Stream & Riparian Conditions (US Reach)

- Overwidened/Aggradation

- Incised/Floodplain Disconnection

Stream & Riparian Conditions (US Reach)

- Pt Bar Formation/Inner Berms
- Temporary Sediment Storage

- Channel Widening/Canopy Tree Loss

Stream & Riparian Conditions (US Reach)

- Bank Instability/Sloughing

- Unstable Planform

Stream & Riparian Conditions (DS Reach)

- Backyard Repairs/Severe Instability

- Channel Widening

Stream & Riparian Conditions (DS Reach)

- Point Bar/Stability

- Bedrock Outcrops

Stream & Riparian Conditions (DS Reach)

- Unstable Planform
- Soil Erosion/Tree Loss/Invasive Species

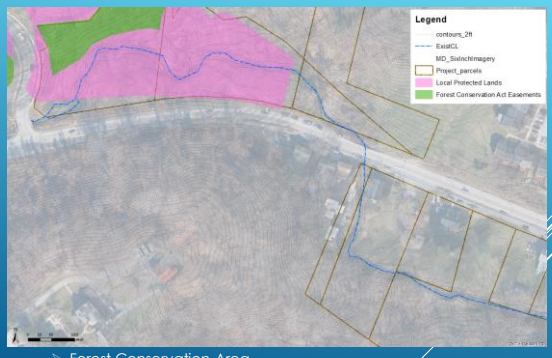
- Severe Bank Erosion
- Risk to Cemetery

Constraints

- Culvert (Begin Reach)
- Frederick Road (Right Bank)
- Bedrock

- Culvert (End of US Reach)
- Road Angle/Channel Entry

Constraints



- Forest Conservation Area

Constraints

- Frederick Road/ROW
- Existing Trees

- Existing Cemetery

Constraints

- Existing Structures/Driveway

- Bedrock
- Existing Backyards

Design Goals and Objectives

Goal: Re-establish a functional stream and riparian corridor to better match the existing urban setting and constraints

Objective: Improve degrading functions where practical and effective

Design (cont'd)

FUNCTION BASED PARAMETERS SUMMARY

Functional Category	Function-Based Parameters	Existing Parameter	Proposed Parameter	As-Built	Monitoring Year									
Hydrology	Catchment Hydrology				#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Reach Runoff													
Hydraulics	Floodplain Connectivity	0.28	0.65											
Geomorphology	Large Woody Debris													
	Lateral Stability	0.30	0.45											
	Riparian Vegetation	0.91	0.91											
	Bed Material													
	Bed Form Diversity	0.69	0.69											
	Sinuosity													
Physicochemical	Temperature													
	Bacteria													
	Organic Matter													
	Nitrogen													
	Phosphorus													
Biology	Macros													
	Fish													

FUNCTIONAL CATEGORY REPORT CARD

Functional Category	ECS	PCS	As-Built	Monitoring Year									
Hydrology				#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Hydraulics	0.28	0.65											
Geomorphology	0.57	0.67											
Physicochemical													
Biology													
Overall Score	0.17	0.26	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Functional Feet	255	390	0										

Design Approaches

Bank Stabilization
- Boulder/Brush Toe Protection
- Permanent Erosion Control (Bedrock areas)

Floodplain Bench & Bank Grading

Channel Re-alignment
- Constructed Riffles/Pools

Outfall/Confluence Stabilization
- Step-Pool

Bank Stabilization

- Boulder & Brush Toe Protection

Bank Stabilization

- Imbricated Wall

- Permanent Erosion Control

Floodplain Bench/Bank Grading

Channel Realignment

Outfall/Confluence Stabilization

Interconnected Wetland

Created Wetlands

Alternatives/Cost-Benefit Analysis

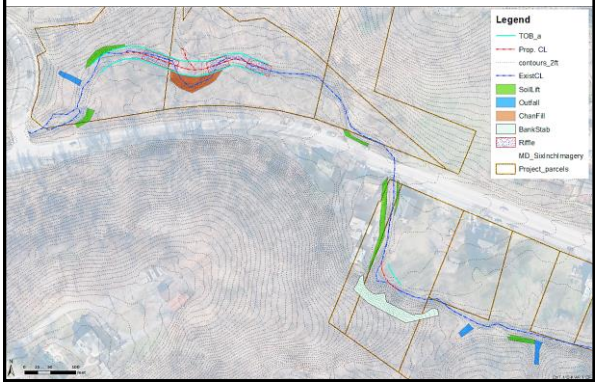
OPTION A

- Bank Treatments
- Channel Realignment (where necessary)
- Less Disturbance (Trees, Cut/Fill)
- Less Expensive
- Does Not Address Flooding

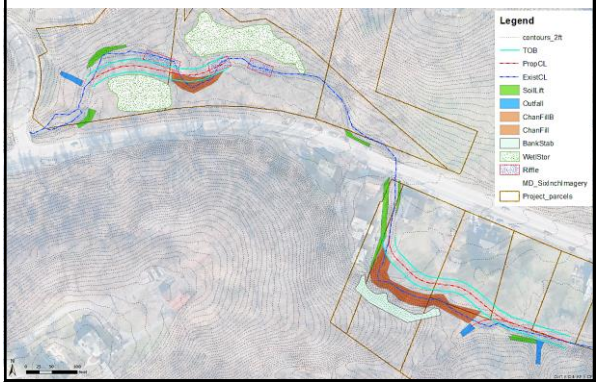
OPTION B

- Channel and Bank Work
- More Disturbance (Trees, Cut/Fill)
- Increase storage/treatment
- More Expensive
- Could improve flooding for smaller events

Alternative A



Alternative B



Ellicott City – Soak It Up

Ellicott City Flood Workgroup
3/13/2017

Objectives

- Engage the EC watershed residential and business community
- Implement small on-site Best Management Practices
- Develop a database of supporters in the watershed
- Focus on conversion of turf to native vegetation

About Turf

Turf cover is the single largest fraction of pervious area in the Chesapeake Bay watershed.

Counties in Bay Watershed with the Highest Turf Grass Cover Based on GIS

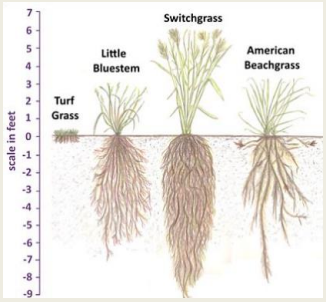
Jurisdiction/County	State	Turf Acres	Total Land Acres	Percent Turf
Montgomery	Maryland	140,272	317,420	44.2%
Baltimore	Maryland	136,456	379,708	35.9%
Prince George's	Maryland	121,008	306,846	39.4%
Lancaster	Pennsylvania	119,615	605,215	19.8%
Fairfax	Virginia	116,932	251,360	46.5%
York	Pennsylvania	110,564	577,749	19.1%
Frederick	Maryland	96,309	424,381	22.7%
Anne Arundel	Maryland	93,081	260,832	35.7%
Carroll	Maryland	85,114	286,896	29.7%
Harford	Maryland	77,084	272,524	28.3%
Howard	Maryland	66,239	160,906	41.2%
Luzerne	Pennsylvania	63,887	486,405	13.1%
Washington	Maryland	61,527	295,043	20.9%
Dauphin	Pennsylvania	56,347	337,650	16.7%
Henrico	Virginia	55,643	150,305	37.0%

http://chesapeakestormwater.net/wp-content/uploads/downloads/2012/01/TechBulletinNo8TheClippingPoint.pdf

What's Wrong with Turf

- The best estimate for how much nitrogen fertilizer is applied to lawns in the Bay watershed is nearly 215 million pounds per year. This is enough nitrogen to grow nearly 2 million acres of corn.
- About 19 million pounds of pesticide active ingredients are used each year.
- Summer lawn irrigation is calculated to suck nearly 7875 cubic feet per second (cfs) of river flow during the summer months. To put this amount of water consumption in perspective, it is roughly five times the combined summer flow of the Choptank, James, Monocacy, Pataspsco, Pamunkey, Patuxent and Rappahanock rivers in an average year.
- **Our compacted lawns produce a lot of extra runoff to the Bay. Our rough calculations suggest that it produces an extra storm runoff flow of 1244 cubic feet per second each day to the Chesapeake Bay.**

What's Wrong with Turf



Turf is an Opportunity

- Stewardship may consist of tree planting, soil compost amendments, rain gardens, conservation landscapes, and reducing or eliminating fertilizer, pesticide and water use.
- Approximately 700 acres of grass in the Tiber Hudson Watershed

Ellicott City – Soak It Up

- Is a social marketing campaign to engage residents and business in converting turf grass to practices that will infiltrate water
- Primary BMP of focus will be conservation landscapes
- Why not rain gardens? Slopes, bedrock, sizing constraints will preclude implementation (based on CleanScapes project in a similar watershed) – higher success expected with conservation landscapes

Conservation Landscapes

- Till compacted subsoil
- Work in compost
- Plant deep rooted native vegetation
- Potentially add 2-3" of ponding
- Native veg also provides pollinator and wildlife habitat

Funding

- Needed to work on private land
- Needed to supplement costs of conservation landscapes
- County reimbursements also offset costs
- Funding will kick off work and eventually rely more on private $
- Chesapeake Bay Trust (ECP sponsor) – 4500 received
- NFWF 5 Star (ACB sponsor) - ~37K pending
- MD DNR (HoCo sponsor, 2 year grant) - ~84K pending

CBT Grant for EC – Soak It Up

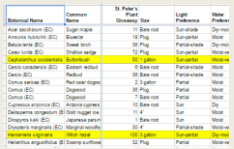
- Develop campaign materials – logo, outreach materials, door hangers, signs
- Vet materials with focus group
- Implement demonstration project at St. Peter's
- Kick off campaign

St Peter's

- ~150 sq ft Rain garden and ~4500 sq ft conservation landscape
- Campaign kick-off

Community Plant Give-away

- May 12 – target / campaign kick-off
- Close to 1000 plants available
- Donations came from MANTS and cuttings that were grown out at our nursery at Corrections



Community Plant Give-away

- Will target West End for plant give-away
- Open to others in the watershed
- Folks can register for Buffer Bundles, Landscape Bundles or Individual Trees or Shrubs
- Pick up will be at EC – Soak It Up kick off event at St Peter's
- Volunteers can help by 1) participating in focus group, 2) deliver bundles and trees to homeowners, 3) other TBD