

Green Streets Manor Woods

Environmentally Friendly Landscapes
for Healthy Watersheds



Concept Design Presentation

November 5, 2014

www.montgomerycountymd.gov/watershedrestoration



GPI
Greenman-Pedersen, Inc.
Engineering and Construction Services

Introductions

- **Rebecca Winer-Skonovd**
 - DEP Project Manager (Consultant)
- **Paul Bogle, P.E.**
 - DEP Senior Engineer
- **Ho-Ching Fong**
 - DEP Watershed Planner
- **Ann English**
 - DEP RainScapes Program Manager
- **Bill Park**
 - Project Manager, GPI

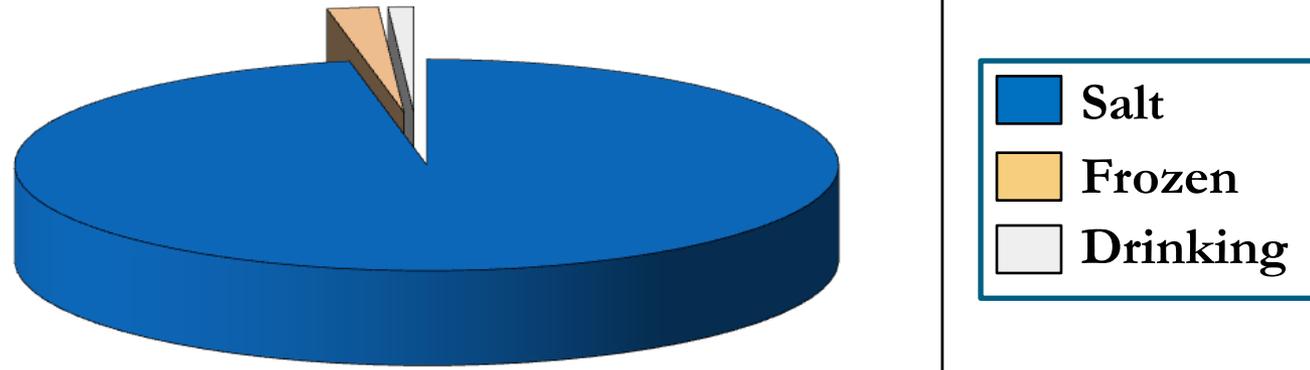
Today's Agenda

- Watershed 101
- What are Green Streets?
- Why Green Streets?
- Green Streets Practices
- Green Street Locations
- Your Green Streets Project!
- Your Involvement
- Beyond Green Streets – other DEP efforts



Watershed 101

- Sources of Water

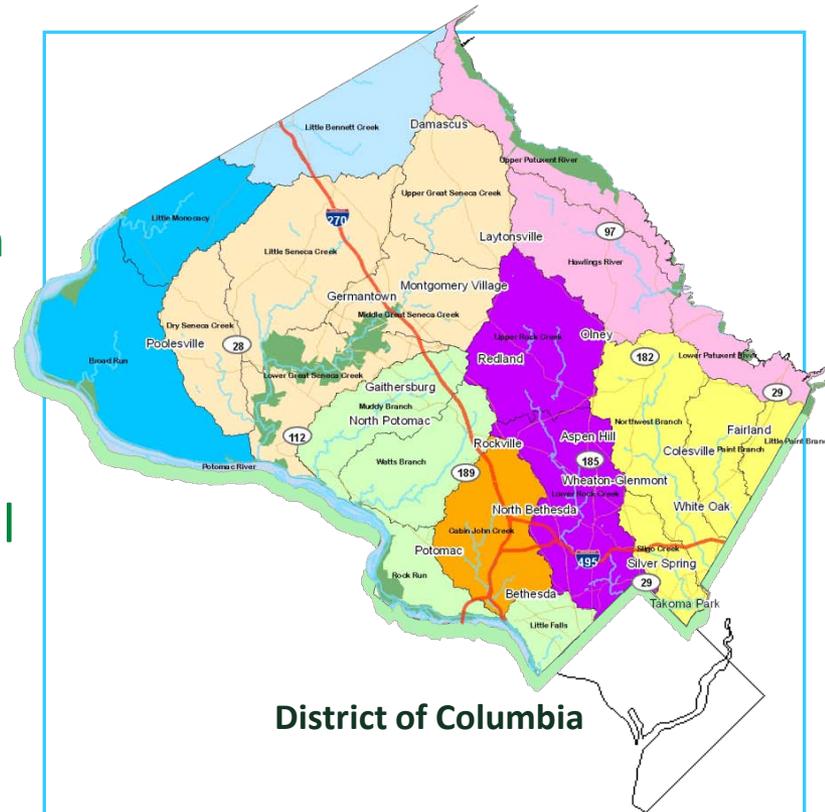


- About 97% is salt water
- About 2% is frozen
- Only 1% is available for drinking water
 - Across the Country, about 57% comes from groundwater sources
 - In Maryland, 74% is from surface water sources
- Potential for greater impacts from runoff in Maryland

Watershed 101

- **Montgomery County, MD**

- 507 sq. miles
- 1,000,000 people
 - Second only to Baltimore City within Maryland in average people per square mile
 - 184 languages spoken
- About 12% impervious surface overall
 - About the size of Washington DC
- Over 1,500 miles of streams
- Two major river basins:
 - Potomac
 - Patuxent
 - Eight local *watersheds*



- **Impervious:** Not allowing water to soak through the ground.

Watershed 101

- What is a Watershed?
 - A *watershed* is an area from which the water above and below ground drains to the same place.
 - Different scales of watersheds:
 - Chesapeake Bay
 - Eight local watersheds
 - Neighborhood (to a storm drain)

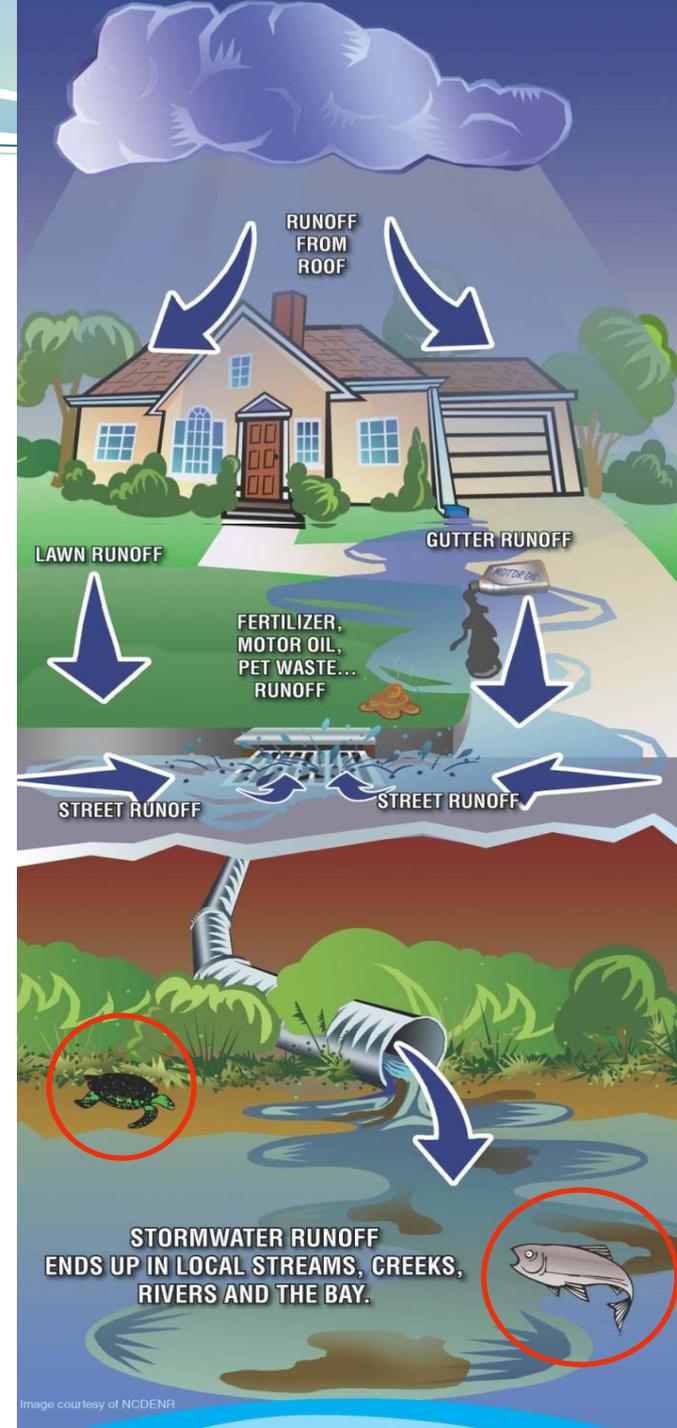


Watershed 101

- **What is Runoff?**

- Water that does not soak into the ground becomes surface runoff. This runoff flows over hard surfaces like rooftops, driveways and parking lots collecting potential contaminants and flows:
 - Directly into streams
 - Into storm drain pipes, eventually leading to streams
 - Into stormwater management facilities, then streams

Two Major Issues:
Volume/Timing of Runoff
Water Quality



Watershed 101

- What is the County doing to protect our Streams?

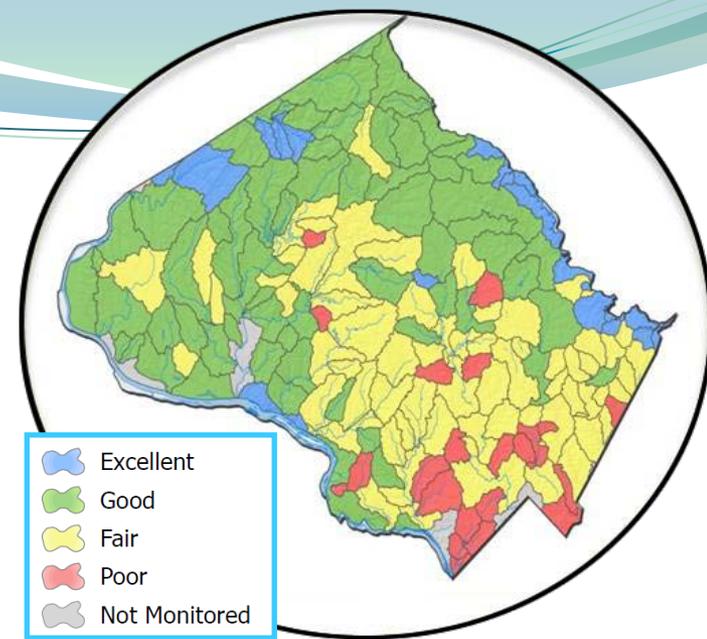
- Must meet regulatory requirements

- Federal Clean Water Act permit program
- MS4 = Municipal Separate Storm Sewer System

- Applies to all large and medium Maryland jurisdictions

- County Programs

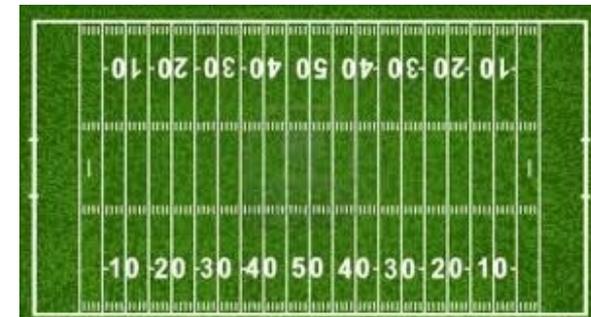
- Restore our streams and watersheds
 - Add runoff management
- Meet water quality protection goals
 - Reduce pollutants getting into our streams
- Educate and engage all stakeholders
 - Individual actions make a difference
- Focus on watersheds showing greatest impacts



What is the County Doing to Protect our Streams?

- Montgomery County is responsible for:
 - What goes into our storm drain pipes
 - What comes out of them
 - What flows into the streams
- DEP is adding stormwater management for 20 % of impervious surfaces
(4,292 acres = 6.7 square miles)... About three times the size of Takoma Park.

That's equivalent to 3,307 football fields!



What are Green Streets?

- Small scale stormwater practices located within street right of way areas.
- Approx. 1/3 of impervious surfaces in our County are roadways.



**RAIN GARDEN,
BIORETENTION**



BIOSWALE



TREE BOX



**PERVIOUS
PARKING &
WALKING PATHS**

Why Green Streets?

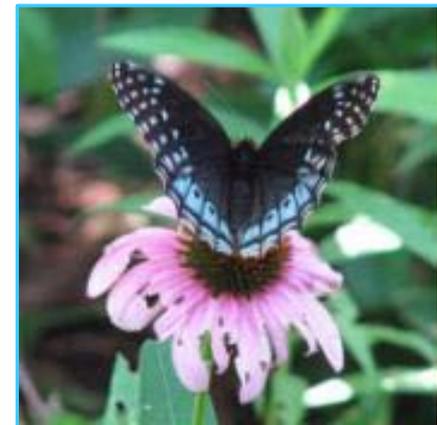
- Replenish groundwater and improve flow in local streams
- Water can soak into the ground while plants and soils filter pollutants



- Create aesthetically attractive streetscapes

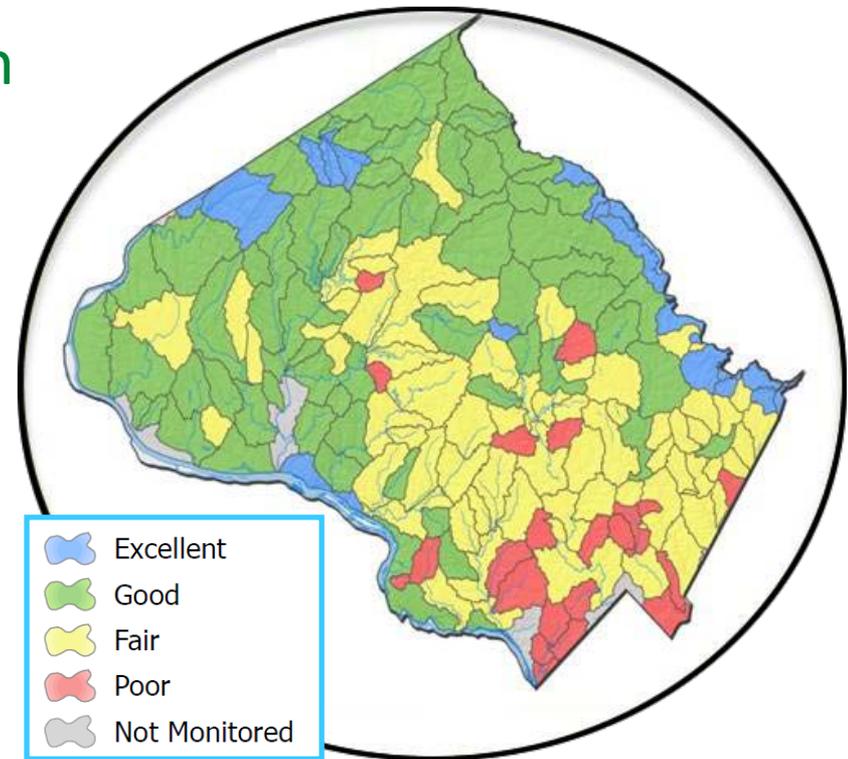


- Provide natural habitat

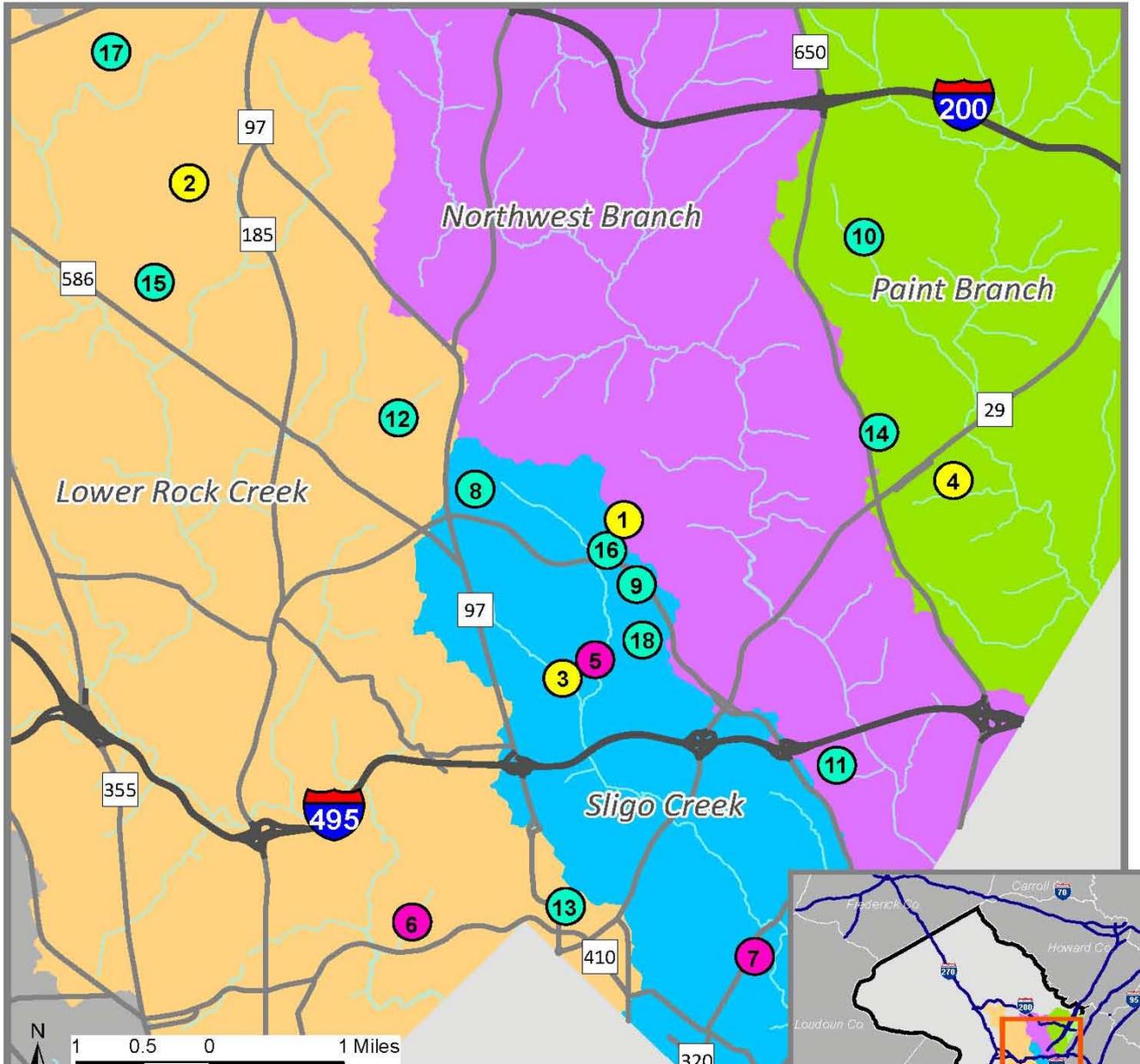


Where will Green Streets be?

- MCDEP plans Green Streets projects:
 - For priority areas identified in Watershed Studies or Restoration Plans
 - Coordinate with Department of Transportation's road & sidewalk improvements



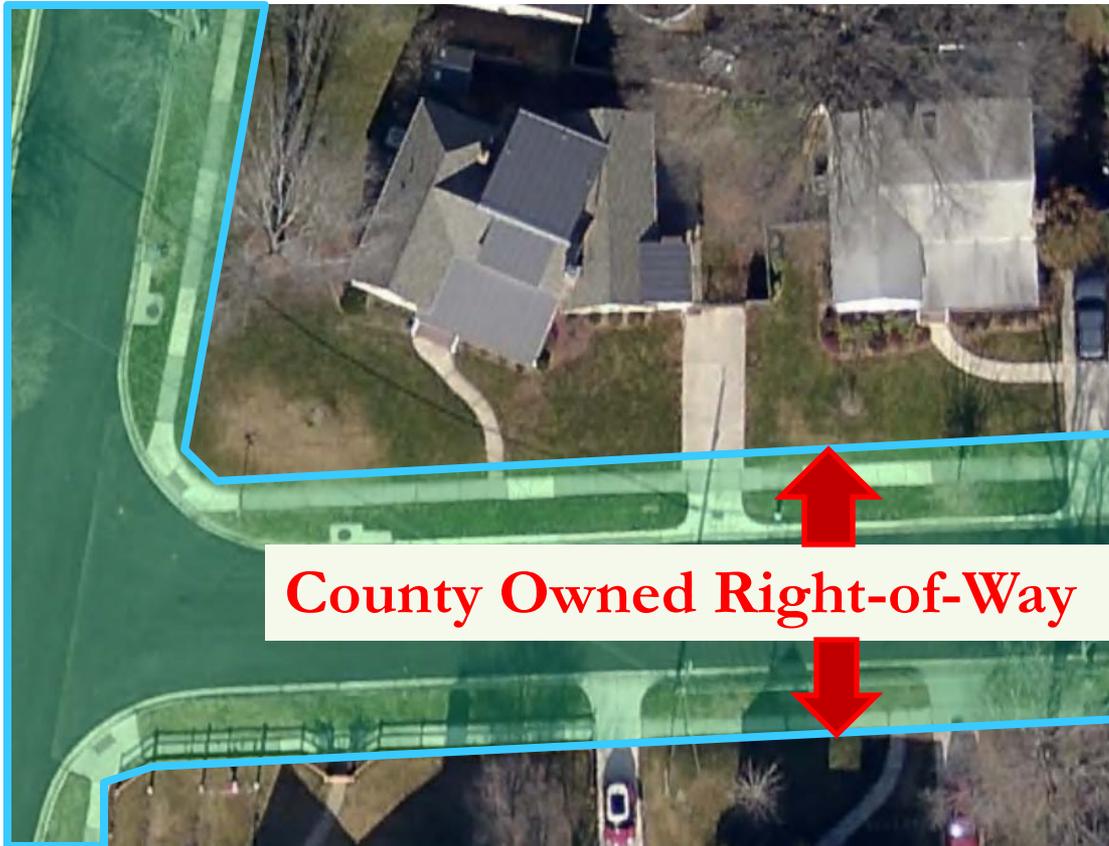
Montgomery County Green Streets



	COMPLETE
1	Arcola Avenue
2	Aspen Hill Library
3	Forest Estates
4	White Oak
	IN CONSTRUCTION
5	Dennis Avenue
6	Donnybrook
7	Sligo Park Hills
	IN DESIGN
8	Amherst
9	Breewood
10	Cannon Road
11	Franklin Knolls and Clifton Park
12	Glenmont Forest
13	Spring Street and Second Street
14	Springbrook \ Homestead Estate
15	Wheaton Woods
16	University Towers
17	Manor Woods
18	McDonald Knolls \ Ballantrae \ Sligo Estates

Where will Green Streets be?

- Selected areas within the County Right-of-Way (ROW)



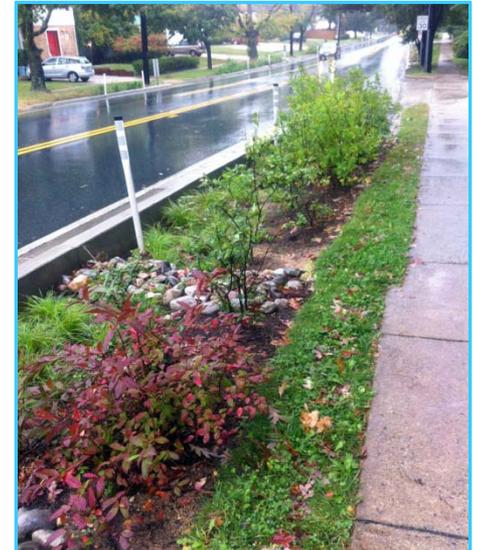
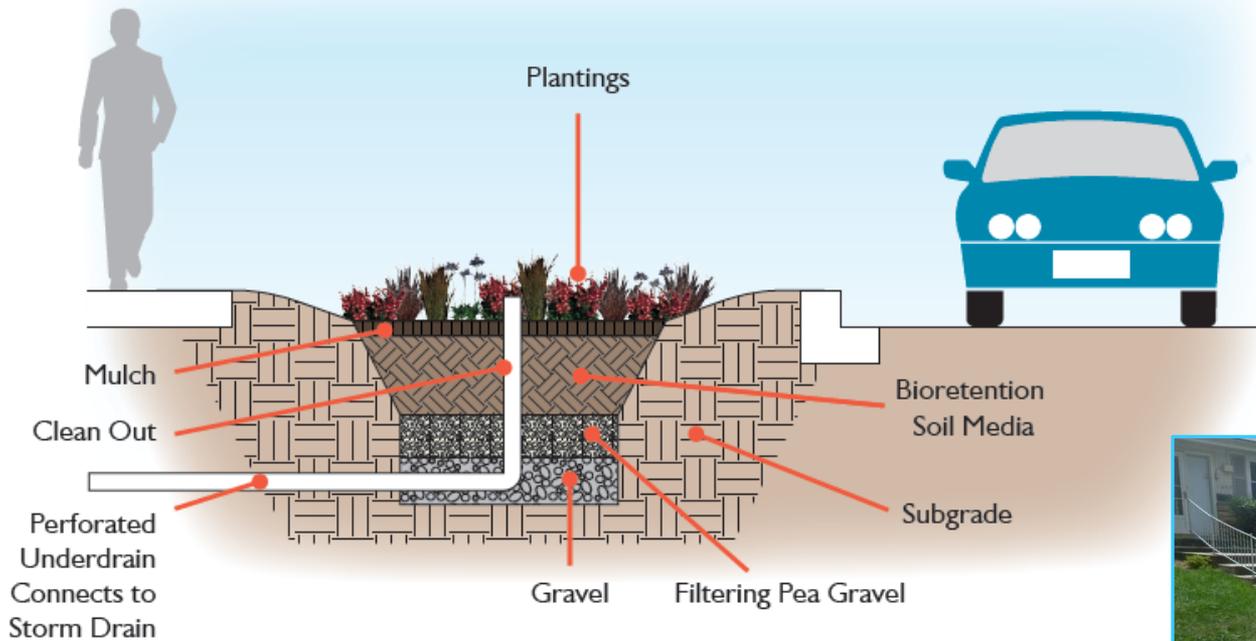
With Sidewalk



Without Sidewalk

Green Streets Practices

- Bioretention



Green Streets Practices

- Bioswale



Arcola



White Oak



Redmiles Rd

12.18.2008



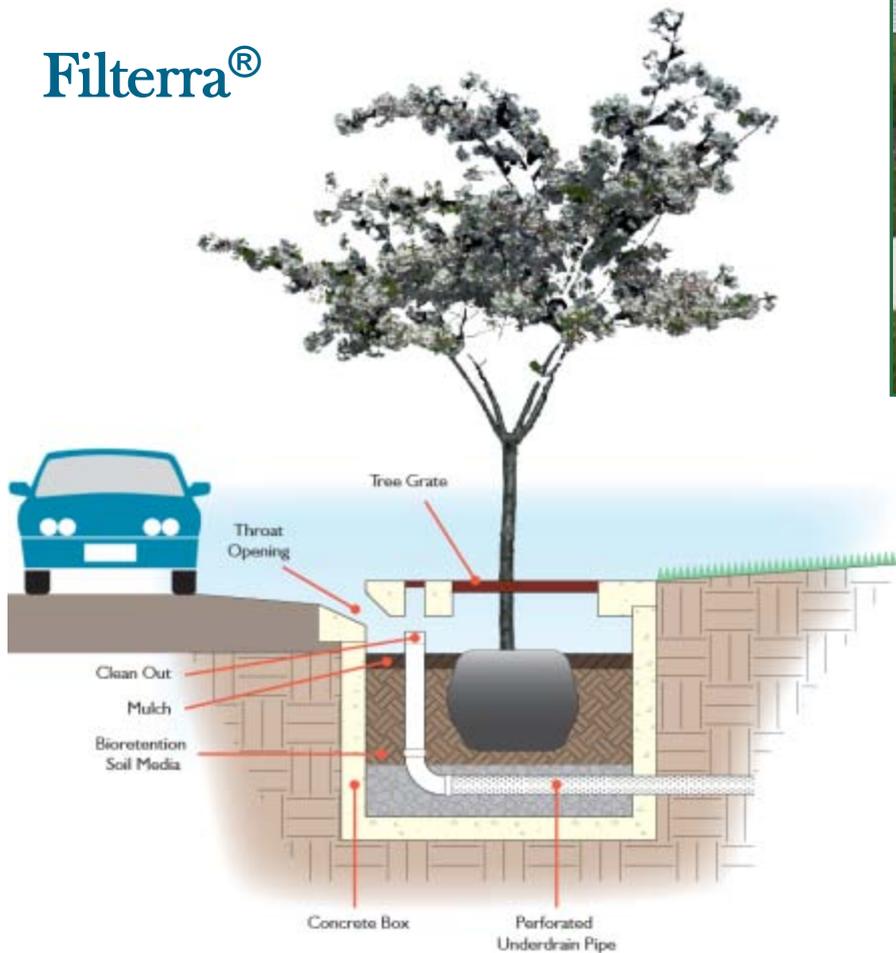
Redmiles Rd

12.18.2008

Green Streets Practices

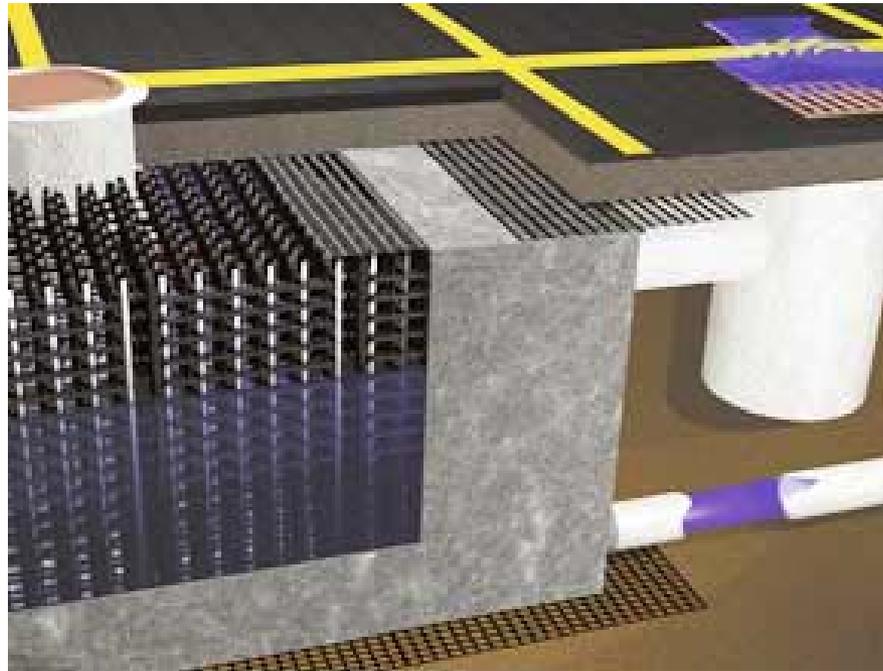
- Tree Box Filter

Filterra®



Green Streets Practices

- Small Scale Underground Stormwater Practices
 - Infiltration structure in curb inlet
 - Rainstore[®] Infiltration



Source: <http://invisiblestructures.com/rainstore3.html>

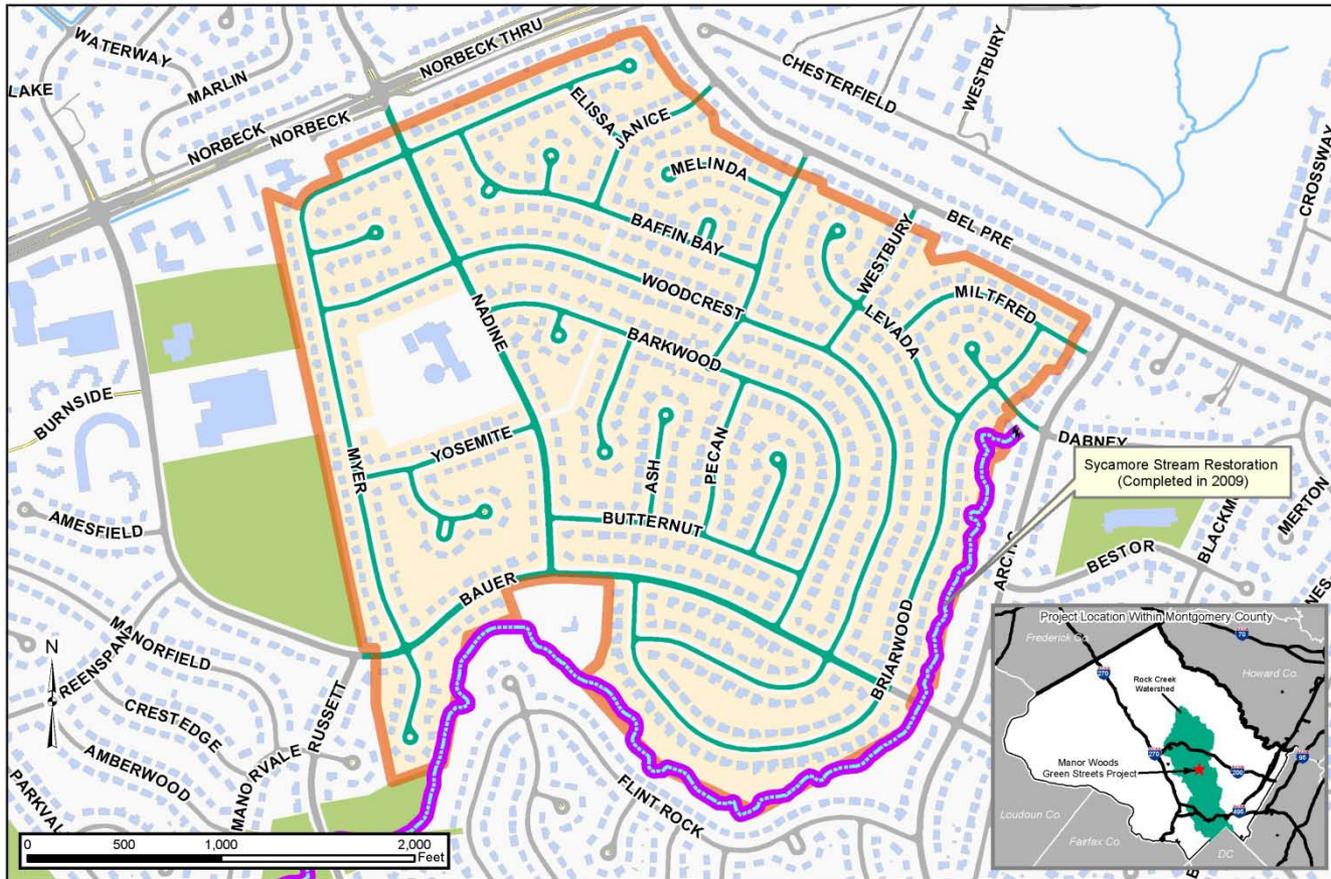
Green Streets in Manor Woods

Project Location



Manor Woods Green Streets Project

Overview Map



Green Streets in Manor Woods

Neighborhood Background

- Developed in 1960-70s
- Single family residences
- No stormwater treatment
- Stormwater drains to Sycamore Creek
- Sycamore Creek restoration completed in 2009



Green Streets in Manor Woods

Constraints & Proposed Practices

Constraints that we Consider:

- Driveways
- Trees
- Utilities
- Parking demand
- Slope
- Soils

Proposed Practices:

- 393 total practices proposed within the right of way

Green Streets in Manor Woods



Manor Woods Green Streets Project Preliminary Design - Location Map 1



Green Streets in Manor Woods



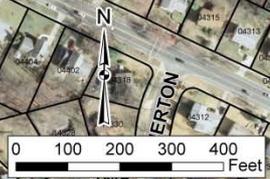
Manor Woods Green Streets Project Preliminary Design - Location Map 2



Legend

Proposed Practice Type

- Bioretention
- Bioswale
- Small-Scale Underground Practice
- Tree Box Filter



Green Streets in Manor Woods



Manor Woods Green Streets Project Preliminary Design - Location Map 3



Green Streets in Manor Woods



Manor Woods Green Streets Project Preliminary Design - Location Map 4



Legend

Proposed Practice Type

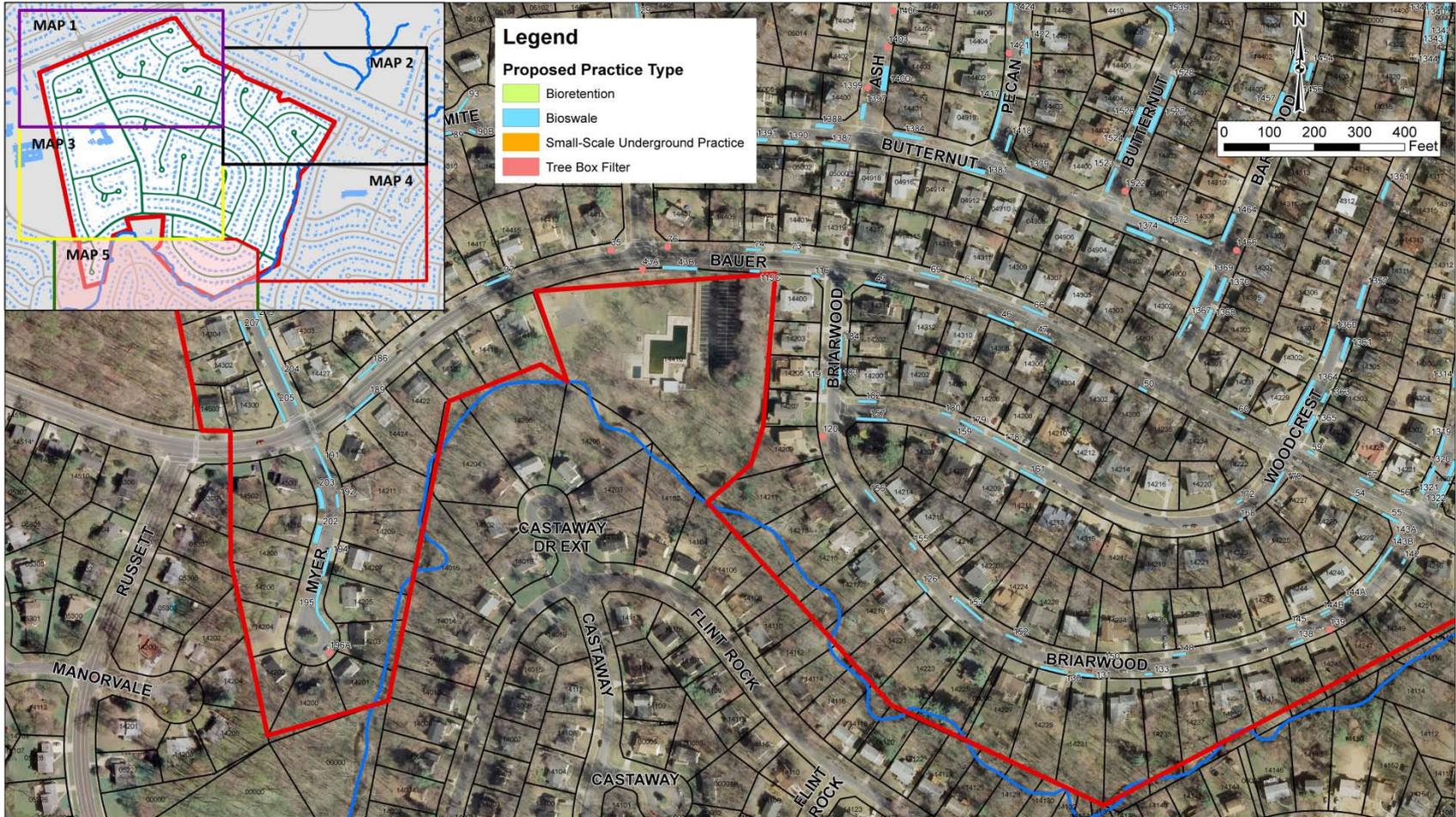
- Bioretention
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Green Streets in Manor Woods



Manor Woods Green Streets Project Preliminary Design - Location Map 5



Green Streets in Manor Woods

Public Events and Project Schedule (Tentative)

Event	Date / Time	Location
Preliminary Site Assessment	August 1, 2014	
Public Meeting	November 5, 2014	Earl B. Wood Middle School
Draft Designs	September 2015	
Community Walk	November 2015	Neighborhood
Final Designs	December 2015	
Construction Duration	~5 days/ practice	Throughout Neighborhood

We are here →

Community Involvement

- Public Meeting
- Community Walk
- Other meetings, as needed



Maintenance

- MCDEP will visit monthly (on average)
- We will:
 - Water plants, if needed
 - Replace plants as needed
 - Replenish mulch
 - Remove weeds
 - Remove sediment & trash





RainScapes Techniques

Green Roof
 ".623 gallons of water falls on each sq. ft. of roof during the during a normal rainstorm of 1". A 1000 sq. ft conventional roof can shed 623 gallons when there is an inch of rain. Green roofs reduce and clean this stormwater runoff before it hits the ground.

Conservation Landscape
 Loosened and improved soil, planted with easy-to-maintain native plants that soak up the rain.

Dry Well
 collects stormwater from rooftops or driveways and filters the rainwater through a small stone-filled pit, then into the underlying soils



Canopy Trees
 Leaves intercept raindrops and retain them, thus reducing stormwater runoff

Pavement Removal
 allows more water to soak into the ground when you plant native plants.

Rain Gardens
 A spoon-like, concave area filled with a special soil mix that collects rainfall and allows it to filter into the ground

Cistern
 Larger than a rain barrel, cisterns perform the same water harvesting benefits and are no more aesthetically intrusive than an air conditioner.

Rain Barrels
 collects and stores rain water from rooftops

Permeable Surfaces
 allow rainwater to rapidly infiltrate and enter the ground where it is naturally filtered

Questions?

- For More Information:

Ho-Ching Fong

240-777-7718 ho-ching.fong@montgomerycountymd.gov

Projects Webpage:

<http://www.montgomerycountymd.gov/DEP/Restoration/manor-woods.html>

