
MONTGOMERY COUNTY ENVIRONMENTAL SITE DESIGN AUDIT

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INTRODUCTION

Environmental Site Design (ESD) offers the promise of reaping the full benefits of growth while enhancing the health of Montgomery County waters, but only when combined with sound watershed land use planning. Community & Environmental Defense Services (CEDS) and Montgomery Stormwater Partners (Partners) initiated an audit to determine if this promise was being met. The audit was prompted by the Chelsea Court project, which was proposed for a site in Silver Spring. The Chelsea Court Stormwater Concept Plan was approved by the Department of Permitting Services (DPS) despite several very severe conflicts with the intent of ESD and specific requirements set forth in the Montgomery County Code. The goal of this audit was to determine, by examining a larger number of projects, how often these and other conflicts are encountered, then resolved. DPS provided a list of the 79 ESD Concept Plans approved in 2012. The Partners then selected 20 projects which they felt would be representative of countywide conditions. It is these 20 projects plus Chelsea Court which are the focus of this Audit.

WHY CHELSEA COURT RAISED CONCERNS

A development company known as EYA proposed developing the 4.85-acre Chelsea School site in Silver Spring with 63 townhouse units and one single family home (the existing Riggs Thompson historic property). Originally called Chelsea Court, the project is now known as Chelsea Heights. The project site is located in the Sligo Creek watershed, which is part of the Anacostia watershed. Many of the individuals who live near this site are members of the Seven Oaks/Evanswood Citizens' Association (SOECA). SOECA has a long history of supporting Montgomery County's considerable efforts to restore Sligo Creek and the Anacostia.

SOECA retained CEDS to assess the validity of a number of potential impacts and to identify equitable solutions for those impacts which proved genuine. An *Equitable Solution* is one which resolves citizen concerns while allowing the applicant to achieve their goals.¹ On August 10, 2012 CEDS wrote to the applicant (EYA) about a number of issues, including the following ESD conflicts:

1. Proposed disturbance of steep slopes composed of highly-erodible soils;
2. The most important trees on the site were not being retained;
3. Failure to maintain dry-weather inflow to Sligo Creek and the Anacostia by using groundwater recharge measures on the site; and
4. Lack of ESD measures serving the historic Riggs-Thompson house.

This effort to work cooperatively with EYA was unsuccessful. This left SOECA no option but to bring the issues to the attention of DPS in a letter dated September 5, 2012.

Our work with DPS resulted in the resolution of the third and fourth issues listed above. But we were left with two very serious threats to Sligo Creek and the Anacostia. Also, the

¹ For further detail on Equitable Solutions visit: ceds.org/eqs

excessive loss of trees would have a dramatic impact upon adjoining homeowners and the neighborhood in general, while it might cause the loss of no more than a sixth of the proposed townhouses. DPS officials claimed they could not resolve these issues without requiring the applicant to eliminate an unknown (though likely small) number of proposed townhouses. DPS officials said they had received clear direction that they should not pursue ESD requirements if it meant reducing development intensity. This direction applied to all projects, not just Chelsea Court. Therefore their hands were tied. Also, Maryland-National Capital Park & Planning (MNCPPC) officials stated that they could not require greater tree preservation than that mandated by the Maryland Forest Conservation Act. MNCPPC felt the applicant had complied with the Act even though most of large trees on the site were slated for removal.

Our letters to EYA and DPS will be found in Attachment A of this report. Our September 5th letter presents the portions of Montgomery County law and the *2007 Maryland Stormwater Design Manual* that obligate DPS and MNCPPC to use site planning techniques to preserve sensitive waters like Sligo Creek and the Anacostia from excessive development impacts, including those proposed for Chelsea Court.

CHILDREN - OUR MOST SENSITIVE STREAM USERS

Some may take issue with our designation of Sligo Creek and the Anacostia as sensitive waters. Normally this phrase brings to mind trout streams or waters supporting endangered species. But both Sligo Creek and the Anacostia have the potential to support an even more valued and sensitive use: as aquatic playgrounds for our children. Both waterways are within a 15-minute walk of tens of thousands of homes.

Restoring these waters to a condition where parents feel comfortable allowing children to wade and splash would directly benefit a large percentage of the County's population. This would mean that people will not have to drive or take public transportation to get to streams that won't make them sick. Of course Montgomery County recognizes this potential and has invested large sums in restoration efforts targeting both waterways. But then we see an apparent opposite view among County officials involved in reviewing proposed development projects. We perceive that aquatic resource protection efforts are less exhaustive for projects in intensely developed watersheds, like Sligo Creek.

From our perspective, each new development project within the watershed provides an extremely important opportunity to restore Montgomery County waters and thus the Chesapeake Bay, as well as achieve on a more local level our child-safe stream restoration goal. We find it deeply disturbing that the County failed to seize upon the opportunity at Chelsea Court. This prompted us to question the extent of the problem, then our request for access to a larger number of approved ESD Concept Plans.

THE MONTGOMERY COUNTY ESD AUDIT

Of the 79 ESD Concept Plans, the Partners selected 20 for review. The projects addressed by these 20 plans are presented in Table 1, on the next page. Note that a 21st project, Chelsea Court,

Table 1: Characteristics of Sites Included in the Montgomery County Stormwater Partners ESD Review

PROJECT #	PROJECT NAME	ADDRESS	SITE ACRES	PERCENT IMPERVIOUS AREA (IA)		PERCENT OF IMPERVIOUS AREA RUNOFF TREATED WITH...			INCHES OF IMPERVIOUS AREA RUNOFF DEPTH TREATED	OTHER PROPOSED LAND USE	
				Existing	Proposed	ESD Practices	Other	Other Practice Type		Type	Percent
240685	Aquilino Cancer Center	9901 Medical Center Drive, Rockville, MD 20850	1.94	68%	68%	100%			2.00	Lawn	32%
243046	Candlewood Elementary School	7210 Osprey Drive, Derwood, MD 20855	5.44	45%	51%	100%			1.90	Lawn	14%
244090	Capital Crescent Trail at River Road	River Road @ Landy Lane, Bethesda, MD	0.78	53%	26%	100%			1.00 ^a	Lawn	49%
239939	Chelsea Court	711 Pershing Drive, Silver Spring, MD 20910	4.85	25%	55%	100%			1.80	Lawn	45%
242487	Crystal Rock	Century Boulevard & Crystal Rock Drive, Germantown, MD 20874	107.20	5%	47%	100%			2.30	Lawn	23%
242615	Esthworthy Estates	12630 Travilah Road, Potomac, MD 20854	2.43	3%	38%	100%			2.10	Lawn	42%
241169	Glen Aldon	Multiple properties in Bethesda	5.30	70%	70%	100%			1.00	Lawn	25%
242887	Glenstone II	12002 Glen Road, North Potomac, MD 20854	70.29	10%	16%	100%			2.60	Pasture	52%
245991	Grosvenor	5400 Grosvenor Lane, Bethesda, MD 20814	35.43	15%	24%	100%			1.60	Lawn	26%
242697	Hanover Shady Grove	Omega Drive, Rockville, MD 20853	6.90	40%	61%	100%				Lawn	29%
229571	Homecrest, Lot 1	2727 Bel Pre Road, Silver Spring, MD	5.70	0%	11%	Waived	100%	Infiltration Trench		Lawn	28%
241667	Horizon Hill	10616 Red Barn Lane, Potomac, MD 20854	6.40	5%	9%	100%			2.60	Lawn	86%
241329	Hoyt Property	5400 Butler Road, Bethesda, MD 20816	1.81	94%	64%	100%			1.80	Lawn	23%
242359	Kings of Nations Christian	10400 Darnestown Road, Rockville, MD 20850	5.50	22%	37%	100%			1.76	Lawn	23%
241347	Mallory Square	9435 Key West Avenue, Rockville, MD 20850	9.85	55%	70%	100%			2.01	Lawn	10%
239006	Martens Property	19430 Waters Road, Germantown, MD 20874	26.47	5%	69%	100%			1.03	Lawn	31%
239369	Parmjit & Saini Estates	13816 Travilah Road, Rockville, MD 20850	2.60	5%	19%	100%			1.40	Lawn	56%
242549	Qiagen Science Campus expansion	19300 Germantown Road, Germantown, MD 20874	4.86	60%	68%	100%			1.83	Lawn	12%
242459	Rock Creek Forest Elementary School	8330 Grubb Road, Chevy Chase, MD 20815	7.95	33%	37%	100%			1.70	Lawn	43%
241551	Towne Crest	17500 Towne Crest Drive, Gaithersburg, MD 20877	8.11	37%	58%	100%			2.00	Lawn	42%
242095	Whetstone Run Asset 10794 Retrofit of Existing Pond	Cross Country Lane, Gaithersburg, MD 20879	22.90	45%		0%	100%	Dry Pond?			
	Total		342.71								
	Average			33%	45%	95%	100%		1.85		35%

a. Documentation provided by DPS does not state the depth of impervious area runoff treated. It is assumed the Water Quality Volume or first inch of impervious area runoff will be treated.

is included in Table 1 so the reader can place this project in context with the others. The last project in Table 1, is Whetstone Run Asset 10794 Retrofit of Existing Pond and does not really fit the purposes of this Audit. This 21st project is dropped from further analysis.

Table 1, shows that most sites have some existing development. Collectively the 21 sites cover nearly a half square mile (343acres). A third of the lands contained within these sites is impervious, which will increase to 45% if each is developed as proposed. Many qualify as *redevelopment* projects.

A redevelopment site is defined as one where existing rooftops, streets, parking lots and other impervious surfaces cover more than 40% of the site. While State law allows for a relaxation of ESD requirements on redevelopment sites, the Montgomery County stormwater regulations requires compliance with the same criteria applied to new development. Traditionally, Montgomery County has required the same stormwater management standards for new development as for redevelopment. Most of the redevelopment projects listed in Table 1 have made full use of runoff volume reduction practices. We applaud the County for this added protection.

Montgomery County Plans Missing Critical Information & Hard To Read

First of all, we deeply appreciate how responsive and cooperative DPS staff were in providing the information needed to conduct this study. However, some of the documents provided were difficult to read. We suggest Montgomery County consider following the lead of other Maryland jurisdictions, like Howard County, where citizens can easily obtain pdf versions of ESD plans and reports. The electronic versions are far easier to read than what was provided by Montgomery County. Plus Howard County requires that all information essential to ESD review be provided on the Concept Plan. Portions of the plans provided by DPS were difficult to read.

Based on this experience in document review, here are three specific improvements that we recommend for the DPS site data collection and information sharing:

- 1) For each development project, provide a standard file with the same types of documents provided in each file;
- 2) Provide PDFs and other formats in sufficient resolution to enable members of the public to view the finer details of the site plans; and
- 3) Require that all essential information be provided on the Concept Plan.

How ESD Is Supposed To Work

In 2000, the Maryland Department of the Environment (MDE) published the first edition of the *Maryland Stormwater Design Manual*.² In 2007, the Maryland General Assembly amended the

² See: http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/MarylandStormwaterDesignManual/Pages/Programs/WaterPrograms/SedimentandStormwater/stormwater_design/index.aspx

Maryland Stormwater Management Act to require the use of Environmental Site Design. In 2009, the Manual was then updated with a new Chapter 5 setting forth how to comply with ESD requirements.

MDE's stormwater design manual, Chapter 5, Part 5.1, states that clustering, and exhaustion of opportunities for natural resource preservation and utilization, are mandatory provisions for stormwater management concept plans. We refer here to: MDE's Stormwater Design Manual, Chapter 5, Part 5.1 Design Process and Planning Techniques, page 5.4. The quote from this Part 5.1 is copied below and the italics are in the original. (As noted on page 5.1 of the MDE Design Manual, italics indicate mandatory criteria.)

- > *Minimizing total site imperviousness by implementing clustered development and other better site design techniques.*
- > *Demonstrating that all reasonable opportunities for meeting stormwater requirements by using ESD have been exhausted by using natural areas and landscape features to manage runoff from impervious surfaces and that structural BMPs have been used only where absolutely necessary.*

From: Montgomery County Code, Section 19-26, Stormwater Management Design Criteria, Section (a) states,

“Each applicant must use planning techniques, nonstructural practices, and design methods to implement environmental site design to the maximum extent practicable.”

Conclusion: As these quotes from State and local regulations make clear, the use of planning techniques like woodland and wetland preservation and clustering of buildings, and nonstructural practices such as sheet flow into Conservation Areas, is mandatory. Local DPS and Planning Department regulators and plan reviewers must require developers to demonstrate that they are adhering to this requirement regarding natural area protection and integration, and that they have exhausted this approach before turning to structural ESD measures such as rain gardens and/or to other stormwater management approaches.

The first approach for ESD, according to the regulations quoted above, is to preserve and protect a site's natural resources - and to integrate these natural areas into the site's stormwater management plan. Clearly this did not occur with regard to the forests on the Chelsea Court site. However, if it is true that an unwritten but real policy prevents DPS from reducing development intensity at any site, then compliance with this state and local mandate to save and integrate natural areas will be difficult if not impossible at many sites. At other sites, such full-fledged ESD compliance will still be possible even with this apparent DPS policy - since at many sites, changes to the configuration, layout, and other aspects can enable natural area protection while still maintaining a yield of buildable units.

As a result of these current practices and policies, Environmental Site Design plan review in Montgomery County by both DPS and the Planning Department, appears to have devolved into an assessment of only those ESD criteria that can be met without reducing development intensity and without placing a priority on natural area protection. Fundamentally, the absence of a protocol that places natural area protection and integration as a mandatory first step in plan review by Permitting Services and the Planning Departments, is the core problem that needs to be fixed. Publishing such a protocol and a clarification of ESD policies on the part of DPS and Planning Department, are necessary first steps towards fixing this problem.

Rainfall Target Requirement Generally Met

The *Maryland Stormwater Design Manual* contains five criteria for preserving aquatic resource health, public health and minimizing damage to downstream properties:

Water Quality Volume: The first inch of runoff from impervious surfaces must be treated with Rain Gardens, bioretention, infiltration and other Best Management Practices capable of removing most pollutants. About 90% of all runoff is accounted for by storms producing up to an inch of runoff. A one-inch rain occurs about once per month.

Recharge Volume: Depending upon soil type, 0.07- to 0.38-inches of runoff from impervious surfaces must be released into the soil to recharge the groundwater system. This recharged water then takes months or years to flow through the earth to enter the nearest streams and wetlands. Thus recharge ensures continuous inflow of water to nearby waterways year-round.

Channel Protection Volume: By managing the velocity of runoff released into downstream channels during a one-year storm, it is thought that bed and bank erosion will be minimized. A one-year storm releases 2.4- to 3.0-inches of rain in 24 hours.

Overbank Flood Protection Volume & Extreme Flood Volume: These are actually two separate criteria but both are intended to protect downstream bridges, homes and other structures from the impact of floodwaters. The rainfall accounting for these floods ranges from 4.3- to 8.1-inches in 24 hours.

The first three criteria must be met on all new development sites. Throughout most of Maryland redevelopment projects only need meet the first criteria (Water Quality Volume), though Montgomery County requires compliance with all three. The flood criteria are only applied where development might threaten downstream structures or in watersheds with a historic flooding problem.

Chapter 5, of the *Maryland Stormwater Design Manual*, presents a process for computing the volume of runoff that must be managed to meet the first three criteria. This amount is termed the *Rainfall Target*. It may range from 1.0- to 2.7-inches. The Rainfall Target equals the Recharge Volume plus the Water Quality volume plus the Channel Protection volume. The



Green Roof



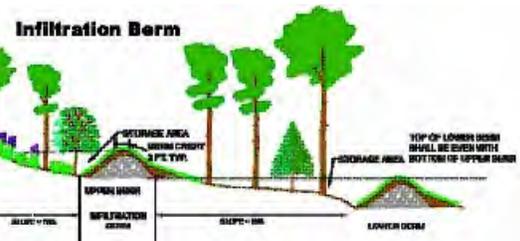
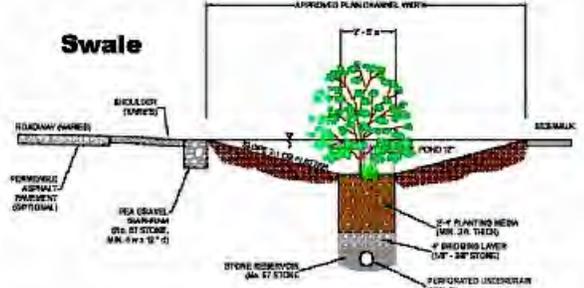
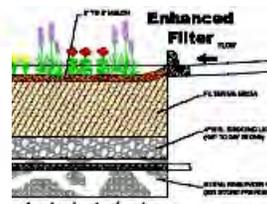
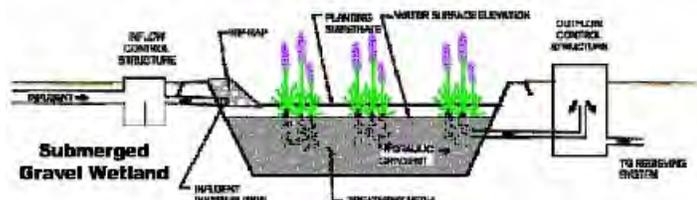
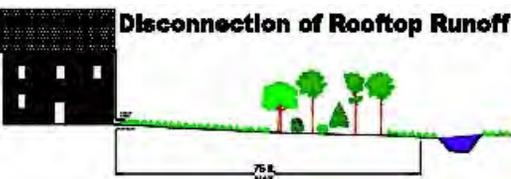
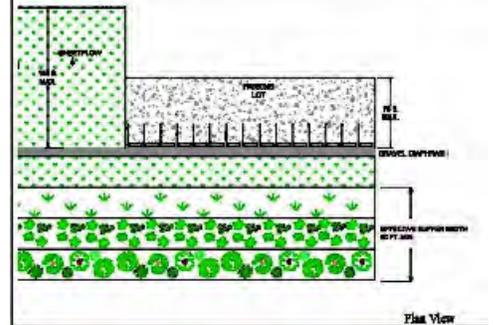
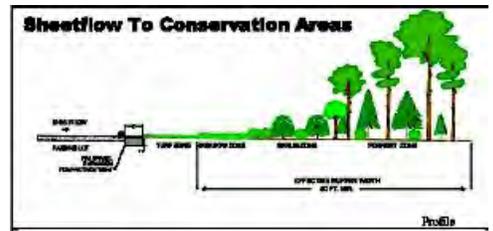
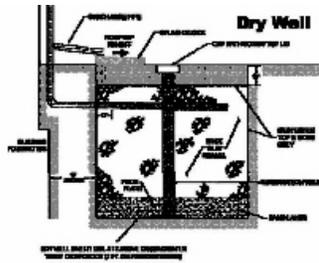
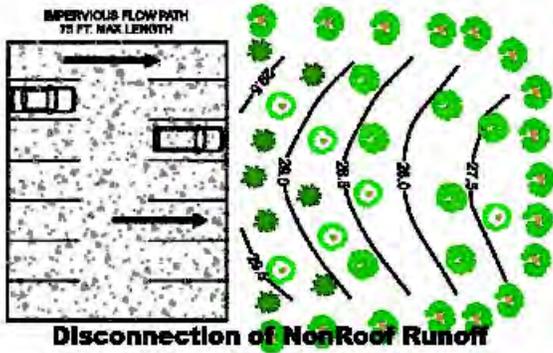
Permeable Pavers



Reinforced Turf



Rainwater Harvesting



ESD Practices

Rainfall Target must then be treated with one or more of the 15 ESD practices, which are illustrated on the preceding page. Ideally, all proposed impervious surfaces would drain to an ESD practice. If the ESD practices are insufficient then conventional ponds and other “structural” practices may be used.

Table 1, shows that for 19 of the 20 projects all (100%) of proposed impervious surfaces will drain to ESD practices. Only one of the 20 projects (Homecrest) received a waiver from ESD requirements. But Homecrest runoff will be treated with infiltration trenches, which can remove much of runoff pollution and maintain recharge, though the trenches are more difficult to maintain than most ESD practices. Montgomery County is to be commended for so few waivers and ensuring that most impervious surfaces drain to ESD practices.

Natural Areas Protection Poorly Addressed

As stated earlier, the Montgomery County stormwater regulations list *preserve and protect natural resources* as the first technique to use in meeting ESD requirements. Fortunately, no other project proposed disturbance of steep slopes on highly-erodible soils as was the case at Chelsea Court.

With regard to forests, the County’s review is limited to compliance with the Maryland Forest Conservation Act (FCA).³ But research conducted in Montgomery County shows that meeting FCA alone is insufficient to preserve aquatic resource health and meet the intent of ESD.

An analysis of 214 Montgomery County subwatersheds documented a strong relationship between the percent of a watershed covered by impervious surfaces as well as forests and stream health.⁴ An equally strong relationship was found between the percent of stream channel bordered by forest buffers and stream health. These relationships are presented in Table 2, on the next page

According to Section 22A-12, of the Montgomery County Forest Conservation regulations, 15% to 50% of a site might be required to be preserved as forest. For most of the 20 sites covered by this Audit, 15% to 20% is the applicable figure.

Table 3, on page 10, provides the subwatershed in which each site is located along with the stream health rating based upon the most recent County assessment.⁵ Stream health is rated as: Poor - 6 streams, Fair - 7 streams, Good - 7 streams, and Excellent - 0 streams.

³ See: <http://www.dnr.state.md.us/forests/programapps/newFCA.asp>

⁴ Goetz, Scott J., Robb K. Wright, Andrew J. Smith, Elizabeth Zinecker, and Erika Schaub, 2003. IKONOS imagery for resource management: Tree cover, impervious surfaces, and riparian buffer analyses in the mid-Atlantic region. *Remote Sensing of Environment* 88 (2003) 195–208. <http://www.sciencedirect.com/science/article/pii/S0034425703002414>

⁵ See: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/csps.asp>

Table 2: Montgomery County Stream Health, Riparian Buffers & Watershed Forest Cover

Stream Health Rating	Average Percent of Watershed Covered By Impervious Surfaces	Percent Watershed Tree Cover	Percent of Area Within 100 Feet of Stream Occupied by Trees
Excellent	3.6%	50.6%	76.8%
Good	4.9%	44.6%	71.3%
Fair	13.9%	37.0%	63.2%
Poor	19.5%	29.6%	26.3%

At five of the sites a stream is located within or near the site. At only one of the five sites was the stream clearly protected by an adequate buffer. The plans for a second site (King of Nations) clearly showed intrusion into the buffer required by Montgomery County regulations. The plans for the other three sites were unclear as to whether the buffer was protected. The ESD report for these four sites did not contain an analysis of stream buffer impacts much less options for resolving negative effects.

Table 3, also shows that of the 343-acres occupied by the 20 sites, 30% is under a tree canopy. While a tree canopy does not necessarily mean the presence of “forest” as defined by the Forest Conservation Act, we would argue that it should be treated the same. While a canopied area may lack the multiple vegetative layers, leaf duff and density of an FCA forest, it has the potential to provide many of the same stream quality benefits. In most cases these benefits can be achieved over time by simply allowing the ground layer to revert through natural growth of native species and the accumulation of a leaf-duff layer.

Again, of the 343 acres encompassed by the 20 sites, 30% is canopied by trees. This will drop to 19% if the sites are developed as proposed. But only a fourth of this remaining canopy will be protected by a forest conservation easement, at least based upon the plans provided by DPS, many of which are hard to read and lacking in detail. As with stream buffers, few of the ESD reports mentioned forest impacts and none presented the alternatives considered for complying with the first technique under Section 19-22A(b), of the Montgomery County Stormwater Management regulations: *preserve and protect natural resources*.

Forest Target Proposed

The fourth column under Forest Cover in Table 3, presents the *Forest Target*. We propose that Montgomery County adopt the Forest Target as a second specific requirement to be evaluated during ESD Concept Plan review. It should be given the same weight as the single specific target presently in use: Rainfall Target.

Table 3: Natural Area Characteristics of Sites Included in the Montgomery Stormwater Partners ESD Review

PROJECT NAME	WATERSHED	STREAM HEALTH	STREAM PRESENT ON OR NEAR SITE		FOREST COVER				STEEP SLOPES COMPOSED OF HIGHLY-ERODIBLE SOILS		COMMENTS
			Present	Buffer Protected	Existing	Proposed	Percent of Proposed Forest Protected	Forest Target	Present	Proposed For Disturbance	
Aquilino Cancer Center	Rock Creek	Poor	No	NA	0%	0%	0%	37%	No	NA	Special Protection Area
Candlewood Elementary School	Upper Rock Creek - Mill Creek	Fair	No	NA	40%	35%	?	45%	No	NA	Steep slopes present, but not proposed for disturbance even though highly-erodible soils are absent.
Capital Crescent Trail at River Road	Little Falls Branch/Potomac	Poor	No	NA	20%	25%	?	37%	No	NA	51% of existing IA to be removed; 19 trees planted
Chelsea Court	Sligo Creek	Poor	No	NA	45%	0%	0%	37%	Yes	Yes	
Crystal Rock	Seneca Creek	Good	Yes	Yes	95%	20%	50%	51%	No	NA	Original site was 172.2 acres, of which 65 acres was dedicated to Black Hills Regional Park
Esthworthy Estates	Pennyfield Mainstem, Muddy Branch	Fair	No	NA	50%	20%	0%	45%	No	NA	
Glen Aldon	Rock Creek	Poor	No	NA	5%	5%	0%	37%	No	NA	
Glenstone II	Greebriar Branch to Potomac	Good	Yes	?	30%	30%	?	51%	No	NA	
Grosvenor	Rock Creek	Poor	Yes	?	85%	50%	?	37%	No	NA	
Hanover Shady Grove	Upper Muddy Branch	Fair	No	NA	5%	10%	?	45%	No	NA	
Homecrest, Lot 1	Bel Pre Creek/NW Branch	Fair	Yes	?	100%	51%	100%	45%	No	NA	
Horizon Hill	Greenbriar Branch/Watts Branch/Potomac	Good	No	NA	10%	5%	?	51%	No	NA	
Hoyt Property	Coquelin Run, lower Rock Creek	Poor	No	NA	3%	3%	?	37%	No	NA	
Kings of Nations Christian	Dufief Mainstem, Muddy Branch	Fair	Yes	No	25%	30%	?	45%	No	NA	
Mallory Square	Muddy Branch	Fair	No	NA	20%	?	?	45%	No	NA	
Martens Property	Seneca Creek	Good	No	NA	0%	?	?	51%	No	NA	
Parmjit & Saini Estates	Potomac Direct	Good	No	NA	25%	25%	?	51%	No	NA	
Qiagen Science Campus expansion	Seneca Creek	Good	No	NA	25%	20%	?	51%	No	NA	
Rock Creek Forest Elementary School	Rock Creek	Fair	No	NA	20%	20%	?	45%	No	NA	
Towne Crest	Middle Great Seneca Creek	Good	No	NA	0%	0%		51%	No	NA	
Total											
Average					30%	19%	25%	45%			

The *Forest Target* is based upon the percent watershed forest cover given in Table 2, on page 8. The County has clearly set the goal of improving the quality of all our degraded streams. The research presented earlier clearly shows that unless certain minimum percentages of watershed forest is preserved, one may not achieve significant improvements in stream quality. Therefore we propose setting this Target at the percent forest cover compatible with the next higher level of quality as shown in Table 4, on the next page.

Note that Table 3 shows that an average of 45% of the land occupied by the 20 sites must be in tree canopy to achieve the overall Forest Targets. Note also that Table 1, shows that an average of 35% of the 20 sites will be in lawn. Finally, Table 3, shows that 19% of the proposed sites will be in forest. If all the proposed lawn could become forest instead, then we'd be at 54% forest overall for the 20 site which is in excess of the 45% goal. The next section shows that minimizing grass cover in favor of trees (or other similarly beneficial ground covers) provides a tremendous benefit with regard to pollutant reduction.

Table 4: Forest Target

Existing Stream Health Rating	Percent Watershed Tree Cover	Forest Target	Stream Health Rating Achievable When Forest Target Is Met
Excellent	50.6%	50.6%	
Good	44.6%	50.6%	Excellent
Fair	37.0%	44.6%	Good
Poor	29.6%	37.0%	Fair

Our focus here is on using the ESD process to increase tree and forest canopy cover on each site so that incrementally, over time, each urban subwatershed experiences a net increase in forest cover. We note that while retaining existing forests (as opposed to achieving a net forest cover increase in a given watershed) can't achieve pollutant reductions per se, it can avoid pollution increases that would need to be offset elsewhere.

Dramatic Nutrient Reductions Achieved By Meeting Forest Target

Table 5, on the next page, shows nutrient loads from forest, lawn and impervious surfaces based upon the values used in the Chesapeake Bay Watershed Model for the Potomac River basin.⁶

Table 5, indicates that lawn generates about three times the nutrients when compared to forest. Table 6, on page 12, compares nutrient loads for the 20 sites under three scenarios: Existing Conditions, Proposed Conditions, and Proposed Condition Plus Lawn Converted to

⁶ See: <http://ches.communitymodeling.org/models/CBPhase5/>

Maximum Forest.

Table 5: Land Use & Nutrient Loads in Pounds Per Acre Per Year

Land Use	Nitrogen	Phosphorus
Forest	4.90	0.13
Lawn (Pervious)	12.09	0.44
Impervious Surfaces	18.44	1.93

While a forest composed of mature trees along with a herbaceous and shrub layer is the ideal, other ground covers may provide many of the same aquatic resource benefits as forest. An example would be dense growing ground covering of woody vines or other plants provided they do not require fertilization, mowing or regular irrigation. These forest alternatives may provide some of the visual benefits of lawns without the excessive nutrient loads.

The two graphs following Table 6, show a very dramatic reduction in nutrient loads under the Maximum Forest scenario, particularly for nitrogen. In other words, maximizing forest could contribute significantly to achieving the Chesapeake Bay Total Maximum Daily Load (TMDL) limit and the requirements under the Municipal Separate Storm Sewer Systems (MS4s) permit, while restoring the County's streams to a condition more suited for our most sensitive users, our children.

Impervious Area Target

Beginning with a study published by the author in 1979⁷, many researchers have documented the negative relationship between stream health and increasing watershed development. As the percent of a watershed covered by buildings, streets and other impervious surfaces increases, the health of waterways draining the watershed declines. This relationship was shown in Table 2, on page 8.

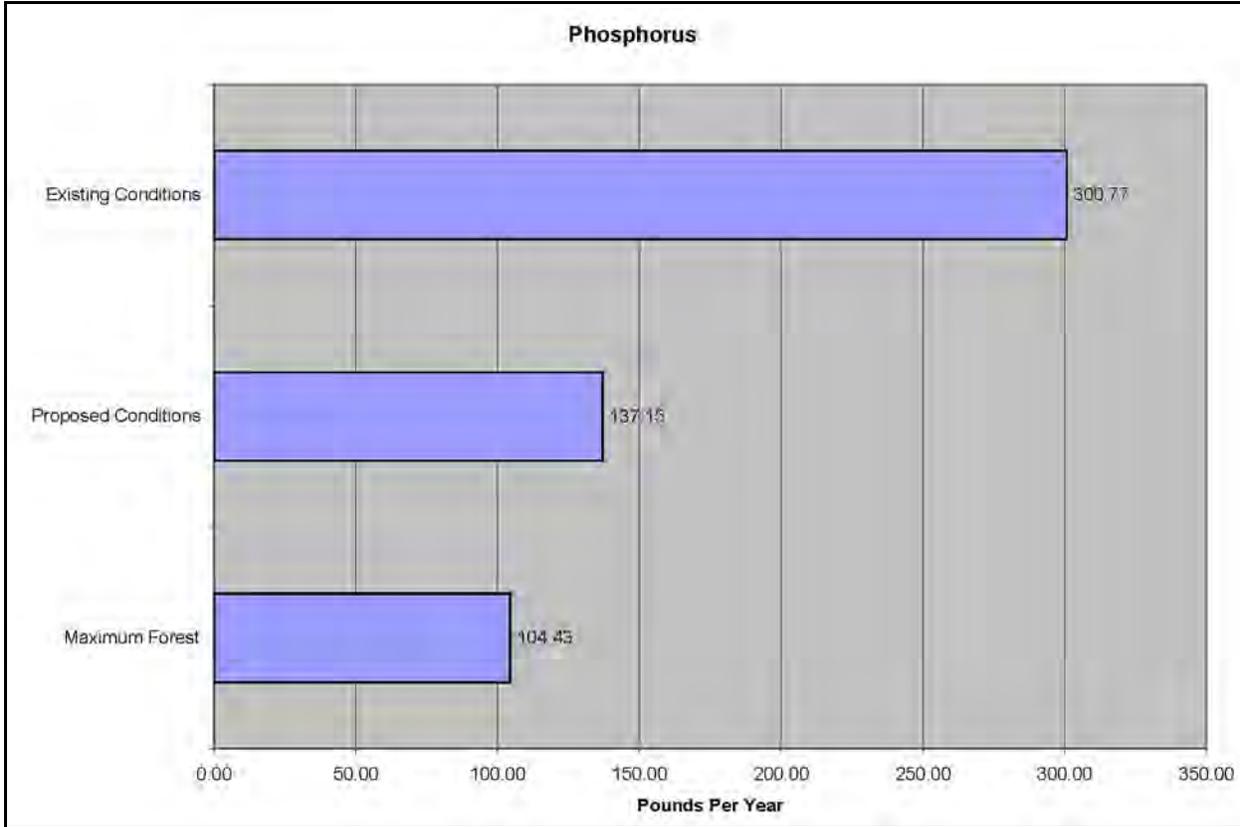
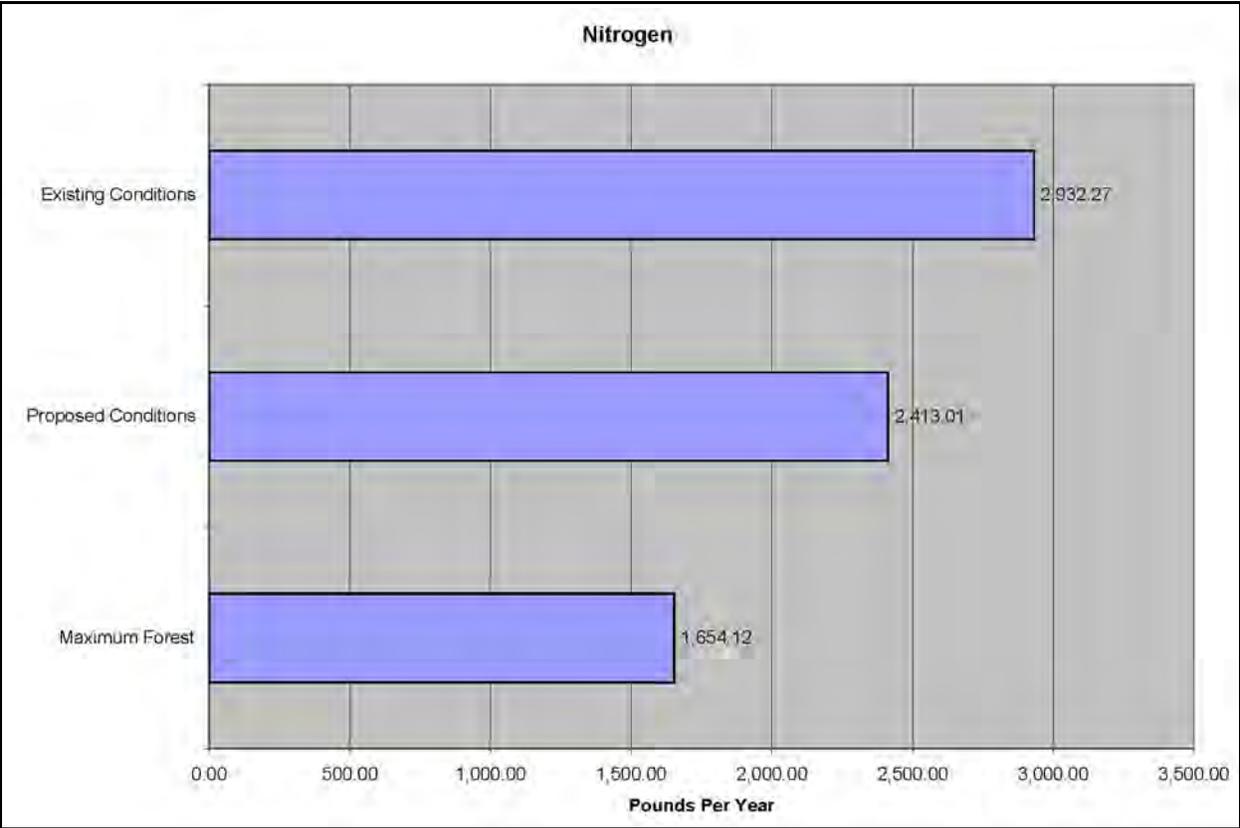
As stated earlier in this report, the *ESD planning techniques and practices* section (19-22A(b)) of the Montgomery County Stormwater Management regulations, states:

- (1) *An applicant must apply the following planning techniques according to the Design Manual to satisfy the on-site stormwater management requirements of Section 19-24:*
 - (A) *preserve and protect natural resources;*
 - (B) *conserve natural drainage patterns;*

⁷ Klein, R.D., 1979. Urbanization and stream quality impairment. *Water Resources Bulletin* (now the Journal of the American Water Resources Association) 15(4):948-963. <http://ceds.org/pdfdocs/Klein1979.pdf>

Table 6: Nutrient Loadings - Existing, Proposed Conditions & Maximum Forest

PROJECT NAME	SITE ACRES	EXISTING LAND USE (acres)			PROPOSED LAND USE (acres)			PROPOSED ENVIRONMENTAL SITE DESIGN TREATMENT					NITROGEN (Pounds Per Year)			PHOSPHORUS (Pounds Per Year)		
		Forest	Lawn	Impervious Area	Forest	Lawn	Impervious Area	Percent Impervious Area (IA) Treated with ESD Practices	Treatment Type	Inches IA Runoff Treated with ESD	IA Nitrogen Removal	IA Phosphorus Removal	Existing	Proposed	Maximum Forest	Existing	Proposed	Maximum Forest
Aquilino Cancer Center	1.94	0.00	0.62	1.32	0.00	0.62	1.32	100%	ESD	2.00	69%	80%	31.83	15.05	10.58	2.82	1.06	0.87
Candlewood Elementary School	5.44	2.18	0.82	2.45	1.90	0.76	2.77	100%	ESD	1.90	68%	79%	65.67	34.91	29.43	5.94	2.30	2.06
Capital Crescent Trail at River Road	0.78	0.16	0.21	0.41	0.20	0.38	0.20	100%	ESD	1.00	55%	66%	10.93	7.26	4.51	0.58	0.37	0.25
Chelsea Court	4.85	2.18	1.46	1.21	0.00	2.18	2.67	100%	ESD	1.80	66%	78%	50.64	43.11	27.42	6.11	2.71	2.03
Crystal Rock	107.20	101.84	0.00	5.36	21.44	24.66	50.38	100%	ESD	2.30	71%	83%	597.85	672.58	495.30	110.88	41.84	34.19
Esthworthy Estates	2.43	1.22	1.14	0.07	0.49	1.02	0.92	100%	ESD	2.10	70%	81%	21.11	19.83	12.49	2.29	1.05	0.73
Glen Aldon	5.30	0.27	1.33	3.71	0.27	1.33	3.71	100%	ESD	1.00	55%	66%	85.73	48.10	38.58	7.78	3.84	3.43
Glenstone II	70.29	21.09	42.17	7.03	21.09	36.55	11.11	100%	ESD	2.60	72%	85%	742.82	602.57	339.77	40.26	24.83	13.49
Grosvenor	35.43	30.12	0.00	5.31	17.72	9.21	8.50	100%	ESD	1.60	65%	76%	245.57	253.05	186.82	22.77	12.10	9.24
Hanover Shady Grove	6.90	0.35	3.80	2.76	0.69	2.00	4.21	100%	ESD	1.80	66%	78%	98.47	53.96	39.57	9.09	3.73	3.11
Homecrest, Lot 1	5.70	5.70	0.00	0.00	2.91	1.60	0.63	Waived	Infiltration Trench	1.00	55%	66%	27.93	38.74	27.27	2.29	1.62	1.13
Horizon Hill	6.40	0.64	5.44	0.32	0.32	5.50	0.58	100%	ESD	2.60	72%	85%	74.81	71.09	31.51	3.58	2.77	1.07
Hoyt Property	1.81	0.05	0.05	1.70	0.05	0.42	1.16	100%	ESD	1.80	66%	78%	32.30	12.56	9.57	2.43	0.95	0.82
Kings of Nations Christian	5.50	1.38	2.92	1.21	1.65	1.27	2.04	100%	ESD	1.76	66%	77%	64.29	36.14	27.04	4.70	2.11	1.71
Mallory Square	9.85	1.97	2.46	5.42	1.97	0.99	6.90	100%	ESD	2.01	69%	80%	139.32	60.98	53.89	14.00	4.81	4.51
Martens Property	26.47	0.00	25.15	1.32	0.00	8.21	18.26	100%	ESD	1.03	55%	66%	328.43	250.76	191.77	38.86	19.47	16.93
Parmjit & Saini Estates	2.60	0.65	1.82	0.13	0.65	1.46	0.49	100%	ESD	1.40	63%	73%	27.59	24.16	13.69	1.68	1.08	0.63
Qiagen Science Campus expansion	4.86	1.22	0.73	2.92	0.97	0.58	3.30	100%	ESD	1.83	66%	78%	68.54	32.53	28.34	6.76	2.55	2.37
Rock Creek Forest Elementary School	7.95	1.59	3.74	2.62	1.59	3.42	2.94	100%	ESD	1.70	66%	77%	101.34	67.56	42.98	7.39	3.64	2.58
Towne Crest	8.11	0.00	5.11	3.00	0.00	3.41	4.70	100%	ESD	2.00	69%	80%	117.10	68.07	43.58	10.58	4.31	3.26
Total	319.81	172.58	98.95	48.28	73.90	105.55	126.80	19.00	0.00	35.23	13.04	15.32	2,932.27	2,413.01	1,654.12	300.77	137.15	104.43



(C) minimize impervious area;

The documents provided by DPS did not contain any reference to *minimizing impervious area* as called for in the *ESD planning techniques and practices* listed above. In other words, none of the reports described efforts by the applicant to reduce impervious area. This is not surprising if it is true that DPS lacks the authority to direct an applicant to eliminate lots or reduce commercial square footage. Furthermore, outside of the Special Protection Areas the County has not adopted any specific impervious area criteria.⁸ In the Upper Rock Creek watershed new development cannot exceed an impervious area (IA) of 8%. Presently a 15% IA limit applies to the Ten Mile Creek watershed, though the preponderance of scientific evidence shows a limit of 4% IA would be more appropriate for this highly-sensitive watershed.⁹

As stated at the beginning of this report, we view child-safe streams as the most important criteria which should apply to all Montgomery County waters. The primary threat to children wading or swimming in our suburban stream are elevated bacteria levels. There is some science to show that bacteria levels begin exceeding public health standards when 13% or more of a watershed is covered by impervious surfaces.¹⁰ For example, the USEPA 2012 *Recreational Water Quality Criteria* call for bacteria density of no more than 30 Colony Forming Units (CFU) per 100 milliliter of water.¹¹ This criteria does not eliminate illnesses, but reduces it to 32 cases per 1,000 people who recreate in water. Note that a coalition of environmental groups believe the criteria should be lower and have sued EPA.¹²

A number of studies have documented the relationship between increasing watershed imperviousness and rising bacteria levels.¹³ One study of bacteria levels in North Carolina

⁸ See: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/whatarespas.asp>

⁹ Goetz, Scott J., Robb K. Wright, Andrew J. Smith, Elizabeth Zinecker, and Erika Schaub, 2003. IKONOS imagery for resource management: Tree cover, impervious surfaces, and riparian buffer analyses in the mid-Atlantic region. *Remote Sensing of Environment* 88 (2003) 195–208

¹⁰ M.A. Mallin, K.E. Williams, E.C. Sham,' and R.P. Lowe Effect of Human Development on Bacteriological Water Quality in Coastal Watersheds, *Ecological Applications*, Vol. 10, No. 4. (Aug., 2000), pp. 1047-1056. <http://www.jstor.org/discover/10.2307/2641016?uid=3739256&uid=2&uid=4&sid=21102402504231>

¹¹ The criteria is based upon a geometric mean. For further detail see the criteria document at: <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/RWQC2012.pdf>

¹² See: <http://www.baltimoresun.com/features/green/blog/bal-bmg-beach-water-quality-gets-extra-scrutiny-threat-of-lawsuit-20130621.0.5333270.story>

¹³ Housing Density and Bacterial Loading in Urban Streams, Katherine D. Youngl and Edward L. Thackstonz, *Journal of Environmental Engineering* / December 1999. http://www.uvm.edu/~bwemple/geog242/pdfs/young_thackston.pdf. Relationship between rainfall and beach bacterial concentrations on Santa Monica Bay beaches, Drew Ackerman and Stephen B. Weisberg, *Journal of Water and Health* | 01.2 | 2003. <http://www.iwaponline.com/jwh/001/0085/0010085.pdf>. *Testing the Waters: A Guide to Water Quality at Vacation*

coastal waters found that the EPA criteria would be exceeded when watershed imperviousness rose above 13%.¹⁴ Assuming for the moment that this relationship is applicable to Montgomery County, the impervious area target for child-safe streams could be 13%. For watersheds where existing impervious area is below 13% then an aquatic life based target would apply. This target would be similar to that proposed in Table 4, above, for the Forest Target.

We recommend a 4% impervious area (IA) limit to retain or achieve *excellent* quality waters based upon the research by Goetz et al 2003.¹⁵ In keeping with Montgomery County's Special Protection Area policies we suggest an 8% IA to retain or achieve *good* quality waters. The 13% IA child-safe stream criteria would apply to waters of fair or poor quality. These Impervious Area Targets are presented in Table 7, on the next page.

If a development project is proposed within a watershed where stream quality is rated poor then the goal would be to limit impervious surfaces to no more than 13% of the site. Again, the child-safe stream standard of 13% would be the highest acceptable impervious area value. If the site drains to a fair quality stream then IA would be limited to 4.9% so that the waterway might achieve good quality.

The proposed IA Targets would be applied in concert with other stream restoration activities. For example, the current Municipal Separate Storm Sewer System (MS4) permit requires Montgomery County to apply restoration measures to 20% of the existing impervious area by 2015.¹⁶ We assume this and other programs would reduce the impact of existing impervious area in watersheds like Sligo Creek. New development would be designed to compliment these restoration activities by limiting impervious area to a level compatible with the next higher stream quality rating. In other words, new development would conform to the targets needed to achieve the County's goal of restoring all waterways to an acceptable level of quality.

IMPLEMENTING THE FOREST & IMPERVIOUS AREA TARGETS

Implementation of these forest cover and imperviousness targets would need to be on a watershed-wide (or subwatershed-wide) scale, and could take a variety of forms. One form that has been used successfully in Montgomery County is through Environmental Overlay Zones to

Beaches, www.nrdc.org/water/oceans/ttw/

¹⁴ Effect of Human Development on Bacteriological Water Quality in Coastal Watersheds. Michael A. Mallin, Kathleen E. Williams, E. Cartier Esham and R. Patrick Lowe in *Ecological Applications*, Vol. 10, pages 1047–1056; 2000. <http://www.jstor.org/discover/10.2307/2641016?uid=3739256&uid=2&uid=4&sid=21102365608431>

¹⁵ Goetz, Scott J., Robb K. Wright, Andrew J. Smith, Elizabeth Zinecker, and Erika Schaub, 2003. IKONOS imagery for resource management: Tree cover, impervious surfaces, and riparian buffer analyses in the mid-Atlantic region. *Remote Sensing of Environment* 88 (2003) 195–208

¹⁶ See: http://www.mde.maryland.gov/programs/Water/StormwaterManagementProgram/Documents/www.mde.state.md.us/assets/document/MO%20CO_MS4_Permit.pdf

protect sensitive, mostly-rural streams in Special Protection Areas. Another form could be through inserting such targets into Master Plans and Sector Plans and relating them to specific sub-portions of such Plans. Voluntary adoption of these targets on the part of landowners and developers is another option, but is less likely to succeed given the history of voluntary conservation measures in the past. However, improvements in state and local Conservation Easement tax incentives and other market incentives could improve the prospects for voluntary adoption of natural area conservation approaches as part of ESD.

Table 7: Impervious Area Target

Existing Stream Health Rating	Average Percent of Watershed Covered By Impervious Surfaces¹⁷	Impervious Area Target	Stream Health Rating Achievable When Impervious Area Target Is Met
Excellent	3.6%	4%	Excellent
Good	4.9%	4%	Excellent
Fair	13.9%	8%	Good
Poor	19.5%	13%	Fair

WHY ESD IS NOT A SUBSTITUTE FOR WATERSHED LAND USE PLANNING

It should be clear at this point that while full use of ESD practices on individual development sites is essential to preserving aquatic resources, ESD by itself is not sufficient to ensure that these waters will remain fit for our children and aquatic ecosystems. While it is remotely possible that ESD practices can significantly reduce development impacts, we will not know the extent until multiple watersheds have been built out with these practices and we can assess how healthy the receiving waters remain. This could take 20 years or more!

In the meantime, it is vital that we combine ESD with watershed land use planning to preserve the health of our waters. Fortunately, the Special Protection Area¹⁸ approach makes Montgomery County a leader with regard to watershed land use planning. However, at least one SPA has an impervious area limit far too high to preserve sensitive aquatic resources. This SPA is for the Ten Mile Creek watershed in the Clarksburg area. The SPA presently allows impervious area to reach 15% and should be lowered to at least 4%. Another major flaw in current SPAs is the absence of Forest and Stream Buffer Targets such as those proposed earlier in this report. With regard to Ten Mile Creek the Forest Target should be 51% of the watershed

¹⁷ Ibid

¹⁸ See: <http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/whatarespas.asp>

with 77% of all Ten Mile Creek stream channels with a riparian forest buffer extending a minimum of 175 feet from each bank. While a minimum 100-foot buffer from both stream banks is normally sufficient, within the SPAs buffers may need to be more substantial. For example, the Clarksburg Master Plan recommended a buffer extending a minimum of 175 feet from each stream bank and some experts say that even larger buffers are needed for such high quality sensitive streams.

CONCLUSIONS & RECOMMENDATIONS

This Audit has shown that:

1. While ESD is important, it is not a substitute for sound watershed-based land use planning.
2. Montgomery County is doing a good job of ensuring that proposed impervious surfaces drain to ESD practices.
3. However, natural areas receive very little consideration.
4. Montgomery County Department of Permitting Services and the Planning Department need to revise the Site Plan Review and Approval protocols so that the first principles of ESD - natural area protection and incorporation into the stormwater management plan - are fully realized. As part of this site plan review process change, the role of a site's natural areas and its reforestation plan need to be incorporated into the site's concept plan at the earliest stage of plan review on the part of both agencies. Since with current agency practice, stormwater management still appears to be considered as an afterthought or adjunct, following site layout of buildings, parking areas and driveways, this sequence must change such that stormwater prevention via natural area protection and incorporation is integrated with the building and pavement design, and helps to shape that layout of the built features, at the earliest concept stage.
5. Fortunately, no other site contained the steep slopes and highly-erodible soils proposed for disturbance at the Chelsea Court site. Given the uniqueness of this situation, it is even more baffling why the County would permit development on such severely steep slopes which pose such a large threat of excessive sediment pollution.
6. Of five projects potentially impacting streams one clearly proposed buffer intrusions while another provided adequate protection. It was unclear from the plans for the other three projects whether stream protection was effective.
7. Portions of the ESD plans were hard to read making it difficult to assess compliance.
8. Montgomery County should make better quality documents available as is the case in

Howard County.

Forest Target

9. County and State laws, plans and policies clearly require management of proposed development in ways that preserve and enhance stream quality. ESD was intended to be a comprehensive review process which addressed all the development issues affecting stream quality: forest conservation, stream buffers, steep slope protection and stormwater quantity-quality management. However, only one specific target is considered during the current review process: Rainfall Target for stormwater quantity-quality management.
10. Various scientific studies show that stream quality is dependent on preserving a minimum amount of stream buffers and watershed forest. Simply complying with the Forest Conservation Act does not ensure preservation of sufficient watershed forest. We propose the adoption of Forest Targets that are given equal status to Rainfall Target in the ESD review process.
11. An analysis of these 20 projects indicates that Forest Targets could be met on many sites by converting proposed lawn area to forest or to other plant covers that provide comparable aquatic ecosystem benefits.
12. Achieving Forest Targets by minimizing lawn area would also bring about a dramatic reduction in nutrient loads.
13. The County should require applicants to more thoroughly address natural resource protection in their Concept Reports along with alternative development scenarios that were considered to reduce impacts and why each was adopted or rejected.

Impervious Area Target

14. Scientific research shows a strong relationship between the presence of disease-causing organisms and the extent of watershed development.
15. One study indicated that a stream is no longer safe for wading, swimming and other activities when impervious area exceeds 13%.
16. The County should vigorously enforce the ESD planning technique of minimizing impervious area by adopting a child-safe standard of no more than 13% impervious area for all new development projects.
17. Projects draining to streams rated Fair, Good or Excellent would be held to the IA Targets presented in the following table, which is the same as Table 7. These targets are set at the percent impervious area compatible with the next higher level of quality. By limiting IA

of a proposed development project to these targets it increases the likelihood that the receiving waters can eventually be restored to the next higher level of quality. The IA Target should be treated the same as other ESD targets in that they are to be achieved to the Maximum Extent Practicable (MEP). Of course, the Special Protection Area imperviousness limits must be met as values that cannot be exceeded and are not subject to the MEP standard.

When Existing Stream Health Rating Is...	...Then The Impervious Area Target Is...	...Which Will Be Compatible With Restoring/Preserving Stream Health To The Following Rating
Excellent	4.0%	Excellent
Good	4.0%	Excellent
Fair	8.0%	Good
Poor	13.0%	Fair

18. Applicants should only be allowed to exceed the IA Targets after documenting that all reasonable efforts have been made to meet the Target.

Need for Improved Watershed Land Use Planning

19. While Montgomery County is to be commended for being a leader in the use of Special Protection Areas as a watershed land use planning approach, at least one SPA sets an impervious area target too high to protect the sensitive waters contained in the area - the Clarksburg/Ten Mile Creek SPA.
20. The SPAs should also be updated to include the Forest and Stream Riparian Buffer Targets proposed in this report.

For further detail on Environmental Site Design visit: ceds.org/esd

Attachment A

COMMUNITY & ENVIRONMENTAL DEFENSE SERVICES

Richard D. Klein, President
811 Crystal Palace Court
Owings Mills, Maryland 21117

(410) 654-3021
1-800-773-4571
FAX (410) 654-3028
E-Mail info@ceds.org
Web Page: www.ceds.org

August 10, 2012

Robert R. Harris
Lerch, Early & Brewer
3 Bethesda Metro Center
Suite 460
Bethesda, Maryland 20814

RE: Chelsea Court

Dear Mr. Harris:

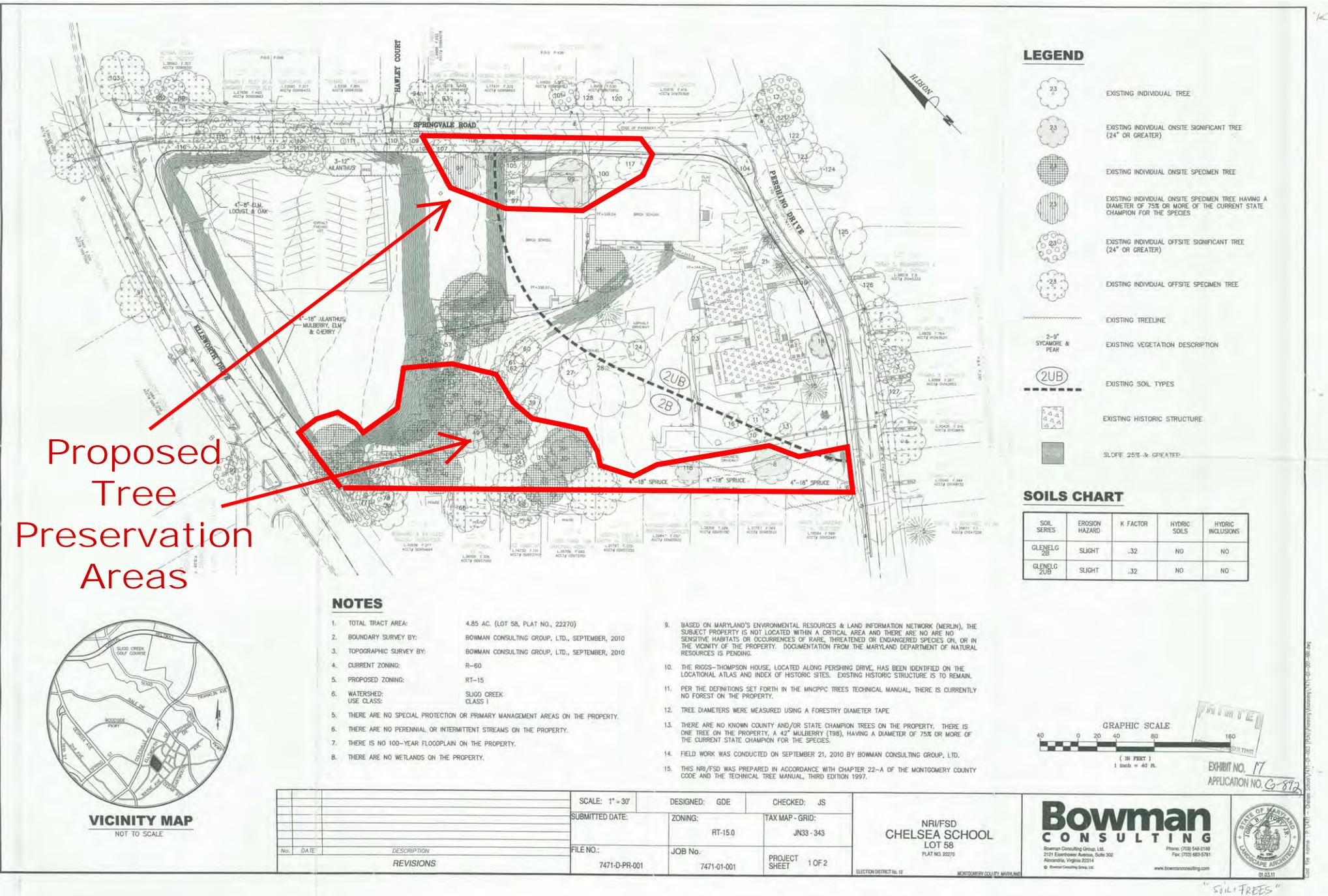
I understand you represent EYA in the Chelsea Court matter.

I am assisting the Seven Oaks/Evanswood Citizens' Association (SOECA) with concerns regarding the project. I was retained to help find equitable solutions to each of the community's concerns. Of course an equitable solution is one which allows an applicant to achieve their goals while resolving each community concern.

Following are SOECA's equitable solutions.

1. Meet the following Environmental Site Design (ESD) regulatory requirements:
 - a. Place the steep slope/highly-erodible soil areas, as defined on page 5-7, of the *Maryland Stormwater Design Manual*, within the area to be preserved as open space;
 - b. Protect the areas outlined with red on enclosed Figure 1, in a forest conservation easement;
 - c. Restrict new impervious surfaces to portions of the site with permeable soils (Hydrologic Soil Group B);
 - d. Ensure that runoff from all new impervious surfaces drains to ESD practices listed in Chapter 5, of the *Maryland Stormwater Design Manual*; and

Figure 1 Tree Preservation Area.jpg



Proposed Tree Preservation Areas

LEGEND

- EXISTING INDIVIDUAL TREE
- EXISTING INDIVIDUAL ONSITE SIGNIFICANT TREE (24" OR GREATER)
- EXISTING INDIVIDUAL ONSITE SPECIMEN TREE
- EXISTING INDIVIDUAL ONSITE SPECIMEN TREE HAVING A DIAMETER OF 75% OR MORE OF THE CURRENT STATE CHAMPION FOR THE SPECIES
- EXISTING INDIVIDUAL OFFSITE SIGNIFICANT TREE (24" OR GREATER)
- EXISTING INDIVIDUAL OFFSITE SPECIMEN TREE
- EXISTING TREELINE
- EXISTING VEGETATION DESCRIPTION
- EXISTING SOIL TYPES
- EXISTING HISTORIC STRUCTURE
- SLOPE 25% & GREATER

SOILS CHART

SOIL SERIES	EROSION HAZARD	K FACTOR	HYDRIC SOILS	HYDRIC INCLUSIONS
GLENELG 2B	SLIGHT	.32	NO	NO
GLENELG 2UB	SLIGHT	.32	NO	NO

NOTES

1. TOTAL TRACT AREA: 4.85 AC. (LOT 58, PLAT NO., 22270)
2. BOUNDARY SURVEY BY: BOWMAN CONSULTING GROUP, LTD., SEPTEMBER, 2010
3. TOPOGRAPHIC SURVEY BY: BOWMAN CONSULTING GROUP, LTD., SEPTEMBER, 2010
4. CURRENT ZONING: R-60
5. PROPOSED ZONING: RT-15
6. WATERSHED: SLIGO CREEK CLASS I
7. THERE ARE NO SPECIAL PROTECTION OR PRIMARY MANAGEMENT AREAS ON THE PROPERTY.
8. THERE ARE NO PERENNIAL OR INTERMITTENT STREAMS ON THE PROPERTY.
9. THERE IS NO 100-YEAR FLOODPLAIN ON THE PROPERTY.
10. THERE ARE NO WETLANDS ON THE PROPERTY.
11. BASED ON MARYLAND'S ENVIRONMENTAL RESOURCES & LAND INFORMATION NETWORK (MERLIN), THE SUBJECT PROPERTY IS NOT LOCATED WITHIN A CRITICAL AREA AND THERE ARE NO RARE, THREATENED OR ENDANGERED SPECIES ON, OR IN THE VICINITY OF THE PROPERTY. DOCUMENTATION FROM THE MARYLAND DEPARTMENT OF NATURAL RESOURCES IS PENDING.
12. THE RIGGS-THOMPSON HOUSE, LOCATED ALONG PERSHING DRIVE, HAS BEEN IDENTIFIED ON THE LOCALATIONAL ATLAS AND INDEX OF HISTORIC SITES. EXISTING HISTORIC STRUCTURE IS TO REMAIN.
13. PER THE DEFINITIONS SET FORTH IN THE MNCPPC TREES TECHNICAL MANUAL, THERE IS CURRENTLY NO FOREST ON THE PROPERTY.
14. TREE DIAMETERS WERE MEASURED USING A FORESTRY DIAMETER TAPE
15. THERE ARE NO KNOWN COUNTY AND/OR STATE CHAMPION TREES ON THE PROPERTY. THERE IS ONE TREE ON THE PROPERTY, A 42" MULBERRY (198), HAVING A DIAMETER OF 75% OR MORE OF THE CURRENT STATE CHAMPION FOR THE SPECIES.
16. FIELD WORK WAS CONDUCTED ON SEPTEMBER 21, 2010 BY BOWMAN CONSULTING GROUP, LTD.
17. THIS NRI/FSD WAS PREPARED IN ACCORDANCE WITH CHAPTER 22-A OF THE MONTGOMERY COUNTY CODE AND THE TECHNICAL TREE MANUAL, THIRD EDITION 1997.



VICINITY MAP
NOT TO SCALE

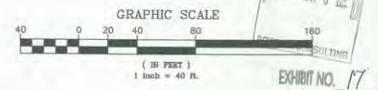


EXHIBIT NO. 17
APPLICATION NO. G-812

SCALE: 1" = 30'	DESIGNED: GDE	CHECKED: JS
SUBMITTED DATE:	ZONING: RT-15.0	TAX MAP - GRID: JN33-343
FILE NO.: 7471-D-PR-001	JOB No.: 7471-01-001	PROJECT SHEET: 1 OF 2

NRI/FSD
CHELSEA SCHOOL
LOT 58
PLAT NO. 22270

Bowman CONSULTING
Bowman Consulting Group, Ltd.
2101 Eisenhower Avenue, Suite 300
Alexandria, Virginia 22314
Phone: (703) 548-2148
Fax: (703) 683-8781
www.bowmanconsulting.com



- e. Explore opportunities to treat runoff from the Riggs-Thompson House (and any other existing impervious area) with ESD practices designed not to detract from the historic integrity of this structure.

2. Restrict the use of the Springvale Road access to emergency vehicles only by placing a gate across the proposed private street. Of course the gate should be approved through the Montgomery County Gate Access Program.

3. During construction and sales phases: restrict site vehicle access to the southwest corner entrance with ingress/egress via Cedar Street onto Ellsworth Drive behind the Silver Spring library; and, allow no visitor or construction parking on Springvale Road or Pershing Drive.

4. Maintain a complete historic setting for the Riggs Thompson House. Do not divide the environmental setting into two or more legal ownerships. Landscape the open space area just northwest of the Riggs-Thompson House to screen the proposed townhouses from view.

5. Design all lights to prevent light trespass into homes in the site vicinity.

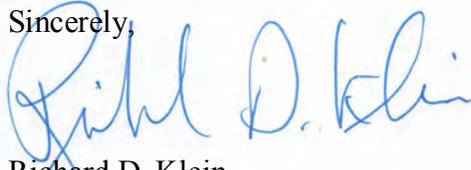
6. In exploring options for making the improvements listed above, we prefer that the proposed number of Moderately Priced Dwelling Units (eight) not be reduced.

7. Reimburse SOECA for expenses incurred (to date \$35,000).

We would deeply appreciate an opportunity to meet with you and your client to begin the process of working toward solutions that are truly equitable for all parties. When we reach consensus each solution must be documented in a Settlement Agreement and Declaration of Covenants that are binding on current and future property owners. At that point the appeal filed in Circuit Court would be withdrawn and SOECA would no longer oppose the project.

I will call in a day or so to answer any questions and to schedule a date when we can meet to discuss this proposal in detail. In the meantime, I can be reached at 410-654-3021.

Sincerely,



Richard D. Klein

cc: Tom Armstrong
Jean Cavanaugh

Judith Christensen
Kenneth Doggett
Don Grove
Michael Gurwitz
John Millson
Peter Perenyi
Kathleen Samiy
Maria Schmit
Anne Spielberg
Victoria Warren
Thomas DeCaro
Robert McGaughy
Anne Vorce
Anne Spielberg
David Brown, Knopf & Brown

COMMUNITY & ENVIRONMENTAL DEFENSE SERVICES

Richard D. Klein, President
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September 5, 2012

David Kuykendall
Water Resources Section
Division of Land Development Services
Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850

**RE: Chelsea Court
SM File #: 239939**

Dear Mr. Kuykendall:

Thanks once again for allowing me to review the Chelsea Court stormwater management file on August 22nd. The following comments are provided on behalf of the Seven Oaks/Evanswood Citizens' Association (SOECA).

The applicant, EYA, has proposed developing the 4.85-acre Chelsea School site in Silver Spring with 63 townhouse units and one single family home (the existing Riggs Thompson historic property). The project site is located in the Sligo Creek watershed, which is part of the Anacostia watershed. Many of the individuals who make up SOECA have a long history of supporting Montgomery County's considerable efforts to restore these troubled waterways.

The Chelsea Court project is new development, not redevelopment. Accordingly, it must maintain after development, as nearly as possible, "woods in good condition" characteristics to the maximum extent practicable. Moreover, the Chelsea Court project provides Montgomery County with an important opportunity to showcase stormwater law compliance and improve stormwater management in the Sligo Creek watershed by using the required highly-effective aquatic resource protection measures essential to restoring Sligo Creek.

The applicant's plan fails to take advantage of this opportunity. Even more disturbing is the failure to comply with some of the most important requirements set forth in the Environmental Site Design portion of the *Maryland Stormwater Design Manual*. By placing

townhouses and other impervious surfaces on steep slopes with highly erodible soils, it fails to protect those slopes. By providing no Recharge Volume, it fails to maintain 100% of the pre-development groundwater recharge volume. It also fails to use practicable means to take advantage of the site's characteristics for maintaining and enhancing recharge, such as ensuring that all impervious surfaces drain to the "B" soils that cover two-thirds of the site, reducing the density of townhouses, using the forested section on the western side to control runoff, and retrofitting the impervious areas associated with the Riggs-Thompson property to the extent consistent with its historic integrity. EYA has failed to establish that it has implemented Environmental Site Design to the Maximum Extent Practicable, as required by law.

On August 10, 2012, I wrote to the applicant's attorney, Mr. Robert Harris, on behalf of SOECA. In the letter we requested an opportunity to meet with Mr. Harris and his client, EYA, to discuss Environmental Site Design and other concerns. However, this meeting never occurred. Therefore, I am providing the following comments to you.

Steep Slopes/Highly-Erodible Soil Intrusion

Section 19-22A, of the Montgomery County Stormwater Management regulations states:

- (a) *An applicant must use the ESD planning techniques and practices and structural stormwater management measures established in this Article and the Design Manual, either alone or in combination, in a stormwater management plan.*

Section 19-21, defines the "Design Manual" as:

The 2000 Maryland Stormwater Design Manual, as revised from time to time, which serves as the official guide for stormwater management principles, methods, and practices in Maryland.

The following text appears page 5-7, of the *Design Manual*:

While it may not be practicable to eliminate earth disturbing activities exclusively on the basis of soil erodibility or slope alone, constraints are warranted when both steep slopes and highly erodible soils occupy the same area within the development footprint. Areas with highly erodible soils and slopes equal to or greater than 25 percent should be incorporated into adjacent buffers, remain undisturbed, protected during the construction process, and/or preserved as open space.

Figure 1, on the next page, is a plan prepared by the applicant's consultant. On Figure 1, slopes 25% or greater have the darkest shading. The soils on the site are listed as Glenelg silt loam and Glenelg-Urban land complex. The Natural Resources Conservation Service *Highly Erodible Soils Map Unit List* for Montgomery County¹ shows that Glenelg silt loam is a highly-

¹ See <http://efotg.sc.egov.usda.gov/references/public/MW/montgomery.pdf>

Figure 1: Steep Slopes & Tree Preservation Areas



LEGEND

- EXISTING INDIVIDUAL TREE
- EXISTING INDIVIDUAL ONSITE SIGNIFICANT TREE (24" OR GREATER)
- EXISTING INDIVIDUAL ONSITE SPECIMEN TREE
- EXISTING INDIVIDUAL ONSITE SPECIMEN TREE HAVING A DIAMETER OF 75% OR MORE OF THE CURRENT STATE CHAMPION FOR THE SPECIES
- EXISTING INDIVIDUAL OFFSITE SIGNIFICANT TREE (24" OR GREATER)
- EXISTING INDIVIDUAL OFFSITE SPECIMEN TREE
- EXISTING TREELINE
- EXISTING VEGETATION DESCRIPTION
- EXISTING SOIL TYPES
- EXISTING HISTORIC STRUCTURE
- SLOPE 25% & GREATER**

SOILS CHART

SOIL SERIES	EROSION HAZARD	K FACTOR	HYDRIC SOILS	HYDRIC INCLUSIONS
GLENGLE 2UB	SLIGHT	.32	NO	NO
GLENGLE 2UB	SLIGHT	.32	NO	NO

Tree Preservation Area

NOTES

- TOTAL TRACT AREA: 4.85 AC. (LOT 58, PLAT NO., 22270)
- BOUNDARY SURVEY BY: BOWMAN CONSULTING GROUP, LTD., SEPTEMBER, 2010
- TOPOGRAPHIC SURVEY BY: BOWMAN CONSULTING GROUP, LTD., SEPTEMBER, 2010
- CURRENT ZONING: R-80
- PROPOSED ZONING: RT-15
- WATERSHED: SLIGO CREEK
USE CLASS: CLASS I
- THERE ARE NO SPECIAL PROTECTION OR PRIMARY MANAGEMENT AREAS ON THE PROPERTY.
- THERE ARE NO PERENNIAL OR INTERMITTENT STREAMS ON THE PROPERTY.
- THERE IS NO 100-YEAR FLOODPLAIN ON THE PROPERTY.
- THERE ARE NO WETLANDS ON THE PROPERTY.
- BASED ON MARYLAND'S ENVIRONMENTAL RESOURCES & LAND INFORMATION NETWORK (MERLIN), THE SUBJECT PROPERTY IS NOT LOCATED WITHIN A CRITICAL AREA AND THERE ARE NO ARE NO SENSITIVE HABITATS OR OCCURRENCES OF RARE, THREATENED OR ENDANGERED SPECIES ON, OR IN THE VICINITY OF THE PROPERTY. DOCUMENTATION FROM THE MARYLAND DEPARTMENT OF NATURAL RESOURCES IS PENDING.
- THE RIGGS-THOMPSON HOUSE, LOCATED ALONG PERSHING DRIVE, HAS BEEN IDENTIFIED ON THE LOCAL ATLAS AND INDEX OF HISTORIC SITES. EXISTING HISTORIC STRUCTURE IS TO REMAIN.
- PER THE DEFINITIONS SET FORTH IN THE MNCPPC TREES TECHNICAL MANUAL, THERE IS CURRENTLY NO FOREST ON THE PROPERTY.
- TREE DIAMETERS WERE MEASURED USING A FORESTRY DIAMETER TAPE
- THERE ARE NO KNOWN COUNTY AND/OR STATE CHAMPION TREES ON THE PROPERTY. THERE IS ONE TREE ON THE PROPERTY, A 42" MULBERRY (198), HAVING A DIAMETER OF 75% OR MORE OF THE CURRENT STATE CHAMPION FOR THE SPECIES.
- FIELD WORK WAS CONDUCTED ON SEPTEMBER 21, 2010 BY BOWMAN CONSULTING GROUP, LTD.
- THIS NRI/FSD WAS PREPARED IN ACCORDANCE WITH CHAPTER 22-A OF THE MONTGOMERY COUNTY CODE AND THE TECHNICAL TREE MANUAL, THIRD EDITION 1997.



VICINITY MAP
NOT TO SCALE

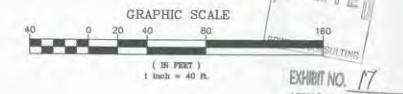


EXHIBIT NO. 17
APPLICATION NO. G-872

SCALE: 1" = 30'	DESIGNED: GDE	CHECKED: JS
SUBMITTED DATE:	ZONING: RT-15.0	TAX MAP - GRID: JN33-343
FILE NO.: 7471-D-PR-001	JOB No.: 7471-01-001	PROJECT SHEET: 1 OF 2

NRI/FSD
CHELSEA SCHOOL
LOT 58
PLAT NO. 22270

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erodible soil when present on slopes steeper than 8%. Therefore, the most darkly shaded portions of the site shown in Figure 1, are steep slopes on highly-erodible soils. The Design Manual text quoted above prohibits disturbance of these areas.

The applicant's plans show that a number of the 63 townhouses and other impervious surfaces are proposed for development on the steep slopes/highly-erodible soils. Again, this is in direct conflict with the Design Manual text quoted above. The Department should direct the applicant to incorporate these steep slopes/highly-erodible soils *"into adjacent buffers, remain undisturbed, protected during the construction process, and/or preserved as open space"* as required by the Design Manual.

Tree/Forest Preservation

Various scientific studies have shown that retention of a minimum amount of forest is essential if a suburban waterway is to be restored to a condition suited for human use. This is why the Design Manual calls for the preservation of existing trees and expansion of forest. The Chelsea School site has a 45% tree canopy and is surrounded by an old leafy green neighborhood of Silver Spring with a 65% tree canopy that serves as the environmental buffer between the neighborhood and the central business district, which has only a 14% tree canopy. However, current project plans show that most of the largest trees on the Chelsea Court site would be eliminated. EYA's plan to clearcut 77 mature trees will, in addition to creating a heat island effect, increase polluted runoff, reduce groundwater recharge, and set back Montgomery County's efforts to restore Sligo Creek and the Anacostia River. Conversely, retaining the green-outlined area on Figure 1, in a forest conservation easement would be more consistent with the Design Manual and would alleviate those problems.

Minimal Groundwater Recharge Proposed

The water carried by Sligo Creek during dry-weather originates as rain that infiltrated pervious areas (grass, forest, etc.) throughout the watershed and recharged the groundwater system. The loss of recharge due to the extensive impervious surfacings throughout the watershed is a key factor accounting for the degraded condition of the stream.

Seizing upon every opportunity to maintain and enhance recharge is critical to reaping the benefits of the County's large investment in the restoration of Sligo Creek. I assume that this and related reasons is why Section 19-22A(b)(1) of the Montgomery County Stormwater Management regulations requires the:

- (E) *use ESD practices to maintain 100% of the average annual pre- development groundwater recharge volume for the site;*

The following statement appears in the applicant's *Stormwater Management Concept Report* (Revision #2, August 17, 2012):

Recharge Volume (Rev) cannot be provided for this site due to a number of factors which include excess cuts below the existing ground surface and native soils of type 'D'. Under-drains have been placed below each stormwater facility to capture treated water that does not naturally infiltrate into the existing undercut soils.

This statement implies that very little (if any) recharge will occur once site development is completed. If this is correct then it would constitute a gross violation of Section 19-22A(b)(1)(E).

When we met I believe you said the close proximity of proposed townhouse foundations to ESD practices was part of the reason why greater groundwater recharge could not be achieved. If this is correct then one obvious solution is to reduce the density of townhouses so the separation needed to maintain recharge can be achieved. This is certainly a practicable alternative that must be implemented in compliance with County requirements.

Poor "D" soils are cited as the other reason why recharge cannot be achieved. Of course the "D" refers to the Hydrologic Soil Group. However, more than two-thirds of the site is on Hydrologic Soil Group B which is well-suited to the use of ESD practices designed to achieve groundwater recharge. Yet the applicant's report provides no explanation as to why recharge cannot be achieved on this majority of the site.

New impervious surfaces (townhouses, streets, parking areas, etc.) should be laid out so they drain to the extensive "B" soils on the site where infiltrating ESD practices could be installed. This approach is essential to meeting the County regulation requiring 100% groundwater recharge.

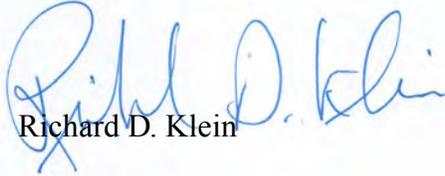
Riggs-Thompson House

The Riggs-Thompson House is a historic structure which will remain once site development is completed. Yet the applicant's plans do not appear to show retrofits of the house and associated impervious areas with ESD practices. The applicant should be directed to consider ESD practices that will eliminate the impact of this impervious area without detracting from the historic integrity of this structure.

Conclusion

The applicant has a duty to meet both the letter and intent of the law. However, as detailed above, the applicant's stormwater management plan is seriously deficient and thwarts the very goals of the State and County Environmental Site Design law. It is critical that the applicant be required to address these flaws so that the project fully complies with the law and Montgomery County's efforts to restore vital waterways such as Sligo Creek and the Anacostia River.

Sincerely,



Richard D. Klein

cc: Mike Bolinder, Anacostia RiverKeeper
 Dana Minerva, Anacostia Watershed Restoration Partnership
 Brent Bolin, Anacostia Watershed Society
 Dolores Milmo, Audubon Naturalist Society
 Alison Prost, Chesapeake Bay Foundation
 Jacqueline Sincore Guild, Chesapeake Legal Alliance
 Michael Wilpers, Friends of Sligo Creek
 Alvin Carlos, Montgomery County Sierra Club
 Diane Cameron, Montgomery County Stormwater Partners
 Anne Ambler, Neighbors of Northwest Branch
 H. Hedrick Belin, Potomac Conservancy
 Tom Armstrong, Seven Oaks/Evanswood Citizens' Association
 Jean Cavanaugh, Seven Oaks/Evanswood Citizens' Association
 Judith Christensen, Seven Oaks/Evanswood Citizens' Association
 Kenneth Doggett, Seven Oaks/Evanswood Citizens' Association
 Don Grove, Seven Oaks/Evanswood Citizens' Association
 Michael Gurwitz, Seven Oaks/Evanswood Citizens' Association
 John Millson, Seven Oaks/Evanswood Citizens' Association
 Peter Perenyi, Seven Oaks/Evanswood Citizens' Association
 Kathleen Samiy, Seven Oaks/Evanswood Citizens' Association
 Maria Schmit, Seven Oaks/Evanswood Citizens' Association
 Anne Spielberg, Seven Oaks/Evanswood Citizens' Association
 Victoria Warren, Seven Oaks/Evanswood Citizens' Association
 Thomas DeCaro, Seven Oaks/Evanswood Citizens' Association
 Robert McGaughy, Seven Oaks/Evanswood Citizens' Association
 Anne Vorce, Seven Oaks/Evanswood Citizens' Association
 Anne Spielberg, Seven Oaks/Evanswood Citizens' Association
 David Brown, Knopf & Brown
 Robert Harris, Lerch, Early & Brewer



January 31, 2013

Diane Schwartz-Jones, Director
Rick Brush, Acting Chief of Land Development
Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850-4166

Dear Diane and Rick,

Thank you for meeting on Monday, November 19th, with leaders of Audubon Naturalist Society and Seven Oaks- Evanswood Citizens Association, along with Councilmember Ervin and Planning Department staff regarding the Chelsea Court project. The meeting helped to clarify County policies regarding trees and stormwater management, and gave an opportunity for us to discuss Environmental Site Design (ESD) implementation methods and policy at greater depth. We encourage all County elements to work closely together, and with us, to make Chelsea Court a model of ESD, fully utilizing the site's natural features, design elements and lastly engineered solutions in that order.

Our discussion on November 19th highlighted our deep concern that under current County policy, trees and steep slopes are largely unprotected, and engineered and structured solutions take priority over using site planning and natural features to reduce stormwater runoff, contrary to current law. Since the current Chelsea Court site plan does not accomplish Environmental Site Design to the Maximum Extent Practicable according to our review of the site plan and applicable state and local law and code (cited below and in our 11/19 meeting discussion), we request that you revoke your agency's approval of the Chelsea Court Stormwater Management Concept Plan based on new information received, and require the applicants to submit a new proposed SWM Concept Plan that will protect and incorporate into the stormwater design, the existing tree grove and steep slopes.

Zoning defines maximum density possible. It is not an entitlement to that maximum. The number of units that fit on a site should be determined *after* the developer complies fully with all laws, regulations, utility and other rights of way, and green space. The developer must first comply to the maximum extent practicable with all laws and regulations that the county and state have put in place to protect the environment.

The Chelsea Court project is located in the Sligo Creek tributary of the Anacostia watershed and has a sizable grove of mature trees on steep, erodible slopes. It is directly adjacent to a stream under Ellsworth Drive that feeds directly into Sligo Creek. The applicant for this project has not shown that they have used clustering of the built environment on this site, nor have they demonstrated exhaustion of all reasonable opportunities for meeting stormwater requirements by using ESD through use of natural areas and landscape features to manage runoff from impervious

surfaces. This exhaustion of ESD opportunities using natural areas and landscape features is required by both Montgomery and State stormwater regulations (citations are given below).

The natural area and landscape features that are present at the Chelsea Court site, and that the Seven Oaks-Evanswood Citizens Association has requested be preserved and used as part of the site's ESD stormwater management plan, are its small grove of mature trees. Additionally, the steep slopes with highly erodible soil must remain undisturbed, per MDE's Stormwater Design Manual. The current stormwater management concept plan for this project proposes to destroy rather than preserve and utilize these natural areas and landscape features, without any showing that the ability to use such preservation and utilization was exhausted by the applicant. Our analysis shows that the site's Stormwater Management Concept Plan is out of compliance with these requirements in the Stormwater Design Manual and in Montgomery's stormwater code.

Rick stated during Monday's meeting that the Chelsea Court project's current design is in the view of DPS in full compliance with the mandatory provisions of the state stormwater regulation and manual. In particular, Rick stated that in the state stormwater manual, Chapter 5 (the so-called ESD chapter), the sole mandatory requirements are to utilize one or more of the stormwater management practices, such as micro-bioretenion, permeable pavement etc., and to meet the numeric stormwater management requirements for groundwater recharge, ESD and Channel Protection volumes.

In response to our specific request for site planning and design-level stormwater management approaches at Chelsea Court, including the so-called "non-structural" stormwater management approach of preservation and utilization of the existing tree grove and steep slopes at the site, Rick stated that such site planning and design approaches for non-structural stormwater management are merely options in the manual but are not mandatory. This conclusion of DPS is counter to our reading of Chapter 5 of the MDE Manual and counter to various provisions of County stormwater code.

Below we quote the relevant portions of the state and local code, and briefly discuss them. (While we find these to be pertinent code sections, this is in no way an exhaustive review of the relevant state and local codes.)

MDE's stormwater design manual, Chapter 5, Part 5.1, states that clustering, and exhaustion of opportunities for natural resource preservation and utilization, are mandatory provisions for stormwater management concept plans.¹

We refer here to: MDE's Stormwater Design Manual, Chapter 5, Part 5.1 Design Process and Planning Techniques, page 5.4. The quote from this Part 5.1 is copied below and the italics are in the original. As noted on page 5.1 of the MDE Design Manual, italics indicate mandatory criteria.

> Minimizing total site imperviousness by implementing clustered development and other better site design techniques.

¹ Maryland Department of the Environment, *Maryland Stormwater Design Manual*, Chapter 5, page 5.4. See also page 5.1.

> Demonstrating that all reasonable opportunities for meeting stormwater requirements by using ESD have been exhausted by using natural areas and landscape features to manage runoff from impervious surfaces and that structural BMPs have been used only where absolutely necessary.

In conjunction with the County code requiring site planning and design methods to be applied to each site as the first steps in Environmental Site Design, we understand this state-level requirement to be mandatory for all projects including for Chelsea Court. To our knowledge no such clustering has been included in the Chelsea Court design, nor have the applicants shown that they have exhausted all reasonable opportunities to use the site's natural areas and landscape features – which are its tree grove and steep slopes – to manage runoff from impervious surfaces.

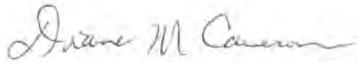
Montgomery County Code, Section 19-26, Stormwater Management Design Criteria, Section (a) states,

“Each applicant must use planning techniques, nonstructural practices, and design methods to implement environmental site design to the maximum extent practicable.”

Contrary to statements during our meeting to the effect that planning techniques and nonstructural practices are merely optional for any given developer, in fact according to this regulation, use of such techniques and practices is mandatory.

In conclusion, we ask DPS to revoke its approval of the Chelsea Court project's Stormwater Management Concept Plan, and to require the applicant to adhere to the requirements of MDE's Stormwater Design Manual and County code. Let's make Chelsea Court a model for Environmental Site Design.

For local clean water,



Diane Cameron
Conservation Program Director
Audubon Naturalist Society



Jean Cavanaugh
President
Seven Oaks Evanswood Citizens Association

cc: Councilmember Valerie Ervin
Bob Hoyt, DEP