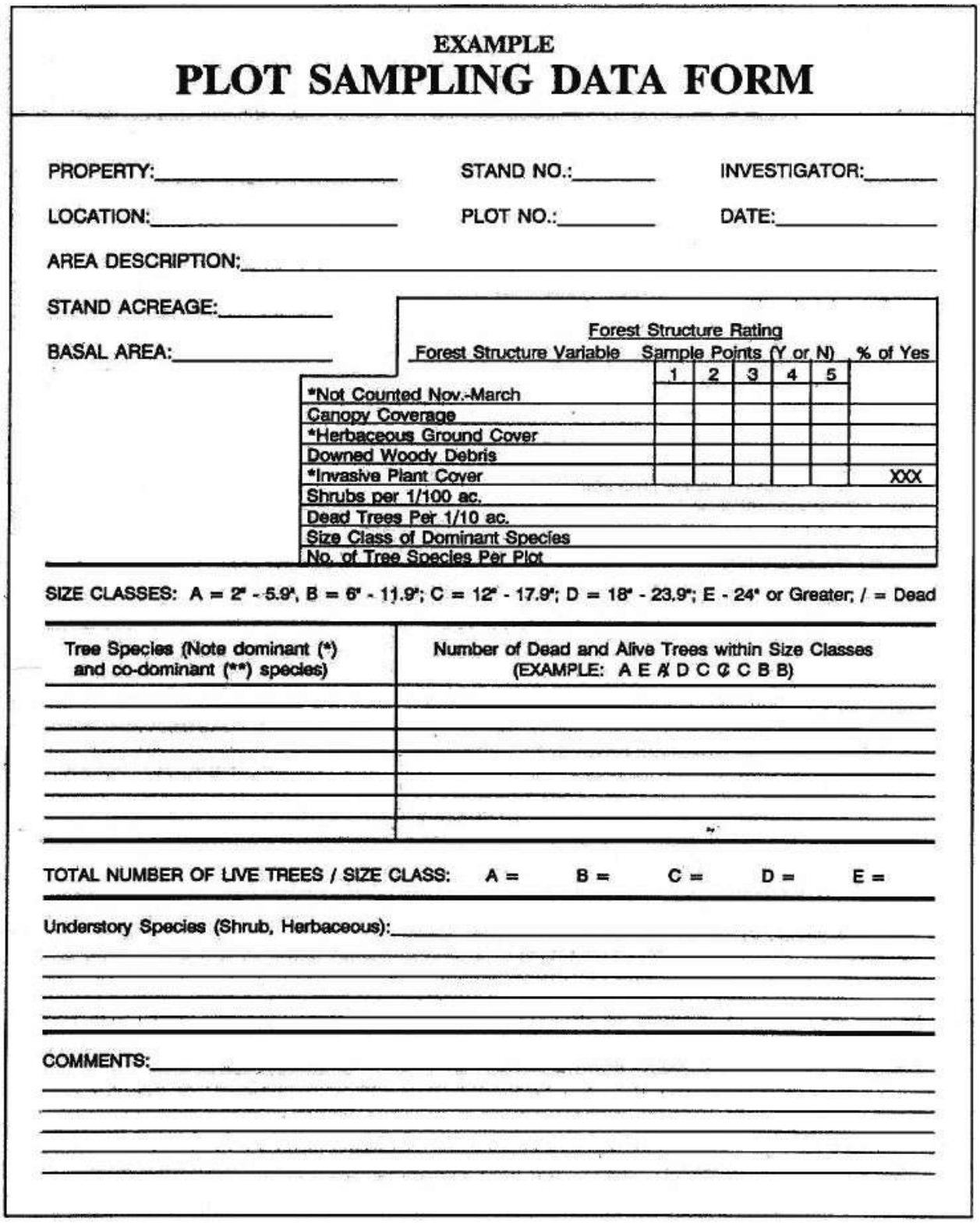
3.3.06 Specimen Tree Survey:

As each plot is sampled, the forest stand can be inventoried for individual specimen trees. The specimen tree survey shall identify each individual specimen tree species, by scientific name, on the Forest Survey Map, delineate the location of each specimen as a point on the Forest Survey Map. Identified specimen trees that will ultimately be proximate to a limit of disturbance line shall be field assessed to determine the CRZ of the specimen tree. To identify specimen tree locations, utilize landmarks such as plot centers, large rocks, streams, or nearby roads. Measure and note distance and azimuth from the landmark. If a stand includes a number of specimen trees and is worthy of retention, circle the tree group on the Forest Survey Map and discuss it in the narrative and synopsis.

The Harford County Forest Conservation Law requires that trees, shrubs, and plants determined to be rare, threatened, or endangered under the Federal Endangered Species Act of 1973, the Maryland Nongame and Endangered Species Conservation Act ,supported by COMAR 08.03.08 are considered priority for retention and protection and shall be left in an undisturbed condition unless the applicant has demonstrated, to the satisfaction of the Department that, reasonable efforts have been made to protect them and the plan cannot be reasonably altered. Note locations of trees, shrubs or plants observed that are identified as Federal or State rare, threatened or endangered species on the Forest Survey Map and the Plot Sampling Data Form. Throughout the sampling process, keep additional records of species observed and report these to the Department of Planning and Zoning and the Department of Natural Resources. A map of general locations of significant plant and wildlife habitats in the County is provided in Figure 3.3.5. If the proposed activity falls within one mile of a black dot on Figure 3.3.5, contact the Department of Planning and Zoning for further information and verification. Also note specimen trees on a historic site or near a historic structure.

After all sample sites have been assessed and inventories completed, create a final version of the Forest Survey Map, noting any discrepancies found in the field. All data sheets must be submitted along with the Forest Survey Map.

Figure 3.3.3 Example Plot Sampling Data Form



EXAMPLE

PLOT SAMPLING DATA FORM

PROPERTY:_____ STAND NO.:_____ INVESTIGATOR:_____

LOCATION:_____ PLOT NO.:_____ DATE:_____

AREA DESCRIPTION:_____

STAND ACREAGE:_____

BASAL AREA:_____

Forest Structure Rating						
Forest Structure Variable	Sample Points (Y or N)					% of Yes
	1	2	3	4	5	
*Not Counted Nov.-March						
Canopy Coverage						
*Herbaceous Ground Cover						
Downed Woody Debris						
*Invasive Plant Cover						XXX
Shrubs per 1/100 ac.						
Dead Trees Per 1/10 ac.						
Size Class of Dominant Species						
No. of Tree Species Per Plot						

SIZE CLASSES: A = 2" - 5.9", B = 6" - 11.9"; C = 12" - 17.9"; D = 18" - 23.9"; E - 24" or Greater; / = Dead

Tree Species (Note dominant (*) and co-dominant (**) species)	Number of Dead and Alive Trees within Size Classes (EXAMPLE: A E A/ D C C/ C B B)

TOTAL NUMBER OF LIVE TREES / SIZE CLASS: A = B = C = D = E =

Understory Species (Shrub, Herbaceous):_____

COMMENTS:_____

Figure 3.3.4 Example Stand Summary Form

STAND SUMMARY FORM

PROPERTY:_____ Date:_____

Prepared By:_____

STAND SUMMARY (2 Stands per Form)

Stand Variable	Stand No.: Acreage:	Stand No.: Acreage:
Dominant forest association: (SAF forest cover type)		
Size class of dominant trees:		
Number of trees/acre: (# trees in all plots x 10)		
Number of tree species in stand:		
Avg. Basal Area/Acre: (Total # countable trees in all plots/#plots x 10		
Number of dead trees/acre:		
Common understory species:		
Number of shrub species:		

Forest Stand Structure Rating	Stand %	Points	Stand %	Points
Avg. No. shrubs 1/100 acre plot:				
% canopy coverage:				
% herbaceous ground cover:				
% downed woody material:				
% exotic or invasive species:				
Forest Stand Structure Value:				

Total Forested Acreage on Site:_____

COMMENTS:

3.3.07 Narrative Statement of Sample Plots and Stands

The narrative is intended to be a professional evaluation of findings on the site (see Figure 3.3.6 for example). Develop a narrative which provides greater insight into priority forest stands for retention and stand management. Information noted in the analysis will be useful for designers and engineers when developing their plans. This evaluation will be used when completing a Forest Conservation Plan.

Begin by summarizing each stand"s characteristics and prioritizing the stands. Discuss the structural arrangement of the stands and condition of the forest community within each stand, including plant and animal species composition and diversity. The Forest Stand Summary Sheets contain pertinent information for stand discussions. Also, discuss stand potential to withstand local disturbance and potential for transplanting. Materials describing proper reforestation and transplant methods can be referenced and/or purchased at the front counter in the Department of Planning and Zoning.

Compare and contrast the Forest Stands and rank them by priority for retention. Base the rankings on Stand Composition, Stand Structure, Stand Condition and Stand Function. Priority rankings are as follows:

1. Stands which contain priority retention areas are ranked first as priority 1 stands.

2. Stands which contain priority areas as identified by the Harford County Land Use Plan or the Harford County Forest Cover, Conservation and Replacement Manual are ranked as priority 2 stands.

3. Any other stands will be ranked as priority 3. Each priority 3 stand will be compared and ranked by order of its functional value for water quality protection, wildlife habitat and at least one other objective, such as timber management, aesthetics, recreation or others as appropriate to the development proposal.

Figure 3.3.5 General Locations of Significant Plant and Wildlife Habitats in Harford County

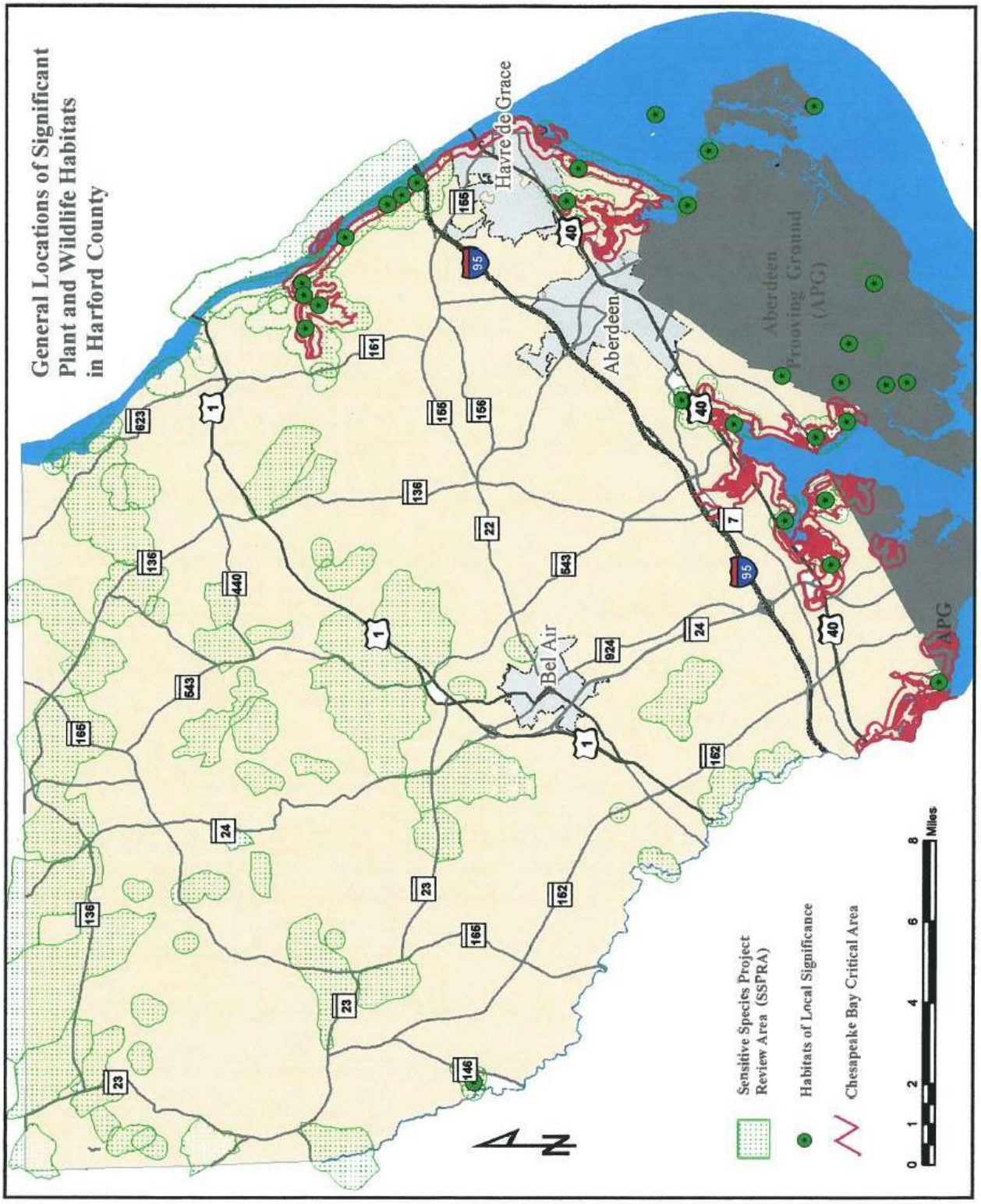


Figure 3.3.6 Example Stand Condition Narrative

Stand Condition Narrative (EXAMPLE)

(Site Name) (Date)

The vegetation on-site was characterized by species composition and divided into stands. Fifteen forest stands were identified on-site. A 1/10 acre fixed plot sampling technique was used to sample forest stand conditions at 28 points on-site (see Plot Sampling Data sheets). One sample plot per stand was sampled for forest structure (see Stand Summary/Forest Structure Rating sheets). Sample point locations were chosen randomly.

Overall, the health of the forest stands was found to be good. With the exception of one stand which had been recently harvested for firewood, little evidence of management was found throughout the site. No rare, threatened or endangered species were observed. A federal historic site, the Brownfield homestead, lies immediately due west of the east property boundary. No significant disease or exotic (gypsy moth) invasion was observed.

Stand #1:

Stand Condition:

Stand #1 is dominated by Tulip poplar (size class 6-10") with Virginia pine being co-dominant. No specimen trees were found during the field survey. Holly is the dominant understory species. The herbaceous growth is dominated by poison ivy and the dominant exotic species, Belle honeysuckle, occurs in the northern part of the stand in breaks between the Virginia pine.

Forest structure for the stand is low (13) due to the frequent breaks in canopy and the low size class of dominant trees. There is evidence of recent firewood harvesting of oak. Numerous Tulip poplars suffered trunk injuries due to poor harvesting techniques. Regenerative potential of the site is high due to the thick coverage of free-to-grow oak seedlings. The condition of the stand does not support retention.

Environmental Features:

The southwest section of the stand contains moderately steep slopes (17% slope) along an unnamed creek which crosses the southwest corner of the parcel. The stream and slopes are part of the NRD. No hydric soils occur outside the NRD. Adjacent land uses are secondary roads and large lot residential areas.

...
...
...

Stand #15: ...

Synopsis ... (overview of site features and existing forest stand conditions)

Figure 3.3.7 Exotic or Invasive Plants

EXOTIC OR INVASIVE PLANTS

These species may displace native vegetation and disrupt forest ecosystems

Common Name	Scientific Name
Herbaceous Plants	
Garlic Mustard[1]	*Alliara officinalis*[1]
a grass	*Arthraxon hispidus*
Musk (nodding) thistle	*Carduus nutans*
Sericea Lespedeza[2]	*Lespedeza cuneata*[2]
a grass[1]	*Microstegium vimineum*[1] *(Eulalia viminea)*
Common Reed[1]	*Phragmites australis*[1] *(P.communis)*
Japanese Knotweed[1]	*Polygonum cuspidatum1*
Mile-a-minute Vine, Devil's Tearthumb[1]	*Polygonum perfoliatum1*
Crown vetch[2]	*Coronilla varia*[2]
Tall Fescue, K31 Fescue[2]	*Festuca elatior (F.arundinacea)*[2]
Lesser Celandine[1]	*Ranunculus ficaria*[1]
Vines	
Porcelain Berry[1]	*Ampelopsis brevipedunculata*[1]
Oriental Bittersweet[1]	*Celastrus orbiculatus*[1]
Cinnamon Vine[1]	*Dioscorea batatas*[1]
Climbing Eyonymus, Wintercreeper	*Euonymus fortune*
English Ivy[2]	*Hedera helix*[2]
Japanese Honeysuckle[1]	*Lonicera japonica*[1]
Kudzu[2]	*Pueraria lobata*[2]
Periwindle	*Vinca minor*
Wisteria[2]	*Wisteria floribunda, W. sinensis*[2]
Shrubs	
Japanese Barberry	*Berberis thunberaii*
Russian Olive	*Eleagnus angustifolium*
Autumn Olive	*Eleagnum umbellate*
Winged Euonymun, Winged Wahoo[1]	*Euonymus alatus*[1]
Privet	*Ligustrum* spp.
Brush Honeysuckles[1], including	*Lonicera* spp.[1]
Belle Honeysuckle	*Lonicera x bella*
Armur Honeysuckle	*Lonicera maackii*
Morrow's Honeysuckle	*Lonicera morrowii*
Tartarian Honeysuckle	*Lonicera tatarica*
Bamboo – running varieties[2]	*Phyllostachys* spp., *Pseudosasa japonica*[2]
Common Buckthorn	*Rhamnus Cathartica*
European Buckthorn	*Rhamnus frangula*
Multiflora Rose[1]	*Rosa multiflora*[1]
Strawberry-raspberry, Balloonberry	*Rubus illecebrosus*
Wineberry	*Rubus phoenicolasius*
Japanese Spiraea[1]	*Spiraea japonica*[1]
Coralberry	*Symphoricarpos orbiculatus*
Trees	
Norway Maple[1]	*Acer platanoides*[1]
Tree of Heaven	*Allanthus altissima*
White Mulberry	*Morus alba*
Empress Tree	*Paulownig tomentosa*
Sweet Cherry, bird Cherry	*Prunus avium*

[1] The most serious threats to natural forests because they are both damaging and strongly invasive
[2] Not as readily established, but once established, very persistent and damaging.

Ranking by Maryland Natural Heritage Program, 21 July 1994

Develop an analytical narrative which provides an overview of site features and existing forest stand conditions by bringing together the information developed above. This analysis will, from an environmental perspective, identify areas which are more suitable for protection, retention and reforestation and areas which are more suitable for development.

The narrative shall begin by describing the overall site conditions and discussing the different habitat components. Describe the sampling method used, forest association or species composition and condition, any past or present management, presence or absence of rare, threatened and endangered species, historic sites, critical habitats, disease, insects, or exotic plant invasion on the site. Support the evaluation by recommending forest stands for retention and management or areas for reforestation.

Following the description of the overall site, address each individual stand, describing stand composition, structure, condition, and function. For each stand surveyed, consider the following in terms of dominant and co-dominant species, common understory and herbaceous species and specimen trees:

- Is the stand (and its successional stages) healthy and regenerating? What are the observed disease or pest infestation problems which may be exacerbated by development stress or disturbance?

- Consider whether the current structure (Density, canopy closure, multiple forest layers) and species present on-site will withstand development stresses, and how this may affect certain habitat types and stand functions.

- Note whether species composition will be altered by stand disturbances. Also, determine whether the presence of invasive and/or exotic species within the stand affect potential reforestation or afforestation areas.

- Discuss any management and control methods that should be implemented to mitigate these potential problems.

Assessing stand functions also includes maintaining or enhancing existing water quality protection benefits and existing water quality protection benefits and existing habitats. In the narrative analysis,

address the following.

- Location of the stand in relation to sensitive areas on the site;
- Does it serve a buffering function to surface runoff or groundwater flow?
- How is the stand configured to serve this function and to accomplish these benefits?
- How does the successional status of the stand affect nutrient uptake or loss?
- What species currently use this stand as habitat?
- Where in the stand are these habitats located?
- What are their size and configuration?
- Is the stand a corridor or a patch, and how is the stand currently functioning? State whether a small increase in size or infill afforestation would be beneficial to the habitat.

Include any additional information on the following: specimen trees, significant vegetative inclusions within the stand that are part of contiguous forested areas or wildlife corridors, wildlife cover or habitat, habitat areas of local significance, prevalence of exotic or invasive shrubs and plants (listed in Figure 3.3.7), historic sites, adjacent land uses, and comments on evidence of past management.

3.3.08 **Forest Stand Delineation**

Full FSD

A Full FSD may be submitted when the Applicant knows that priority forests will be cleared, that forests will be cleared below the afforestation threshold, and that forests will be cleared below the break-even point (as shown on the Forest Conservation Worksheet, Figure 4.3.1).

Once the Environmental Features Map and the Forest Survey Map have been completed, Full FSD requirements for plot sampling and the field assessment can be carried out.

Mapping Sample Plot Locations

Before formally sighting the sample plot locations it is wise to first make a cursory evaluation of the forest stands and calculate the number of trees per acre (number of trees in all of the plots within the stand multiplied by 10) to determine whether the stand is a "forest" regulated by the Development Regulations (as defined in §267-4. Definitions).

Sample plot locations shall be drawn as points on the Forest Survey Map during map preparation and inventoried during the field assessment. The Law requires that the following specimen trees be considered priority for retention and protection. These trees shall be located and drawn on the Forest Survey Map:

Trees having a DBH of 30 inches or greater.

Trees designated as national, state or county champions.

Trees having 75% of the DBH of the current state champion tree of that species.

Lists of State champion trees, State champion trees in Harford County, and County champion trees can be referenced and/or purchased at the front counter in the Department of Planning and Zoning.

Sample plots will be inventoried to determine tree species and forest characteristics. To determine the number of sample plots required, the site acreage must be divided into forest stands. To determine forest stands, divide the Forest Survey Map based on the following: forest stands [characterized by wooded and nonwooded areas (i.e., tree lines)], species, soils, elevation changes, upland versus bottomland areas, north and south facing aspects, and knowledge of Harford County forest patterns. After the forest stands for the site have been identified and delineated, determine the acreage for each stand.

Once the forest stands have been identified and stand acreage has been calculated, determine the number of plots per stand. The number of sample plots shall adequately characterize the forest stands. In circumstances where the plot sampling has produced questionable results, the Department may require that a site be re-sampled establishing a confidence interval of 67%.

The following example uses a plot sampling method using randomly located 1/10 acre plots. This formula is precise enough to meet a confidence level of 67%, ensuring statistically that a certain minimum number of plots calculated per stand and forested area will support an accurate description of the forested area:

- One plot/4 acres forest stand area;
- Two plots minimum per stand; and
- Three plots minimum for the total forest area of the site.

Plot Distribution

Once the number of sample plots has been determined, ensure that the plot locations represent the topographic features of each community type within the stand, and that all communities are assessed by positioning the sample plots randomly throughout the forest stands. Locate, draw and number the plots as points on the Forest Survey Map. Number the points sequentially starting at or near an accessible location indicated on the map.

Plot Sampling

During the field assessment, establish the plot locations in a manner representative of stand structure and the forested environment. Stake and flag the plot centers and verify plot locations on the Forest Survey Map. Mark the plot center with a minimum two foot stake or rod flagged at the top with bright flagging. The stand number and plot number or letter shall be indicated on the flagging in waterproof ink. Tie a minimum of four flags, preferably biodegradable or photodegradable, around the plot perimeter indicating the plot limits. Indicate on the map the color of the flags used to locate sample plots.

Sampling shall be conducted through the fixed-plot method, which is preferred by the Department; however, other methods may be approved by the Department. The fixed-plot method involves establishing sample plots of a one-tenth (1/10) acre circle with a 37.2' radius. A ten-factor prism may be used with a prism pole to measure the radius from the plot center.

Under most conditions, basal area is optional, however, determining basal area is recommended by the State of Maryland, Department of Natural Resources, and the Department may require basal area

information:

If a forest management plan for the site will be requested within the next 5 years; or

If basal area information will provide additional clarity in determining forest stand priority.

If required, basal area shall be determined by utilizing one of the following methodologies:

The variable plot method utilizing a ten-factor prism or angle gauge.

The fixed plot method. Measure the DBH of all trees in the plot and tally this information on the plot sampling data form. Determine basal area per tree from the Basal Area Table located in Appendix B. Add the basal areas to determine the sum total basal area in square feet for the plot. Multiply by 10 to determine basal area per acre.

Shrubs shall be sampled by listing all of the shrub species, and counting the number of shrubs within a minimum one-hundredth (1/100) acre plot. A one-hundredth acre plot equals an 11.8' radius within the 1/10 acre plot.

Collect data within each sample plot along the defined sampling route. Within each sample plot, record measurements on a Plot Sampling Data Form (Figure 3.3.3). Complete one Plot Sampling Data Form per plot within a stand. The forest structure rating section of the Plot Sampling Data Form will provide information for prioritizing stands within the site. The technique for rating forest structure is explained in Appendix C. When all plots have been sampled within a stand, complete one Stand Summary Form (Figure 3.3.4) per stand. The Stand Summary Form is a compilation of all plot data on a per- acre basis for that stand.

Simplified Forest Stand Delineation

A Simplified FSD may be submitted when the Applicant knows that the forest retention amount will be equal to or greater than the break-even point (as shown on the Forest Conservation Worksheet) and will be placed under a long-term protective agreement. The preliminary Forest Conservation Plan (Chapter 4) may be submitted at the same time as the Simplified FSD.

A Simplified FSD may also be submitted when the site has existing forest but: 1) Forest will not be impacted by clearing or grading and 2) Forests will be fully protected by a long-term protective agreement; or when an application for subdivision, grading, or sediment control permits is submitted for areas equal to or greater than 40,000 square feet where no forest exists.

If the amount of retained forest turns out to be less than the break-even point, a full FSD will subsequently be required, possibly delaying the development review process. A statement that clearing will not occur below the break-even point must appear on the Forest Survey Map and in the narrative. Include calculations that demonstrate that the development proposal meets the conditions of Forest Retention and protection in the amount greater than or equal to the break-even amount.

If changes are made to the plans at a later date that cause the amount of retained forest to fall below the break-even point, or if errors are discovered in the worksheet calculations, submittal of a full FSD will be required.

Submittal of the Simplified FSD shall include: an Environmental Features Map, a Forest Survey Map and a Stand Condition Narrative with a checklist. A specimen tree survey (Section 3.3.07) shall be conducted and mapped on the Forest Survey Map. The forest survey shall be conducted by a qualified professional. Disregard any reference to plots while completing a Simplified FSD. No delineation of plots or rating of forest structure is necessary.

The narrative may be included as notes on the Forest Survey Map. Section 3.3.07 describes the contents of the narrative statement. Overall, the Simplified FSD statement shall include:

- The preliminary worksheet calculations indicating forest conservation thresholds and required retention amounts;
- Summary of walk-through forest survey;
- Summary of the simplified narrative analysis.

The FSD checklist (Figure 3.4.1) shall be submitted with the following modifications for a Simplified FSD:

- Areas proposed for long term protection;

- Locations of sample plot sites are not required;
- Plot sampling data forms are not required.

3.4 Forest Stand Delineation Submittal

3.4.01 Submittal Guidelines

Once the FSD is complete (including finalized maps, data sheets, and narrative/synopsis), submit the package to the Development Review Section of the Department of Planning and Zoning with a completed FSD checklist (Figure 3.4.1).

Figure 3.4.1

Harford County Department of Planning and Zoning
Development Review

FOREST STAND DELINEATION PLAN APPLICATION

SITE DESCRIPTION
Project/Subdivision Name: _____ **Plan Alias:** _____

(Tax Map No.) (Grid No.) (Parcel No.) (Lot No.) (Plat #) (Zoning District) (Election District)

(Street Address and/or Road Name) (Residential/Commercial/Industrial) (No. of Acres)

APPLICANT/CONSULTANT INFORMATION

OWNER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

DEVELOPER/CONTRACT PURCHASER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

SURVEYOR/ENGINEER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

PLAN APPLICATION REQUIREMENTS

Submission of application will require completion of all the following items at the time of the initial submittal to ensure acceptance of the plan for processing. Plan submission applications found to be incomplete will be rejected.

LEGEND

P Provided NA Not Applicable
X Not Provided, Justification Attached.

Submittal Requirements

_____ Forest Stand Delineation (FSD) Plans (3 copies)
_____ Appropriate Fees

Checklist

Environmental Features Map

_____Proposed subdivision name including any pertinent phasing or sectional information.
_____Owner name and address/contract purchaser.
_____Seal and signature of licensed forester, landscape architect, or approved professional.
_____Tax map, parcel number and deed reference.
_____Date of drawing.
_____Zoning.
_____North Arrow.
_____50' or 100' scale or as approved by Planning and Zoning. The scale selected must be consistent with all other plans submitted to Harford County during the development review process.
_____Site vicinity map.
_____Owner's name and zoning designation of the adjacent properties.
_____Property boundaries.
_____Topographic contours at intervals not greater than 5 feet.
_____All soils present on-site with any hydric soils, highly erodible soils, prime agricultural soils, and soils with structural limitation highlighted.
_____Location of existing buildings.
_____Board of Appeals Case Number (s).
_____Existing easements or rights-of-way.
_____Perennial and intermittent streams and any associated NRD or floodplain area. Acreage of the NRD or floodplain areas should be provided.
_____Non-tidal wetlands and any associated floodplain areas and/or NRD. Acreage of these areas should be provided.
_____Slopes greater than 15% and less than 25% shaded and any associated NRD areas identified. Acreage of the NRD areas should be provided.
_____Slopes greater than 25% cross-hatches and any associated NRD areas identified. Acreage of the NRD areas should be provided.
_____Limits of the Harford County Chesapeake Bay Critical Area Overlay District and any associated natural features and/or required buffers.

Forest Survey Map

_____Name and address of the individual or firm preparing the FSD
_____Seal and signature of licensed forester, landscape architect, or approved professional
_____Date of drawing.
_____Property boundaries.
_____North arrow.
_____Net tract area in acres.
_____Perennial and intermittent streams.
_____Non-tidal wetlands and any associated floodplain areas.
_____Limits of the Harford County Chesapeake Bay Critical Area Overlay District including any required buffers.
_____ Forested and unforested areas.
_____Historic sites.
_____Locations of the sample plot sites. These locations should be represented on the map by dots. Each dot shall also be numbered.
_____Individual trees over 24" diameter at breast height (DBH). These trees should be labeled on the map and identified by scientific (Latin) name and common name.
_____Rare, threatened and endangered trees, shrubs, plant and animal species, communities and Habitat areas; critical habitats. These areas should be labeled on the map and identified by scientific (Latin) name and common name.
_____Trees designated as national, state or county champions and/or trees which have a DBH of 75% of a designated champion. These trees should be labeled on the map and identified by scientific (Latin) name and common name.
_____Forest stands extending off-site. Tree lines should be delineated a minimum of 100' off site to show the general size and area of these stands.

Plot Sampling Data Form

_____The Plot Sampling Data Form is a prefabricated form to be used in the field. The data on form should represent the features surveyed within each numbered sample plot.

Stand Summary Form

_____This form should also be prefabricated. The purpose of the Stand Summary Sheet is to develop a more homogenous characterization of each forest stand based on the data gathered from the sample plots.

Narrative Statement of Stand Condition

_____The Narrative should be a written report which verbally explains the significant Environmental aspects of each forest stand as outlined in the Harford County Forest Stand Delineation Guidelines. There should be a narrative statement for each forest forested areas on-site as outlined in the Stand on-site. The Narrative includes a synopsis which is a verbal analysis of the Harford County Forest Stand Delineation Guidelines. It should also give an overview of the areas that may be retained, afforested or reforested.

Should you have any questions, please contact the Development Review Section of the Department of Planning and Zoning at 410-638-3103 ext. 1380.

Updated 1/2009

4.0

Chapter 4
FOREST CONSERVATION PLAN

4.1 Introduction

Once the FSD for a site is approved, a Forest Conservation Plan (FCP) shall be submitted to the Department concurrently with the concept plan or preliminary plan, site plan, grading plan, or building permit application.

The purpose of the FCP is to delineate and describe areas where forest retention, afforestation, or reforestation are planned to accommodate the design of the proposed development and meet the requirements of the Development Regulations. The framework of this Chapter is designed to guide an applicant through the process of completing a FCP based on the information gathered in the FSD.

4.2 Forest Conservation Plan Preparation

4.2.01 Guidelines

A FCP shall be submitted to the Department if the proposed development meets the requirements for Forest Stand Delineation submittal.

A FCP may be prepared a licensed forester, licensed landscape architect, or qualified professional approved by the State of Maryland, Department of Natural Resources, or Forest Service.

A FCP shall contain the following elements:

The approved FSD for the site; and

A completed FCP checklist (figure 4.2.1)

A Forest Conservation Worksheet and the accompanying calculations; and

A Forest Conservation Site Map; and

A Forest Protection Report; and

A Reforestation Report and an Afforestation Report, if required; and

An Afforestation and Reforestation Planting Report, if required; and

An Individual Tree Landscaping Report, if required; and

An Individual Tree Landscaping Map, if required; and

A construction timetable indicating the phasing of the project and showing the sequence for tree conservation procedures; and

A legally binding, two (2) year Maintenance Agreement and a Maintenance Report that details how designated afforestation, reforestation and individual tree landscaping areas will be maintained to insure protection and satisfactory establishment; The two (2) year Maintenance Agreement will start upon receipt by the Department of Planning and Zoning of a letter stating that the trees have been planted; and

A bond, letter of credit or other security approved by the Department for the estimated cost of afforestation, reforestation and individual tree landscaping; and

Legal Protection Agreement for areas of forest retention, afforestation, reforestation and individual tree landscaping.

Figure 4.2.1

Harford County Department of Planning and Zoning
Development Review

FOREST CONSERVATION PLAN APPLICATION

SITE DESCRIPTION

Project/Subdivision Name: _____ **Plan Alias:** _____

(Tax Map No.) (Grid No.) (Parcel No.) (Lot No.) (Plat #) (Zoning District) (Election District)

(Street Address and/or Road Name) (Residential/Commercial/Industrial) (No. of Acres)

APPLICANT/CONSULTANT INFORMATION

OWNER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

DEVELOPER/CONTRACT PURCHASER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

SURVEYOR/ENGINEER

(Name)

(Address)

(City, State, Zip Code)

(Telephone) (Fax) (E-mail)

(Contact Person)

PLAN APPLICATION REQUIREMENTS

Submission of application will require completion of all the following items at the time of the initial submittal to ensure acceptance of the plan for processing. Plan submission applications found to be incomplete will be rejected.

LEGEND
_P_ Provided _NA_ Not Applicable
_X_ Not Provided, Justification Attached.

Submittal Requirements

_____ Forest Conservation Plan (FCP) - 3 copies
FSD submitted on _____.
_____ Appropriate Fees.

Checklist
Environmental Features Map

_____Proposed subdivision/development name.
_____Owner name and address/contract purchaser.
_____Seal and signature of licensed forester, landscape architect, or approved professional.
_____Tax map, parcel number and deed reference.
_____Date of drawing.
_____Zoning.
_____North Arrow.
_____The scale of the site map must be the same as used on the environmental features map and forest survey map in the FSD.
_____Acreage of the lot or parcel.
_____Site vicinity map.
_____Owner's name and zoning designation of the adjacent properties.
_____Property boundaries.
_____Location of existing buildings.
_____Existing easements or rights-of-way.
_____Perennial and intermittent streams and any associated NRD or floodplain.
_____Non-tidal wetlands and any associated floodplain areas and/or NRD.
_____Limits of the Harford County Chesapeake Bay Critical Area Overlay District including any required buffers.
_____The limits of grading disturbance.
_____Stockpile areas to scale.
_____The protection devices used around the designated forest retention area (labeled and numbered on the map).
_____The mitigation proposed for disturbance within the dripline of a retention area (labeled and numbered on the map).
_____Net tract area in square feet.
_____Total area of forest conservation that is proposed on site and off site in square feet.
_____Field verified edges of the forest retention areas.
_____Forest retention area priority.
_____An Afforestation/Reforestation Report and Planting Plan /Map.
_____An Individual Tree Landscaping Report and Map.
_____A construction timetable indicating the phasing of the project and showing the sequence for tree conservation procedures.

Should you have any questions, please contact the Development Review Section of the Department of Planning and Zoning at 410-638-3103 ext. 1380.

Updated: 12/2008

4.3 The Forest Conservation Worksheet

The forest conservation worksheet (Figure 4.3.1) is designed to use the data gathered in the FSD to determine the afforestation and reforestation requirements for the proposed site. A section of the forest conservation worksheet has been dedicated to computing reforestation credit for the retention of forest above the forest conservation threshold.

4.3.01 Guidelines

The following information is needed to complete the Forest Conservation Worksheet:

Land use category: The FCP and Preliminary Plan shall indicate the land use category for the site according to Table 4.3.1; and

Total area of the site (parcel or lot); and

Any unforested area of the site within the 100-year floodplain; and

Areas remaining in agricultural production: refer to the definition of „Net Tract Area" within §267-4 Definitions of Development Regulations; and

Existing forest cover on-site: determined for the approved FSD; and

On-site area of forest proposed for clearing.

Any portion of the site within a public utility right-of-way as defined in the definition of „Net Tract Area" (§267-4 Definitions of the Development Regulations)

A separate forest conservation worksheet shall be completed for each proposed use (i.e., residential, business, etc.) within the development site.

Table 4.3.1

Harford County
Zoning Categories and Corresponding Forest Conservation Requirements

	County Zoning District	Afforestation Percentage	Forest Conservation Threshold
Low Density Residential	AG, RR	20%	40%
High Density Residential	R1, R2, R3, R4, VR	15%	30%
Natural Resources	*	20%	50%
Business	*	15%	15%
Industrial	*	15%	15%
Institutional	*	15%	30%

* To determine whether the proposed development can be defined under this use for the afforestation, and minimum threshold percentages, reference the definition of this use in the Harford County Forest Conservation Ordinance and the tables in chapter §267-50. (Principal Permitted Uses for Specific Zoning Districts) of the Development Regulations.

In determining the forest conservation requirements for a site it is important to remember that the percentages for Afforestation and the Forest Conservation Threshold are based on the Net Tract Area.

4.4 Forest Conservation Site Map

4.4.01 Guidelines

The Forest Conservation Site Map shall show areas of forest retention, afforestation, and reforestation that are proposed to satisfy the forest conservation requirements of the Development Regulations. The amount of afforestation, reforestation and retention required for the proposed development site should have been determined by completing the Forest Conservation Worksheet.

The scale of the Forest Conservation Site Map, the preliminary plan or concept plan shall be the same as the scale used for the Environmental Features Map and the Forest Survey Map in the FSD. Sheet sizes shall

either be 20 x 24 inches, 24 x 36 inches or 30 x 42 inches.

The Forest Conservation Site Map shall also delineate the exact locations of:

The limits of grading disturbance; and

Stockpile areas to scale; and

The protection devices used around the designated forest retention areas. The type of protection device being implemented shall be labeled and numbered on the Forest Conservation Site Map. This number shall correspond to the detail for each different protection device provided in the Forest Protection Report (Section 4.9); and

The mitigation proposed for disturbance within the dripline of a retention area. The type of mitigation measure being implemented shall be labeled and numbered on the Forest Conservation Site Map. This number shall correspond to the detail for each different mitigation measure provided in the Forest Protection Report (Section 4.9).

The following figures from the Forest Conservation Worksheet shall be displayed in tabular form on the Forest Conservation Site Map in units of square feet.

The net tract area; and

The total area of forest conservation required; and

The total area of forest conservation that the applicant proposes to provide, including both on-site and off-site areas.

Disturbance areas (acres) both total and sensitive areas. Sensitive areas are defined as environmental areas including significant or special natural features or significant wildlife habitats (§267-62.D(3)); water source protection areas (§267-66); and floodplain areas (Article VII 131-9)

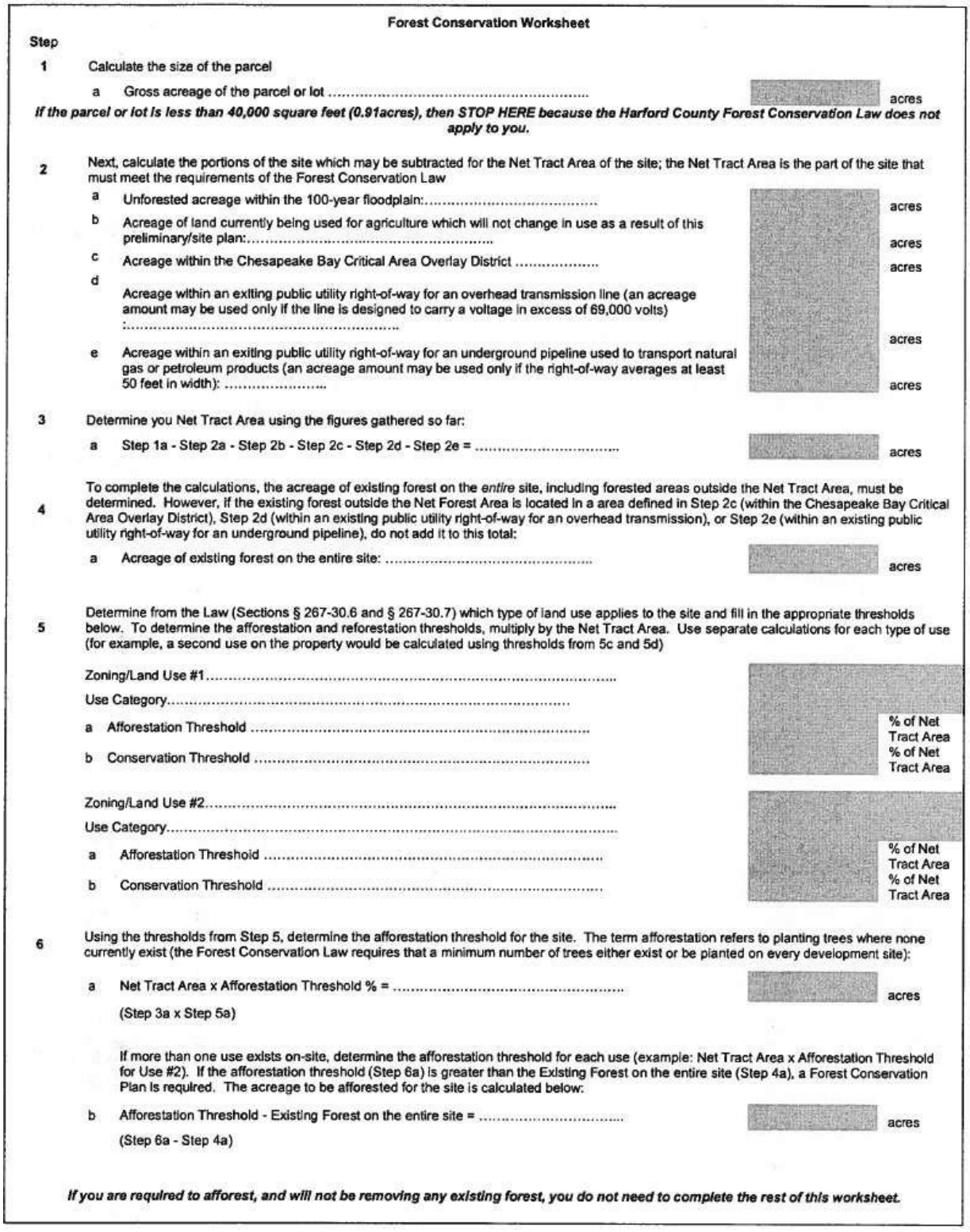
Field verified edges of the forest retention areas shall be delineated on the Forest Conservation Site Map.

Forest retention areas shall be assigned priority based on the criteria established in Section 4.6 and the acreage of each priority retention

area shall be noted in a tabular format on the Forest Conservation Plan Site Map.

Specimen trees (i.e. trees with a DBH of 30 inches or more, national, state or county champion trees and trees with a DBH of 75% of an identified national, state or county champion) shall be considered high priority retention areas and delineated on the Forest Conservation Site Map.

Figure 4.3.1



Forest Conservation Worksheet

Step

1 Calculate the size of the parcel

a Gross acreage of the parcel or lot ..... acres

If the parcel or lot is less than 40,000 square feet (0.91acres), then STOP HERE because the Harford County Forest Conservation Law does not apply to you.

2 Next, calculate the portions of the site which may be subtracted for the Net Tract Area of the site; the Net Tract Area is the part of the site that must meet the requirements of the Forest Conservation Law

a Unforested acreage within the 100-year floodplain:..... acres

b Acreage of land currently being used for agriculture which will not change in use as a result of this preliminary/site plan:..... acres

c Acreage within the Chesapeake Bay Critical Area Overlay District ..... acres

d Acreage within an exiting public utility right-of-way for an overhead transmission line (an acreage amount may be used only if the line is designed to carry a voltage in excess of 69,000 volts) :..... acres

e Acreage within an exiting public utility right-of-way for an underground pipeline used to transport natural gas or petroleum products (an acreage amount may be used only if the right-of-way averages at least 50 feet in width): ..... acres

3 Determine you Net Tract Area using the figures gathered so far:

a Step 1a - Step 2a - Step 2b - Step 2c - Step 2d - Step 2e = ... acres

4 To complete the calculations, the acreage of existing forest on the *entire* site, including forested areas outside the Net Tract Area, must be determined. However, if the existing forest outside the Net Forest Area is located in a area defined in Step 2c (within the Chesapeake Bay Critical Area Overlay District), Step 2d (within an existing public utility right-of-way for an overhead transmission), or Step 2e (within an existing public utility right-of-way for an underground pipeline), do not add it to this total:

a Acreage of existing forest on the entire site: ..... acres

5 Determine from the Law (Sections § 267-30.6 and § 267-30.7) which type of land use applies to the site and fill in the appropriate thresholds below. To determine the afforestation and reforestation thresholds, multiply by the Net Tract Area. Use separate calculations for each type of use (for example, a second use on the property would be calculated using thresholds from 5c and 5d)

Zoning/Land Use #1.....

Use Category.....

a Afforestation Threshold ..... % of Net Tract Area

b Conservation Threshold ..... % of Net Tract Area

Zoning/Land Use #2.....

Use Category.....

a Afforestation Threshold ..... % of Net Tract Area

b Conservation Threshold ..... % of Net Tract Area

6 Using the thresholds from Step 5, determine the afforestation threshold for the site. The term afforestation refers to planting trees where none currently exist (the Forest Conservation Law requires that a minimum number of trees either exist or be planted on every development site):

a Net Tract Area x Afforestation Threshold % = ... acres

(Step 3a x Step 5a)

If more than one use exists on-site, determine the afforestation threshold for each use (example: Net Tract Area x Afforestation Threshold for Use #2). If the afforestation threshold (Step 6a) is greater than the Existing Forest on the entire site (Step 4a), a Forest Conservation Plan is required. The acreage to be afforested for the site is calculated below:

b Afforestation Threshold - Existing Forest on the entire site = ... acres

(Step 6a - Step 4a)

If you are required to afforest, and will not be removing any existing forest, you do not need to complete the rest of this worksheet.

If the Existing Forest on the entire site (Step 4a) is greater than the Afforestation Threshold (Step 6a), then you do not need to afforest; however, any forest removed from the site may have to be replaced. To determine if the site must be reforested, the rest of the worksheet shall be completed.

7 Next, calculate the forest conservation threshold for the site. This threshold determines at what point reforestation is completed at a ratio of 2 acres reforested per 1 acre removed OR 1/4 acre reforested per 1 acre removed.

a Net Tract Area x Conservation Threshold % = ... acres

(Step 3a x Step 5b)

8 To determine the reforestation requirements, the amount of forest to be cut, cleared or graded within the Net Tract Area of the site must be calculated. If the units on the site are to be served by an on-site septic system, please refer to the Harford County Forest Cover Conservation and Replacement Manual (Section 4.5.02 & Section 4.10.03)

a Acreage of forest to be removed ..... acres

The amount of existing forest *within* the Net Tract Area must also be calculated. This calculation is different than Step 4a which was the acreage of existing forest on the *entire* site.

b Acreage of forest within the Net Tract Area ..... acres

9 Now determine the amount of forest that will remain within the Net Tract Area using the acreages calculated from Step 8.

a Acreage of forest within the Net Tract Area - Acreage of forest to be removed =..... acres

(Step 8b - Step 8a)

Now determine the amount forest that must be replaced through reforestation on the development site by using the set of calculations that is appropriate for your site.

If, for your site, the forest to remain on the Net Tract Area (Step 9a) is less than the Forest Conservation Threshold (Step 7a), then you must calculate Step 10a through Step 10d to determine your reforestation acreage.

If, for your site, the existing forest within the Net Tract Area (Step 8b) is less than the Forest Conservation Threshold (Step 7a), then use step 11 to determine your afforestation acreage.

If for your site, the forest to remain on the Net Tract Area (Step 9a) is greater than the Forest Conservation Threshold (Step 7a), then go directly to Step 12 to determine your reforestation acreage.

10 Because the forest to remain on the Net Tract Area (Step 9a) is less than the Forest Conservation Threshold (Step 7a), part of the site will be reforested at a ratio of 2 acres replaced for every 1 acre removed and part of your site will be reforested at a ratio of 1/4 acre replaced for every 1 acre removed. Once all the calculations in Step 10 are completed, add Step 10b and Step 10d to obtain the total amount of reforestation for the site. Step 13 does not have to be completed because forest was removed below the Forest Conservation Threshold, eliminating the possibility of forest credit for this site.

First determine the acreage of the forest removed *below* the forest conservation threshold:

a Forest Conservation Threshold - the amount of forest that will remain within the Net Tract Area = ... acres

(Step 7a - Step 9a)

The acreage calculated in Step 10a must be replaced at a ration of 2 acres replaced for every 1 acre removed:

b Step 10a x 2 = ... acres

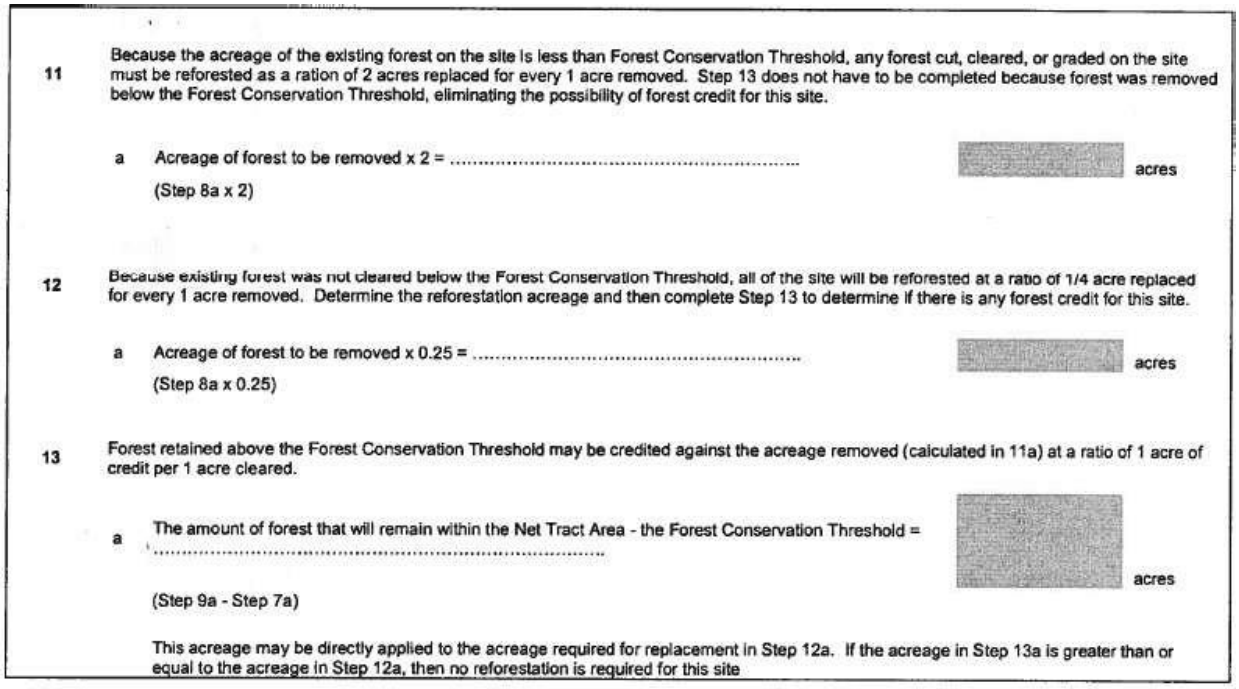
Now calculate the amount of forest removed above the forest conservation threshold

c Acreage of forest to be removed - Step 10a = ... acres

(Step 8a - Step 10a)

The acreage calculated in Step 10c. must be replaced at a ratio of 1/4 acre replaced for every 1 acre removed:

d Step 10c x 0.25 = ... acres



11 Because the acreage of the existing forest on the site is less than Forest Conservation Threshold, any forest cut, cleared, or graded on the site must be reforested as a ration of 2 acres replaced for every 1 acre removed. Step 13 does not have to be completed because forest was removed below the Forest Conservation Threshold, eliminating the possibility of forest credit for this site.

a Acreage of forest to be removed x 2 = ... acres
(Step 8a x 2)

12 Because existing forest was not cleared below the Forest Conservation Threshold, all of the site will be reforested at a ratio of 1/4 acre replaced for every 1 acre removed. Determine the reforestation acreage and then complete Step 13 to determine if there is any forest credit for this site.

a Acreage of forest to be removed x 0.25 = ... acres
(Step 8a x 0.25)

13 Forest retained above the Forest Conservation Threshold may be credited against the acreage removed (calculated in 11a) at a ratio of 1 acre of credit per 1 acre cleared.

a The amount of forest that will remain within the Net Tract Area - the Forest Conservation Threshold = ... acres
(Step 9a - Step 7a)

This acreage may be directly applied to the acreage required for replacement in Step 12a. If the acreage in Step 13a is greater than or equal to the acreage in Step 12a, then no reforestation is required for this site

4.5 Forest Retention Areas

A percentage of the existing forest on a proposed development site is likely to be preserved. These preserved areas are termed forest retention areas and shall be protected from development.

On Forest Conservation Plans, forest retention lines are to be delineated in the field by the edges of the canopy dripline before tree removal. However, most tree roots grow beyond the dripline. The majority of the root material supporting a tree is found in the upper two and a half to three feet of the soil profile. On a field grown tree, the roots may extend out three to four times beyond the crown spread.

It is preferable, and strongly encouraged, that forest stands be delineated by their Critical Root Zones (CRZ) rather than the dripline. By using CRZ as a realistic limit of disturbance, tree roots can be avoided and the number of trees that can be lost through root damage will be reduced. For isolated specimen trees, 1" DBH = 1.5' radius of the CRZ. For the edges of large areas, use 1" DBH = 1' radius of the CRZ, or an 8' radius around the tree trunk, whichever is greater.

No forest retention area easements shall be permitted on residential lots with a net tract area of less than 20,000 square feet. No more than 25% of any lot with a net lot area between 20,000 square feet and 60,000 square feet shall be encumbered by a forest retention area easement.

4.5.01 Requirements

§267-39.C of the Development Regulations identifies areas that shall be considered equal in priority for retention and protection. These areas shall be left in an undisturbed condition, not impacted by development, unless the applicant has demonstrated, to the satisfaction of the Department, that reasonable efforts have been made to protect them and the plan cannot be reasonably altered.

4.5.02 General Guidelines

The dripline of the tree or trees being retained shall be used as the outer boundary of a forest retention area. However, critical root zone is strongly encouraged as the boundary for forest retention areas (see Section 4.5).

Forested areas will only be considered forest retention if they are a minimum of 10,000 square feet in area and have a minimum width of 35 feet from trunk-to-trunk.

Only forested areas within the net tract area shall be considered when designating forest retention areas.

Forested areas within the one-hundred year floodplain and areas designated as Natural Resource District under §267-62 of Development Regulations may be counted toward the retention requirements.

Forest retained on a proposed development site above the forest conservation requirements established in §267-39.A(2) of the Development Regulations may not be credited toward the forest conservation requirements of a different proposed, or existing, development site.

The following guidelines apply to septic reserve areas.

For each lot created, a maximum of 30,000 square feet of existing forest within the identified septic reserve area may be counted toward the forest retention requirements of the site.

A minimum of 10,000 square feet of the identified septic reserve area shall be counted as cleared to provide for the initial septic system installation and one replacement system.

Forested septic reserve areas 10,000 square feet or less shall be counted as cleared when calculating the forest conservation requirements for a site.

4.5.03 Use of Forest Retention Areas

Once a forest retention area has been designated on a Forest Conservation Plan, the activities listed in §267-46.B of the Development Regulations shall be prohibited unless mitigation for disturbance within a particular forest retention area is approved by the Department. These restrictions include: grading, filling, trenching, tunneling, storage of construction materials, or equipment; placement, or operation of vehicles, equipment or construction trailers and sediment and erosion control devices.

Activities that may result in soil compaction or damage to a tree shall be prohibited within a forest retention area unless mitigation for disturbance is approved by the Department. These disturbances include but are not limited to: utility lines, access roads, storm water management devices, and impervious surfaces of any kind.

If at the end of the designated construction period (an element of the construction timetable, Section 4.15), any portions of the forest retention areas have died as a result of construction practices or inadequate tree protection, the affected portions shall be considered not in compliance with the Harford County Forest Conservation Law or the approved Forest Conservation Plan. If such areas are found, the Department will first grant the applicant a prescribed amount of time to replace the damaged areas. If repairs are not made within the prescribed time or to the Department's satisfaction, the applicant will be subject to a fine of $1.20 per square foot for the area found in non-compliance with the Law or the approved Forest Conservation Plan.

The management of any forest retention area shall be consistent with §267-37.B(13) of the Development Regulations. Additionally, the forest retention areas to be managed shall be labeled on the Forest Conservation Site Map and the forest management practices shall be described in the Forest Protection Report (Section 4.9).

4.5.04 Changes to Forest Retention Areas

After a FCP has been approved by the Department, any changes of more than 10,000 square feet to the boundaries of the designated forest retention areas must be amended through a new FCP series. Minor

revisions of 10,000 square feet or less will be permitted through amendment of the necessary elements of the approved FCP. In either case, the FCP must be approved or re-approved by the Department, within the FCP approval time-frame identified in the Law, before work may proceed on or off-site.

4.6 Designating Forest Retention Areas

This section describes the procedure for determining which forested areas on-site shall be retained by providing a method for prioritizing forested areas using specific retention criteria. Existing on-site forested areas will be ranked according to four areas of priority. These priority areas will be based on the information gathered in the Forest Stand Delineation.

4.6.01 Stand Prioritization Guidelines

The following lists identify the characteristics necessary to qualify a stand as high, moderate, low or disturbed priority. Areas containing any element listed under the high priority category shall be mapped as such.

High Priority Forest Retention Areas

Critical habitats of rare, threatened, or endangered species;

Trees, shrubs, or herbaceous plants associated with:

Intermittent and perennial streams and their buffers;

Slopes over 25%;

Hydric soils;

Highly erodible soils with a K value greater than 0.35 on slopes of 15% of more; and

100-year floodplain areas.

Trees, shrubs, or herbaceous plants that are part of a stand that has one or more of the following characteristics:

Stands or portions of stands with high forest structural diversity (as defined in Chapter 3 of this Manual);

Contiguous forested areas of approximately 100 acres that

connect the largest or most vegetated tracts of land within and adjacent to the site; and

Forested areas which provide a corridor 300 ft. wide or more of primarily native vegetation between two larger forested tracts.

Individual trees with one or more of the following characteristics:

Trees that are part of a historic site or associated with a historic structure;

Trees designated as a national, state, or local champion trees;

Trees measuring 75% or more of the diameter measured at 4.5 feet above the ground (DBH) of the designated state champion tree; and

Trees with a DBH of 24" or greater.

Moderate Priority Forest Retention Areas

Stands or portions of stands with good structural diversity (See Chapter 3 of this Manual);

Contiguous forested areas approximately 20 acres or more in size which connect the largest or most vegetated tracts of land within and adjacent to the site;

Forested stream buffers up to forest corridor width (50 ft. - 300 ft. wide); and

Forested areas which provide a landscaping and/or buffering function, especially between conflicting land uses.

Low Priority Forest Retention Areas

Stands or portions of stands with poor forest structural diversity or areas with none of the characteristics mentioned in Priority Areas 1, 2, or 4.

Disturbed Priority Forest Retention Areas

A high percentage of exotic or invasive species is used in this step to identify areas of forest that have suffered significant disturbance in the recent past. See Chapter 3, Figure 3.3.7, of this Manual for

additional information.

The majority of the vegetation in the stand consists of exotic or invasive species.

4.6.02 Priority Area Guidelines

Priority areas shall be set aside as forest retention areas in descending order. If all of the high priority areas are retained and the forest retention threshold requirement for the site has still not been achieved, then medium priority areas shall be retained on down to disturbed areas.

Once the priority areas for the proposed site have been established, the acreage of each Priority Area shall be calculated and placed on the Forest Conservation Site Map.

The priority ranking of each forest stand shall be identified on the Forest Conservation Plan Site Map.

Any proposed impacts within the priority retention areas shall be justified in the Forest Protection Report (Section 4.9).

If two stands of apparently equal value exist within the proposed development site, the following criteria shall be used to help determine which stand is of greater value for retention purposes.

Neighboring land uses - Adjacent land use which is incompatible with the proposed development shall be buffered.

Site-specific climate needs - Forests act as windbreaks and moderate temperature extremes. When applicable, the climatic benefits of forested areas shall be considered.

Susceptibility to disease or pest infestation - There may be diseases or pests noted on the Forest Stand Delineation which are not life threatening to trees. These health concerns, however, may be the deciding factor between two stands of apparently equal value.

Recharge to hydrology - Forested areas may border but may not be technically within the buffer region of a wetland, stream or spring. Disturbance of these areas shall be avoided. In many cases, expansion of buffer areas shall be emphasized.

Contiguous forested lands - Small forested areas within the proposed

development site shall be retained if they are connected to large off-site forested areas.

4.6.03 Priority Regions for Retention

There are portions of Harford County where specific priorities will be targeted for retention. Priority regions are specific geographic portions of the County where specific forest retention areas will be selected regardless of their ranking within the priority area lists. These priority regions are Water Supply Protection Areas (the Winters Run watershed and the Perryman Wellfield aquifer recharge area), Habitat Areas of Local Significance and Historic Preservation Districts. The priority regions for Harford County have been mapped in Figure 4.6.1.

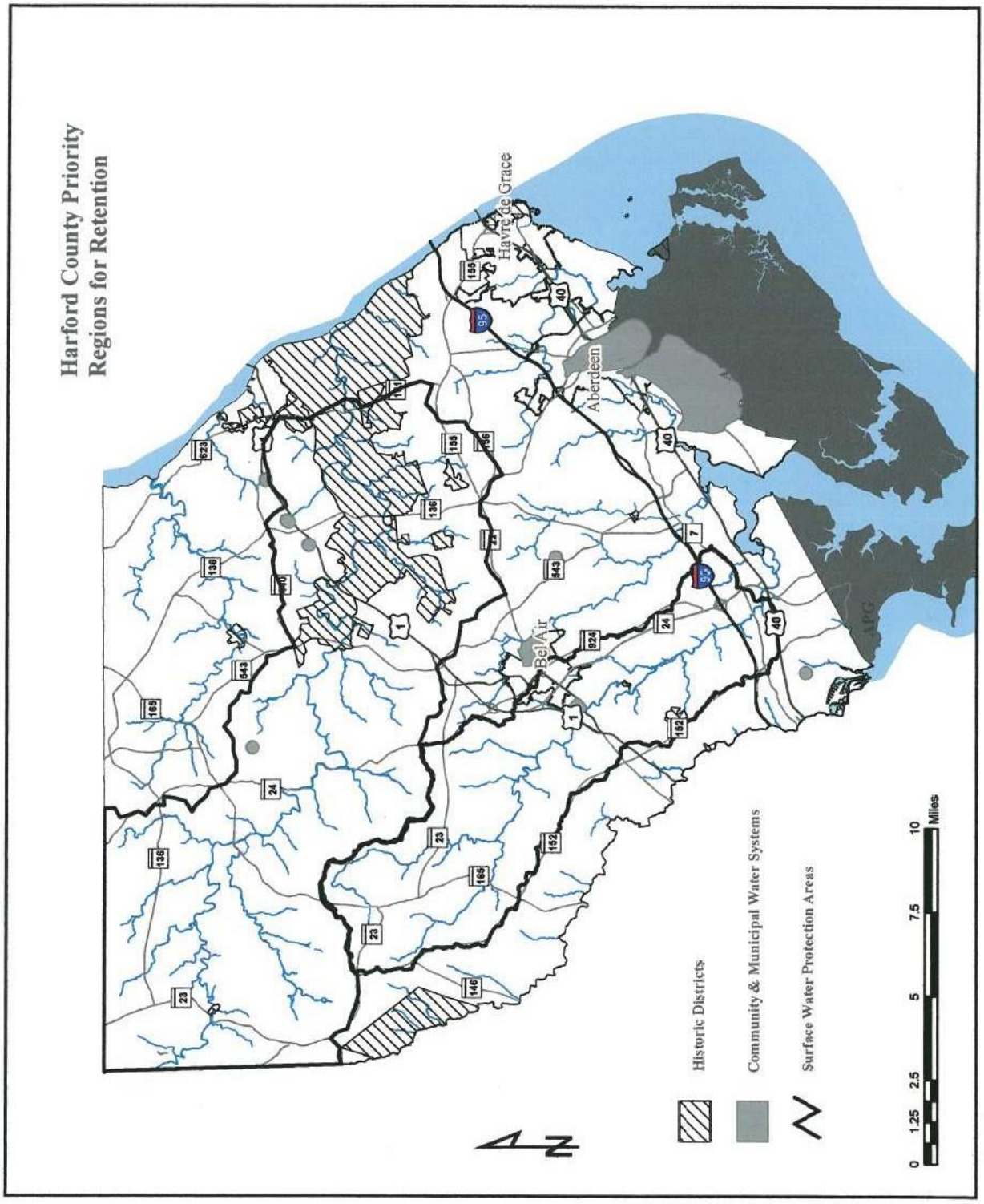
If the location of a proposed development site is in question relative to the priority regions, the applicant shall contact the Department for a final site location determination.

4.6.04 Guidelines for Priority Regions

It is important for the applicant to remember that the benefits of forest conservation (i.e., retention, reforestation and afforestation) are not mutually exclusive. The guidelines established in this section are designed to show what the Department will be looking for in the identified priority regions.

In the Water Supply Protection Areas, water quality protection shall be given top consideration. For the Winters Run Watershed, a surface water supply, riparian buffers from Winters Run proper or its tributaries should be established to prevent water quality impacts from the development. Within the Perryman Wellfield aquifer recharge area, infiltration of pollutants into the groundwater shall be mitigated through the use of forest resources (i.e., forested buffer strips, etc.) in addition to traditional storm water management extended detention and infiltration ponds.

Figure 4.6.1 Harford County Priority Regions for Retention



Development that is near or within an identified Habitat Area of Local Significance shall follow the site specific best management practices (BMP's) required by the Maryland Natural Heritage Program.

In areas near or adjacent to designated Historic Preservation Districts, buffering shall be emphasized to screen development from the Historic Preservation District. Development proposed within a Historic Preservation District will additionally strive to retain individual historic trees.

4.7 Forest Protection

Once the forest retention areas have been delineated, protection will be required to buffer these areas from construction activities. The application and correct installation of the appropriate forest protection device will save an applicant costly replacement to damaged forest retention areas. The specific forest protection guidelines are intended to steer an applicant though the construction phase of a project, ensuring that the construction activities will not adversely affect the trees that have been identified as retention areas, or individual specimen trees.

4.7.01 Forest Protection Requirements

Once all tree protection devices have been installed, the applicant shall contact the Department and schedule an inspection of the forest protection devices. A staff member from the Department shall inspect, and approve, the installation of all protection devices before any grading shall be permitted.

4.7.02 General Forest Protection Guidelines

Protection devices shall be placed around all identified forest retention areas.

To correctly select and implement the proper protection devices for the site, the following boundaries shall first be determined:

Forest retention areas; and

Individual specimen trees; and

The siting of all utilities; and

The siting of all access roads; and

The limits of disturbance for grading; and

The limits of disturbance for storm water management.

Public utility companies regulated by the Maryland Public Service Commission are exempt from the requirements of the Law. An applicant should strive to coordinate with these utilities early in the design of the development to avoid designating forest retention areas which may be legally cleared by these entities prior to the final inspection by the Department. Under the following conditions, the Department will not permit any forested areas cleared to be counted toward the forest conservation requirements of a site. The applicant will be responsible for the replacement of these areas or designating new forest retention areas of equal value and size.

If a forest retention area is cleared to directly serve the proposed development.

If a forested retention area is cleared to extend service to a new phase or section of a previously approved development.

4.7.03 Specific Forest Protection Guidelines

Forest retention areas and individual trees that are to be protected from construction activities shall be identified at the construction site. Highly visible signage shall be used to protect these areas, and must be located on-site prior to any land clearing or grading. These devices shall be maintained throughout the construction phase of the project.

All protection devices shall be in place prior to any land clearing or grading that occurs within 100 feet of a retention area boundary, or individual specimen trees that are to be saved. If grading or clearing occurs beyond 100 feet of a retention area or individual specimen tree, those trees that are to be retained shall be clearly identified (i.e., flagging, tree paint, etc.) at breast height and also at the base of the tree.

Forest retention area signs (as shown in Figure 5.7.1) shall be posted at a maximum 150 foot interval along the retention edge. Attachment of signs to the trees is prohibited.

Forest protection devices shall be monitored, and maintained throughout the construction phase of the project. When the construction phase of the project is complete and the sediment in surrounding area is stabilized,

the forest protection devices shall be removed.

No equipment, machinery, vehicles, materials or excessive pedestrian traffic shall be allowed within the dripline of a retention area, or individual specimen tree that is to be protected.

No grading, filling, trenching or tunneling shall be allowed within the dripline of a retention area, or individual specimen tree that is to be protected, unless the activity has been approved by the Department and the appropriate mitigation procedures are followed.

4.7.04 Design Guidelines

Protection devices shall be combined with sediment and erosion control devices whenever possible.

Fencing shall be at least 4 feet in height.

Fencing shall be flagged and or painted with highly visible colored flagging or paint.

Signs shall be posted at all retention areas and individual trees identifying the area.

4.7.05 Design Options

The following are types of devices that shall be used for tree protection only.

Blaze orange plastic mesh fencing (Figure 4.7.2).

The following devices may be used for both tree protection and sediment and erosion control, provided that the Harford County Stormwater Management and Sediment Control requirements are satisfied.

Filter cloth on wire mesh with highly visible flags or signs. This is a combination of silt fence and protection device (Figure 4.7.3).

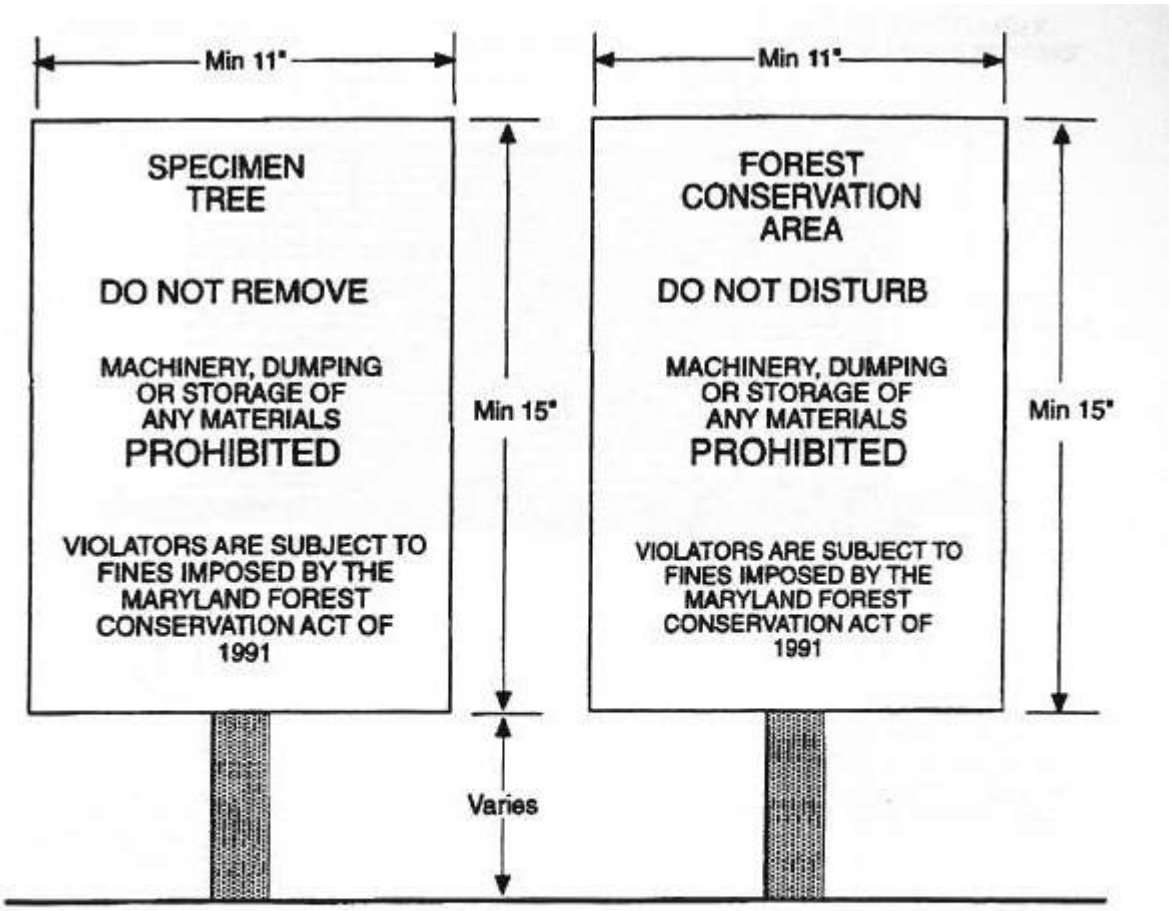
Straw bale dike with flags on wooden stakes (Figure 4.7.4).

Perimeter dike, or swale.

Construction of this device will be within the limits of disturbance only, highly visible flags shall be placed along the dike and will be

maintained throughout the construction phase of the project (Figure 4.7.5).

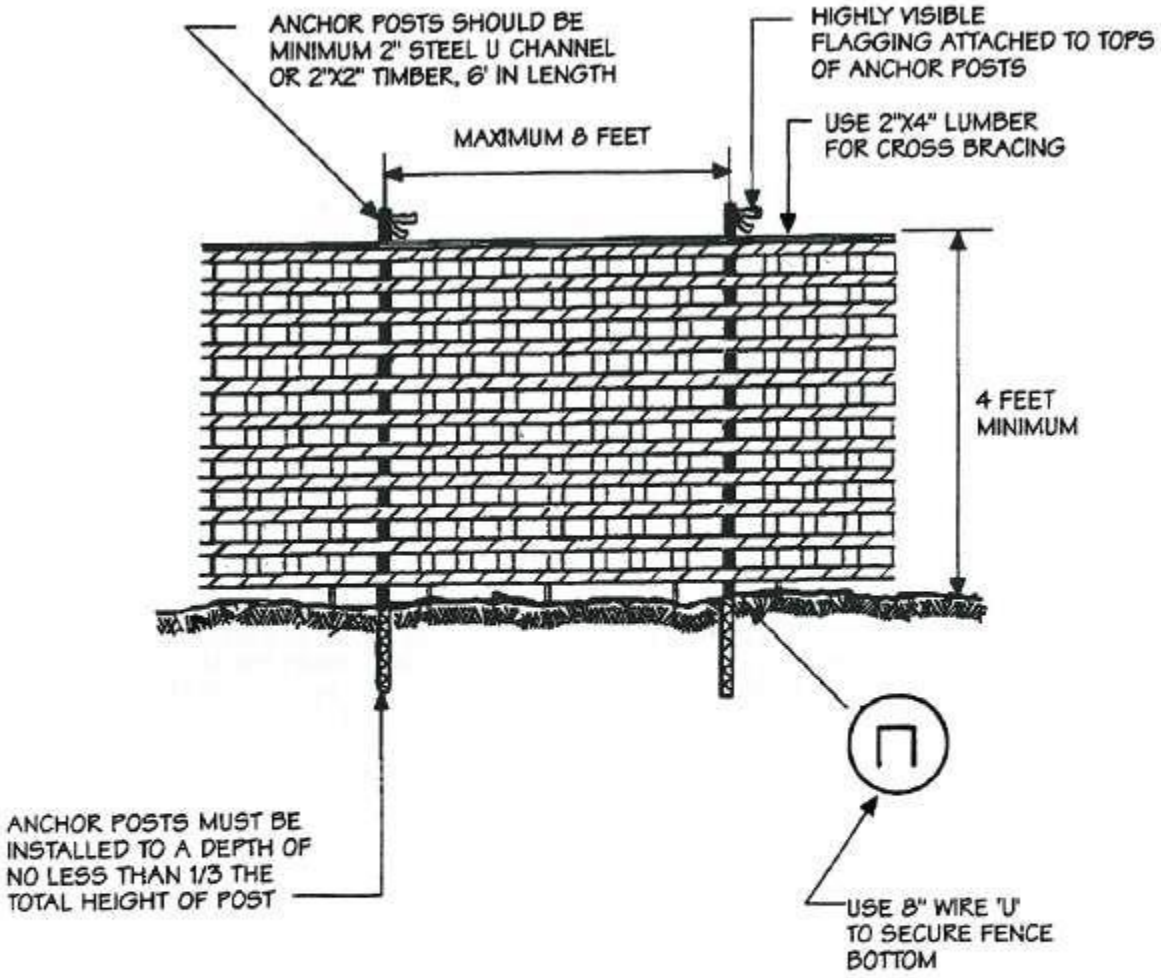
Figure 4.7.1 Forest Retentions Area Signs



Notes:
1. Bottom of signs to be higher than top of tree protection fence.
2. Signs to be placed approximately 50' feet apart. Conditions on site affecting visibility may warrant placing signs closer or farther apart.
3. Attachment of signs to trees is prohibited.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.7.2 Forest Protection Option: Plastic Mesh Fencing

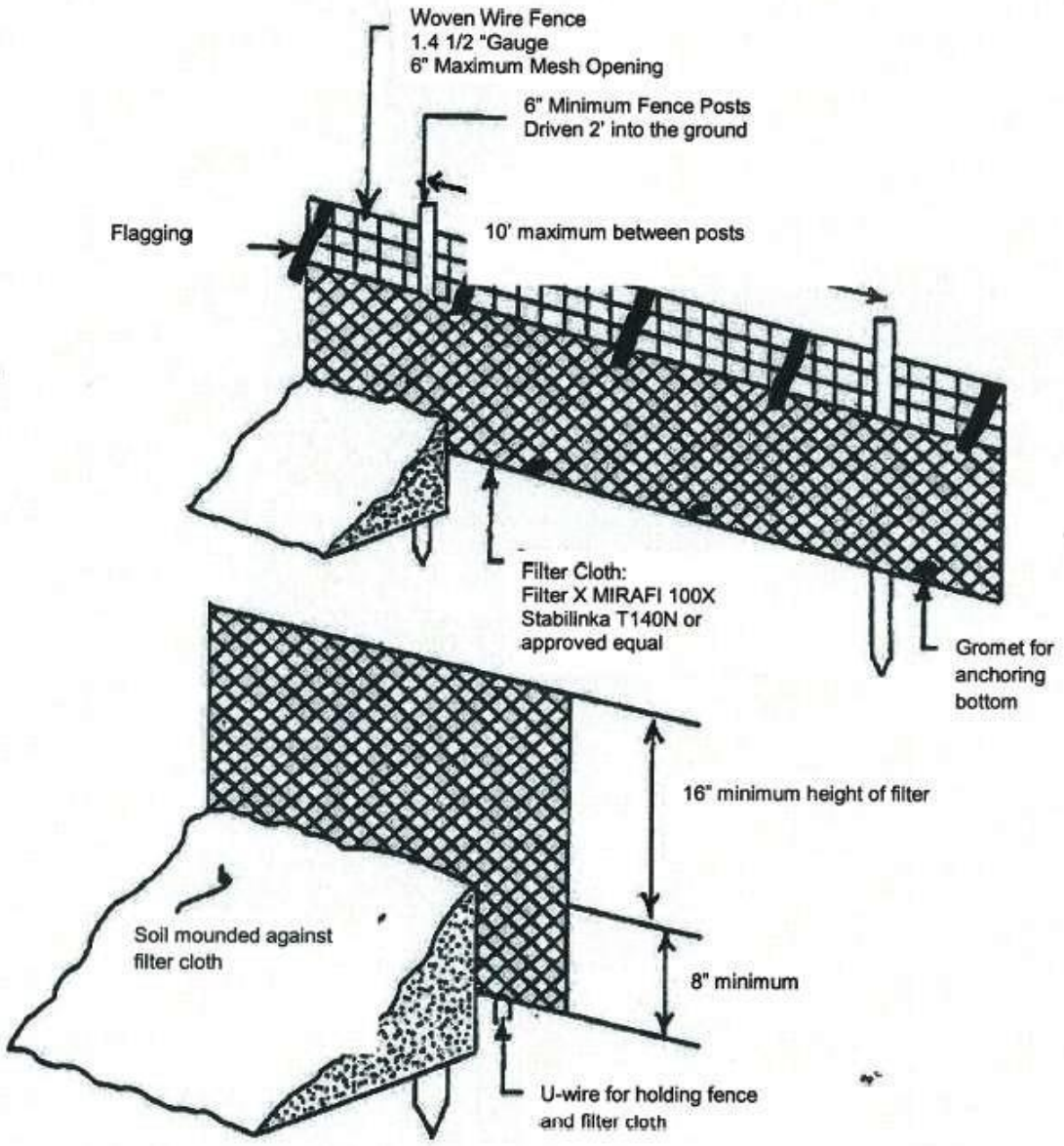


Notes:

1. Blaze orange or blue plastic mesh fence for forest protection device, only.
2. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
3. Boundaries of Retention Area should be staked and flagged prior to installing device.
4. Avoid damage to critical root zone. Do not damage or sever large roots when installing posts.
5. Protection signs are required.
6. Device should be maintained throughout construction.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.7.3 Combination Protection Device: Filter Cloth on Mesh Wire with Flags

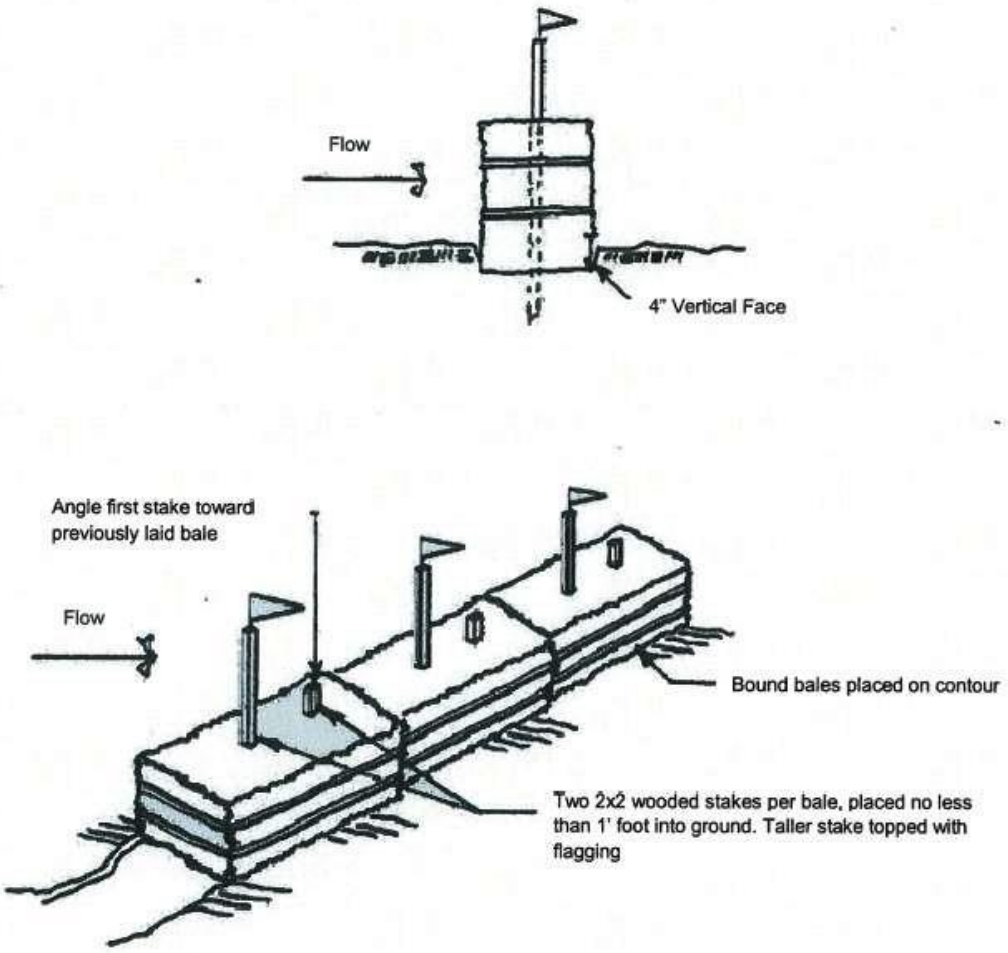


Notes:

1. Combination sediment control and protective device
2. Retention area will be set as part of the review process
3. Boundaries of Retention Area should be staked prior to installing protective device
4. Root damage should be avoided
5. Mound soil only within the limits of disturbance
6. Protective signage is also recommended
7. All standard maintenance for sediment control devices apply to these details

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.7.4 Combination Protection Device: Straw Bale Dike with Flags

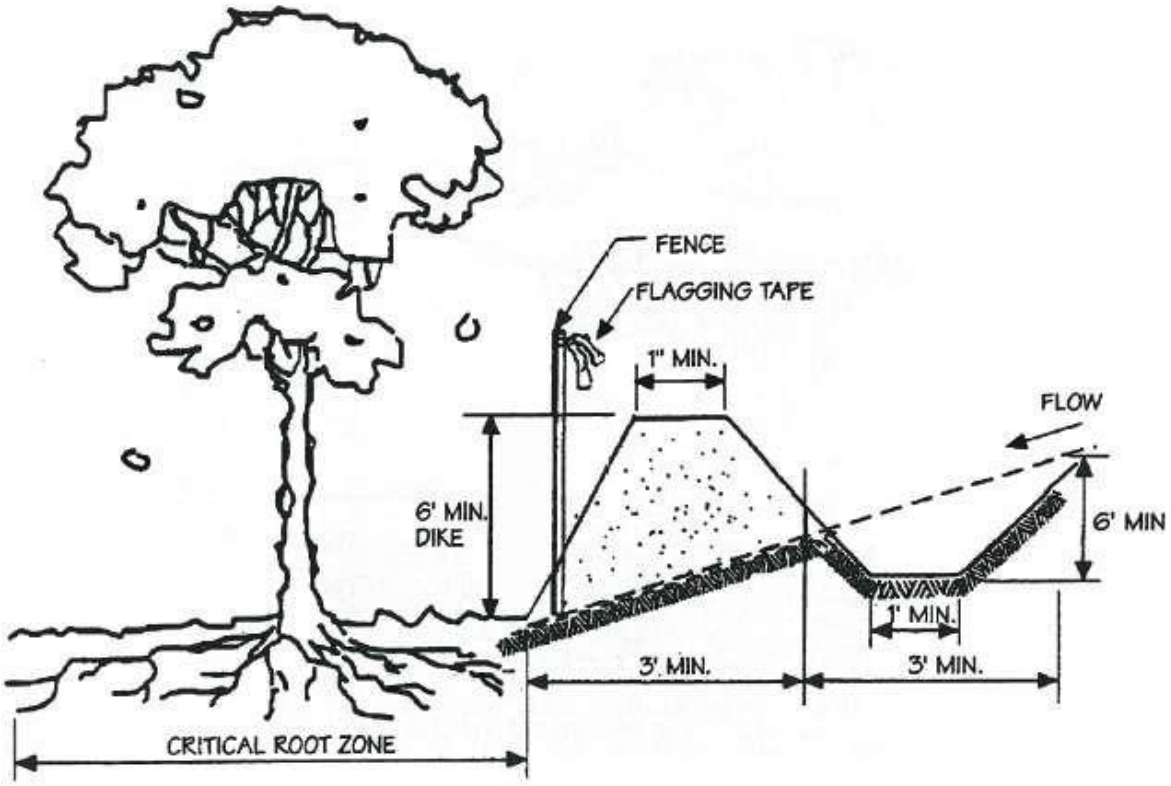


Notes:

1. Combination sediment control and protective device
2. Retention area will be set as part of the review process
3. Boundaries of Retention Area should be staked prior to installing protective device
4. Root damage should be avoided
5. This device should only be placed within the limit of distribution
6. Protective signage is also recommended
7. All standard maintenance for sediment control devices apply to these details

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.7.5 Combination Protection Device: Perimeter Dike or Swale with Flags



Notes:

1. Combine sediment control and forest protection device.
2. Boundaries of Retention Area will be established as part of the forest conservation plan review process.
3. Boundaries of Retention Area should be staked prior to installing protection device.
4. Root damage should be avoided.
5. Toe of slope should be outside the Critical Root Zone.
6. Equipment is prohibited within Critical Root Zone of Retention Area; place dike accordingly.
7. All standard maintenance for earth dikes and swales apply to these details.
8. All standard reclamation practices for earth dikes and swales shall apply to these details.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

4.8 Forest Protection Area Mitigation

At this point in the preparation of the Forest Conservation Plan, an applicant should have identified and designated forest retention areas, specimen trees, reforestation/afforestation areas and the sighting of all such as grading, sediment and erosion control and stormwater management areas. These guidelines are intended to direct an applicant through the construction phase of a project, ensuring that the construction activities will not adversely affect trees that have been identified within retention areas.

These guidelines will follow the Department's preferred sequence of construction:

Pre-construction

Construction

Post-construction

4.8.01 General Guidelines

One or more of the following mitigation procedures must be implemented when construction activities will impact any area within the dripline of a tree or area of trees that are to be retained. Any impact to a tree or the area within the dripline of a tree that is to be retained is prohibited unless approved by the Department and proper mitigation procedures are proposed and justified in the Forest Protection Plan.

4.8.02 Pre-construction Activities

This section will introduce measures that shall be implemented on-site, prior to clearing. The measures outlined shall be executed under the supervision of a licensed tree care professional.

Stress reduction of specimen trees.

Specimen trees to be retained shall be examined to determine what stress reduction techniques are needed.

Applicants shall address each item below on the Forest Protection Plan noting if a technique is being used and for what reasons.

Root Pruning:

Evaluation Criteria: Will the dripline be affected by the construction activities such as grade changes, excavation for foundations, and road or utility installation? (prune prior to construction as shown in Figure 5.8.1).

Crown Reduction or Pruning:

Evaluation Criteria: Has the root system been significantly reduced (>10%). Are there dead, damaged or diseased limbs?

Watering:

Evaluation criteria: Will construction activities alter the hydrology of the site? Are existing conditions stressful? Has or will pruning occur?

Fertilizing:

Evaluation criteria: Is or will the tree be under stressful conditions? Has or will pruning occur?

4.8.03 Design Considerations

Reduce crown only at specified times of the year:

Flowering trees- only after flowering and before bud set;

Non-flowering trees- in late winter, early spring or mid-summer.

No more than 1/3 of the crown should be removed at one time, using the acceptable pruning methods (Figure 4.8.2).

Apply low nitrogen and slow release fertilizers in late fall or early spring (Figure 4.8.3):

For small trees (<3" DBH), use broadcast method.

For larger trees (>3" DBH), use punch or pressurized injector method (Figure 4.8.4).

Do not apply fertilizer within 3 feet of the tree trunk.

4.8.04 Long-term Protection Devices

The following guidelines and mitigation measures shall be considered whenever construction activities will impact the dripline of a retention area. The construction of these devices may take place either before or after the grading process. The location and sequence of construction shall be indicated on the FCP. These devices shall remain in place for the life of the tree.

Evaluation Criteria:

If any portion of the dripline of either an individual specimen tree or the forest retention edge is impacted by development activity.

Design options:

Install tree well and root aeration system as appropriate (Figure 4.8.5).

Install retaining walls as appropriate (Figure 4.8.6).

Install raised sidewalks as appropriate (Figure 4.8.7).

Utilize tunneling practices (Figure 4.8.8).

4.8.05 Construction Phase

Improper or sloppy construction techniques can cause the death of trees immediately, or as late as 10 years after construction has been completed. Tree conditions shall be monitored by the applicant during construction and corrective measures shall be taken when appropriate.

Minimum standards:

A licensed tree care professional will be consulted to monitor tree conditions during construction and take any necessary corrective actions.

On-site decisions concerning forest protection areas shall be made in consultation with the licensed forester, landscape architect, or the approved professional who prepared the original Forest Conservation Plan.

Long-term tree protection devices shall be installed at this time as

described earlier in the pre-construction activities

Design considerations; the following will be monitored by the tree care professional:

Condition	Corrective Action
soil compaction	aerate and monitor.
root injury	prune and monitor; consider crown reduction.
trunk wounds	repair and monitor.
limb injury	prune and monitor.
flooded conditions	drain and monitor; correct problem.
drought conditions	water and monitor; correct problem.

4.8.06 Post-construction

After construction has been completed several actions shall be taken to increase the survivability of the trees that are retained on the project site.

Stress Reduction: (see stress reduction under pre- construction activities).

Repair any tree damage. Options include:

Root repair

Removal of dead limbs (if they pose a safety hazard)

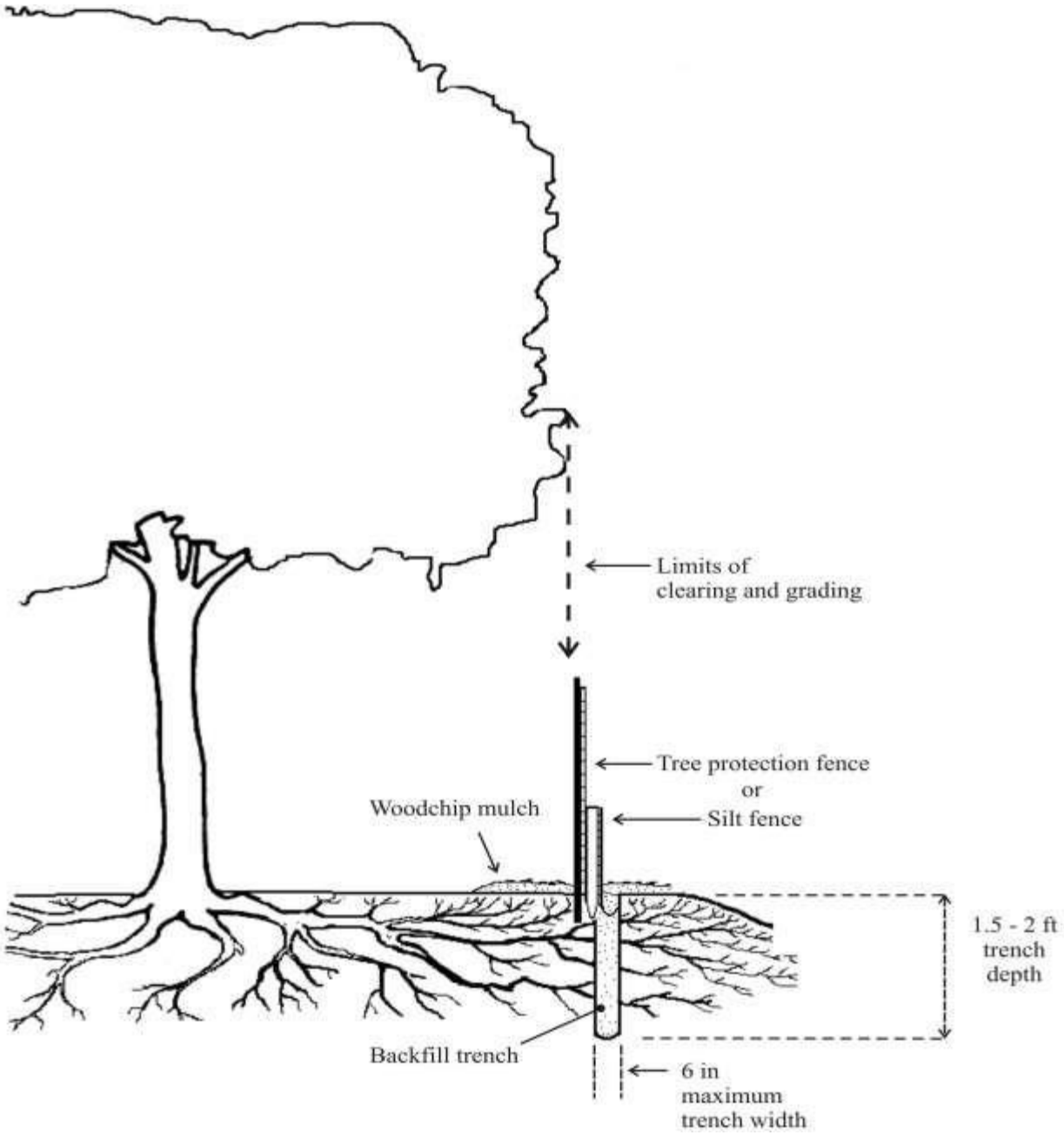
Soil aeration

Removal of dead, dying trees:

An applicant shall not remove trees unless they pose a safety hazard (if the height of the tree is greater than or equal to the distance to the nearest building).

Removal of temporary structures.

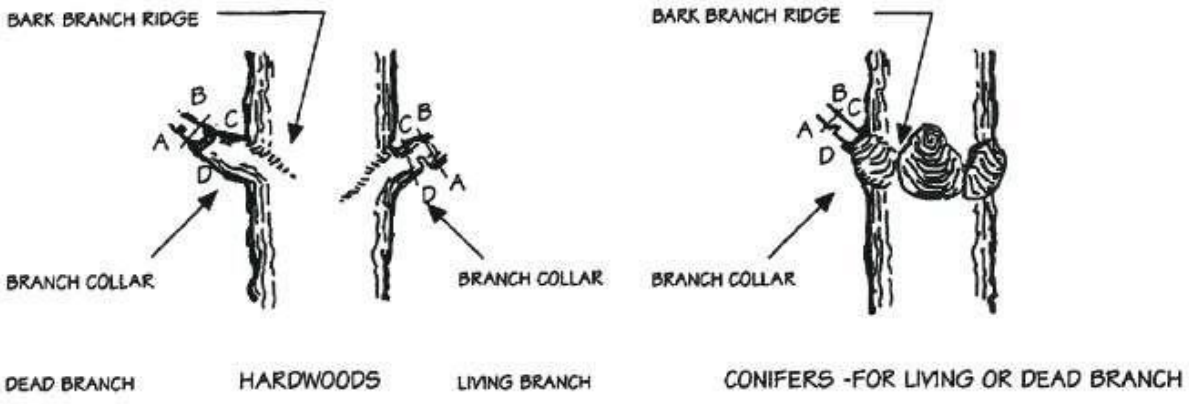
4.8.1 Root Pruning Prior to Construction



Source: Fairfax County Government, Virginia (2001). Public Facilities Manual – Chapter 12, Tree Conservation, Vegetation Preservation and Planting http://www.fairfaxcounty.gov/dpwes/publications/pfm/ (accessed 2009)

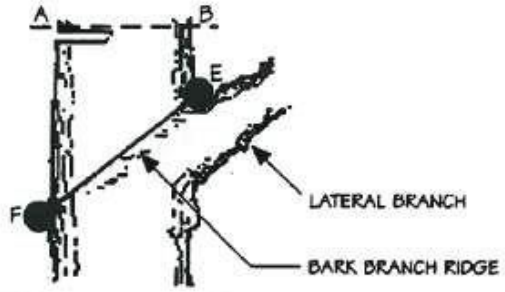
Figure 4.8.2 Crown Pruning

Pruning a Branch



Notes:
1. Remove branch weight by undercutting at A and remove limb by cutting through at AB.
2. Remove stub at CD (line between branch bark ridge and outer edge of branch collar).
3. If D is difficult to find on hardwoods, angle of CD to trunk should be the reflective angle of the bark branch ridge to the trunk.
4. Only prune at specified times.
5. Remove no more than 30% of crown at one time.

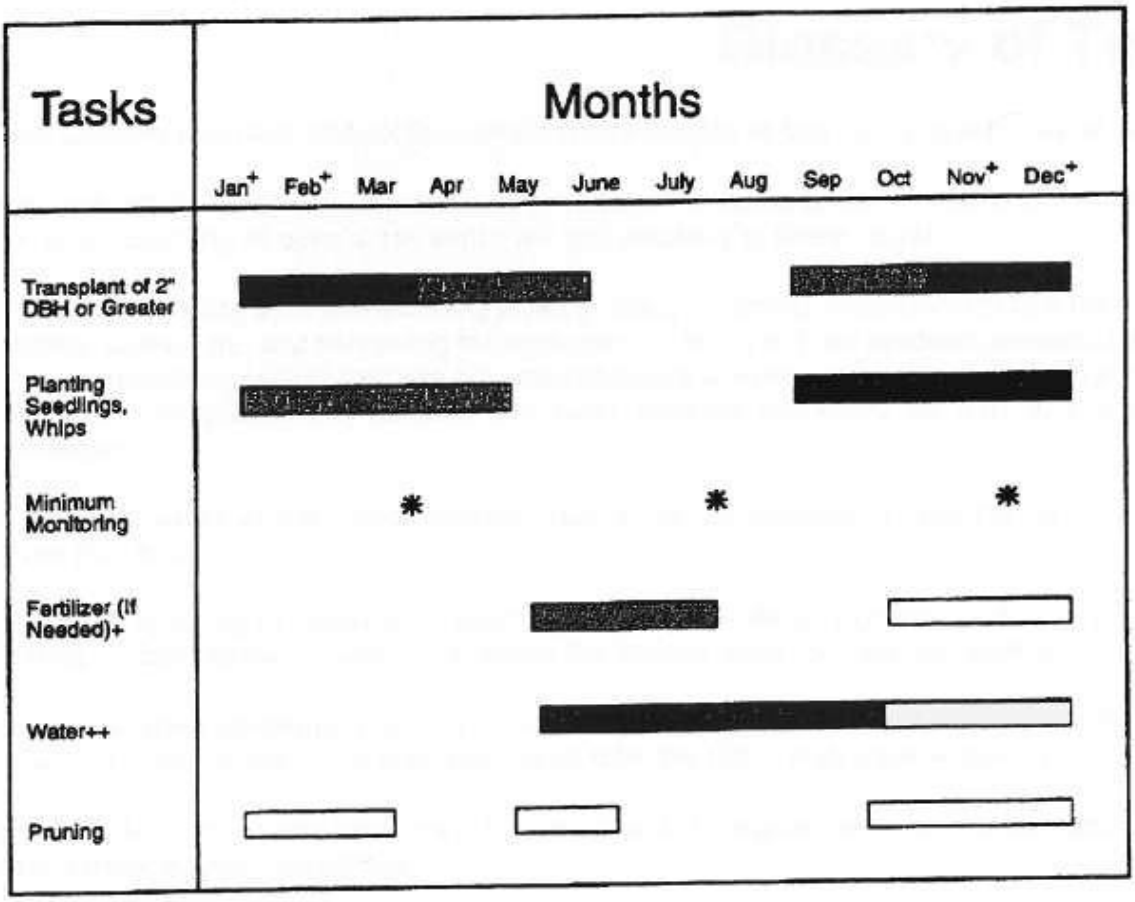
Pruning a Leader to Reduce Size



Notes:
1. Remove top weight by undercutting at A and remove limb by cutting through AB.
2. Remove stub at EF parallel to the bark branch ridge.
3. Only prune at specified times.
4. No more than 30% of crown to be removed at one time.
5. Diameter of lateral branch should be no less than 30% of the diameter of the leader.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.8.3 Fertilizer Application Calendar



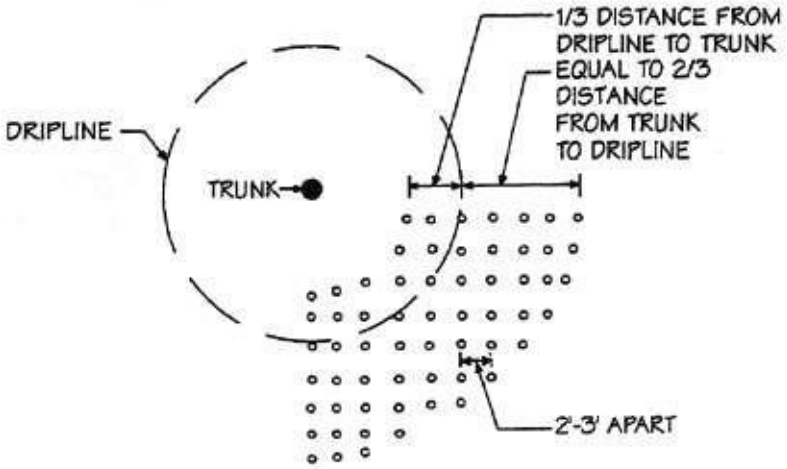
Notes:

1. Activities during November through February depend on ground conditions.
2. No fall planting of oaks and pines.
3. The planting and care of trees is most successful when coordinated with the local conditions. This calendar summarizes some of the recommended time frames for basic reforestation and stress reduction activities.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

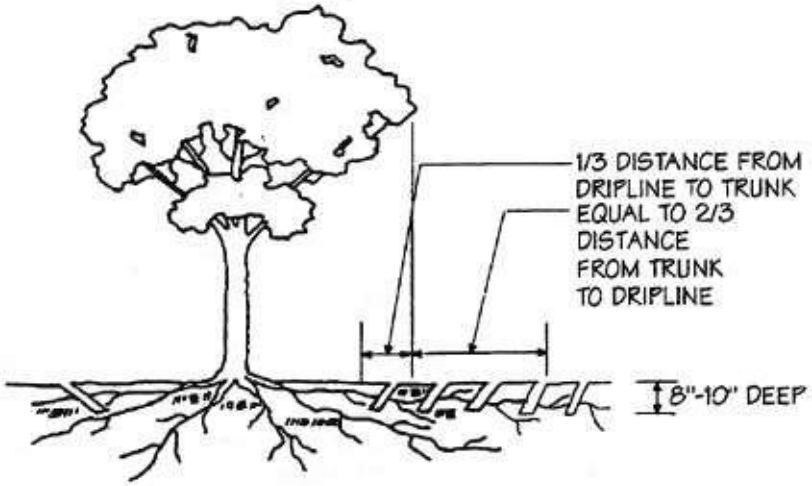
Figure 4.8.4 Punch or Pressurized Injector Fertilization

Vertical Mulching or Fertilizing



Notes:
1. Auger holes 8"-10" deep, 2'-3' apart, 1"-3" wide.
2. Leave soil on ground.
3. Apply fertilizer 1/3 distance in from dripline to trunk.
4. Fertilize with 50/50 compost and pine fines.

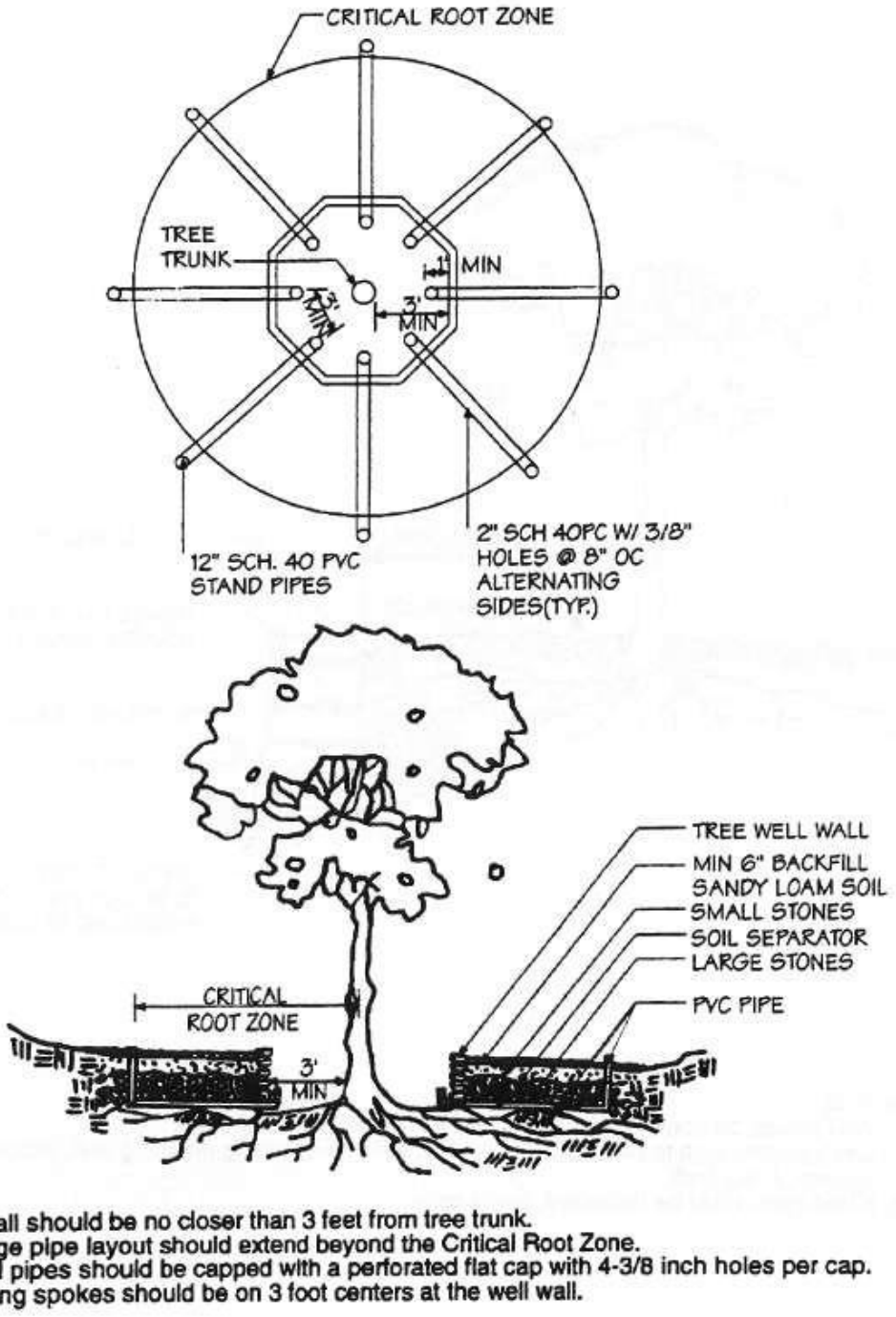
Application of Fertilizer by Injection



Notes:
1. Injection holes to be 8"-10" deep, 2'-3' apart.
2. Auger holes, do not poke. Leave soil on ground.
3. Apply fertilizer 1/3 distance in from dripline to trunk and extend 2/3 out from dripline.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

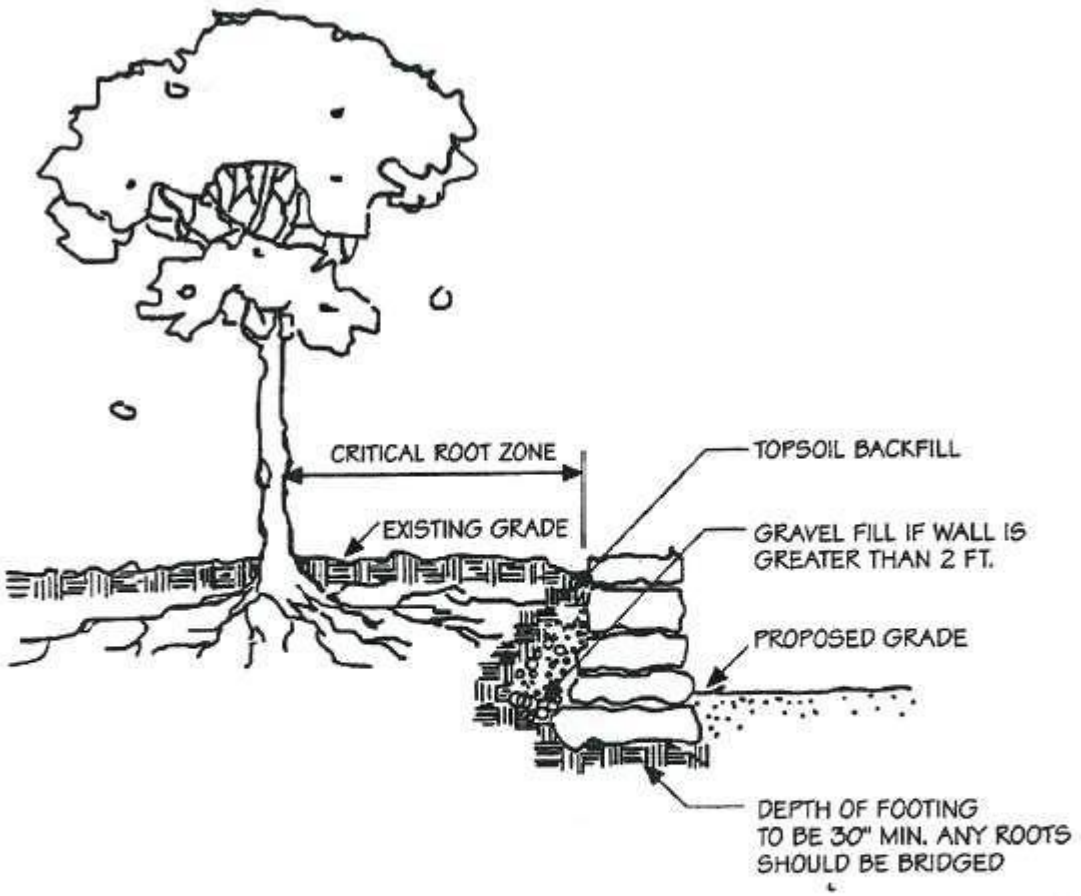
Figure 4.8.5 Tree Well and Aeration System



Notes:
1. Well wall should be no closer than 3 feet from tree trunk.
2. Drainage pipe layout should extend beyond the Critical Root Zone.
3. Vertical pipes should be capped with a perforated flat cap with 4-3/8 inch holes per cap.
4. Radiating spokes should be on 3 foot centers at the well wall.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

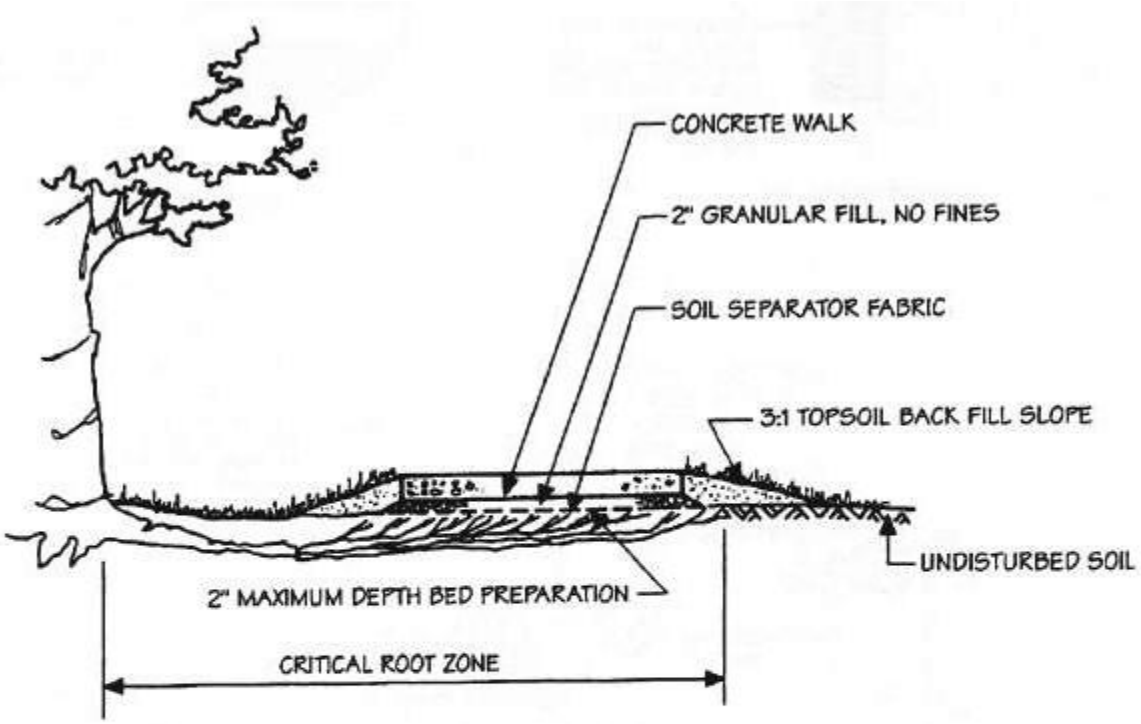
Figure 4.8.6 Retaining Wall



Notes:
1. Wall should be constructed outside the Critical Root Zone.
2. Use extreme care to protect existing roots while constructing retaining wall, including anchoring system, if required.
3. If tree roots must be disturbed, prune roots

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

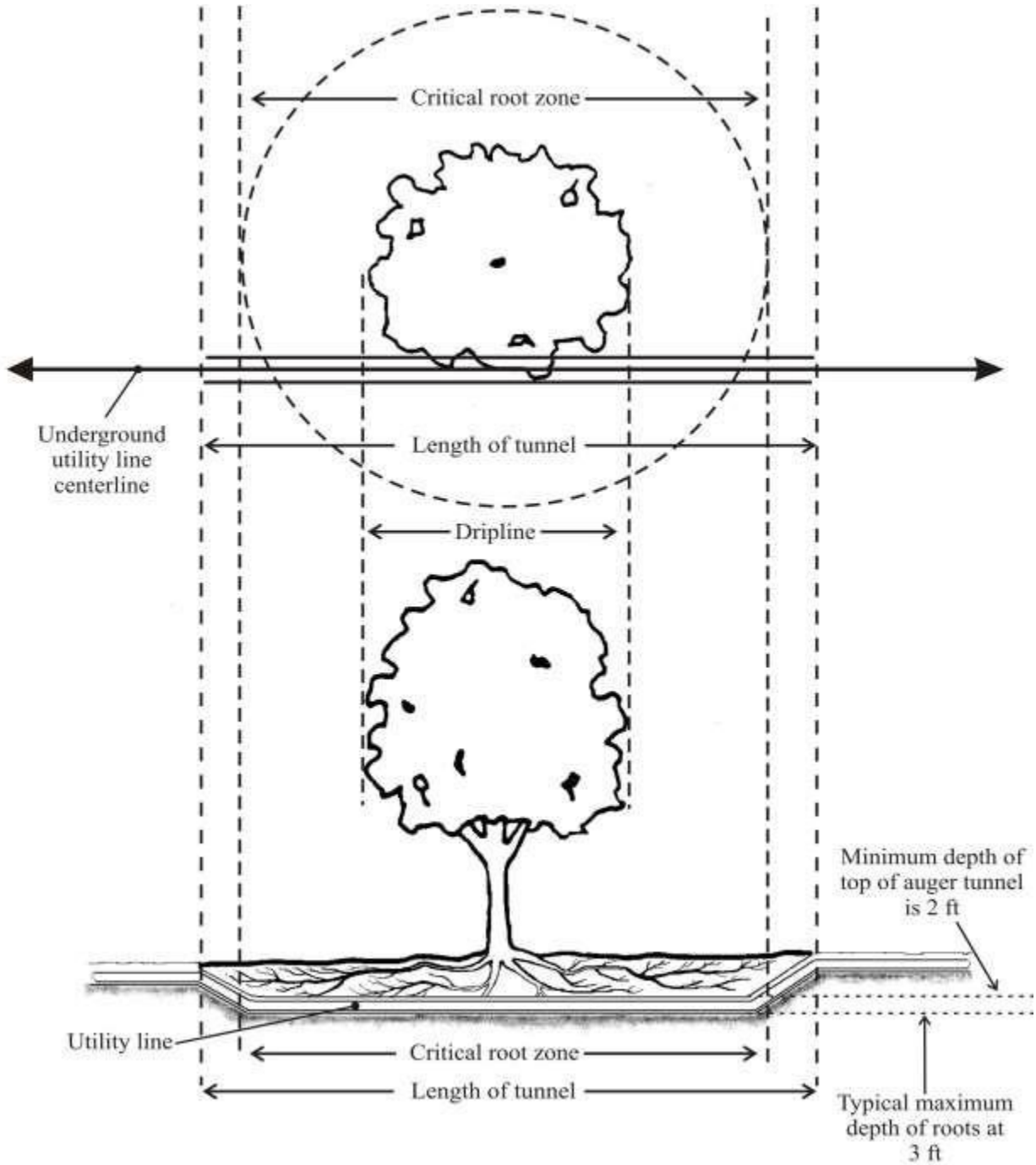
Figure 4.8.7 Raised Sidewalk



Notes:
1. Bed preparation should not exceed 2 inches
2. Granular fill should contain no fines
3. Minimize width of sidewalk as allowed by code.
4. Take extreme care of existing trees' critical root zone during construction.

Source: Ericson, T and Howell, G.P., eds. (1997) State Forest Conservation Technical Manual. Maryland Department of Natural Resources

Figure 4.8.8 Tunneling



Source: Fairfax County Government, Virginia (2001). Public Facilities Manual – Chapter 12, Tree Conservation, Vegetation Preservation and Planting http://www.fairfaxcounty.gov/dpwes/publications/pfm/ (accessed 2009)

4.9 Forest Protection Report

4.9.01 Guidelines

A Forest Protection Report shall be submitted with the FCP which describes activities occurring on the site with regard to the identified forest protection areas. The Forest Protection Report shall address:

The type of forest protection devices selected and a justification for the use of each device based on the characteristics of the site and a description of how these devices are to be installed.

A numbered detail for each forest protection device being implemented on the Forest Conservation Site Map.

The justification for any disturbance within an identified forest protection area and a description of how the mitigation is to be implemented.

A numbered detail for each mitigation measure being implemented on the Forest Conservation Site Map.

An explanation of any pre-construction, construction or post-construction activities which are scheduled with regard to the identified forest protection areas.

4.10 Afforestation and Reforestation

Following the delineation of the forest retention areas, an applicant may propose to deforest other portions of the site provided the minimum retention threshold acreage is maintained. However, the applicant will have to provide afforestation and reforestation for the portions of the site that are cleared unless there is a credit for forest retained above the forest conservation threshold. Credit for forest retention is calculated in step 12 of the Forest Conservation Worksheet. Guidelines for the required sequence for forest conservation (§267-41.A of the Development Regulations) are described under Section 4.10.05, Guidelines for Afforestation and Reforestation Techniques.

4.10.01 Management of Residual Forests

When partial clearing of a forest to make room for development occurs, the residual forest may need specialized treatments to enable it to withstand the changes imposed upon it. Methods of restabilizing altered

forest stands less than one-half acre can involve selective clearing and supplemental planting.

Selective clearing can involve removal of dominant trees that are taller than the smallest side of the stand. These trees can be removed if a healthy understory exists. Species prone to wind-throw may be removed if they are within one tree height of structures. Stumps should not be removed under any circumstance.

When clearing is completed and the residual stand left has abundant sun-sensitive species in the stand margin, supplemental edge planting of sun-tolerant plant materials is recommended.

The amount of supplemental planting needed in a stand will depend on whether the stand harbors a high regenerative population which can potentially respond to release. This can be determined from information supplied in the FSD, Stand Summary Sheet.

4.10.02 Requirements

If the applicant removes forest, afforestation and reforestation shall be applied to the site unless there is retention credit sufficient to offset the forest removal (see Section 4.3).

The applicant shall afforest the site if:

There is no existing forestland on the site; or

The existing forest cover on the site is below the afforestation thresholds established in §267-39.A(1) of the Development Regulations.

For reforestation and afforestation, the applicant shall follow the requirements established in §267-41.A and §267-41C of the Development Regulations.

4.10.03 General Guidelines

The applicant shall strive to create forested areas through afforestation and reforestation as the primary technique for satisfying the forest conservation requirements of the proposed development site.

When applying afforestation and reforestation, the applicant shall utilize the following design goals:

The integration of native forest associations into developed landscapes; and

The promotion of diverse, stable forests that are able to provide multiple benefits to the community.

The survival rate for afforestation and reforestation areas shall be at least 75% of the total number of trees planted per acre under the approved FCP, whichever is greater. The survival rate for these areas will be determined after the second year surety inspection.

To be considered as either afforestation or reforestation, planting areas shall be a minimum of 10,000 square feet and have a minimum planting width of 35 feet.

The following guidelines apply to unforested septic reserve areas 40,000 square feet and larger.

For each lot created, a maximum of 30,000 square feet of the identified septic reserve area may be utilized for afforestation or reforestation.

A minimum of 10,000 square feet of the identified septic reserve area shall remain in an unforested state to permit the installation of the septic system and one replacement system.

Septic reserve areas 10,000 square feet or less shall not be used for afforestation or reforestation plantings.

4.10.04 General Guidelines for Afforestation and Reforestation Techniques

The forest conservation priorities established in §267-41A of the Development Regulations are required to be implemented by the applicant in sequential order. Justification for the use of a lower priority shall be provided in the Afforestation and Reforestation Report (Section 4.11) and subject to final approval by the Department.

Forest conservation priorities 2, on-site afforestation using stock greater than 1.5 inches DBH, and 3, on-site afforestation using whip and seedling stock, specifically use the term "afforestation" with regard to forest replacement. The Department will also accept reforestation with regard to these priorities.

4.10.05 Specific Guidelines for Afforestation and Reforestation Techniques

Priority 1, selective clearing and supplemental planting on-site, shall be used in conjunction with priorities 2, on-site afforestation using stock greater than 1.5 inches DBH, or 3, onsite afforestation using whip and seedling stock.

If the forest conservation requirements for the site cannot, or have not, been fulfilled through afforestation and reforestation then the applicant shall utilize priority 4, on-site individual tree plantings, or 5, landscaping (Individual Tree Landscaping guidelines are found in Section 4.14).

Individual Tree Landscaping under priority 4 shall not exceed the percentage of the total forest conservation requirements identified in table 4.14.1 (Individual Tree Landscaping, Section 4.14).

Planting areas larger than 10,000 square feet will be considered afforestation or reforestation areas rather than individual tree landscaping areas.

Areas landscaped under priority 5 shall be reviewed by the Department for issues such as planting density and long term survivability. Forest conservation credit for these areas may be subject to change.

Areas proposed to be landscaped under priority 5 shall have a minimum planting area of 2500 square feet and a maximum planting area of 10,000 square feet.

Landscaped areas shall have a minimum planting width of 35 feet.

Landscaping under priority 5 shall contain, at a minimum, 7 native shade trees and 20 native shrubs per 2500 square feet of landscaped area. A listing of acceptable native understory species is included in Appendix E.

The Department will only permit the use of the natural regeneration, priorities 8 and 9, if there are no other afforestation or reforestation alternatives feasible for a development site. If natural regeneration is permitted, the Department strongly recommends that a licensed forester be consulted to manage this type of afforestation practice. Finally, it is important to note that natural regeneration areas must be managed, not left in an unattended state, to ensure that the area will meet the definition of `forest' within two years.

Natural regeneration shall only be permitted in areas of low visibility or low use either on-site or off-site.

The area selected for natural regeneration shall have a suitable regenerative source and a mechanism for distribution to create a stable population of tree species. The original seed bed or other local seed sources shall not be disturbed. Treatment is extremely species and site specific.

The area of natural regeneration shall be delineated, and labeled, on the Forest Conservation Site Map.

The applicant shall discuss in the Afforestation and Reforestation Planting Report (Section 4.11): the method of regeneration to be used; the design of the target forest association being created; proof of existing seedbank (i.e., standing seed crop, existing whips and seedlings, etc.), and how the area will be managed so that a `forest,' as defined by the Development Regulations, will be established within the two year time-frame.

The applicant shall additionally demonstrate, in the Afforestation and Reforestation Planting Report (Section 4.11), that the physical conditions of the area are suitable for encouraging natural regeneration and plant growth. At a minimum, the following topics shall be discussed:

Soils,

Sunlight,

Moisture; and

Soil stabilization material (non-turf building).

The Department will only permit the use of the off-site priorities under extraordinary circumstances. If one of the off-site priorities is permitted by the Department, the following guidelines apply.

The off-site area to be afforested and reforested by the applicant shall be in the same watershed as the proposed development.

The applicant shall supply a location for the off-site planting as part of the Forest Conservation Site Map (Section 4.4).

The applicant shall provide a justification for the proposed use of the off-site priority in the Afforestation and Reforestation Report (Section 4.11).

The Department will not accept the purchase of a existing forested area by the applicant as a fulfillment of the off-site forest conservation requirements. All off-site proposals shall be afforested by the applicant and appropriate legal protection measures, as outlined in Section 4.18, instituted on the site.

The Department will permit the purchase of additional forested area adjacent to the proposed development to avoid off-site planting; provided:

The forested area purchased is integrated into the overall forest retention, afforestation, reforestation, and individual tree planting design of the development.

4.10.06 Guidelines for Creating a Managed Edge

Forested buffers 35 feet in planting width or wider may contain the following:

A managed edge developed in accordance with this Section.

A maximum of 15 feet of the managed edge may be comprised of individual trees which can be credited under Individual Tree Planting (§267-43 of the Development Regulations), provided the other requirements of that Section are met.

If individual trees are to be utilized within the managed edge, the location managed edge shall be delineated on the Individual Tree Landscaping Map.

A typical planting detail of the proposed managed edge, complete with names of the vegetation to be planted, shall be delineated on the Individual Tree Landscaping Map.

The managed edge shall be located on the side of the buffer closest to the proposed dwellings.

On sites where some of the forested areas are to be cleared and some retained as residual stands, borders are a valuable asset to the built community, and to wildlife. Borders created in accordance with this

Section will count toward the forest conservation requirements for the site.

Naturally occurring forest edges contain a variety of small trees, shrubs, and herbaceous vegetation that require full sunlight to grow. This diversity of plants offers wildlife many sources of food and shelter. A created edge can be as effective as a naturally occurring edge in creating wildlife habitat and protecting trees within the forest.

In urban developments, the buffer or stand edge will be defined as the area from the dripline to the tree base. However, the planted border should be at least 25 feet wide and should provide a gradual change from the open area to the forest. Edges should consist of intermixed small trees, shrubs, and herbaceous material allowing for a softer edge as well as wildlife habitat.

Edge Plantings:

A forest border can provide two edges, one between the open area and the border, and the other between the border and the forest. Small trees should be planted adjacent to the forest. Shrubs should be planted next to the small trees. Herbaceous vegetation should be planted next to the shrubs. This border will soften the forest edge and make it more attractive for wildlife and the community.

Many species of trees, shrubs and vines can be used. Flowering dogwood, crabapple, serviceberry, American holly and apple trees are some small trees well adapted for use in borders. Trees should be planted 10 to 12 feet away from the forest edge.

Shrubs should be planted beyond the planted trees. Blackberry, viburnums, blueberry, sumac, elderberry and bayberry are a few shrub species that can be planted. Shrubs and vines growing naturally in the forest should be left untouched unless they are exotic or invasive species. Vines that do well are grape, Virginia creeper, trumpet vine and morning glory. Herbaceous vegetation includes certain grasses, legumes and wildflowers. Vines and herbaceous vegetation should be planted in the zone between shrubs and the open area. A list of acceptable native understory species is provided in Appendix D.

Maintenance:

A managed edge will require periodic maintenance. Maintenance

consists of fertilizing and mulching new plantings within the drip line and interior until they are established. After establishment, impact to the edge should be limited to the removal of vegetation as described in 4.10.07(F)(ii). If the area is to be maintained as shrub and herbaceous border, vegetation must be mowed one to three times, in mid-summer, every two to four years to reduce density and prevent larger trees from taking over. Pruning will also be limited to removal of material as described in 4.10.07(F)(ii).

Removal of vegetation shall be limited to invasive and exotic species, diseased, and dead limbs which hang beyond the drip line. Diseased material shall be removed from the site and disposed of to reduce the spreading of diseases. Removal shall not include dead material which is inside the drip line, including fallen material, rotten material or leaf mold.

4.10.07 Guidelines for Priority Area Reestablishment

The priorities for reestablishment in §267-41.C are all of equal weight. However, considering the site-specific nature of these priorities, the applicant shall determine which of these priorities would provide the most benefit to the environmental quality of the proposed development site. The selected priorities shall be justified in the Afforestation and Reforestation Report (Section 4.11).

Buffers mentioned in the priorities for reestablishment which are not associated with a dimension shall have a minimum planting area width of 35 feet.

4.11 Afforestation and Reforestation Report

4.11.01 Introduction

The Afforestation and Reforestation Report is an element of the FCP where the applicant has the ability to justify the proposed forest conservation to the Department. Therefore, the Afforestation and Reforestation Report should be emphasized within the FCP as the Department will stress the contents of this report, when reviewing the proposed plan with the other elements of the FCP.

4.11.02 Guidelines

The following shall be discussed in the Afforestation and Reforestation Report:

How techniques for forest retention have been exhausted.

Why priority forests and priority areas specified in §267-39.C of the Development Regulations cannot be left in an undisturbed condition.

If priority forests and priority areas cannot be remain in an undisturbed condition, how the sequence for afforestation and reforestation will be followed in compliance with §267-41.A of the Development Regulations.

Based on the proposed development site characteristics, which priority areas for reestablishment are being selected for afforestation and reforestation in compliance with §267-41.C of the Development Regulations.

4.12 Afforestation and Reforestation Planting Report

After the afforestation and reforestation areas have been delineated, a site specific planting program for the site shall be developed within the Afforestation and Reforestation Planting Report. The first step in developing an Afforestation and Reforestation Planting Report is to assess the condition of the planting sites. Items that shall be considered include soils, hydrology, and sunlight. The second step is to choose an appropriate mix of plant materials for site conditions. The final step is the specification of methods and density of planting.

4.12.01 Guidelines

At a minimum, the following elements shall be addressed in the planting report:

A narrative summary of the existing conditions with regard to each afforestation and reforestation which considers site characteristics as well as a soil evaluation; and

The methodology by which the trees are to be planted in each afforestation and reforestation area; and

A typical planting detail for each size (i.e., whip, seedling, etc.) tree and shrub; and

The types of species used for reforestation and/or afforestation; and

A plant materials table for each planting area including a plant materials source and:

Species; and

Number of Plants; and

Size of plants.

4.13 Planting in Afforestation and Reforestation Areas

Preparation of the planting area is of utmost importance for a successful afforestation or reforestation effort. If a planting is maintained, survivability may be as high as 90%, but planted trees must be able to outgrow their competition during their first two years. If the site chosen for planting has been graded, then proper drainage, air spaces in the soil and soil nutrients will have been removed and the remaining soils compacted. All of these factors are important for good tree growth, and must be replaced.

When selecting a site for planting, use the knowledge gained from the FSD to evaluate the forest type that once occupied the site. Determine the viability of the soils for planting. Plant tree species according to their needs, based on the existing soil and habitat requirements. In order to create a representative forest on a recently cut area or one adjacent to a forest, a lesser diversity of tree species for planting is adequate since seed of the original species will still be present, or seeds from the adjacent forest, such as black cherry and red maple, will blow onto the site or be carried in by birds. An isolated open field will have less diversity available to it, so a greater diversity of tree species will be required for planting.

Species should be chosen depending on their degree of tolerance. If planting in a riparian zone, it is important to consider drainage conditions, flood frequency and duration, and water table levels of the zone. Conditions of the riparian zone can dictate which species are best adapted for survival. The best places to look for good afforestation or reforestation opportunities are on rises of the floodplain or on terraces above it. If planting in a watershed with low water quality, keep in mind that trees will absorb many nutrients and accumulate them in their biomass. Deciduous trees have greater nutrient demands than conifers and are therefore more effective filters than conifers.

4.13.01 Requirements

Tree species used for afforestation and reforestation shall be selected from the list of approved tree species located in Appendix D

Afforestation and reforestation shall be completed within 2 years.

4.13.02 Guidelines

Species selection for the reforestation and afforestation areas shall be based on one of the following options.

Evaluate an adjacent forest stand and associated soils, if it is relatively undisturbed, or the nearest relatively undisturbed stand. Attempt to replicate the forest community if the site conditions remain the same. This method shall only be used if the adjacent forest stand is undisturbed.

If adjacent or nearby forest stands are disturbed, determine the forest association for the region based on the Maryland Forest Resource Inventory, and plant species found within that association. This information is available to be purchased from the Department.

Based on the seral stages represented in the forest association; plant approximately one-third pioneer species and two-thirds mid or late successional species with a canopy of 60% dominant trees and 40% understory trees.

Planting and general maintenance of trees planted for afforestation and reforestation shall be in accordance with the American Standard for Nursery Stock – ANSI Z60.1-2004.

The 2 year time-frame for completion of afforestation and reforestation identified in § 267-41D(1) in the Development Regulations will begin on the date the grading permit for the site or phase is issued.

Tree species selection and distribution should represent the natural selection process and past forest association of the site. Species native to Maryland shall be used unless shown to be unavailable. Local (within a 100 mile radius) native genetic stock is recommended for better survivability. The use of local materials is generally encouraged due to the hardiness and adaptability of local plants to local conditions.

There shall be a minimum of 5 different species used in each

afforestation or reforestation area. This guideline, however, does not apply to individual tree planting areas.

The following species are examples of fast-growing species that can outgrow invasive species during the first year: Sweet Gum, Yellow Poplar, White Ash, Green Ash, Black Locust, Black Walnut. Yellow poplar is an opportunistic species whose seed can remain in the soil for up to ten years as it waits for an opening in the forest cover.

Oaks are an example of slow-growing species. Oak acorns often become mast for wildlife or contract a worm after the first season. However, oaks are only a little shade-tolerant and can regenerate on poorer soil as long as there is no invasive growth; oaks grow slow enough that they are outgrown by faster growing species. Oak seedlings develop a root system during the first year and the seedling develops during the second year. If the seedling is not maintained during the first year, invasive plants may overtake the oak and considerably reduce its chances for survival.

All plant materials greater than 1 inch caliper shall meet or exceed the requirements of standard nurserymen specifications. It shall be the responsibility of the professional preparing the FCP to inspect all plant material. All plants shall be typical of the species and variety, shall have a normal habit of growth, and shall be first quality, sound, vigorous, well branched, and with healthy, well furnished root systems. They shall be free of disease, insect pests and mechanical injuries.

Planting stock less than 1 inch caliper shall meet the following standards:

Seedlings/Whips:

Hardwoods - 1/4" to 1/2" caliper with roots no less than 8" long.

Conifers - 1/8" to 1/4" caliper with roots not less than 8" long and top height of 6" or more.

Shrubs:

1/8" or larger caliper with 8" root system

Stocking, as a minimum standard, shall meet the density requirements described in the following table. The spacing requirements listed are not to imply that the trees must be planted in a grid pattern.

Trees per Acre	Tree Size	Spacing
150	1.5" DBH	20' x 20'
350	Hardwood Seedlings or Whips	11' x 11'
700	Seedlings	8' x 8'

The following design guidelines shall be considered when planting an afforestation or reforestation site:

Plant larger stock around the perimeter in order to protect interior smaller stock.

Mix stock size when no mechanized equipment is proposed for use on-site.

Mix stock size when seedlings are to be mulched.

Use smaller stock for understory trees and larger stock for overstory in random plantings.

Larger stock shall be used in proposed areas of high human activity (i.e., common open space areas).

Tree shelters provide protection from faster growing invasive plants, particularly in agricultural or fallow fields. Tree shelters may not be necessary in grass fields unless there is concern about other competing species. Tree shelters are especially important for use in floodplain areas because of the height of the vegetation surrounding the plantings.

A tube height of two feet or greater is generally sufficient to protect against invasive plants. Tree shelters are an effective way of protecting young seedlings, particularly oaks, but increase maintenance requirements. It is important to consider whether an investment in tree shelters outweighs the advantages of investing in larger containerized stock.

White-colored tree shelters, rather than tan-colored, may be more effective for seedlings, particularly evergreens, during periods of heat and drought.

Herbicides may be required to remove invasive and exotic plants such as Multiflora rose and Japanese honeysuckle from an afforestation or reforestation site. Herbicides can be sprayed over existing conifers, but if planting broad-leaf hardwoods, herbicides must be used prior to planting, not afterward.

A tree spade can be used for moving trees of a larger DBH, when the need exists. Spade trees should be used in areas relatively free of impervious surfaces because roots can be cut or damaged considerably and result in growth that is not aesthetically pleasing in shape. Therefore, it is best to transplant well-formed specimen trees with a tree spade.

4.14 Individual Tree Landscaping

Under the right circumstances, planting individual trees can be a desirable way to achieve a portion of the forest conservation requirements for a site while adding to the aesthetics of the proposed development. Individual Tree Landscaping also allows trees to be planted in areas that are not of a sufficient size for afforestation or reforestation.

It is important, when decisions are made concerning tree and forest replacement, that the distinction is made between option 4, Individual Tree Landscaping, and option 5, Landscaping under §267-41.A. The Individual Tree Landscaping option is designed to permit the planting of street trees, and small groups of trees, up to 10,000 square feet, where pedestrian foot traffic or other activities will occur within the dripline of the planted trees. The Landscaping option is designed to allow distinct areas between 2,500 and 10,000 square feet to be planted in a manner more consistent with traditional landscaping which includes the use of shrubs to create an understory beneath the planted trees.

If Individual Tree Landscaping is proposed for the site, an Individual Tree Landscaping Report and an Individual Tree Landscaping Map shall be submitted with the FCP.

4.14.01 Requirements

Trees planted under this priority shall have a caliper of at least 1.5 inches.

The Individual Tree Landscaping Map shall include:

A list of the proposed tree species to be utilized;

The number of trees to be planted;

A calculation of the square footage of the mature canopy of the trees; and

An overlay showing the location of the trees on the preliminary subdivision plan or the concept plan.

Trees planted under Individual Tree Landscaping option shall be credited against an applicant"s forest conservation requirements based on the square footage of the mature canopy of each tree planted.

4.14.02 Guidelines

The tree species permitted for afforestation and reforestation as well as for individual tree landscaping are identified in the Approved Plant List (Appendix D).

Areas of Individual Tree Landscaping shall be reviewed by the Department for issues such as planting density and long term survivability. Forest conservation credit for these areas may be subject to change.

Individual Tree Landscaping shall not be permitted as an option for fulfilling forest conservation requirements in Natural Resources, Low Density Residential and Medium Density Residential uses.

Individual Tree Landscaping shall not exceed the percentage of the total forest conservation requirements for the uses identified in Table 4.14.1.

Planted areas larger than 10,000 square feet will be afforestation or reforestation areas rather than individual tree landscaping areas.

Individual tree landscaping shall be completed within two (2) years.

The two (2) year time-frame for completion of the individual tree landscaping will begin on the date the grading permit for the site is issued.

Individual tree landscaping shall be located along streets, in parking areas and in other common-area sites where the plantings may provide buffering, energy conservation and other environmental benefits.

Table 4.14.1 Maximum Percentage of Total Forest Conservation Requirements which may be satisfied as Individual Tree Planting

	Land Use Designation				
		Residential	*Business*	*Institutional*	*Industrial*
Acreage of Net tract Area	0-1	10%	100%	50%	100%
	1-5	20%	50%	40%	100%
	5-10	30%	30%	30%	50%
	10-20	30%	20%	30%	30%
	20-50	30%	20%	30%	20%
	50-100	30%	10%	30%	10%
	100-200	30%	10%	30%	10%
	200 +	30%	10%	30%	10%

4.14.03 **Individual Tree Landscaping Report Guidelines**

The following elements shall be discussed in the Individual Tree Landscaping Report:

A narrative summary of each individual tree planting area, which considers existing site conditions as well as a soil evaluation.

The method by which the trees are to be planted in each individual tree planting area.

A typical planting detail for the individual tree plantings.

4.14.04 **Individual Tree Landscaping Map Guidelines**

In addition to the requirements established in the Ordinance, the Individual Tree Landscaping Map shall show:

The scale of the Individual Tree Landscaping map shall be consistent with the scale of the Forest Conservation Site Map. Sheet sizes shall either be 20 x 24 inches, 24 x 36 inches, or 30 x 42 inches.

Calculations showing the percentage of the total forest conservation requirement fulfilled by individual trees.

Mature canopy size for individual trees shall be calculated using the diameters supplied in Appendix H.

4.15 Construction Timetable

The purpose of the Construction Timetable is to graphically assimilate the elements proposed on the Forest Conservation Site Map (Section 4.4), the Forest Protection Report (Section 4.9), the Afforestation and Reforestation Report (Section 4.13) and the Individual Tree Landscaping Report (Section 4.14). The Department realizes that, due to external forces beyond the applicant"s control, the Construction Timetable cannot be exact. However, it is in the applicant"s best interest to provide the Department with as much detail as possible.

4.15.01 Requirements

The applicant shall submit a construction timetable with the FCP indicating the phasing of the project and showing the sequence for tree conservation procedures.

4.15.02 Guidelines

The Department will permit forest clearance, afforestation, reforestation, and individual tree landscaping requirements for a site to be implemented by development phase. Within the framework of the Construction Timetable, the applicant shall indicate what portion of the forest conservation requirements are to be fulfilled within a specific phase. However, afforestation, reforestation, or individual tree landscaping areas located within a phase shall be completed with that phase.

If an applicant chooses to complete afforestation, reforestation and individual tree landscaping requirements by development phase, separate surety, maintenance agreement and legal protection documents will be required per phase for the portion of the afforestation, reforestation and individual tree landscaping completed.

It shall be the responsibility of the applicant to coordinate the forest conservation requirements (i.e., clearing, afforestation, reforestation, surety) by phase, if necessary, for the development project. The Department, as a part of the FCP review process, will review the relationship between the phasing of the development site and afforestation, reforestation and individual tree landscaping.

The Construction Timetable shall correspond to a calendar year which outlines any phasing of the proposed development project and any sectioning of the proposed phases.

The following Forest conservation measures shall be indicated within the framework of the Construction Timetable for each phase and section:

Forest Protection;

Afforestation;

Reforestation;

Individual Tree Planting.

If the status of the Construction Timetable changes it shall be the responsibility of the applicant to promptly submit a revised Construction Timetable to the Department.

4.16 Maintenance Report for Areas of Afforestation, Reforestation and Individual Tree Planting

Some of the requirements of newly planted areas can be maintained by nature alone while others require human intervention. A maintenance regime should be determined by on-site environmental conditions: structure and nutrient content of the soil, and rainfall. Understanding these factors and the specific needs of the species and size of the plants used will result in a healthy forested area at the end of the maintenance period.

In addition to the Maintenance Agreement shown in Figure 4.18.1, the applicant shall provide a Maintenance Report that meets the requirements and guidelines established in this Section.

4.16.01 Requirements

The applicant shall implement a binding two (2) year maintenance agreement to all afforestation and reforestation areas. The two (2) year Maintenance Agreement will start upon receipt by the Department of Planning and Zoning of a letter stating that the trees have been planted.

The content of the maintenance agreement shall detail how afforestation and reforestation areas will be maintained to ensure protection or satisfactory establishment, including:

Watering; and

Reinforcement planting provisions if survival rates fall below the

required standards established in Section 4.10.03 of this Manual.

4.16.02 Harford County Maintenance Agreement

In applying legal protection (Section 4.18) to areas of afforestation, reforestation and individual tree landscaping, the applicant agrees to maintain these areas for a period of two (2) years (See Figure 4.18.1).

Individual tree landscaping areas shall be included in the maintenance agreement.

4.16.03 Maintenance Report Guidelines

It shall be the responsibility of the applicant to inform the Department in writing when areas of afforestation, reforestation and individual tree landscaping have been planted. The two (2) year maintenance agreement shall begin on the date that the applicant"s letter is received by the Department.

The Maintenance Report shall also address:

Fertilizing plans;

Control of competing vegetation;

Protection from disease, pests and mechanical injury; and

The name, address and telephone number of the company or individual responsible for tree care.

The Maintenance Report may indicate little or no action for watering (4.16.01.B.i), fertilizing, control of competing vegetation and protection from disease, pests and mechanical injury (4.16.02.A.i, ii, and iii), if appropriate. However, if the planting site is an agricultural, fallow, or grass field with an insufficient or exposed layer of natural soil including organic material, mulching and fertilizing may be necessary.

For off-site afforestation, reforestation and individual tree landscaping, the applicant shall present evidence of a legal right to implement the proposed maintenance agreement. Such evidence shall include either:

An executed deed conveying title to a selected site to the applicant; or

An executed conservation easement agreement; or

Written evidence of the landowner's consent to the use of a selected site; or

Other written evidence of a possessory or ownership interest in a select site.

4.17 Surety

4.17.01 Requirements

Before receiving a grading permit or a building permit, an applicant required to conduct afforestation, reforestation or individual tree planting shall furnish surety in the form of a bond, an irrevocable letter of credit, or other security approved by the Department.

The surety shall:

Assure that the afforestation, reforestation and individual tree landscaping are conducted and maintained in accordance with the approved forest conservation plan.

Be in an amount equal to the estimated cost , as approved by the Department, for areas of afforestation, reforestation and individual tree plantings.

If the Development is scheduled to be constructed in phases, cover the portion of the development within the limits of disturbance delineated in the grading plan application.

4.17.02 Guidelines

The following types of surety are acceptable for afforestation, reforestation and individual tree planting areas:

A bond which shall be made payable to Harford County; or

An irrevocable letter of credit which shall:

Be equivalent to the required bond; and

Be issued by a financial institution authorized to do business in Maryland; and Expressly state that the total sum is guaranteed to

be available and payable directly to the Department on demand in the event of forfeiture; and

Be in force until all mitigation for reforestation and afforestation and monitoring requirements have been fulfilled to the satisfaction of the Department.

The value of the surety shall be 40 cents per square foot for the total acreage of required afforestation, reforestation and individual tree landscaping.

A different amount of surety for afforestation, reforestation and individual tree landscaping may be posted if the applicant submits a bid from a landscape contractor which clearly itemizes the following costs.

Initial site preparation, including contacting `MISS UTILITY', if necessary;

Delivery of planting stock;

Plants;

Stakes and tubing, if necessary;

Deer protection, if necessary;

Mulching;

Extra fill, backfill;

Fertilizer;

Watering;

Removal of extra soil, backfill;

Maintenance - pruning, weeding, mowing, pesticides;

A two (2) year guarantee for all of the above.

The surety shall be posted to Harford County, with a completed Reforestation and Afforestation Surety Agreement (Figure 4.17.1), either prior to, or at the time, application is made for a grading permit or a building permit for the site.

Figure 4.17.1 Reforestation and Afforestation Surety Agreement

REFORESTATION AND AFFORESTATION SURETY AGREEMENT

THIS CONSERVATION AGREEMENT made this **(numerical)** day of **(month)**, 20__, by and between HARFORD COUNTY, MARYLAND, a body corporate and politic of the State of Maryland (hereinafter referred to as the "County"), and **(name)** (hereinafter referred to as "Developer").

WHEREAS, Developer is constructing a development known as **(name)**; and

WHEREAS, said property does not lie within the Chesapeake Bay Critical Overlay District; and

WHEREAS, the Harford County Zoning Code requires replacement of forest cover removed for development within the County, outside of the Chesapeake Bay Critical Area Overlay District; and

WHEREAS, the Harford County Zoning Code further provides that the Developer shall deposit a surety with Harford County to ensure all reforestation or afforestation is completed and that the reforestation or afforestation areas are adequately maintained after installation as found in Sections 267-37, 267-40, 267-41, 267-43 and 267-46; and

WHEREAS, Developer is desirous of providing said surety to the County.

WITNESSETH that for and in consideration of the mutual promise and covenants set forth herein below, and other good and valuable consideration, the parties hereto, their successors and assigns, agree as follows:

1. That pursuant to Sections 267-39, 267-40, 267-43 and 267-44 of the Harford County Zoning Code, Developer is responsible for planting **(acreage)** acres of forest to complete the construction of the development. The estimated amount of the surety is based on the costs provided in the approved Forest Conservation Plan.

2. That the applicable estimated cost is therefore **((written amount (numerical amount))** and the required surety shall be one hundred percent of this amount.

3. That a **(bond or Irrevocable Letter of Credit** in the amount of **(written amount (numerical amount))** shall be submitted to the County prior to the approval of a grading or building permit. The bond or letter of credit must be in a form approved by the County.

4. That pursuant to Section 267-45 of the Harford County Zoning Code, the surety will be held until the forested area established meets or exceeds standards specified in the Forest Conservation Manual. If, after one complete growing season from the time of planting, all components of the project meet or exceed the standards as determined by an inspection by the Department of Planning and Zoning, two-thirds (2/3) of the surety will be returned. The remainder will be released if, after the second growing season, all standards are met.

5. The Developer shall comply with all other applicable State and County laws.

6. No grading permit will be issued or approved until said bond or letter of credit is posted with the County.

7. In accordance with the Forest Conservation Plan # _____, **(acreage of planting or planting description)** shall be planted in the locations as shown on the approved Forest Conservation Plan.

8. Developer further agrees to comply with all applicable sections of the Harford County Code as it relates to the construction of this development.

AS WITNESS our hands and seals as of the date first above written.

WITNESS: Harford County, Maryland

_____ BY: _____
David R. Craig
County Executive

WITNESS:

_____ **BY:** _____
Title

Approved as to form and legal sufficiency
This ____ day of _____, 20__

Reviewed and concur this_____ day of _____, 20__

_____
Nancy L. Giorno
Deputy County Attorney

_____
C. Pete Gutwald
Director of Planning and Zoning

4.18 Legal Protection for Areas of Afforestation, Reforestation and Individual Tree Landscaping

The protection of forest conservation areas, whether on-site or off-site, is important if the forest conservation areas are to function as they were intended.

4.18.01 Requirements

The applicant shall submit a binding protective agreement with the FCP that:

Provides protection for areas of forest conservation, including areas of afforestation, reforestation, retention and individual tree plantings; and

Limits uses in areas of forest conservation to those uses that are consistent with forest conservation, including recreational activities and any forest management practice that is used to preserve forest; and

Incorporates conservation easements, deed restrictions, covenants, and other agreements as necessary.

4.18.02 Guidelines

If a final plat is to be recorded for the development site, all areas of forest retention, afforestation, reforestation and individual tree planting shall be clearly labeled as non-disturbance areas on the final plat. However, the Department may require other forms of legal protection if necessary.

If a final plat will not be recorded for the development site, the applicant will enter into the forest protection agreement with Harford County shown in Figure 4.18.1.

As part of the forest protection agreement with Harford County, a site map of the retention, afforestation, reforestation and individual tree landscaping areas shall be provided by the applicant for inclusion into the land records. The site map shall:

Be no larger than 8½"" x 1""; and

Be stamped by a licensed surveyor; and

Show the location of all afforestation, reforestation, retention and individual tree landscaping areas.

Figure 4.18.1 Declaration of Covenant and Restrictions Retention and/or Reforestation

Feb 09

DECLARATION OF COVENANTS AND RESTRICTIONS
FOREST RETENTION

THIS DECLARATION, made this ____ day of _____, 20__ by _____, hereafter referred to as "Declarant".

WHEREAS, Declarant is seized and possessed of certain land in Harford County, in the State of Maryland, acquired by virtue of a deed dated _____ from _____ to _____ and _____ recorded among the Land Records of Harford County in Liber _____ Folio_____, Tax Map_____ Parcel_____, Account No. _____ and

WHEREAS, certain County laws mandate compliance with various restrictions and/or environmental protection when developing or subdividing the property in that area; and

WHEREAS, County law provides for the retention of existing forest in relationship to development or subdivision of property, in accordance with the Declaration of Intent filed by Declarant in accordance with § 267-34.B.

WHEREAS, Declarant understands that in order to subdivide Declarant's property, certain forest or trees are required to be retained in accordance with these County laws; and

WHEREAS, Declarant understands that § 267-37.B.(13) requires the execution and recordation of this Declaration.

NOW, THEREFORE, Declarant hereby declares that the property shown on the aforesaid plat entitled "_____" and recorded in Plat Book ____, Folio____ (the "Plat"), shall be held, sold, and conveyed subject to the following easements, covenants, and/or conditions which are for the purpose of complying with the Forest Conservation provisions of the Harford County Code, and which shall run with the real property and be binding on all parties having any right, title, or interest in the described property or any part thereof, their heirs, successors and assigns, and shall inure to the benefit of each owner thereof.

1. The remaining forest on the site, designed as "Forest Retention Areas" on the Plat, shall be retained under this covenant and subject to the limitations and guidelines of the Harford County Forest Conservation Ordinance, Article VI of the Harford County Zoning Code.
2. In the event the retained forest is destroyed or must be removed from its present site, Declarant understands that a Forest Conservation Plan may have to be submitted in accordance with County law.
3. Declarant also understands and accepts that any disturbance, destruction or removal of the forest without following the due process of revising the approved Declaration of Intent or submission of Forest Conservation Plan is subject to Penalties provisions of the Forest Conservation Ordinance, § 267-48. Violations and Penalties.
4. These covenants, conditions and restrictions contained in the Declaration, are binding on Declarant, Declarant's personal representatives, successors or assigns,

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and this Declaration shall be recorded among the Land Records of Harford County upon execution by Declarant.

5. This Declaration may be terminated or amended in whole or in part with respect to all or a portion of the Property only with the written consent of both the owner of the Property, or affected portion of the Property, at the time of the termination or amendment and the then Director of the Harford County Department of Planning and Zoning. Any instrument terminating or amending this Declaration must be recorded in the Land Records of Harford County, Maryland.

The provisions of this Declaration shall be enforceable by Declarant and/or Harford County, Maryland.

Any person other than Declarant who violates the provisions of this Declaration and/or applicable County Law shall indemnify and hold Declarant harmless from all costs, expenses, fines and penalties incurred or imposed, including attorney's fees incurred by Declarant, as result of such violation.

Witness:

_____ _____

(SEAL)

STATE OF MARYLAND, COUNTY OF HARFORD, TO WIT:

I HEREBY CERTIFY that on this ____ day of _____, 20__, before me, the subscriber, a Notary Public of the State of Maryland, in and for the County aforesaid, personally appeared _____ , who are known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged the foregoing Declaration to be *(his or her)* act in said capacity.

AS WITNESS my hand and Notarial Seal.

My Commission Expires:

_____ _____

Notary Seal

5.0 Chapter 5
ABBREVIATED PROCESS

5.1 Introduction

The provisions of § 267-38 of the Development Regulations establish forest conservation procedures for certain minor residential subdivisions under an Abbreviated Process. The Abbreviated Process applies differentially to minor subdivisions based on the proposed forest clearance. The Abbreviated Process requirements in this Chapter apply to minor subdivisions of five lots or fewer that will result in the cutting, clearing, or grading of 20,000 square feet, or less, of forest. The Abbreviated Process guidelines in this Chapter are applicable to subdivisions of five (5) lots or fewer that will result in the cutting, clearing or grading of more than 20,000 square feet of forest.

Subdivision activity under the Abbreviated Process is limited to a total of five lots per parcel. Upon reaching the five (5) lot limit, additional minor subdivisions shall not be accepted for a parcel under the Abbreviated Process regardless of forest clearance. This does not restrict further parcel subdivision, including minor subdivisions, but these subdivisions must be in full conformance with Chapter 3 and Chapter 4 of this Manual.

Forest disturbance, under an abbreviated process application, shall be cumulatively measured on the parcel as it was described in the Land Records as of the effective date of County Council Bill No. 93-11, June 14, 1993.

5.2 Abbreviated Process Requirements

5.2.02 **Requirements**

A person is not required to submit a Forest Stand Delineation or a Forest Conservation Plan for a subdivision of five (5) or fewer residential lots if:

Development will not result in the cutting, clearing, or grading of:

A cumulative total of more than 20,000 square feet of forest on the parcel; and

Forest that is subject to an approved Forest Conservation Plan.

The person files with the preliminary subdivision plan a Declaration of Intent stating that development will be conducted in accordance with

the requirements of this Section.

The forest to be retained on the parcel is designated as such on the preliminary subdivision plan and the final subdivision plat.

5.3 Abbreviated Process Guidelines

5.3.01 Guidelines

If an applicant proposes a minor subdivision that will cumulatively cut, clear or grade more than 20,000 square feet of forest, per parcel, the applicant shall submit to the Department:

A FSD which contains the following elements:

A Forest Survey Map for the site showing a minimum of two (2) plots, and a maximum of ten (10) plots per forest stand; and

Forest Structure Analysis Data Sheets for each of the plots; and

An Environmental Features Map for the site; and

A Narrative for the site.

A FCP for the site in accordance with the guidelines established in Chapter 4 of this Manual.

Appendix A

Harford County Highly Erodible and Hydric Soils 2007

As defined by COMAR 27.01.01, 30 & 32: highly erodible soils = soils with a slope greater than 15% or with a "K" value > .35 and slope of >5%; hydric = soils wet enough to periodically produce anaerobic conditions**, thereby influencing the species composition and growth, or both, of plants on these soils.

Abr	Soil name	Soil type	Soil type	K#	Description	Slopes %
AdA	Aldino		Hydric †	.43	Silt loam	0-3
AdB	Aldino	Potentially erodible	Hydric †	.43	Silt loam	3-8
AdC	Aldino	Erodible	Hydric †	.43	Silt loam	8-15
AsB	Aldino	Potentially erodible	Hydric †	.37	Very stony loam	0-8
Av	Alluvial		Hydric	.43	Flood plain	
BaA	Baile		Hydric	.43	Silt loam	0-3
BaB	Baile	Erodible	Hydric	43	Silt loam	3-8
BeA	Beltsville		Hydric †	.43	Silt loam	0-2
BeB	Beltsville		Hydric †	.43	Silt loam	2-5
BeC	Beltsville	Erodible	Hydric †	.43	Silt loam	5-10
BrC2	Brandywine			.20	Gravelly loam	8-15
BrD3	Brandywine	Erodible		.20	Gravelly loam	15-25
BrE3	Brandywine	Erodible		.20	Gravelly loam	25-45
CcC2	Chester	Erodible		.32	Silt loam	8-15
CgD2	Chester	Erodible		.28	Gravelly silt loam	15-25
ChB2	Chillum			.43	Silt loam	2-5
CkC2	Chillum-Neshaminy			.43	Silt loam	2-5
Cu	Codorus		Hydric †	.43	Silt loam	
Cv	Comus			.43	Silt loam	
Cx	Cut and fill					
DcA	Delanco		†	.37	Silt loam	0-3
DcB	Delanco	Potentially erodible	†	.37	Silt loam	3-8
En	Elkton		Hydric	.43	Silt loam	
EhC2	Elioak	Erodible		.32	Silt loam	8-15
EsA	Elsinboro			.37	Loam	0-2
EsB2	Elsinboro			.37	Loam	2-5
EsC2	Elsinboro	Erodible		.37	Loam	5-10
EvC	Evesboro			.17	Loamy sand	5-15
Fs	Fallsington		Hydric	.32	Loam	
GcB2	Glenelg			.32	Loam mod erode	3-8

May have a high water Table without anaerobic conditions. Example: Delanco has a seasonal high water Table in late winter/early spring, but little or no biological activity using oxygen. Delanco is not hydric, but may have hydric inclusions.

† Soils may contain hydric soil inclusions in depressions, low areas, drainageways and seepage areas.

Abr	Soil name	Soil type	Soil type	K#	Description	Slopes %
GcC2	Glenelg	Erodible		.32	Loam mod erode	8-15
GcC3	Glenelg	Erodible				8-15
GcD2	Glenelg	Erodible		.32	Loam mod erode	15-25
GcD3	Glenelg	Erodible		.32	Loam sev erode	15-25
GgD2	Glenelg	Erodible		.32	Gravelly loam	15-25
GgD3	Glenelg	Erodible		.32	Gravelly loam	15-25
GnA	Glenville		Hydric †	.32	Silt loam	0-3
GnB	Glenville		Hydric †	.32	Silt loam	3-8
Hb	Hatboro		Hydric	.49	Silt loam	
JpB	Joppa			.28	Gravelly sandy	2-5
JpC	Joppa			.28	Gravelly sandy	5-10
KeB	Kelly	Potentially erodible	Hydric †	.37	Silt loam	3-8
KeC2	Kelly	Erodible	Hydric †	.43	Silt loam	8-15
KfD	Kelly	Potentially erodible	†	.24	Stony silt loam	3-25
KpA	Keyport		Hydric †	.43	Silt loam	0-2
KpB	Keyport		Hydric †	.43	Silt loam	2-5
KrA	Kinkora		Hydric	.43	Silt loam	0-3
KrB	Kinkora	Erodible	Hydric	.43	Silt loam	3-8
LeD2	Legore	Erodible		.32	Silt loam	15-25
LeE	Legore	Erodible		.32	Silt loam	25-50
LfD	Legore	Erodible		.24	Very stoney silt loam	15-25
LfE	Legore	Erodible		.24	Very stoney silt loam	25-45
LgD3	Legore	Erodible		.24	Silty clay loam	15-25
Lr	Leonardtown		Hydric	.43	Silt loam	
LyB	Loamy Clayey			.17		0-5
LyD	Loamy Clayey	Potentially erodible		.17		5-15
LyE	Loamy Clayey	Erodible		.17		15-30
MbB2	Manor	Potentially erodible		.37	Loam mod erode	3-8
MbC2	Manor	Erodible		.37	Loam mod erode	8-15
MbC3	Manor	Erodible		.37	Loam sev. Erode	8-15
MbD2	Manor	Erodible		.37	Loam mod erode	15-25
MbD3	Manor	Erodible		.37	Loam sev. Erode	15-25
McB2	Manor Channery	Potentially erodible		.37	Loam mod erode	3-8
McC2	Manor Channery	Erodible		.37	Loam mod erode	8-15
McC3	Manor Channery	Erodible		.37	Loam sev. Erode	8-15

May have a high water Table without anaerobic conditions. Example: Delanco has a seasonal high water Table in late winter/early spring, but little or no biological activity using oxygen. Delanco is not hydric, but may have hydric inclusions.

† Soils may contain hydric soil inclusions in depressions, low areas, drainageways and seepage areas.

Abr	Soil name	Soil type	Soil type	K#	Description	Slopes %
GcC2	Glenelg	Erodible		.32	Loam mod erode	8-15
GcC3	Glenelg	Erodible				8-15
GcD2	Glenelg	Erodible		.32	Loam mod erode	15-25
GcD3	Glenelg	Erodible		.32	Loam sev erode	15-25
GgD2	Glenelg	Erodible		.32	Gravelly loam	15-25
GgD3	Glenelg	Erodible		.32	Gravelly loam	15-25
GnA	Glenville		Hydric †	.32	Silt loam	0-3
GnB	Glenville		Hydric †	.32	Silt loam	3-8
Hb	Hatboro		Hydric	.49	Silt loam	
JpB	Joppa			.28	Gravelly sandy	2-5
JpC	Joppa			.28	Gravelly sandy	5-10
KeB	Kelly	Potentially erodible	Hydric †	.37	Silt loam	3-8
KeC2	Kelly	Erodible	Hydric †	.43	Silt loam	8-15
KfD	Kelly	Potentially erodible	†	.24	Stony silt loam	3-25
KpA	Keyport		Hydric †	.43	Silt loam	0-2
KpB	Keyport		Hydric †	.43	Silt loam	2-5
KrA	Kinkora		Hydric	.43	Silt loam	0-3
KrB	Kinkora	Erodible	Hydric	.43	Silt loam	3-8
LeD2	Legore	Erodible		.32	Silt loam	15-25
LeE	Legore	Erodible		.32	Silt loam	25-50
LfD	Legore	Erodible		.24	Very stoney silt loam	15-25
LfE	Legore	Erodible		.24	Very stoney silt loam	25-45
LgD3	Legore	Erodible		.24	Silty clay loam	15-25
Lr	Leonardtown		Hydric	.43	Silt loam	
LyB	Loamy Clayey			.17		0-5
LyD	Loamy Clayey	Potentially erodible		.17		5-15
LyE	Loamy Clayey	Erodible		.17		15-30
MbB2	Manor	Potentially erodible		.37	Loam mod erode	3-8
MbC2	Manor	Erodible		.37	Loam mod erode	8-15
MbC3	Manor	Erodible		.37	Loam sev. Erode	8-15
MbD2	Manor	Erodible		.37	Loam mod erode	15-25
MbD3	Manor	Erodible		.37	Loam sev. Erode	15-25
McB2	Manor Channery	Potentially erodible		.37	Loam mod erode	3-8
McC2	Manor Channery	Erodible		.37	Loam mod erode	8-15
McC3	Manor Channery	Erodible		.37	Loam sev. Erode	8-15

May have a high water Table without anaerobic conditions. Example: Delanco has a seasonal high water Table in late winter/early spring, but little or no biological activity using oxygen. Delanco is not hydric, but may have hydric inclusions.

† Soils may contain hydric soil inclusions in depressions, low areas, drainageways and seepage areas.

Abr	Soil name	Soil type	Soil type	K#	Description	Slopes %
McD2	Manor Channery	Erodible		.37	Loam mod erode	15-25
McD3	Manor Channery	Erodible		.37	Loam sev. Erode	15-25
MdE	Manor	Erodible		.32	Stony loam	25-45
MfE	Manor	Erodible		.37	Soils	25-45
MgC	Manor and Glenelg			.32	Very stoney	3-15
MgD	Manor and Glenelg	Erodible		.32	Stoney loam	15-25
MkA	Matapeake			.49	Silt loam	0-2
MkB	Matapeake			.49	Silt loam	2-5
MlA	Mattapex		Hydric †	.43	Silt loam	0-2
MlB	Mattapex		Hydric †	.43	Silt loam	2-5
NsD	Neshaminy and Montalto	Erodible		.24	Stony silt loam	15-25
NsE	Neshaminy and Montalto	Erodible		.24	Very stony silt loam	25-45
Ot	Othello		Hydric	.32	Silt loam	
Sa	Sand and Gravel		Hydric †	.02		
ShB2	Sassafras			.28	Sandy loam mod erode	2-5
ShC2	Sassafras			.28	Sandy loam mod erode	5-10
SlB2	Sassafras			.28	Loam mod erode	2-5
SlC2	Sassafras			.28	Loam mod erode	5-10
SsD	Sassafras and Joppa			.28	Soils	10-15
SsE	Sassafras and Joppa	Erodible		.28	Soils	15-30
Sw	Swamp		Hydric			
Tm	Tidal marsh		Hydric			
WaA	Watchung		Hydric	.43	Silt loam	0-3
WaB	Watchung	Erodible	Hydric	.43	Silt loam	3-8
WcD	Watchung	Erodible	Hydric	.43	Very stony silt loam	0-8
WhC2	Whiteford	Potentially erodible		.32	Silt loam	8-15
WoB	Woodstown		Hydric †	.32	Loam	0-5

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† Soils may contain hydric soil inclusions in depressions, low areas, drainageways and seepage areas.

Prime Agricultural Soils
For
Harford County, Maryland

The following soil mapping units are considered to be prime agricultural soils by the Harford County Soil Conservation District. As part of a Forest Stand Delineation, prime agricultural soils must be highlighted on the Environmental Features Map.

CgB2 - CHESTER GRAVELY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

CcA - CHESTER SILT LOAM, 0 TO 3 PERCENT SLOPES.

Ccb2 - CHESTER SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

CHb2 - CHILLUM SILT LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED.

Cu - CODORUS SILT LOAM.

Cv - COMUS SILT LOAM.

DcA - DELANCO SILT LOAM, 0 TO 3 PERCENT SLOPES.

DcB - DELANCO SILT LOAM 3 TO 8 PERCENT SLOPES.

EhB2 - ELIOAK SILT LOAD, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

EsA - ELSINBORO LOAM, 0 TO 2 PERCENT SLOPES.

EsB2 - ELSINBORO LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED.

GgB2 - GLENELG GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

GnA - GLENVILLE SILT LOAM, 0 TO 3 PERCENT SLOPES.

GnB - GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES.

LeB2 - LEGORE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

MbB2 - MANOR LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

MkA - MATAPEAKE SILT LOAM, 0 TO 2 PERCENT SLOPES.

MkB - MATAPEAKE SILT LOAM, 2 TO 5 PERCENT SLOPES.

MIA - MATTAPEX SILT LOAM, 0 TO 2 PERCENT SLOPES.

MIB - MATTAPEX SILT LOAM, 2 TO 5 PERCENT SLOPES.

MsA - MONTALTA SILT LOAM, 0 TO 3 PERCENT SLOPES.

MsB2 - MONTALTO SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

NeA - NESHAMINY SILT LOAM, 0 TO 3 PERCENT SLOPES.

NcB2 - NESHAMINY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED.

SIB2 - SASSAFRAS LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED.

ShB2 - SASSAFRASS SANDY LOAM, 2 TO 5 PERCENT SLOPES, MODERATELY ERODED.

WhB - WHITEFORD SILT LOAM, 3 TO 8 PERCENT SLOPES.

WoB - WOODSTOWN LOAM, 0 TO 5 PERCENT SLOPES.

Appendix B

Basal Area Calculation

Basal Area

By David R. Larsen

Basal area per tree is the cross-sectional area of a tree at breast height. It can be calculated from Diameter at breast height (DBH) by the following formula:

$$BA = \frac{\pi}{4*144} DBH^2$$

$$BA = 0.005454154 * DBH^2$$

where

BA is basal area per tree.
DBH is the diameter at breast height.
B is the constant 3.1415.

Basal area per acre is the sum of all the basal area per tree in the acre. Basal area per acre or hectare is a standard measure of the size-density relationship in a stand.

$$BA/ac = \sum_{i=1}^{n} BA_i w_i$$

where:

BA/ac is the Basal area per acre,
BA_i is the Basal area per tree for the *i*th tree
w_i is the sample expansion factor weight.

Appendix C

Techniques for Forest Stand Structure Data Collection

The Plot Sampling Data Form, Stand Summary Form and Forest Stand Structure Analysis sheet, along with other forest stand data, are used to determine the retention potential of the stand. All values are based on the 1/10th acre sample. If alternative plot sample sizes are used, these values are not directly applicable. To measure the value of the forest structure, sample in the following way:

1. Within the 1/10th acre circular plot, select four sample points on the edge and one in the center of the circle, as follows:

2. Measure the presence or absence of forest structure parameters at each sample point by recording "yes" or "no" on the Forest Structure Rating (FSR) chart (Plot Sampling Data Form). Measure the forest structure parameters as follows:

    1) Canopy coverage: Visually estimate the percent areal coverage. Use one of two methods: look straight up, or look through a sampling tube constructed from 1 1/2" diameter by 4" length tube (same size as a toilet paper tube). Hold tube vertically. *Note:* record multiple-stemmed trees on the form, as, for example, A/B/C.

    2) Native herbaceous vegetation: Visually estimate using one of two methods: look straight down, or randomly toss a two foot diameter circle and observe vegetation within the frame. During the winter (November through March), if no herbaceous material is present and the forest structure rating appears to be 0, examine the soil for organic material (i.e., stalks, leaves, etc.) indicative of the previous year's growth, and the potential for spring ephemerals.

    3) Dead/downed woody material: Visually estimate using one of two methods: look straight down, or randomly toss a two foot diameter circle and observe material within the frame.

    4) Exotic/invasive species: Visually estimate using one of two methods: look straight down, or randomly toss a two foot diameter circle and observe vegetation within the frame. If exotic or invasive plants are observed vertically, note this on the sampling sheet.

5) Calculate the number and species of shrubs in a 1/100 acre plot.

3. Calculate on the FSR chart the percentages of "yes" for each parameter on the plot.

> *Note:* On the FSR chart, due to the natural attrition of invasive plants as forested areas mature, no percentage amount is applied to invasive plants during the analysis of the forest stand. Therefore, a plot percentage for the Invasive Plant Cover category is not required. However, fill in the chart (yes or no) for invasive plants observed at each point. Comment on the Plot Sampling Data Form. In certain cases, the presence of exotic and/or invasive plants is great enough to affect the priority rating of a stand. If exotic and/or invasive plants are predominant throughout the stand, comment in the Narrative as well.

4. Once all five points have been sampled and recorded in the FSR chart on the Plot Sampling Data Form, and all plots have been sampled within a stand, average the plot percentages to determine stand percentages for the above parameters.

5. The Stand Summary Form lists information collected from all plots in each forest stand. Record the averaged percentages in the FSR section of the Stand Summary Form. List the number of shrub species per stand in this section of the form, as well.

6. Complete the rest of the Stand Summary Form. Complete the top section using information collected on rest of the Plot Sampling Data Form.

7. Use the Forest Stand Structure Analysis (FSSA) sheet to measure the forest stand structure value based on the percentages, and numbers, on the Stand Summary Form. Record the number of points a percentage in the FSR section receives by correlating its percentage with the corresponding numbers (i.e., 3,2,1,0) on the FSSA sheet. Write the point value in the associated column on the Stand Summary Form.

8. Add the points in the column. Determine the value of the forest stand structure by checking the points against the Forest Structure Value scale (high priority, good, poor) on the Forest Stand Structure Analysis sheet. Write the Forest Stand Structure Value for each stand on the Stand Summary Form.

Forest Stand Structure Analysis

Match the parameter percentages per stand (listed on the Stand Summary Form) with the corresponding point value (3,2,1,0) for each parameter listed below. Record the parameter points in the corresponding column on the lower half of the Stand Summary Form. All values are based on the 1/10th acre sample.

1. Percent Canopy Closure	
70%-100%	3
40%-69%	2
10%-39%	1
0%-9%	0

5. Size Class-Dominant Trees	
D,E	3
B,C	2
A	1
0"-1"	0

+2. No. Shrubs per 1/100 Acre	
6 or more	3
4-5	2
2-3	1
0-1	0

+6. Percent Herbaceous Cover	
75%-100%	3
25%-74%	2
5%-24%	1
0%-4%	0

3. No. Dead Trees per Plot	
3 or more	3
2	2
1	1
0	0

7. No. Tree Species per Plot	
6 or more	3
4-5	2
2-3	1
0-1	0

4. Percent of Dead/Downed Woody Material Present	
15%-100%	3
5%-14%	2
2%-4%	1
0%-1%	0

+ = not measured from November - March

Forest Stand Structure Value Scale To determine habitat value:

Range of total forest stand structures from samples taken:	Point Totals April-October:	Nov.-March:
Priority forest structure	15-21	11-15
Good forest structure	7-14	6-10
Poor forest structure	0-6	0-5

Appendix D

Harford County
Approved Plant List
April 2019

The Harford County Approved Plant list includes:

- Permitted tree and plant species for afforestation and reforestation,
- Permitted street tree species, and
- Permitted tree and plant species for individual landscaping

Please note that not all of the plants on this list are native Maryland species, and therefore not all of the plant species on this list can be used to meet mitigation requirements within the Chesapeake Bay Critical Area. Please refer to the Native Plants list from US Fish and Wildlife, on Harford County's website, for a comprehensive list of appropriate native plant species to use in the Critical Area.

Plant Species Permitted for Afforestation and Reforestation

Trees

Scientific Name	Common Name
Acer negundo	Boxelder
Acer rubrum	Red maple
Acer saccharum	Sugar maple
Acer saccharinum	Silver Maple
Amelanchier canadensis	Shadbush serviceberry
Betula lenta	Black or Sweet Gum
Betula nigra	River birch
Carpinus caroliniana	American hornbeam
Carya cordiformis	Bitternut hickory
Carya glabra	Pignut hickory
Carya ovata	Shagbark hickory
Carya tomentosa	Mockernut hickory
Catalpa speciosa	Northern catalpa
Celtis occidentalis	Common hackberry
Cercis canadensis	Eastern redbud
Cornus florida	Flowering dogwood
Crataegus crus-galli	Cockspur hawthorn
Crataegus pruinosa	Frosted hawthorn
Crataegus punctata	Dotted hawthorn
Diospyros virginiana	Common persimmon
Fagus grandifolia	American beech
Hamamelis virginiana	Common witchhazel
Juglans cinerea	Butternut
Juglans nigra	Black walnut
Juniperus virginiana	Eastern red cedar
Larix laricinia	Eastern larch, tamarack
Liquidambar styraciflua	American Sweet Gum
Liriodendron tulipifera	Tulip poplar
Magnolia virginiana	Sweetbay Magnolia
Morus rubra	Red Mulberry
Nyssa sylvatica	Black tupelo/ Black Gum
Ostrya virginiana	American hophornbeam
Pinus echinata	Shorleaf Pine
Pinus rigida	Pitch Pine
Pinus strobus	Eastern white pine
Pinus virginiana	Viginia pine

Plant Species Permitted for Afforestation and Reforestation

Trees cont.

Scientific Name	Common Name
Platanus occidentalis	Sycamore
Populus deltoides	Eastern cottonwood
Populus grandidentata	Bigtooth aspen
Populus heterophylla	Swamp cottonwood
Prunus serotina	Black cherry
Prunus virginiana	Choke cherry
Quercus alba	White oak
Quercus bicolor	Swamp white oak
Quercus coccinea	Scarlet oak
Quercus imbricaria	Shingle oak
Quercus marilandica	Blackjack oak
Quercus michauxii	Swamp Chestnut oak
Quercus montana	Chestnut oak
Quercus palustris	Pin oak
Quercus phellos	Willow oak
Quercus rubra	Northern red oak
Quercus stellata	Post oak
Quercus velutina	Black oak
Robinia pseudoacacia	Black locust
Salix nigra	Black willow
Sassafras albidum	Common sassafras
Tilia americana	American basswood
Tsuga canadensis	Eastern hemlock
Ulmus rubra	Slippery elm

Plant Species Permitted for Afforestation and Reforestation

Understory Shrubs

Scientific Name	Common Name
Alnus serrulata	Alder
Aronia arbutifolia	Red Chokeberry
Cephalanthus occidentalis	Buttonbush
Clethra alnifolia	Pepperbush
Cornus amomum	Silky Dogwood
Euonymus americanus	Strawberry bush
Gaylussacia frondosa	Blue Huckleberry
Ilex verticillata	Winterberry
Kalmia latifolia	Mountain Laurel
Leucothoe racemosa	Fetterbush
Lindera benzoin	Spicebush
Rhododendron atlanticum	Dwarf Azalea
Rhododendron canescens	Mountatin Azalea
Rhododendron periclymenoides	Pink Azalea
Rhododendron arborescens	Smooth Azalea
Rhododendron viscosum	Swamp Azalea
Rhododendron maximum	Rosebay
Rosa palustris	Swamp Rose
Sambucus canadensis	Elderberry
Vaccinium corymbosum	Highbus Blueberry
Vaccinium vacillans	Lowbush Blueberry
Viburnum acerifolium	Mapleleaf viburnum
Viburnum dentatum	Southern Arrowood
Viburnum prunifolium	Blackhaw
Viburnum recognitum	Northern Arrowood

Hebaceous Plants, Grasses and Grasslike plants

Scientific Name	Common Name
Acorus calamus	Sweetflag
Agrostis alba	Redtop
Agrostis perennans	Upland Bluegrass
Alisma subcordatum	Mud plaintain
Carex spp.	Sedges
Cyperus spp.	Nutsedges
Eleocharis spp.	Spikerushes
Elymus virginica	Virginia Wildrye
Festuca rubra	Red Fescue

Plant Species Permitted for Afforestation and Reforestation

Hebaceous Plants, Grasses and Grasslike plants cont.

Scientific Name	Common Name
Glyceria striata	Fowl Manna grass
Iris versicolor	Blue Iris
Juncus effusus	Common rush
Leersia oryzoides	Rice cutgrass
Panicum virgatum	Switch grass
Peltandra virginica	Arrow arum
Poa palustris	Fowl Bluegrass
Poa trivialis	Rough Bluegrass
Poa sylvestris	Woodland Bluegrass
Pontederia cordata	Pickerelweed
Rhynchospora	Beaksedge
Sagittaria latifolia	Duck Potato
Scirpus spp.	Bulrushes
Sparganium americanum	Bur-reed
Tridens flavus	Purpletop
Typha angustifolia	Narrowleaf cattail
Typha latifolia	Common cattail
Zizania aquatica	Wild rice

Hebaceous Plants, Fern and Fern Allies

Scientific Name	Common Name
Adiantum pedatum	Maidenhair fern
Athyrium filix-femina	Lady fern
Dryopteris spinulosa	Spinulose Woodfern
Lycopodium fabelliforme	Ground cedar
Lycopodium lucidum	Shining Clubmoss
Lycopodium obscurum	Rare Clubmoss
Onoclea sensibilis	Sensitive Fern
Osmunda cinnamomea	Cinnamon fern
Osmunda regalis	Royal fern
Polystichium acrosticoides	Christmas fern
Thelypteris noveboracensis	New York fern
Thelypteris thelypteroides	Marsh fern
Woodwardia areolata	Netted Chainfern
Woodwardia virginica	Virginia Chainfern

Plant Species Permitted for Afforestation and Reforestation

Hebaceous Plants, Broadleaf types

Scientific Name	Common Name
Apocynum cannabinum	Rosemallow Indian hemp
Arisaema triphyllum	Jack-in-the pulpit
Aster novae-angliae	New England aster
Bidens frondosa	Devil's Beggars-ticks
Boehmeria cylindrica	False nettle
Claytonia virginica	Spring beauty
Eupatorium fistulossum	Joe-pye weed
Eupatorium perfoliatum	Boneset
Eurpybia paluclosa	Swamp aster
Hibiscus moscheutos	Rose mallow
Hypericum punctatum	Spotted St. Johnswort
Impatiens capensis	Jewelweed
Lobelia cardinalis	Cardinal flower
Lobelia siphilitica	Great blue Lobelia
Ludwigia alternifolia	Seedbox
Mimulus alatus	Monkeyflower
Symplocarpus foetidus	Skunk cabbage
Polygonum hydropiperoides	Swamp Smartweed
Polygonum hydropiper	Waterpepper Smartweed
Polygonum punctatum	Dotted Smartweed
Polygonum sagittatum	Arrowleaf tearthumb
Verbena hastata	Blue Vervain
Verbena urticifolia	White Vervain
Vernonia noveboracensis	New York ironweed

Sources:

Hightshoe, G. (1988) Nature Trees Shrubs and Vines for Urban and Rural America

Tufts, C. (1988) The Backyard Naturalist

USDA (2008) United States Conservation Service Plants Database

Medium Trees**

Scientific Name	Common Name
Acer buergeranum	Trident Maple*
Acer campestre	Hedge Maple
Acer ginnala	Amur Maple*
Acer griseum	Paperbark Maple*
Acer palmatum & cultivars	Japanese Maple*

Approved Street Trees

Acer truncatum	Shantung/Purpleblow Maple

Medium Trees cont.**

Scientific Name	Common Name
Aesculus x carnea 'Rosea'	Red Horse-chestnut
Amelanchier & cultivars	Serviceberry
Carpinus betularus	Eurpean Hornbeam
Carpinus caroliniana	American Hornbeam
Cercidiphyllum japonica	Katsura Tree
Cercis canadensis	Eastern Redbud*
Cladrastis lutea	Yellowwood
Cornus florida & cultivars	Flowering Dogwood*
Cornus kousa & cultivars	Japanese Dogwood*
Cornus mas	Cornelian Cherry Dogwood
Crataegus crus-galli 'inermis'	Thornless Cockspur Hawthorn*
Crateagus phaenopyrum	Washington Hawthorne*
Crataegus viridis 'Winter King'	Winter King Hawthorne*
Crateagus laevigata 'Crimson Cloud'	Cromson Cloud Hawthorne*
Franklinia alatamaha	Franklinia*
Gleditsia triacanthos	Honey Locust - Imperial^
Koelreutaria paniculata	Golden Rain Tree
Laburnum x watereri 'Vossil'	Goldenchain - Vossil*
Lagerstroemia indica	Crepe Myrtle*
Malus spp.	Crabapple*
Prunus cerasifera atropurpurea 'Thundercloud'	Thundercloud Purpleaf Plum
Prunus sargentii	Sargent Cherry
Prunus serrulata 'Kwanzan'	Kwanzan Cherry
Prunus yedoensis	Yoshino Cherry
Sophora japonica	Japanese Pagoda Tree
Stewartia & culivars	Stewartia*
Styrax japonica	Japanese Snowbell*
Syringa reticulata	Japanese Tree Lilac*
Acer rubrum & cultivars	Red Maple
Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple
Aesculus hippocastanum 'Baumann'	Baumann Horse-chestnut
Ginkgo biloba 'Autumn Gold'	Autumn Gold Ginkgo (male only)
Ginkgo biloba ' Princeton Sentry'	Princeton Sentry Ginkgo (male only)
Gleditsia triacanthos inermis 'Imperial'	Imperial Thornless Honey Locust
Gleditsia triacanthos inermis	Thornless Honey Locust 'Shademaster'
Liquidambar styraciflua	American Sweet Gum^

Approved Street Trees

Medium Trees cont.**

Scientific Name	Common Name
Metasequoia glyptostroboides	Dawn Redwood
Nyssa sylvatica	Black Gum/Black tupelo
Platanus x acerifolia 'Bloodgood'	Bloodgood London Plane
Platanus x acerifolia 'Columbia'	Columbia London Plane
Quercus acutissima	Sawtooth Oak^
Quercus alba	White Oak
Quercus coccinea	Scarlet Oak
Quercus palustris	Pin Oak
Quercus phellos	Willow Oak
Quercus rubra	Northern Red Oak
Quercus robur 'Fastigiata'	Columnar English Oak
Sophora japonica 'Regent'	Regent Scholartree
Sophora japonicam	Japanese Pagodatree/Scholartree
Tilia americana 'Redmond'	Redmond American Linden
Tilia cordata 'Chancellor'	Chancellor Littleleaf Linden
Tilia cordata 'Greenspire'	Greenspire Littleleaf Linden
Zelkova serrata 'Village Green'	Village Green Japanese Zelkova
Ulmus parvifolia	Chinese Elm

* grows to less than 25 feet; can be planted under powerlines

** grows between 25 and 40 feet; shall not be planted under powerlines; at the time of planting, the tree shall measure a minium of 1 to 1 1/2" caliper

*** grows to more than 40 feet; shall not be planted under powerlines; at the time of planting, the tree shall measure a minimum of 1 1/2 to 2" caliper

^These plant species are not recommended in or adjacent to stormwater management facilities due to the excessive leaf debris from the large leaves or dense foliage

Sources: Baltimore Gas and Electric Company (2008) The Right Tree

Howard County Government (1998) Landscape Manual

Harford County Government (1992) Forest Cover Conservation and Replacement Manual

Approved Street Trees

Deciduous Trees (Small to Medium)

Scientific Name	Common Name
Crataegus viridis	Green Hawthorn
Magnolia soulangiana	Chinese Magnolia
Magnolia stellata	Star Magnolia
Magnolia virginiana	Sweetbay Magnolia
Prydendron arboreum	Sourwood
Prunus cerasifera	Purple Leaf Flowering Plum
Prunus cerasifera	Hollywood Flowering Plum
Prunus serrulata	Oriental Cherry
Syringa amurensis	Lilac

Deciduous Trees (Large to Medium)

Scientific Name	Common Name
Acer grisium	Paperbark Maple
Acer saccharum & cultivars	Sugar Maple^
Betula nigra	River Maple
Cercidophyllum japonicum	Katsura Tree
Cladrastis lutea	American Yellowwood
Fagus grandifolia	American Beech
Fagus sylvatica	European Beech
Platanus X acerfoliaslis	London Planetree
Quercus bicolor	Swamp White Oak
Quercus imbricaria	Shingle Oak
Quercus macrocarpa	Bur Oak
Tilia cordata & cultivars	Little-leaf Linden
Tilia x euchlora	Crimean Linden
Tilia tomentosa	Silver Linden
Ulmus parvifolia	Chinese Elm
Zelkova serrata & cultivars	Japanese Zelkova

Evergreen Trees

Scientific Name	Common Name
Abies concolor	White Fir
Abies nordmanniana	Nordman Fir
Cedrus atlantica	Atlas Cedar
Cedrus deodara	Deodar Cedar
Cedrus libani	Cedar of Lebanon
Chamaecyparis obtusa	Hinoki Cypress
Cupressocypanis x leylandi	Leyland Cypress
Crytomeria japonica	Japanese Cryptomeria
Ilex opaca	American Holly
Picea abies	Norway Spruce

Approved Street Trees

Evergreen Trees cont.

Scientific Name	Common Name
Pinus resinosa	Red Pine
Pinus strobus	Eastern White Pine
Pinus thunbergiana	Japanese Black Pine
Pseudotsuga menziesii	Douglas Fir
Thuja occidentalis	Arborvitae
Tsuga canadensis	Canadian Hemlock

Shrubs – Broadleaf & Evergreen

Scientific Name	Common Name
Abelia x grandiflora	Glossy Abelia
Azalea 'Blaaw's Pink'	Blaaw's Pink Azalea
Azalea 'Delaware Valley White'	Delaware Valley White Azalea
Azalea 'Gumpo Pink'	Gumpo Pink Azalea
Azalea 'Gumpo White'	Gumpo White Azalea
Azalea 'Hershey Red'	Hershey Red Azalea
Azalea 'Hino Crimson'	Hino Crimson Azalea
Azalea poukhanensis	Korean Azalea
Euonymus kiautschovicus 'Manhattan'	Manhattan Euonymus
Euonymus kiautschovicus 'Siebodiana'	Siebold Euonymus
Ilex cornuta	Chinese Holly
Ilex x cornuta 'Burfordii'	Burford Holly
Ilex crenata 'Green Lustre'	Green Lustre Holly
Ilex x crenata 'Compacta'	Compact Japanese Holly
Ilex crenata 'Steeds Upright'	Steed's Upright Holly
Ilex glabra 'Compacta'	Compact Inkberry
Ilex crenata 'Helleri'	Helleri Holly
Ilex x Meserveae 'Blue Prince'	Blue Prince Holly
Ilex x Meserveae 'Blue Princess'	Blue Princess Holly
Ilex attenuata 'Fosterii'	Foster Holly
Ilex 'Nellie R. Stevens'	Nellie Stevens Holly
Kalmia latifolia	Mountain Laurel
Leucothoe axillaris	Coast Leucothoe
Mahonia aquifolium	Oregon Grapeholly
Mahonia bealei	Leatherleaf Mahonia
Pieris japonica	Japanese Andromeda
Pyracantha cpccinea 'Lowboy'	Lowboy Firethorn
Pyracantha coccinea 'Lalandei'	Lalandei Scarlet Firethorn
Prunus laurocerasus 'Schipkaensis'	Skip Cherrylaurel
Prunus laurocerasus 'Otto Lutyken'	Otto Lutyken Cherrylaurel

Approved Street Trees

Shrubs – Broadleaf & Evergreen, cont.

Scientific Name	Common Name
Photinia x fraserii	Frasers Photinia
Rhododendron catawbiense album	White Catawba Rhododendron
Rhododendron catawbiense 'Roseum Elegans'	Roseum Elegans Catawba Rhododendron
Rhododendron 'P.J.M.'	P.J.M. Rhododendron
Skimmia japonica	Japanese Skimmia

Shrubs – Deciduous & Semi-Evergreen

Scientific Name	Common Name
Azalea 'Exbury'	Exbury Azalea (red, pink, yellow, orange, white)
Chaenomeles speciosa 'Texas Scarlet'	Flowering Quince
Cornus stolonifera	Red-Osier Dogwood
Clethra alnifolia	Summersweet Clethra
Cotoneaster salicifolius 'Repens'/	Willowleaf Cotoneaster
Cotoneaster dammerii 'Coral Beauty'	Coral Beauty Cotoneaster
Forsythia intermedia 'Spectabilis'	Showy Border Forsythia
Forsythia suspensa var. 'sieboldii'	Siebold Weeping Forsythia
Ilex verticillata	Winterberry
Myrica pennsylvanica	Northern Bayberry
Viburnum dentatum	Arrowwood Viburnum
Virburnum x Juddi	Judd Virburnum
Viburnum prunifolium	Black haw Viburnum

Shrubs – Needle Evergreen

Scientific Name	Common Name
Juniperus chinensis 'Pfitzeriana Compacta'	Compact Pfitzer Juniper
Juniperus chinensis 'Sargenti'	Sargent Juniper
Juniperus chinesis 'Sea Green'	Sea Green Juniper
Juniperus horizontalis 'plumosa'	Andorra Juniper
Juniperus horizontalis 'Prince of Wales'	Prince of Wales Juniper
Taxus baccata 'Repandens'	Spreading English Yew
Taxus cuspidata 'Nana'	Dwarf Japanese Yew
Taxus media 'Hicksii'	Hicks Yew
Taxus media 'Densiformis'	Densiformis Yew

^These plant species are not recommended in or adjacent to stormwater management facilities due to the excessive leaf debris from the large leaves or dense foliage

Trees in the buffer yard shall be a minimum of 4 1/2 to 6 feet in height

Shrubs shall be container grown in not less than 3 gallon containers and shall not be pruned to less than 5 feet in height

Approved Street Trees

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Approved Street Trees

Appendix E

Harford County Approved Plant List
April 2019

Approved Street Trees

Approved Street Trees

Planting and General Maintenance References

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