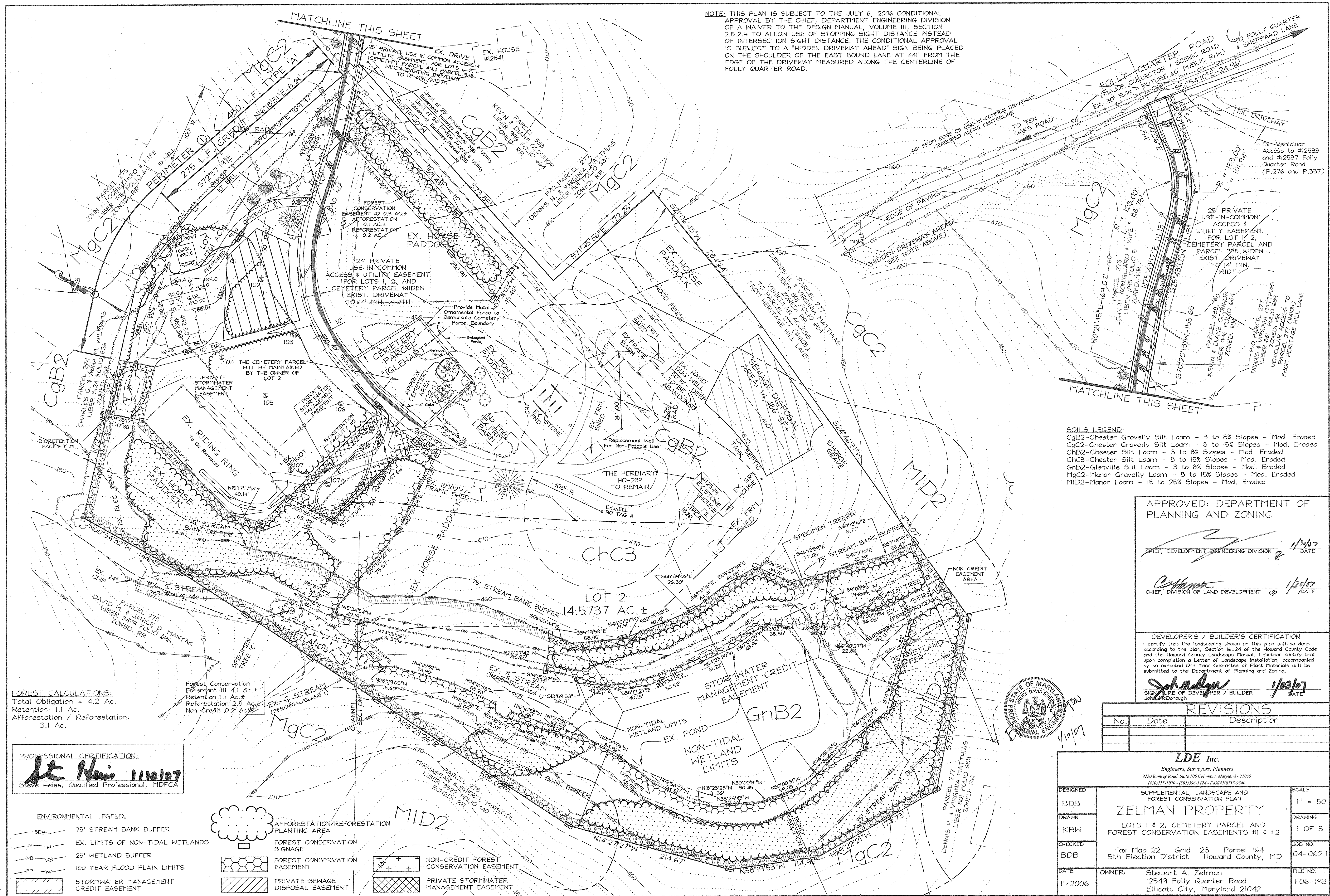


NOTE: THIS PLAN IS SUBJECT TO THE JULY 6, 2006 CONDITIONAL APPROVAL BY THE CHIEF, DEPARTMENT ENGINEERING DIVISION OF A WAIVER TO THE DESIGN MANUAL, VOLUME III, SECTION 2.5.2.H TO ALLOW USE OF STOPPING SIGHT DISTANCE INSTEAD OF INTERSECTION SIGHT DISTANCE. THE CONDITIONAL APPROVAL IS SUBJECT TO A "HIDDEN DRIVEWAY AHEAD" SIGN BEING PLACED ON THE SHOULDER OF THE EAST BOUND LANE AT 441' FROM THE EDGE OF THE DRIVEWAY MEASURED ALONG THE CENTERLINE OF FOLLY QUARTER ROAD.



SOILS LEGEND:
 CgB2-Chester Gravelly Silt Loam - 3 to 8% Slopes - Mod. Eroded
 CgC2-Chester Gravelly Silt Loam - 8 to 15% Slopes - Mod. Eroded
 ChB2-Chester Silt Loam - 3 to 8% Slopes - Mod. Eroded
 ChC3-Chester Silt Loam - 8 to 15% Slopes - Mod. Eroded
 GnB2-Glenville Silt Loam - 3 to 8% Slopes - Mod. Eroded
 MgC2-Manor Gravelly Loam - 8 to 15% Slopes - Mod. Eroded
 MID2-Manor Loam - 15 to 25% Slopes - Mod. Eroded

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION *[Signature]* 1/15/07 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT *[Signature]* 1/15/07 DATE

DEVELOPER'S / BUILDER'S CERTIFICATION

I certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual. I further certify that upon completion a Letter of Landscape Installation, accompanied by an executed One Year Guarantee of Plant Materials will be submitted to the Department of Planning and Zoning.

[Signature] 1/03/07 DATE

SIGNATURE OF DEVELOPER / BUILDER

REVISIONS		
No.	Date	Description

LDE Inc. Engineers, Surveyors, Planners 9230 Ramsey Road, Suite 106 Columbia, Maryland - 21045 (410)715-1070 - (301)595-3424 - FAX(410)715-9340			
DESIGNED BDB	ZELMAN PROPERTY LOTS 1 & 2, CEMETERY PARCEL AND FOREST CONSERVATION EASEMENTS #1 & #2 Tax Map 22 Grid 23 Parcel 164 5th Election District - Howard County, MD	SCALE 1" = 50'	
DRAWN KBW		DRAWING 1 OF 3	
CHECKED BDB		JOB NO. 04-062.1	
DATE 11/2006		OWNER: Stewart A. Zelman 12549 Folly Quarter Road Ellicott City, Maryland 21042	FILE NO. F06-193

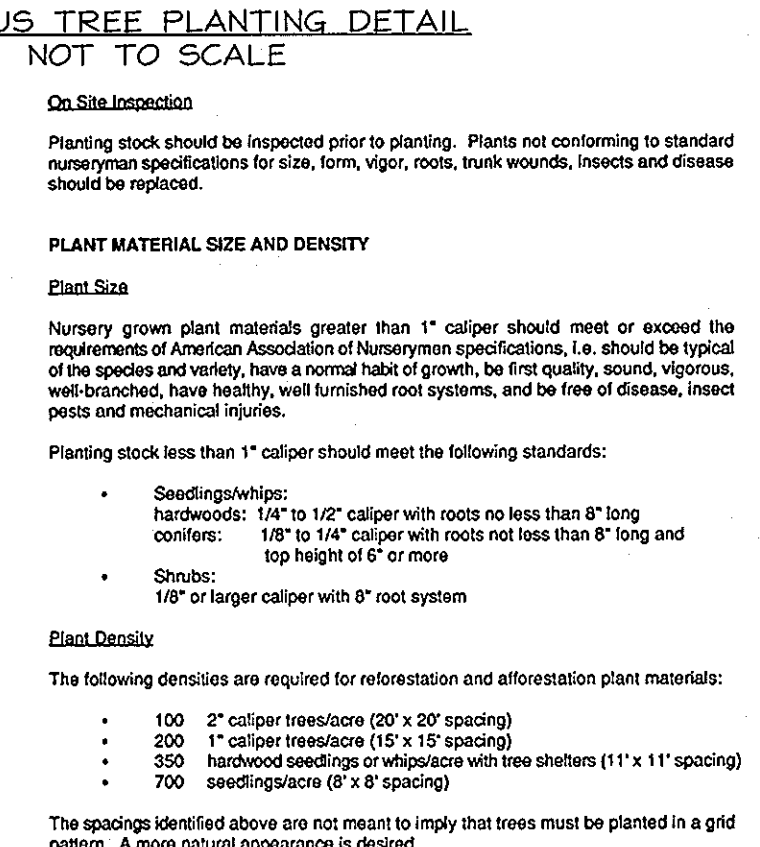
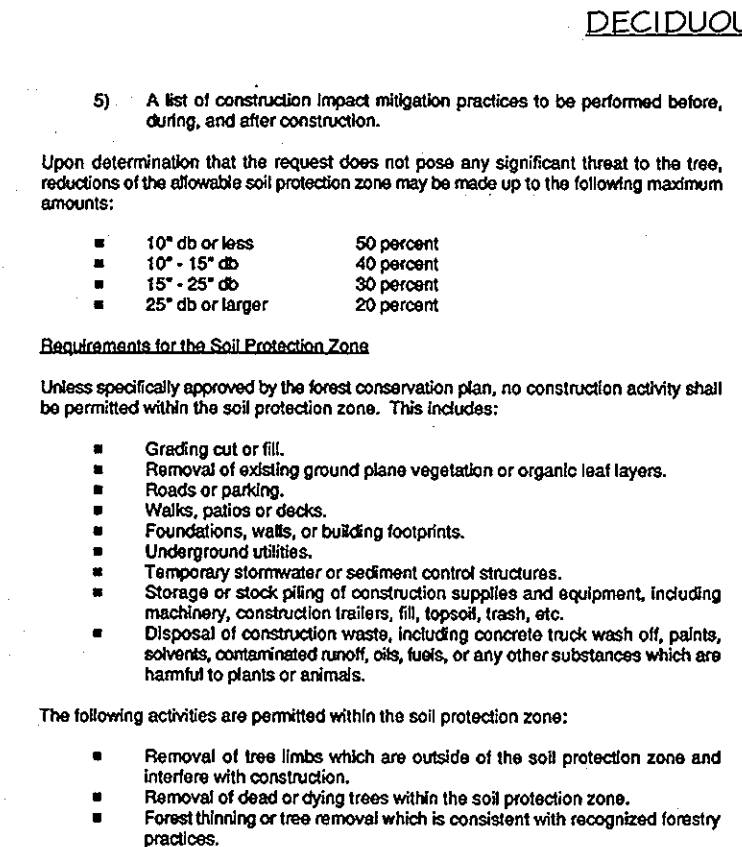
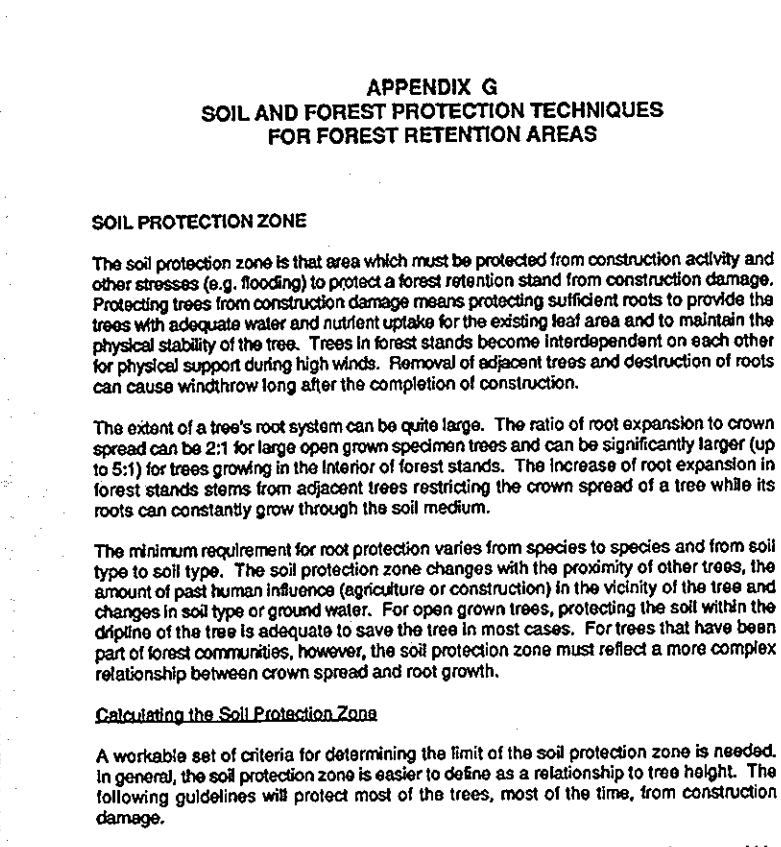
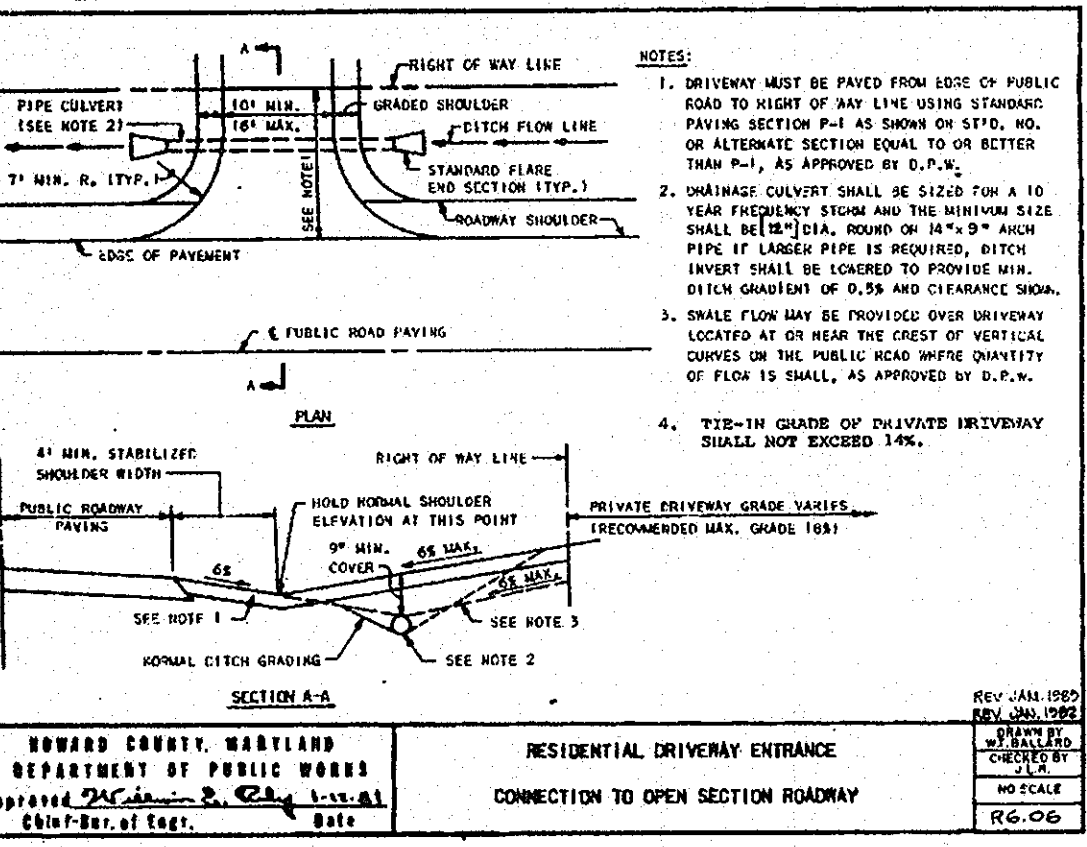
FOREST CALCULATIONS:
 Total Obligation = 4.2 Ac.
 Retention: 1.1 Ac.
 Afforestation / Reforestation: 3.1 Ac.

PROFESSIONAL CERTIFICATION:
[Signature] 1/10/07
 Steve Heiss, Qualified Professional, MDFCA

ENVIRONMENTAL LEGEND:			
	75' STREAM BANK BUFFER		AFFORESTATION/REFORESTATION PLANTING AREA
	EX. LIMITS OF NON-TIDAL WETLANDS		FOREST CONSERVATION SIGNAGE
	25' WETLAND BUFFER		FOREST CONSERVATION EASEMENT
	100 YEAR FLOOD PLAIN LIMITS		NON-CREDIT FOREST CONSERVATION EASEMENT
	STORMWATER MANAGEMENT CREDIT EASEMENT		PRIVATE SEWAGE DISPOSAL EASEMENT
	STORMWATER MANAGEMENT EASEMENT		PRIVATE STORMWATER MANAGEMENT EASEMENT

F:\04-062\04-062.dwg SUPPLEMENTAL PLAN, 1/10/2007 15:29:39 PM

SECTION NUMBER	ROAD AND STREET CLASSIFICATION	PAVEMENT MATERIALS	
		FULL DEPTH BIT. CONC. ALTERNATE	GRANULAR BASE ALTERNATES
P-1	PARKING BAYS PARKING AND COMMERCIAL- INDUSTRIAL ZONES WITH NO HEAVY TRUCKS	1" BIT. CONC. SURFACE	1" BIT. CONC. SURFACE
		4" BIT. CONC. BASE	2" BIT. CONC. BASE
	TRAVELWAYS FOR APARTMENTS AND COMMERCIAL INDUSTRIAL ZONES WITH NO HEAVY TRUCKS	1" BIT. CONC. SURFACE	4" GRADED AGGREGATE BASE (SAB)
TRAVELWAYS ARE DEFINED AS THE ROADWAYS LEADING TO THE PARKING BAYS.			
HEAVY TRUCKS ARE DEFINED AS THOSE WITH 6 WHEEL OR MORE INCLUDING GARBAGE TRUCKS.			
HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS Approved: <i>[Signature]</i> Chief-Dir. of Engr. Date: _____		REV. JAN. 1994 REV. JAN. 1992	REV. JAN. 1994 REV. JAN. 1992
PAVING SECTIONS P-1 THROUGH P-4		NO SCALE R=2.01	



Perimeter No.	Perimeter Length	Buffer Type	Adjacent Land Use
1	480 L.F.	A	SFD
Total	480 L.F.		

Category	Adjacent to Roadways	Adjacent to Properties
Landscaping Type	A	A
Linear Feet of Roadway Frontage/Perimeter	480 L.F.	---
Credit for Existing Vegetation (Yes, No, Linear Feet) (Describe below if needed)	---	YES-275 L.F.
Credit for Wall, Fence or Berm (Yes, No, Linear Feet) (Describe below if needed)	---	NO
Number of Plants Required	---	Using 205 L.F. 160x4
Number of Plants Provided	---	4 Shade

SYMBOL	QTY.	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
○	4	Red Maple 'October Glory'	Acer rubrum 'October Glory'	2 1/2" - 3" Cal.	B & B

LANDSCAPE NOTES:

- This plan has been prepared in accordance with the provisions of Section 16.124 of the Howard County Code and Howard County Landscape Manual.
- The Owner/Developer is responsible for planting of all material required to meet the standards established by the Howard County Landscape Manual.
- Financial Surety for the required landscaping must be posted as part of the Builder's Grading Permit in the amount of \$100,000 for 4 Shade Trees on Lot 1.
- The Owner, Tenant or their agents shall be responsible for maintenance of the required landscaping, plant materials, berms, fences and walls. All plant materials shall be maintained in good growing condition, and when necessary, replaced with new materials to ensure continued compliance with applicable regulations. All other required landscaping shall be permanently maintained in good condition, and when necessary, repaired or replaced.
- All plant materials shall conform to the American Associated Nurserymen's publication, American Nursery Stock.
- No clearing of existing vegetation is permitted within the landscape edge for which credit is being taken; however, landscape maintenance is authorized.
- At the time of installation, all shrubs and other plantings herewith listed and approved for the site, shall be of the proper height requirements in accordance with the Howard County Landscape Manual. In addition, no substitutions or relocation of required plantings may be made without prior review and approval from the Department of Planning and Zoning. Any deviation from the approved Landscape Plan may result in denial or delay in the release of landscape surety until such time as all required materials are planted and/or revisions are made to applicable plans and certificates.

QUANTITY	SPECIES	SIZE	REMARKS
186	White Oak (Quercus alba)	seedling / whip	container
186	Flowering Dogwood (Cornus florida)	seedling / whip	container
186	Red Maple (Acer rubrum)	seedling / whip	container
186	Tulip Poplar (Liriodendron tulipifera)	seedling / whip	container
186	White Sassafras (Sassafras albidum)	seedling / whip	container
186	American Beech (Fagus grandifolia)	seedling / whip	container

Note: 1. Required planting quantity: 31 acres X 350/Ac. = 1085 minimum required < 1116 provided.
2. 350 hardwood seedlings or whips per acre with tree shelters are required. Provide random spacing of approximately 11' x 11'; see Planting Distribution Detail sheet.

APPENDIX G SOIL PROTECTION TECHNIQUES FOR FOREST RETENTION AREAS

5) A list of construction impact mitigation practices to be performed before, during, and after construction.

Upon determination that the request does not pose any significant threat to the tree, reduction of the allowable soil protection zone may be made up to the following maximum amounts:

10' or less	50 percent
10' - 15' dia	40 percent
15' - 25' dia	30 percent
25' or larger	20 percent

Requirements for the Soil Protection Zone

Unless specifically approved by the forest conservation plan, no construction activity shall be permitted within the soil protection zone. This includes:

- Grading or fill.
- Removal of existing ground plane vegetation or organic leaf litter.
- Excavation or grading.
- Wells, pipes or ditches.
- Foundations, walls, or building footings.
- Underground utilities.
- Temporary stormwater or sediment control structures.
- Storage or stock piling of construction supplies and equipment, including machinery, construction trailers, fill, topsoil, trash, etc.
- Disposal of construction waste, including concrete block wash off, paints, solvents, contaminated runoff, oils, fuels, or any other substances which are harmful to plants or animals.

The following activities are permitted within the soil protection zone:

- Removal of tree limbs which are outside of the soil protection zone and interfere with construction.
- Removal of dead or dying trees within the soil protection zone.
- Removal of trees or other vegetation which threaten the ecological balance of the remaining plants in the soil protection zone.
- Removal of trees or other vegetation which threaten the ecological balance of the remaining plants in the soil protection zone.
- Fences which do not require continuous footings or which have posts no greater than 6" dia and which are installed in accordance with the following requirements:
 - They are constructed of materials that can be installed using equipment that does not require a medium weight of 12 tons.
 - They are no wider than 6" dia.
 - They are constructed of materials that are not less than 2" dia.
 - They are constructed of materials that are not less than 2" dia.
- Removal of any existing walls, wells, roads, or other structures as required. These items should be removed without the use of heavy equipment.

Construction Adjacent to Soil Protection Zone

Prior to the start of any construction (including grading) adjacent to the soil protection zone, a fence must be erected along the boundary of the soil protection zone. The fence shall have 8' x 12" x 1" orange plastic which shall read "Tree Preservation Area" in 1" high lettering printed every 50'. The fence shall be installed in accordance with the following:

- 3 strands of barbed wire spaced 18" apart - 4' high.
- 4' high wood and wire "post and rail" fence.
- 4' high chain link fence.
- 4' high welded wire fence.

All fencing shall be attached to 1" x 4" Channel metal posts set 10' o.c. max. No fencing or wire shall be attached to any tree.

Prior to the start of any grading, all adjacent control devices shall be in place to prevent any soil from entering the soil protection zone. A synthetic fabric fabric liner of a type acceptable to the U.S.D.A. Soil Conservation Service shall be installed on the uphill side of all soil protection zones. This liner shall be constructed of a material that is resistant to degradation by the soil and is capable of being installed and removed without the use of heavy machinery. All drainage devices, ditches, or swales require to maintain existing surface and subsurface groundwater conditions within the soil protection zone must be installed and operational prior to grading.

Maintenance of the Soil Protection Zone

Forest retention areas, smaller tree stands, and individual trees that the Forest Conservation Plan specifies must be protected and require careful management during and after construction.

Specimen trees and groups of trees are nearly always growing on soils previously affected by human activity. If the soils under these trees are already compacted, they should be core aerated prior to construction and again after construction. Light spring and fall soil core aeration will also help these trees adjust to the new environment. Very old trees (20" or larger D.B.H.) should be manually irrigated several times during the first two summer following grading in their vicinity. Each group of trees must also be monitored for disease and insect problems during and after construction. Trees in construction zones are more susceptible to attack by pests than trees in undisturbed conditions.

Landscaping practices under an critical to tree survival as how much construction occurs around them. The following management practices must be in the soil protection zone:

- Base soil prior to construction, core aerate. Hand scarify with a steel rake to a depth of 1" max. Top dress with 1" - 2" shredded bark mulch.
- Water to construction, core aerate. Keep grass mowed during construction.
- Uniform grass: leave undisturbed during construction. After construction, mow grass and core aerate.
- Landscaping shrubs and/or groundcovers: leave undisturbed during construction. Hand scarify and mow any area with bare soil. Leave any paved areas, walls, drives, etc. in place within the dripline until after all amendments are in place.
- Initial scoring ground plane growth: leave undisturbed except for invasive vines or small trees which could affect growth habits of specimen trees.

On steep slopes or erodible soils, soil disturbance should be limited to the planting field whose radius is equal to 2.5 diameter of the root ball.

Disturbed Areas

Soils should be treated by incorporating natural mulch within the top 12 inches or by amendments as determined by a soils analysis. Soil amendments, by definition, include any material added to the soil to improve its physical, chemical, or biological properties. On development sites, the common use of fill materials may increase the need for such amendments. Natural amendments such as organic mulch or leaf mold compost are preferred.

When fill material is used at the planting site, it should be clean fill with 12 inches of native soil. Stacking of native top soils must be done in such a way that the height of the pile does not impede the seed bank.

Planting Period

Planting should occur within 24 hours of delivery to the site. Plant materials left ungranted for more than 24 hours should be protected from direct sun and weather and kept moist. Bare root stock ungranted for more than 48 hours should be stored in a shaded area. Nursery stock should be planted within 2 weeks. On-site local transplanted materials should be stored in tree banks if ungranted for more than 24 hours, following the example in Exhibit H-3.

On Site Inspection

Planting stock should be inspected prior to planting. Plants not conforming to standard nurserymen specifications for size, form, vigor, roots, trunk wounds, insects and disease should be rejected.

Plant Material Size and Density

Nursery grown plant materials greater than 1" caliper should meet or exceed the requirements of American Association of Nurserymen specifications, i.e. should be typical of the species and variety, have a normal habit of growth, be free of disease, insect pests, and mechanical injuries.

Planting stock less than 1" caliper should meet the following standards:

- Seedlings/whips:
 - handmade: 18" to 12" caliper with roots no less than 1" long
 - commercial: 18" to 14" caliper with roots no less than 1" long and 100% root system
- Shrubs: 18" or larger caliper with 8" root system

The following densities are required for reforestation and afforestation plant materials:

- 100 2" caliper trees/acre (20' x 20' spacing)
- 200 1" caliper trees/acre (15' x 15' spacing)
- 350 hardwood seedlings or whips with tree shelters (11" x 11" spacing)
- 700 seedlings (8' x 8' spacing)

The spacings identified above are not meant to imply that trees must be planted in a grid pattern. A more natural appearance is desired.

Plant Installation

Seedlings/Whips

Small stock, such as seedlings and whips, and ball and burlap stock up to 2" caliper, can be planted by manual methods of planting using shovels, planting or dibble bars, and methods (See Exhibit H-4). For large areas, planting machines are occasionally used but have the drawback of creating linear, plantation-type forests.

Balled and Burlapped Trees

Balled and burlapped trees must be handled with care while planting. These should not be packed up by the truck or dropped; both these practices may separate the trunk from the root ball. Prior to planting, root balls should be kept moist. (See Exhibit H-7)

Planting Fields

The planting field should be prepared and native stockpiled soils should be used to backfill the planting field. Flake soils evenly over the planting field and cover with 2 to 4 inches of mulch. Use watering to settle soil backfilled areas. Amendments are not recommended in the planting field; studies have shown that roots will be encouraged to stay within the amended soils.

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GENERAL GUIDANCE FOR MAINTENANCE OF PLANTED AREAS

Watering

A watering plan should only be implemented to compensate for deficient rainfall patterns. Trees can die from too much water as well as too little. Newly planted trees may need water as often as once a week for the first growing season. The next two years, in contrast, may require watering only a few times a year (one a month during July and August). After that, trees should only need water in severe droughts. Bare root transplants, if successfully watered during planting, may not need water for almost 2-3 weeks after growth begins. Balled and burlap material may require more frequent watering.

Soil and Watering

Soil texture influences the downward flow of water. Soils with more clay tend to retain more water and can be watered less often; soils with more sand drain more quickly and need to be watered more often. For examples of on-site evaluation recommendations, see the Appendix. If the soil was well prepared before planting, there should be few drainage problems. Restricted downward penetration indicates the soil may have been compacted during construction and not aerated before planting, or there may be a clay hardpan.

How to Water

The best way to water is deeply and slowly using a regular hose, a soaker hose, or drip irrigation. For larger trees, start by watering the root ball thoroughly. The watered area should be extended to include the whole root zone as the tree becomes more established. Mulching around the base of newly transplanted trees prevents roots from drying too quickly while still providing air movement to the roots.

Fertilizing

Fertilizing is the chemical modification of soils to correct for a specific nutrient deficiency. These deficiencies are most effectively identified in a laboratory soil analysis. Nothing should be added to the soil without first testing to determine any nutrient needs.

What Nutrients to Apply

Trees depend on three major nutrients, nitrogen, phosphorus, and potassium and a host of other minor ones (or micronutrients) such as calcium, magnesium and iron. The most critical of these micronutrients are available in abundance in most soils, but nitrogen, phosphorus, and potassium are usually the limiting ones.

When to Fertilize

Even when soils are deficient in nitrogen, fertilizing within the first growing season after planting is not recommended. Too much nitrogen may cause a spurt seedlings and whips that may cause root rot. It is, however, best to wait until after the end of the first growing season, either in the late fall or early spring.

What Type of Fertilizer

Organic fertilizers are preferred to synthetic fertilizers. Bone meal or seaweed meal are good sources of phosphorus. Organic fertilizers have a slow release effect that can supply nutrients to the plant as needed while minimizing the risk of excess nutrients entering the forest system and the water supply. Some synthetic fertilizers can mimic this slow-release action and may be appropriate for use.

Control of Competing Vegetation

Unintentionally, good sites for reforestation and afforestation are generally good sites for unwanted vegetation as well. Unwanted vegetation growing near newly planted trees can take over the site. The need to control this problem depends on the ability of the planted material to withstand the intrusion. Smaller trees may need more care, although some seedlings survive with the overgrowth and will shade it out as the trees grow. As a preventative measure, consider the potential for growth of invasive species while choosing a reforestation or afforestation area.

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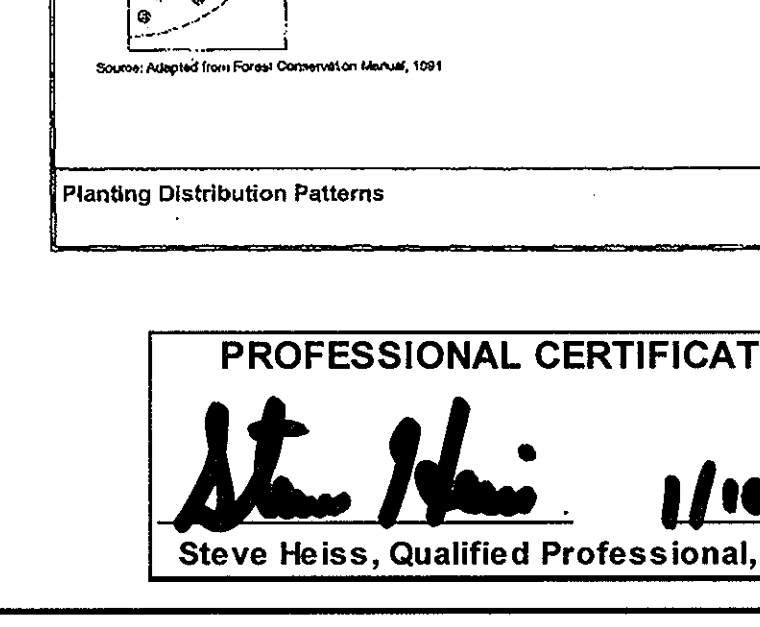
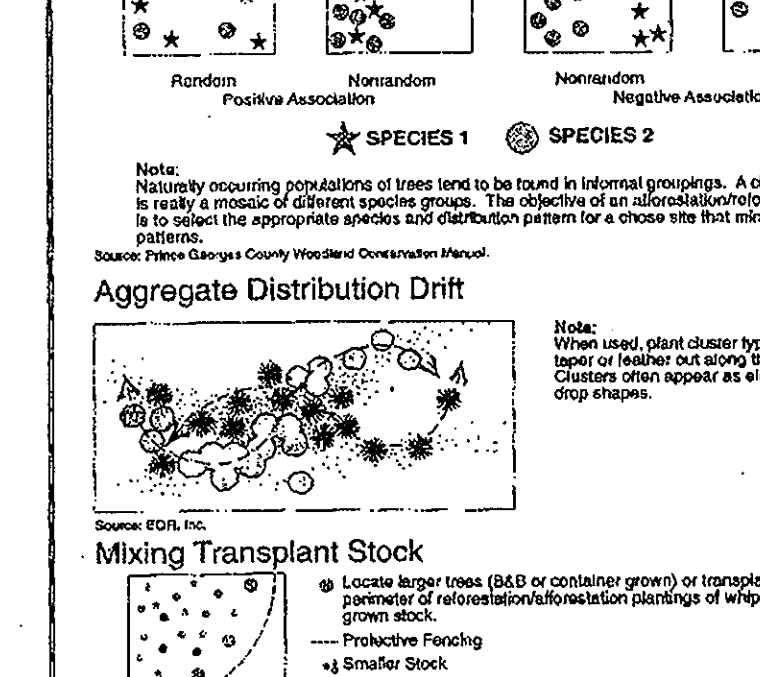
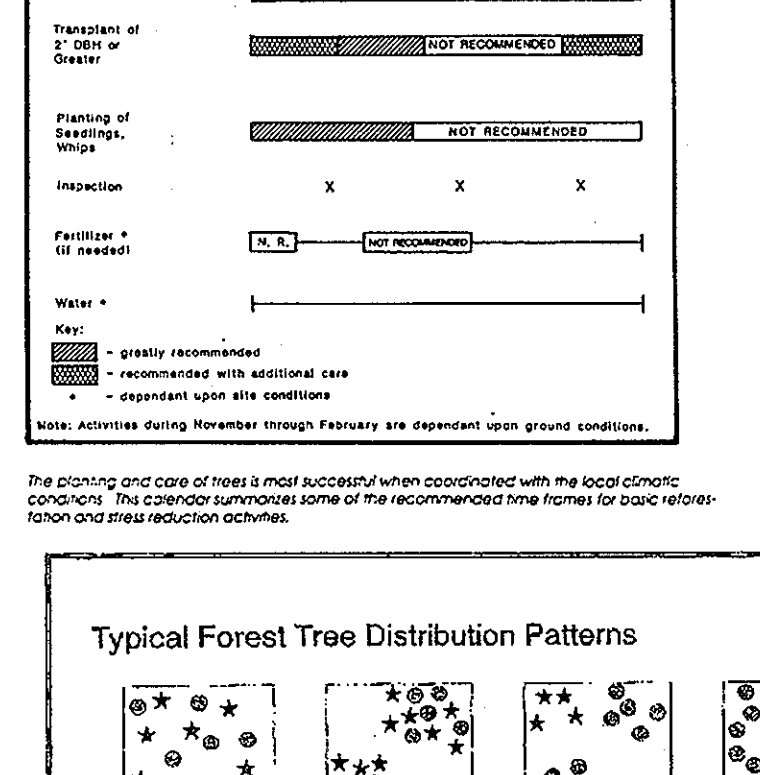
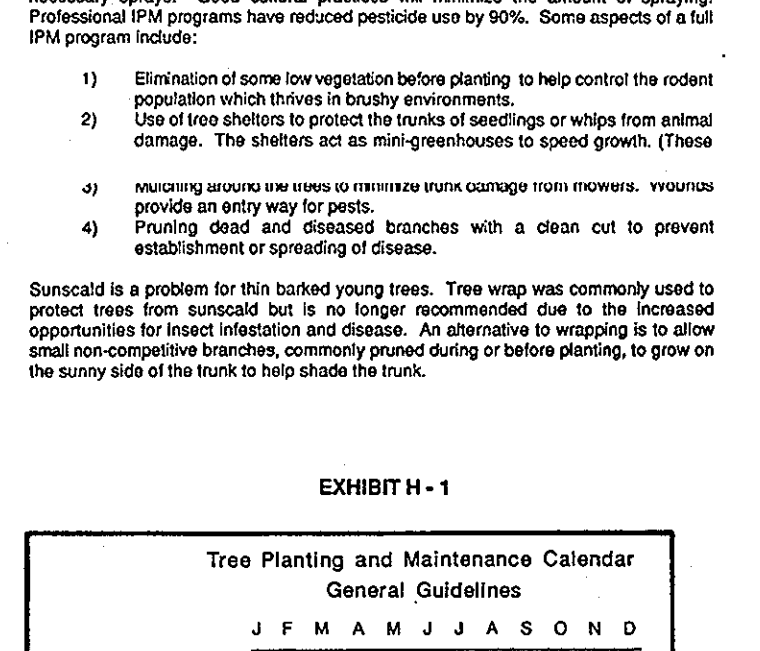
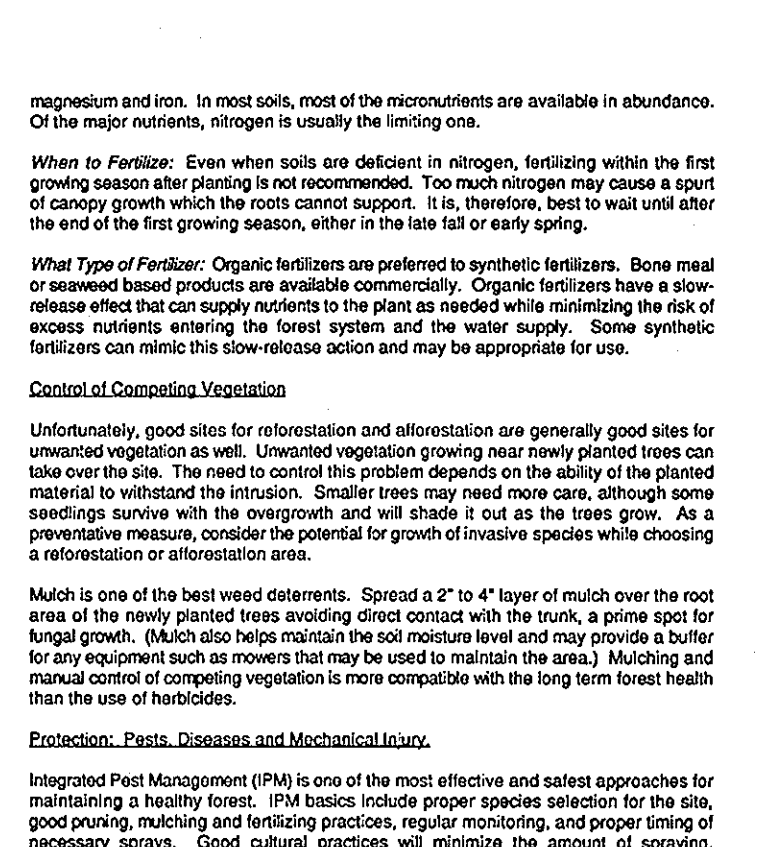
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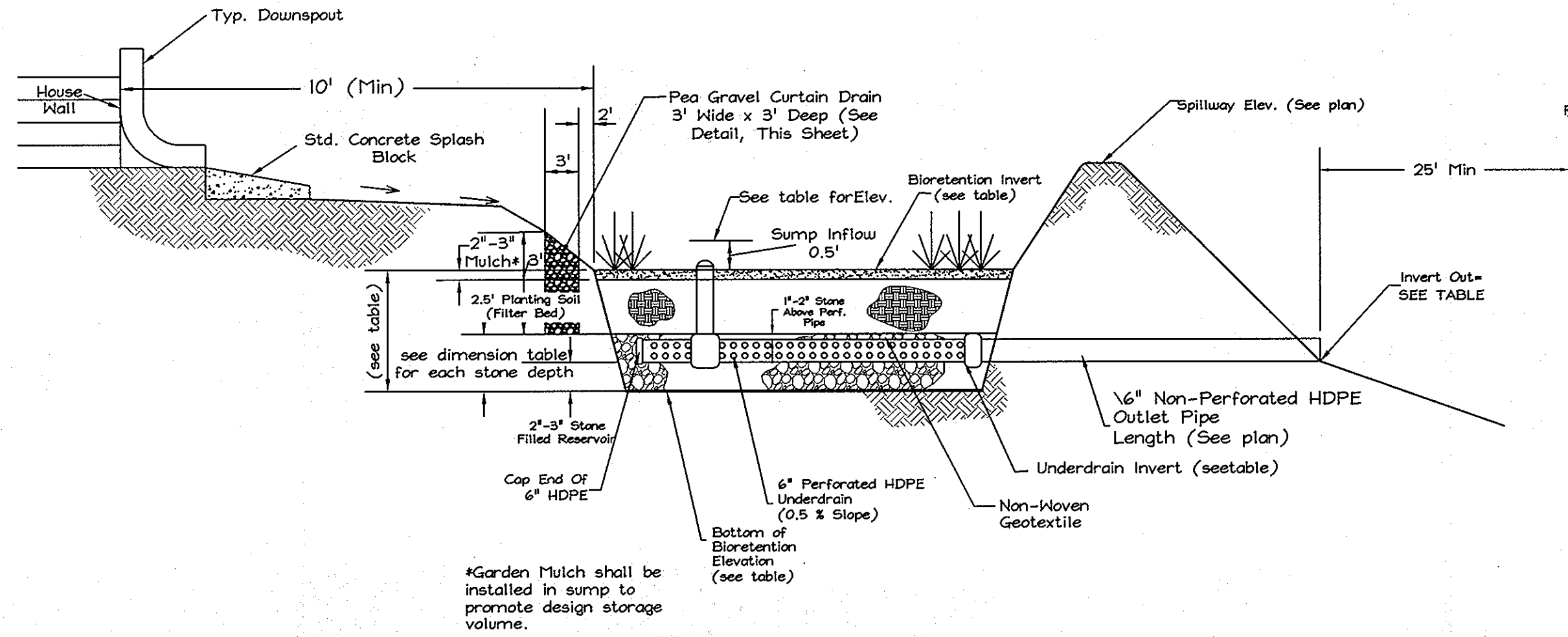


Figure 6-3. Planting Details - Shrub

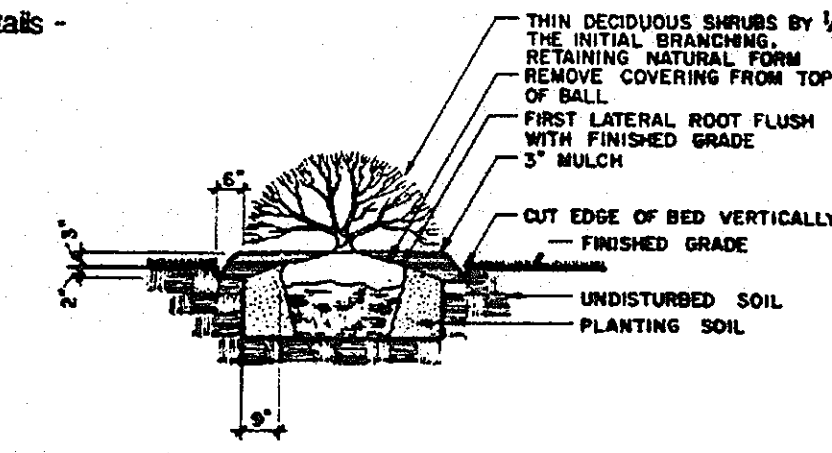
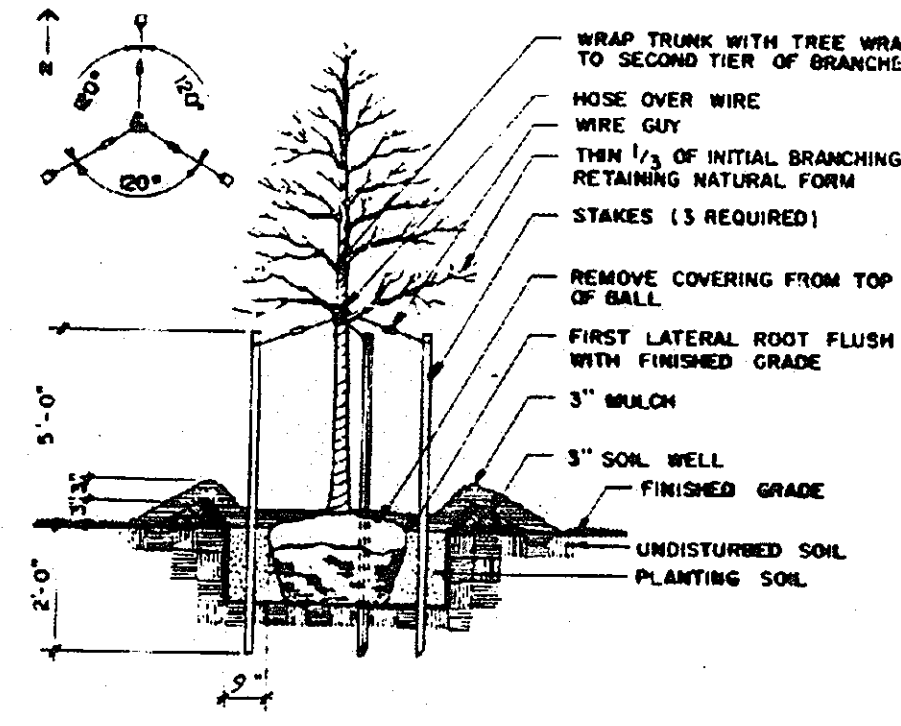


Figure 6-1. Planting Detail - Deciduous Tree



Specifications for Bioretention

1. Material Specifications
The allowable materials to be used in bioretention area are detailed in Table B.3.2.

2. Planting Soil
The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:
pH range: 5.2 - 7.0
organic matter: 1.5 - 4% (by weight)
magnesium: 35 lb./ac.
phosphorus (phosphate-P205): 75 lb./ac.
potassium (potash-K2O): 85 lb./ac.
soluble salts: not to exceed 500 ppm

All bioretention areas shall have a minimum of one test. Each test shall consist of both the standard soil test for pH, phosphorus, and potassium and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the top soil was excavated.

Since different labs calibrate their testing equipment differently, all testing results shall come from the same testing facility.
Should the pH fall out of the acceptable range, it may be modified (higher) with lime or (lower) with iron sulfate plus sulfur.

3. Compaction
It is very important to minimize compaction of both the base of the bioretention area and the required backfill. When possible, use excavation hoes to remove original soil. If bioretention rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure. Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to restructure the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.
Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.
When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.
When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material
Recommended plant material for bioretention areas can be found in Appendix A, Section A.2.3.

5. Plant Installation
Mulch should be placed to a uniform thickness of 2" to 3". Shredded hardwood mulch is the only accepted mulch. Fine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.
Root stock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.
Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball. Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.
The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains
Underdrains are to be placed on a 3'-0" wide section of filter cloth. Pipe is placed next, followed by the gravel bedding. The ends of underdrain pipes not terminating in an observation well shall be capped.
The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous
The bioretention facility may not be constructed until all contributing drainage area has been stabilized.

TYPICAL BIORETENTION FACILITY PROFILE
N.T.S.

BIORETENTION LANDSCAPE SCHEDULE					
SYMBOL	QNTY	COMMON NAME	SCIENTIFIC NAME	SIZE	REMARKS
SHADE TREES					
RM	8	Red Maple October Glory	<i>Acer rubrum</i>	2'-2 1/2' Caliper	B & B
RB	8	River Birch (Heritage Clump Birch)	<i>Betula nigra</i> 'Heritage'	10' - 12' Ht.	B & B
SHRUBS					
AZ	16	Azalea	<i>Azalea sp.</i>	18" - 24" Ht.	container 3' o.c.
IB	16	Inkberry	<i>Ilex glabra</i>	18" - 24" Ht.	container 3' o.c.
AW	16	Arrowwood	<i>Viburnum dentatum</i>	18" - 24" Ht.	container 3' o.c.
HERBACEOUS - GRASSES					
SG	1630 s.t.	Switchgrass	<i>Panicum virgatum</i>		Seed Mixture

Material	Specification	Size	Notes
Planting soil	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (3.5' to 4' deep)	sand 35 - 60% silt 30 - 50% clay 10 - 25%	n/a	USDA soil types loamy sand, sandy loam or loam
mulch	shredded hardwood	n/a	aged 6 months, minimum
pea gravel diaphragm and curtain drain	pea gravel: ASTM-D-448	pea gravel: No. 6 stone: 2" to 5"	
geotextile	Class "C" - apparent opening size (ASTM-D-4751), grab tensile strength (ASTM-D-4632), puncture resistance (ASTM-D-4852)	n/a	for use as necessary beneath underdrains only
underdrain gravel	AASHTO M-43	0.375" to 0.75"	
underdrain piping	F 788, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SD365	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel cover pipes; not necessary underdrain pipes
pothead in place concrete (if required)	MSHA Mix No. 3, $f_c = 3500$ psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of pothead-in-place concrete required; 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approval by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 308.8.05; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil pressure); and analysis of potential cracking. Sand substitutions such as Diabase and Gyrstone #10 are not acceptable. No calcium carbonate or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
sand (1' deep)	AASHTO M-6 or ASTM-C-33	0.075" to 0.04"	

Planting Distribution: Facilities # 1 & 2: (2)RM, (2)RB, (4)AZ, (4)IB, (4)AW ; (8)AZ, (8)IB, (8)AW

FOREST CONSERVATION WORKSHEET

NET TRACT AREA:
A. Total tract area: 16.1 Ac.
B. Area within 100 year floodplain: 2.7 Ac. (Onsite area within
C. Area to remain in agricultural production: 0.0 Ac. 100 yr. Floodplain)
D. Net tract area: 13.4 Ac.

LAND USE CATEGORY
Input the number "1" under the appropriate land use zoning, and limit to only one entry.
ARA MDR IDA HDR MPD CIA
0 1 0 0 0 0

E. Afforestation threshold: 20% x D = 2.7 Ac.
F. Conservation threshold: 25% x D = 3.4 Ac.

EXISTING FOREST COVER:
G. Existing forest cover (excluding floodplain): 2.6 Ac. (outside of floodplain)
H. Area of Ex. forest above afforestation threshold: 0.0 Ac.
I. Area of forest above conservation threshold: 0.0 Ac.

BREAK EVEN POINT:
J. Forest retention above threshold with no mitigation: 0.0 Ac.
K. Clearing permitted without mitigation: 0.0 Ac.

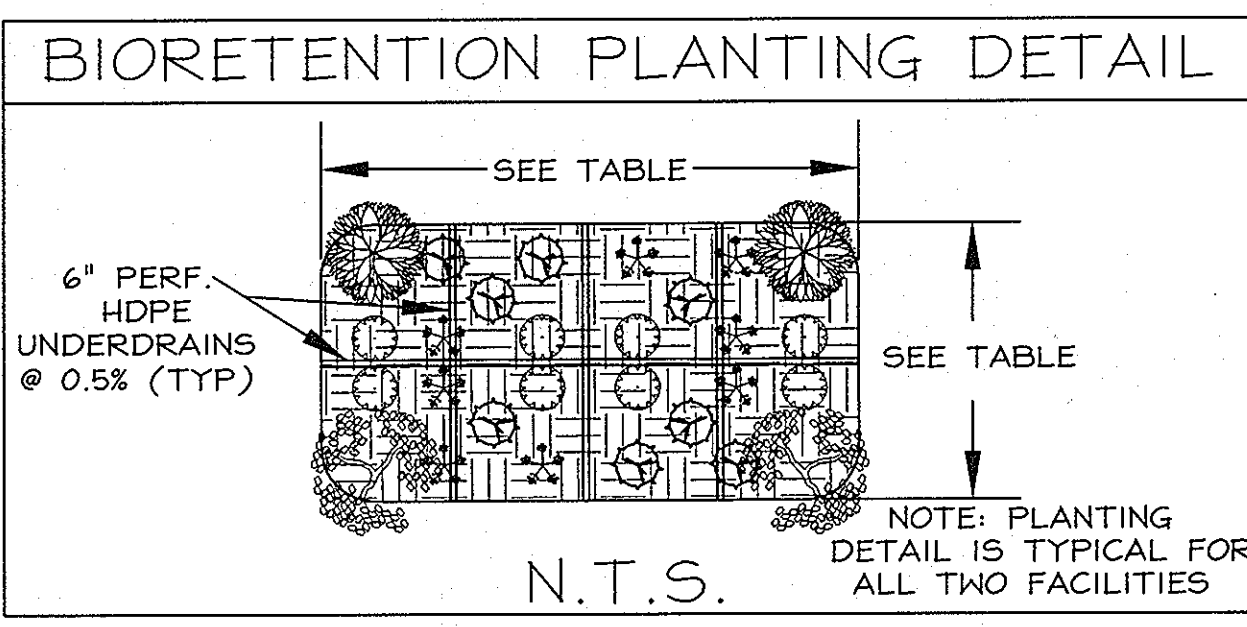
Break even formula: 0.20 x area of forest above conservation threshold + the conservation threshold.

PROPOSED FOREST CLEARING:
L. Total area of forest to be cleared (cannot exceed existing): 1.5 Ac.
M. Total area of forest to be retained: 1.1 Ac.

PLANTING REQUIREMENTS:
N. Reforestation for clearing above conservation threshold: 0.0 Ac.
O. Reforestation for clearing below conservation threshold: 3.0 Ac.
P. Credit for retention above reforestation threshold: 0.0 Ac.
R. Total reforestation required: (1.5 Ac. x 2.0) = 3.0 Ac.
S. Total afforestation required: (2.7 Ac. - 2.6 Ac.) = 0.1 Ac.
T. Total reforestation and afforestation required: 3.1 Ac.

The total obligation of 4.2 acres will be met by retention of 1.1 acres of existing onsite forest and 3.1 acres of new plantings, 3.0 acres of reforestation and 0.1 acres of afforestation.

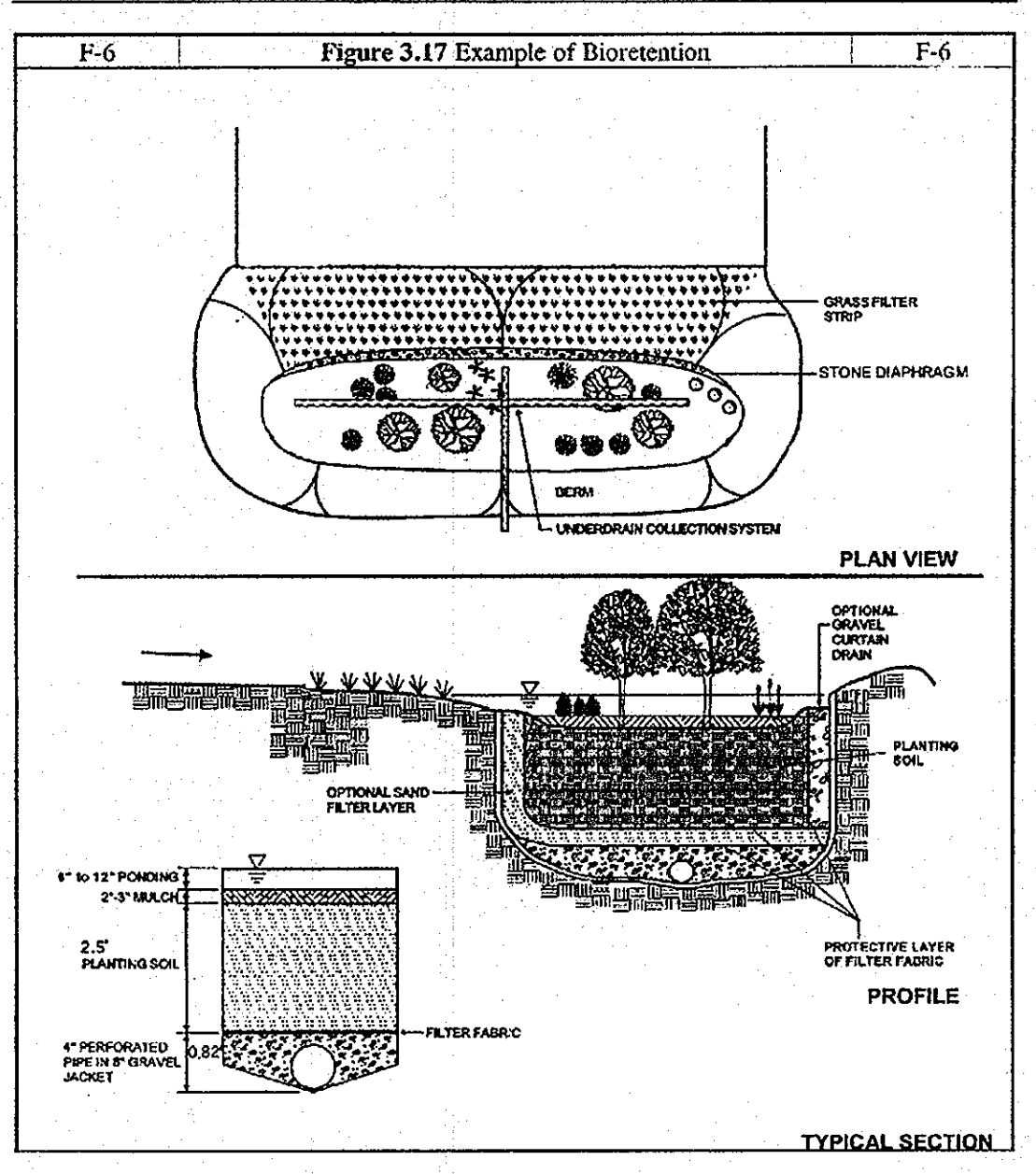
In accordance with Section 16.1202 of the Howard County Code and Forest Conservation Manual, Forest Conservation obligations shall be fulfilled by the retention of 1.10 acres of forest and 3.10 acres of plantings (3.0 acres of reforestation and 0.10 acres of afforestation). Surety in the amount of \$77,101.20 shall be posted with the Developer's Agreement for F06-193 (47,916 S.F. x 0.20 = \$4,583.20 + 135,036 S.F. x 0.50 = \$67,518).



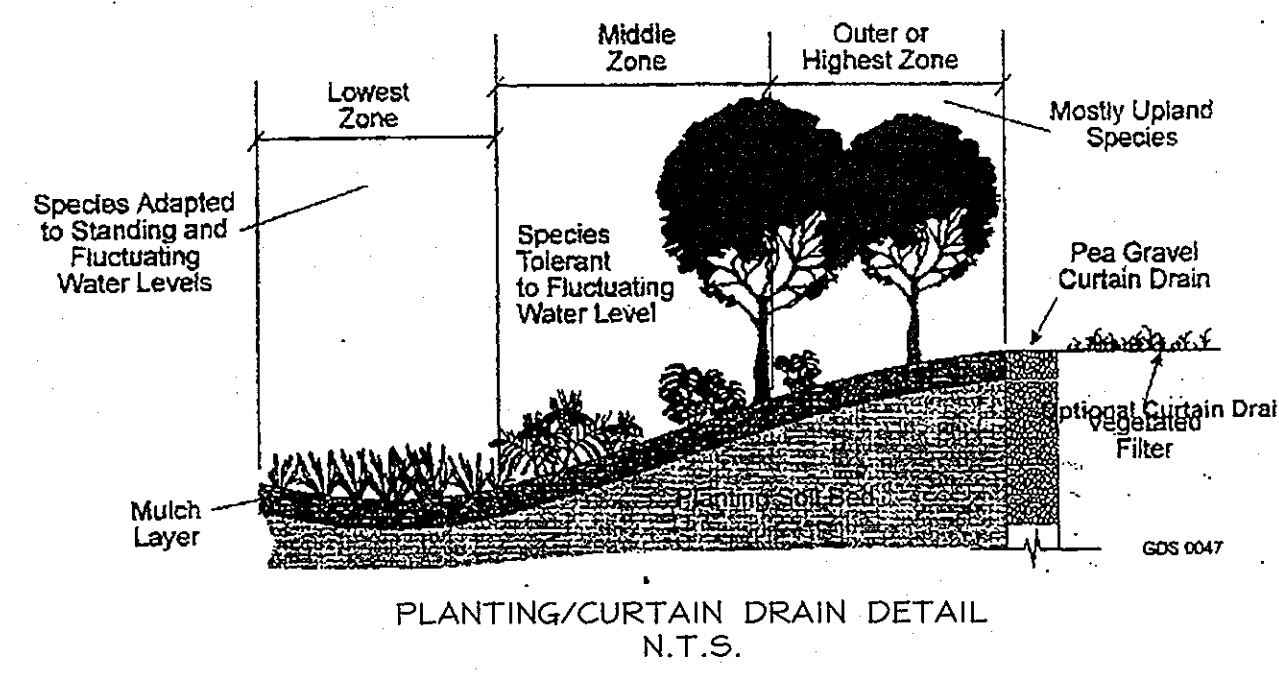
Maintenance Schedule for Bioretention

- Inspect facility on a semi-annual basis the first year, and after major storm events.
- Inspect facility annually after the first year.
- Test plantings bed soils on an annual basis for pH to establish acidic levels. If the pH is below 5.2, apply limestone. If the pH is above 7.0, iron sulfate plus sulfur should be added.
- Inspect soil of bed for erosion after major storm events. Correct erosion problems as necessary.
- Inspect surface of bed for clogging from fine sediments on an annual basis. If clogged, cores aerate non-vegetated areas to insure adequate filtration.
- Bi-annual mulching is recommended. A 3" mulch depth is recommended.
- All plant materials should be inspected annually. Dead or severely diseased species should be replaced.
- Woody vegetation may require periodic pruning.

Chapter 3. Performance Criteria for Urban BMP Design Stormwater Filtering Systems



Facility No.	Width	Length	Depth	Bot. Elev.	Inv. Out	Top Embank.	Top Elev.	Remarks
1	18'	21'	3.53'	481.47	PIPE OUT 481.47	486.50'	485.00	0.78 stone reservoir for REV
2	48.2'	50'	3.53'	469.47	PIPE OUT 469.47	474.50'	473.00	0.78 stone reservoir for REV



PROFESSIONAL CERTIFICATION:
Steve Heiss 11/18/07
Steve Heiss, Qualified Professional, MDFCA

APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION 1/30/07 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT 1/30/07 DATE

DEVELOPER'S / BUILDER'S CERTIFICATION
I certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Howard County Landscape Manual. I further certify that upon completion a Letter of Landscape Installation, accompanied by an executed One Year Guarantee of Plant Materials will be submitted to the Department of Planning and Zoning.

John McDonough 1/17/07 DATE
John McDonough

No.	Date	Description

LDE Inc.		
Engineers, Surveyors, Planners 9250 Ramsey Road, Suite 106 Columbia, Maryland - 21045 (410)715-1070 - (301)596-3424 - FAX(410)715-9340		
DESIGNED	BDB	STORMWATER MANAGEMENT NOTES & DETAILS FOREST CONSERVATION WORKSHEET ZELMAN PROPERTY
DRAWN	KBW	LOTS 1 & 2, CEMETERY PARCEL AND FOREST CONSERVATION EASEMENTS #1 & #2
CHECKED	BDB	Tax Map 22 Grid 23 Parcel 164 5th Election District - Howard County, MD
DATE	11/2006	OWNER: Stewart A. Zelman 12549 Folly Quarter Road Ellicott City, Maryland 21042
SCALE	AS SHOWN	
DRAWING	3 of 3	
JOB NO.	04-062.1	
FILE NO.	F06-193	