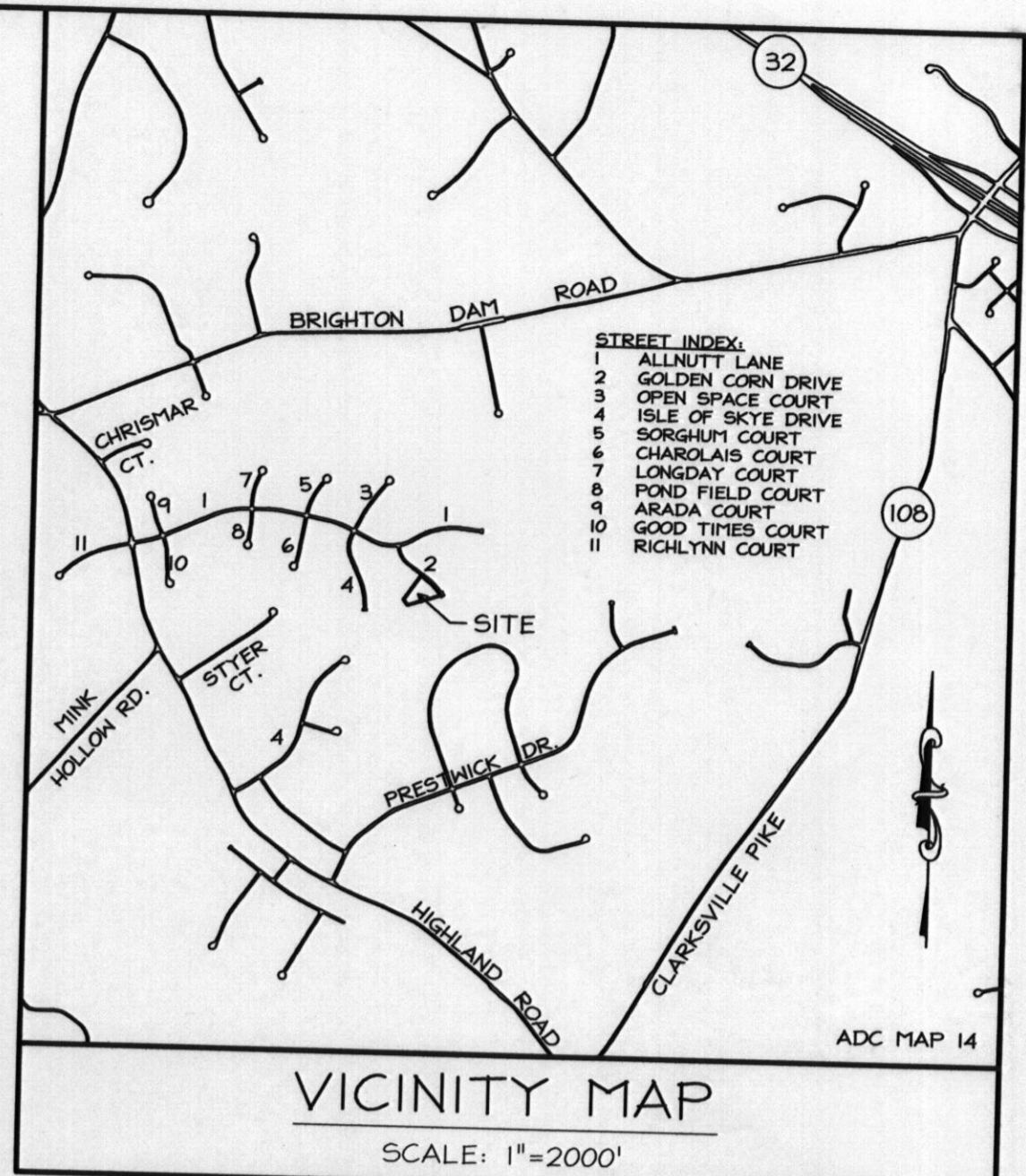


LEGEND

- PROPOSED SEWAGE DISPOSAL EASEMENT
- EXISTING SEWAGE DISPOSAL EASEMENT
- GnB2
MgB2 SOILS DIVIDE
- - - - - EXISTING 5' CONTOUR
- - - - - EXISTING 1' CONTOUR
- - - - - EXISTING TRELLINE
- ⊙ PASSED SAND MOUND TEST LOCATION 5/6/04
- ⊙ EXISTING WELL
- ⊙ PRIMARY WELL LOCATION
- ⊙ ALTERNATE WELL LOCATION
- STABILIZED CONSTRUCTION ENTRANCE (SCE)
- - - - - SILT FENCE (SF)
- ⋯⋯⋯ LIMIT OF DISTURBANCE (LOD)
- ⋯⋯⋯ EROSION CONTROL MATTING (ECM)
- - - - - PROTECTIVE FENCE AROUND SEPTIC EASEMENT



NOTES:

1. Existing Zoning: RR-DEO per 2/2/04 Comprehensive Zoning Plan
2. Plat Reference: Plat #3941
3. Total Area of Lot: 73,582 SF or 1.689 Ac.±
4. The lot shown hereon complies with the minimum lot area and ownership width as required by the Maryland Department of the Environment.
5. All existing wells and septic systems within 100 feet of the lot which may affect this proposal have been shown.
6. The topography shown is taken from field run topography done by C. B. Miller Associates in July, 2004. The location of the sand mound tests is from field run data performed by LDE, Inc. on October 29, 2004.
7. Any changes to the Private Sewage Easement shall require a Revised Percolation Certification Plan.
8. The well for this lot has been drilled.
9. The geothermal wells for this lot shall be a closed loop system.
10. The sand mound areas delineated and identified on Lot 33, must be protected by a fixed barrier at all times during grading and construction activities. Thereafter protective measures should be implemented to protect those areas from erosion, particularly due to concentrated flow or encroachment by wheeled vehicles while soil is saturated. Subsequent building permit applications may be denied should a sand mound area be evaluated and found to be unsatisfactory for the intended use. A supplemental plan with all of the necessary details for installation of the system will be required prior to release of the building permit.
11. Prior to building permit approval for Lot 33, the primary sand mound and gravel bed corners must be staked for field review.
12. The Percolation Certification Plan for this lot was signed by the County Health Officer on 12/23/2004.
13. Limit of Disturbance: 26,930 SF
14. Stormwater management for this lot is provided by Environmental Site Design (ESD) by use of a non-structural rooftop disconnection and two (2) Micro Scale Practices - Private Rain Gardens.

SEWAGE DISPOSAL SYSTEM DESIGN DATA

1. Invert @ Wall: 452.5
2. 1500 Gallon Septic Tank:
Ex. Grade Over Tank 456.8
Proposed Grade Over Tank 456.8
Invert In 451.8
Invert Out 451.5
3. 1500 Gallon Pump Chamber:
Ex. Grade Over Tank 456.3
Proposed Grade Over Tank 456.3
Invert In 451.0
Invert Out 451.5

Note: Pump Design and Sand Mound Design to be Provided by Contractor Prior to Issuance of Septic Installation Permit

SOILS LEGEND:

SYMBOL	NAME/DESCRIPTION	SOIL GROUP
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	C
MgB2	Manor gravelly loam, 3 to 8 percent slopes, moderately eroded	B
MgC2	Manor gravelly loam, 8 to 15 percent slopes, moderately eroded	B

This area designates a private sewage easement of at least 10,000 square feet as required by the Maryland Department of the Environment for individual sewage disposal. Improvements of any nature in this area are restricted until public sewage is available. These easements shall become null and void upon connection to a public system. The county health officer shall have the authority to grant adjustments to the private sewage easement. Recordation of a modified sewage easement shall not be necessary.

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19184, EXPIRATION DATE: 6/30/11.

SIGNED *Bruce D. Burton*
BRUCE D. BURTON
12/2/10

NO.	DATE	REVISIONS

LDE Inc.
Engineers, Surveyors, Planners
9250 Ramsey Road, Suite 106 Columbia, Maryland - 21045
(410)715-1070 • (301)596-3424 • FAX (410)715-9540

DESIGNED BDB	PLOT PLAN FOR BUILDING PERMIT ALLNUTT FARMS ESTATES SECTION FOUR LOT 33	SCALE 1" = 30'
DRAWN LDE		DRAWING 1 OF 2
CHECKED BDB	TAX MAP 34 GRID 15 P/O PARCEL 375 5th ELECTION DISTRICT HOWARD COUNTY, MD	JOB NO. 09-008.2
DATE 12/2010	BUILDER: Hamilton Reed, LLC 3368 Brantley Court, Glenwood, MD 21738 410-442-1751	OWNER: Steve Allnutt 13492 Open Space Ct. Highland, MD 20777
	CONTRACT PURCHASER Avery C. Van Geison 9328 Sleepie Court Laurel, MD 20773	FILE NO.

B.4.C Specifications for Micro-Bioretentlon, Rain Gardens, Landscape Infiltration & Infiltration Berms

1. Material Specifications
The allowable materials to be used in these practices are detailed in Table B.4.1.

2. Filtering Media or 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 micro-bioretentlon practice 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 15.06.01.05.

The planting soil shall be tested and shall meet the following criteria:
- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
- Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy sand (60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
- Clay Content - Media shall have a clay content of less than 5%.
- pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, 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 topsoil was excavated.

3. Compaction
It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, 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 refracture 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 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 micro-bioretentlon practices can be found in Appendix A, Section A.2.3.

5. Plant Installation
Compost is a better organic material source, is less likely to float, and should be placed in the invert and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only acceptable mulch. Pine 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.

Rootstock 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, 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 - NOT APPLICABLE TO THIS PROJECT
Underdrains should meet the following criteria:
- Pipes - Should be 4" to 6" diameter, slotted or perforated rigid plastic pipe (ASTM F 758, Type PS 28, or AASHTO-M-278) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).
- Perforations - If perforated pipe is used, perforations should be 3/8" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a 1/4" (No. 4 or 4x4) galvanized hardware cloth.
- Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain.
- The main collector pipe shall be at a minimum 0.5% slope.
- A rigid, non-perforated observation well must be provided (one per every 1,000 square feet) to provide a clean-out port and monitor performance of the filter.
- A 4" layer of pea gravel (1/8" to 3/8" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 24".

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
These practices may not be constructed until all contributing drainage area has been stabilized.

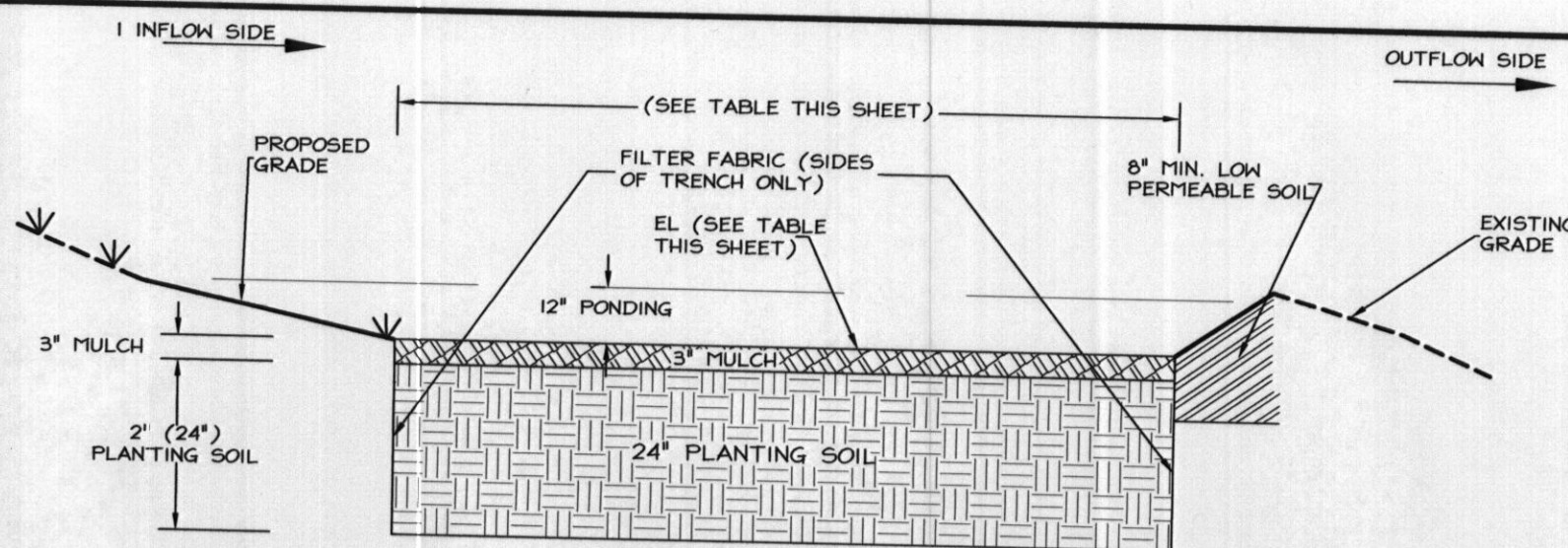
Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2" to 4" deep)	loamy sand (60-65%) & compost (35-40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type I nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipe; not necessary underdrain pipes. Perforated pipe shall be wrapped with 1/2-inch galvanized hardware cloth.
Poured in place concrete (if required)	MSHA Mix No. 3; $f_c = 3500$ psi @ 28 days, normal weight, air-entrained, reinforcing to meet ASTM-A-615-60	n/a	on-site testing of poured-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 approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil pressure) and analysis of potential cracking.
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonate or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

SWM LEGEND

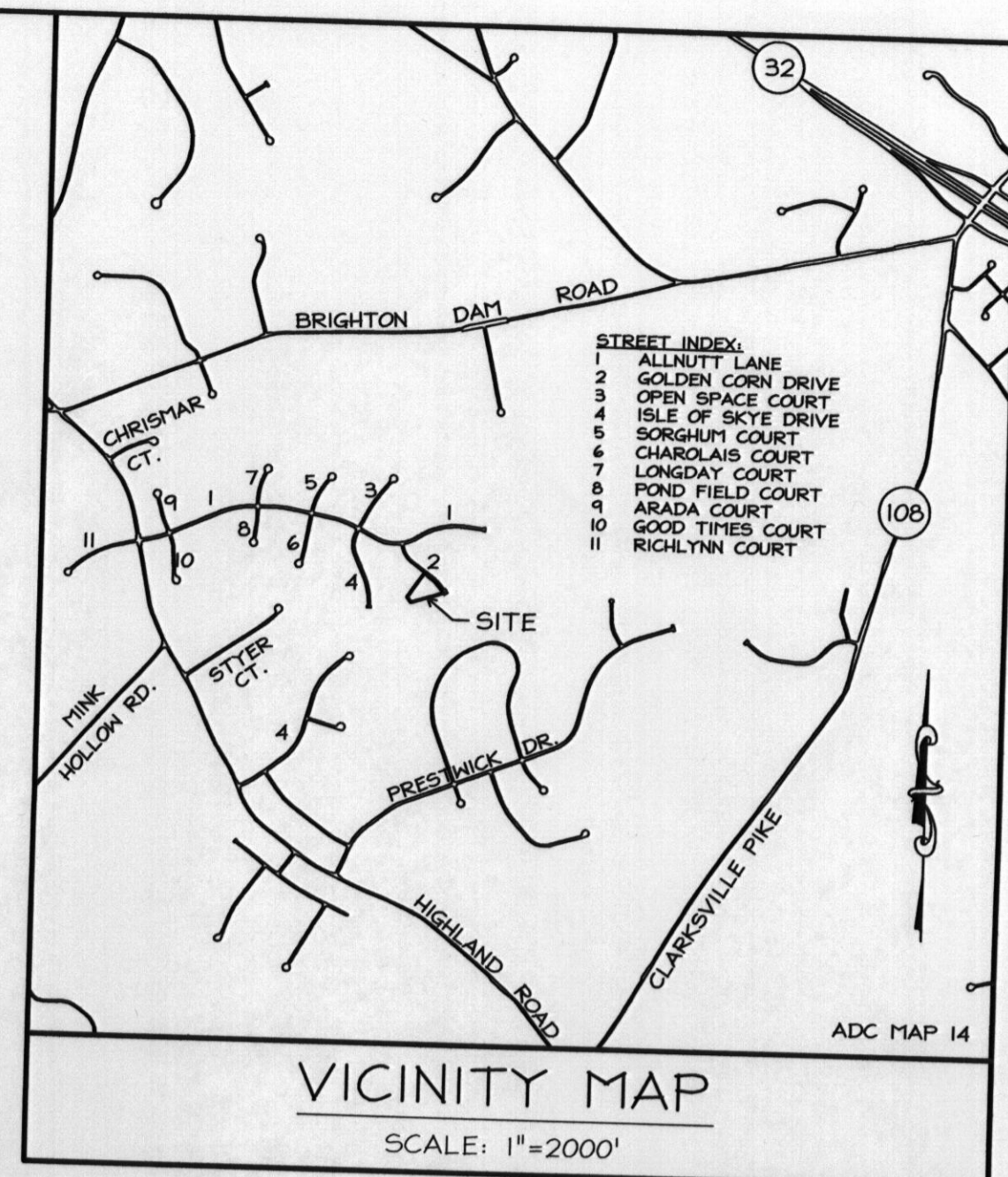
- ROOFTOP DISCONNECTION AREA
- ROOFTOP NOT DISCONNECTED
- EXCLUSION ZONE (SWM PRACTICES NOT PERMITTED)

LEGEND

- PROPOSED SEWAGE DISPOSAL EASEMENT
- EXISTING SEWAGE DISPOSAL EASEMENT
- SOILS DIVIDE
- EXISTING 5' CONTOUR
- EXISTING 1' CONTOUR
- EXISTING TREELINE
- PASSED SAND MOUND TEST LOCATION 5/6/09
- EXISTING WELL
- PRIMARY WELL LOCATION
- ALTERNATE WELL LOCATION



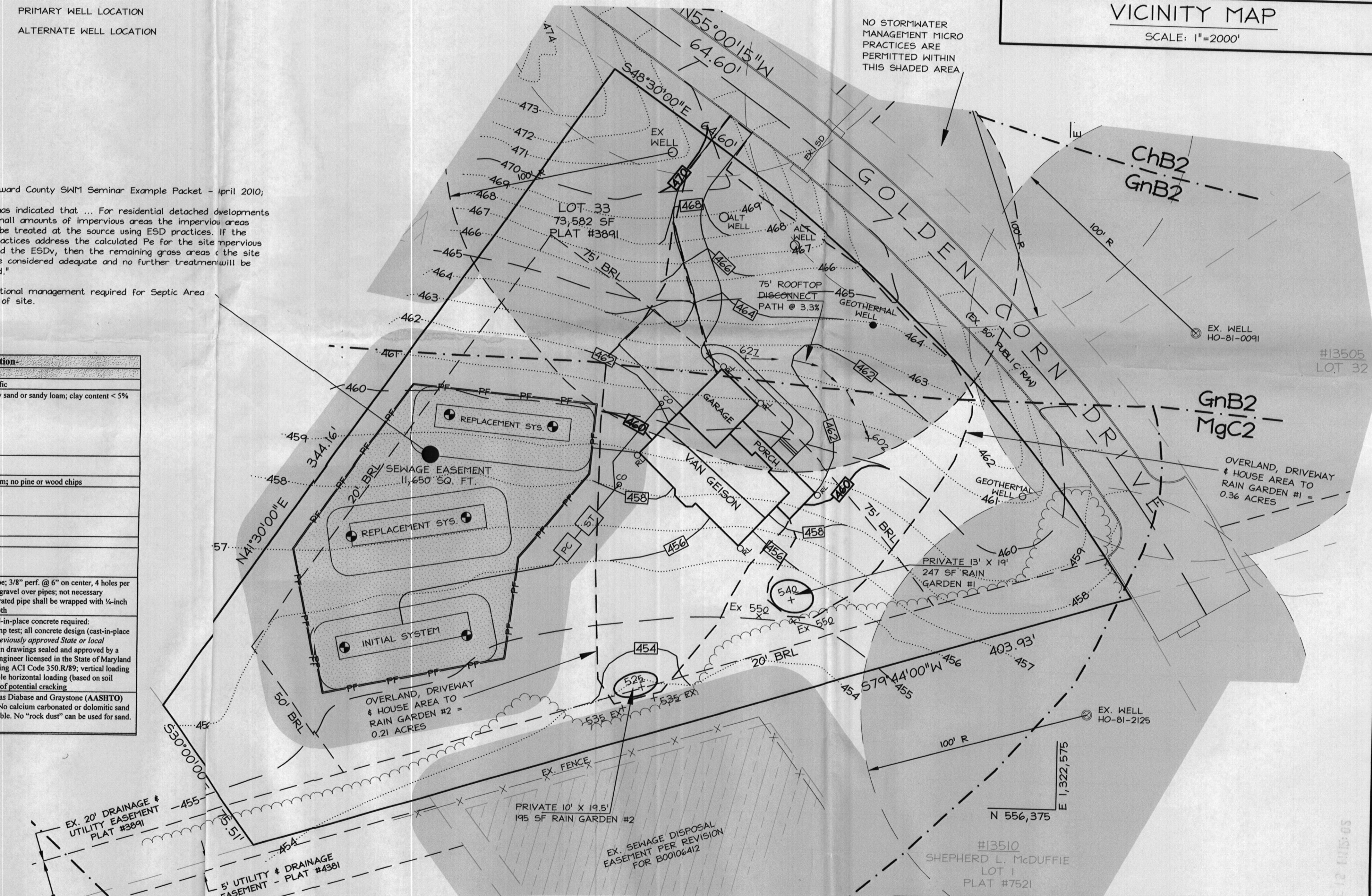
TYP. SECTION FOR PROPOSED PRIVATE RAIN GARDENS & OUTFALL
SCALE: N.T.S.



Per Howard County SWM Seminar Example Packet - April 2010;

"MDE has indicated that ... For residential detached developments with small amounts of impervious areas the impervious areas should be treated at the source using ESD practices. If the ESD practices address the calculated P_e for the site impervious area and the ESD, then the remaining grass areas < the site shall be considered adequate and no further treatment will be required."

No additional management required for Septic Area portion of site.



STORMWATER MANAGEMENT PLAN VIEW

Scale 1" = 30'

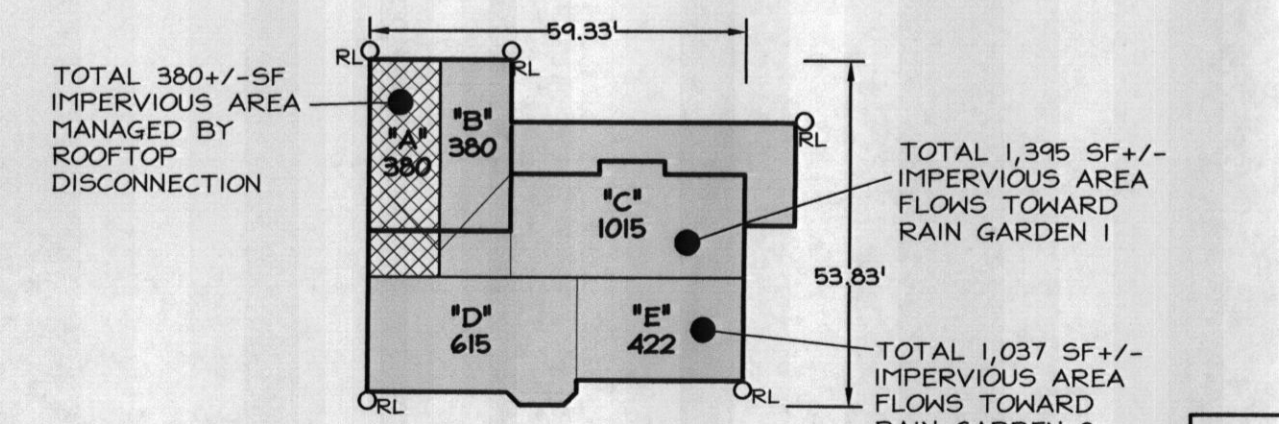
INSPECTION CHART FOR PRIVATE RAIN GARDEN FACILITIES

STAGE	Engineer's Approval	
	Initial/Date	#
1. Surrounding site shall be stabilized.		
2. Inspection of excavation to subgrade.		
3. Inspection during placement of filter material. Material should be mixed on-site prior to installation. (See Appendix B.4.)		
4. Inspection upon the completion of final grading & establishment of permanent stabilization.		

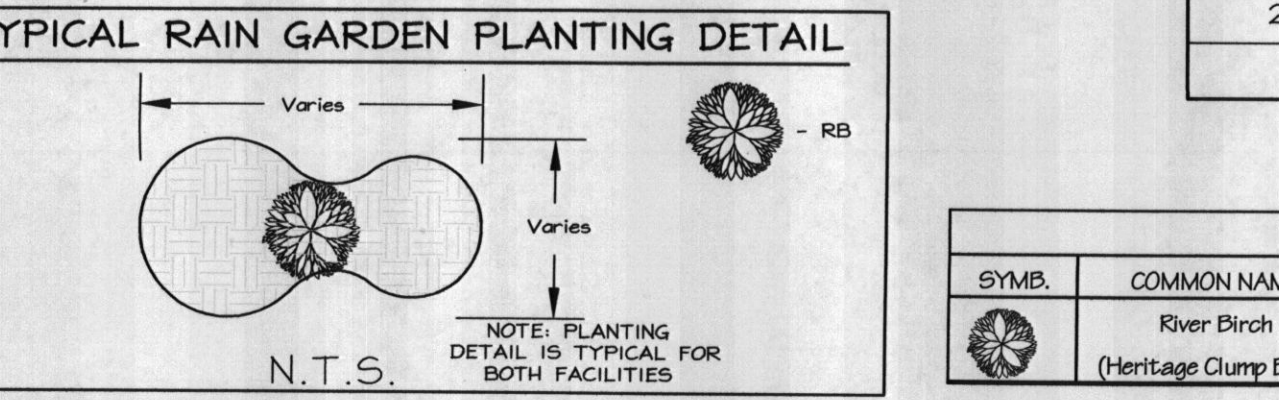
Please notify certifying engineer 48 hours prior to commencing construction
Engineer's Name: LDE, Inc.
Phone Number: 410-715-1070

MAINTENANCE CRITERIA FOR PRIVATE RAIN GARDENS

- Privately owned practices shall have a maintenance plan and be protected by easement, deed restriction, ordinance, or other legal measures preventing its neglect, adverse alteration, and removal.
- Rain garden maintenance is generally no different than that required of other landscaped areas. The top few inches of the planting soil should be removed and replaced when water ponds for more than 48 hours. Silt and sediment should be removed from the surface of the bed as needed.
- Where practices are used to treat areas with higher concentrations of heavy metals (e.g., parking lots, roads), mulch should be replaced annually. Otherwise, the top two to three inches should be replaced as necessary.
- Occasional pruning and replacement of dead vegetation is necessary. If specific plants are not surviving, more appropriate species should be used. Watering may be required during prolonged dry periods.



Facility No	Width	Length	Square Feet	Depth	Inv.	Top Mulch Elev.	Location
1	13'	19'	247	2.25'	451.75	454.00	Lot 33
2	10'	19.5'	195	2.25'	450.25	452.50	Lot 33



SYMB.	COMMON NAME	BOTANICAL NAME	QTY	SIZE	REMARKS
	River Birch	<i>Betula nigra</i>	2	10' - 12' Ht	B & B
	(Heritage Clump Birch)	"Heritage"			3 Stems

I HEREBY CERTIFY THAT THESE DOCUMENT WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19184, EXPIRATION DATE: 6/30/11.
SIGNED: *Bruce D. Burton*
BRUCE D. BURTON

NO.	DATE	REVISIONS

LDE Inc.
Engineers, Surveyors, Planners
9250 Ramsey Road, Suite 106 Columbia, Maryland - 21045
(410)715-1070 - (301)596-3424 - FAX(410)715-9540

DESIGNED: BDB
DRAWN: LDE
CHECKED: BDB
DATE: 12/2010

SCALE: 1" = 30'
DRAWING: 2 OF 2
JOB NO.: 09-008.2
FILE NO.:

TAX MAP 34 GRID 15 P/O PARCEL 375
5th ELECTION DISTRICT HOWARD COUNTY, MD

PREVIOUS SUBMITTALS:

BUILDER: Hamilton Reed, LLC
3368 Brantly Court
Glenwood, MD 21738
410-442-1751

OWNER: Steve Allnut
13492 Open Space Ct.
Highland, MD 20777

CONTRACT PURCHASER: Avery C. Van Geison
4328 Steeple Court
Laurel, MD 20723