Streamside at Clarksburg

Located in Sub-Watershed LSTM 206

Response to MNCPPC

Ten Mile Creek Limited Master Plan Amendment Presentations

April 17th, 2013

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.




10 Mile Creek Area Limited Amendment

Key Questions

How do we balance policies that support the 1994 plan vision?

- Clarksburg at a town scale and with a transit orientation
- Protection of natural features
- Importance of I-270 high tech corridor with employment options

How significantly could the watershed be impacted by development?

How well can those impacts be mitigated?

What constitutes an acceptable level of stream quality decline?

What other development options should be considered?

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

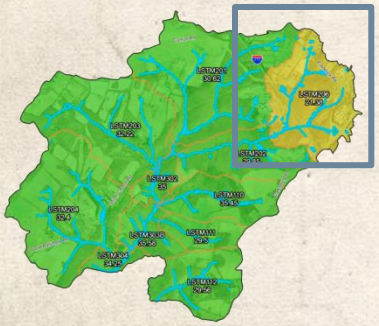
Ten Mile Creek Watershed

How Streamside compares to TMC as a whole

Environmental Features	Overall Ten Mile Creek Watershed	Sub-watershed LSTM 206	Streamside at Clarksburg
Steep Slopes	Yes	Yes	Yes
Moderate to Shallow Bedrock Layer	Moderate to Shallow	Moderate to Shallow	Moderate
Erodible Soils	Yes	No	No
Water Quality	Good	Fair	Fair
MD DNR Hubs / Corridors / Gaps	Yes / Yes / Yes	No / No / No	No / No / No
Widespread Channel Instability	No	Some	Yes
Flood Flows Naturally / Access to Floodplain	Yes	Some disconnections	Many disconnections
Stream Bed Ideal to Support Benthic Macro-invertebrates	Yes	Some streambeds choked	Many streambeds choked
Pre-development Water Cycle still in place	Yes	No	No

How Streamside (LSTM 206) differs from the rest of the Ten Mile Creek (TMC) Watershed

Ref. Slide 15-20
Map Slide 24



Ten Mile Creek (Overall)*	Streamside (LSTM 206)*
Contains Agricultural Preserve	No Agricultural Preserve
Low Imperviousness (0-5% Avg.)	Existing Imperviousness (12-40% Avg.) ~ Exceeds Overall Average
Major Current Uses: Forest, Agricultural, Rural, Low Density Residential	Major Current Uses: Forest, Agricultural, Low, Medium, and High Density Residential, Industrial, Institutional, & Commercial
Overall No Stormwater Management Facilities – Natural SWM Regime	Outdated Stormwater Management Facilities – Failed Anthropogenic Influences (Man-Made)

Existing Conditions

Slide 16

10 Mile Creek Area Limited Amendment

Existing Imperviousness

Subwatershed Boundaries

Subwatershed Imperviousness

- 0.0 - 0.05
- 0.05 - 0.08
- 0.08 - 0.12
- 0.12 - 0.40

www.montgomeryplanning.org/10milecreek

Sub-Watershed LSTM 206 Existing Conditions

Roads

Major Roadways
60% Impervious
(Total Area 2,664,500 Sq. Ft.)
(Approximate Impervious Area 1,600,000 Sq. Ft.)

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions

Montgomery County Owned

1 **West Side Correctional Facility**
9 % Impervious
(Total Area 2,598,672 Sq. Ft.)
(Impervious Area 245,466 Sq. Ft.)

2 **355 West Side Property**
8 % Impervious
(Total 103,953 Sq. Ft.)
(Impervious Area 7,831Sq. Ft.)

3 **355 East Side**
23 % Impervious
(Total Area 109,928 Sq. Ft.)
(Impervious Area 25,000 Sq. Ft.)

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

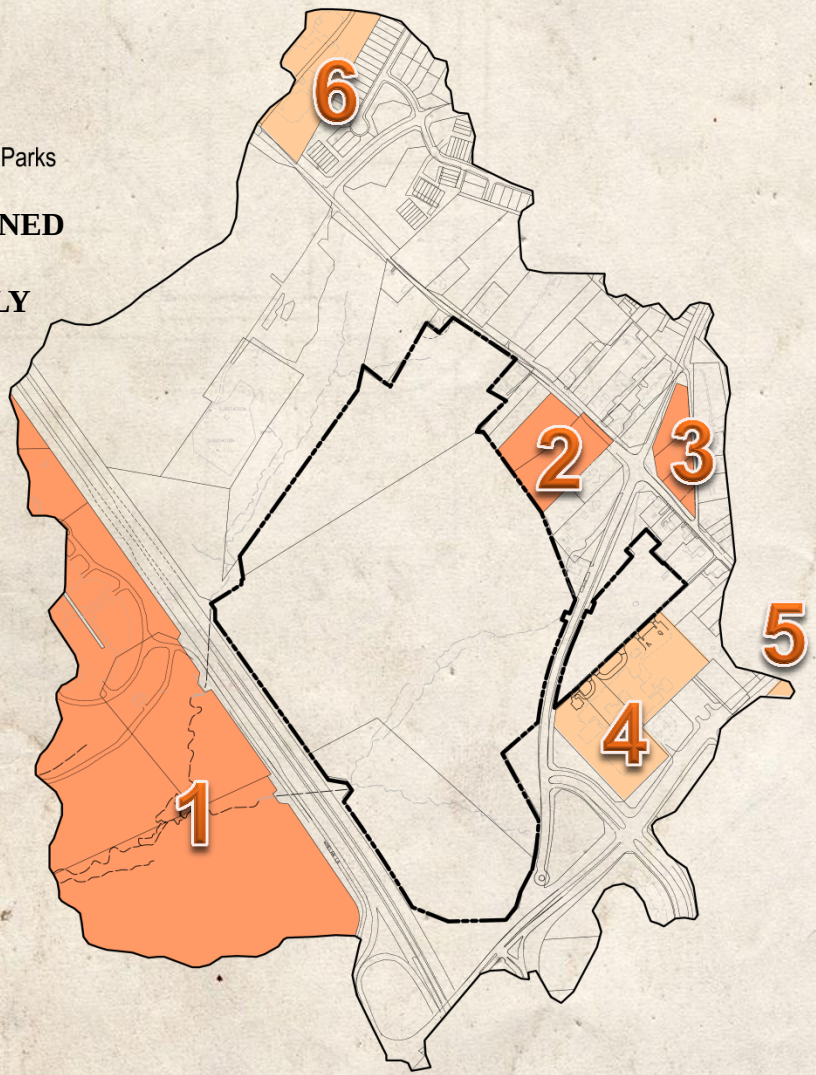
Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions

Montgomery County Owned

School Property / MNCPPC Parks

TOTAL COUNTY OWNED LAND IS APPROXIMATELY 80 ACRES



1 **West Side Correctional Facility**
9 % Impervious
(Total Area 2,598,672 Sq. Ft.)
(Impervious Area 245,466 Sq. Ft.)

2 **355 West Side Property**
8 % Impervious
(Total 103,953 Sq. Ft.)
(Impervious Area 7,831Sq. Ft.)

3 **355 East Side**
23 % Impervious
(Total Area 109,928 Sq. Ft.)
(Impervious Area 25,000 Sq. Ft.)

4 **Clarksburg Elem School**
39 % Impervious
(Total Area 435,058 Sq. Ft.)
(Impervious Area 170,415 Sq. Ft.)

5 **Tavern Park**
Less than 1% Impervious
(Total Area 10,205 Sq. Ft.)
(Impervious Area 100 Sq. Ft.)

6 **Regional Park**
38 % Impervious
(Total Area 267,775 Sq. Ft.)
(Impervious Area 102,028 Sq. Ft.)

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions

1 — Substation
40 % Impervious
(Total Area 314,020 Sq. Ft.)
(Impervious Area 124,622 Sq. Ft.)

2 — Bank
70 % Impervious
(Total Area 39,980 Sq. Ft.)
(Impervious Area 27,850 Sq. Ft.)

3 — 355 East Commercial
52 % Impervious
(Total Area 174,569 Sq. Ft.)
(Impervious Area 90,179 Sq. Ft.)

4 — East 121 Commercial
32 % Impervious
(Total Area 43,095 Sq. Ft.)
(Impervious Area 13,742 Sq. Ft.)

5 — Gateway Commons
12 % Impervious
(Total Area 208,862 Sq. Ft.)
(Impervious Area 25,342 Sq. Ft.)

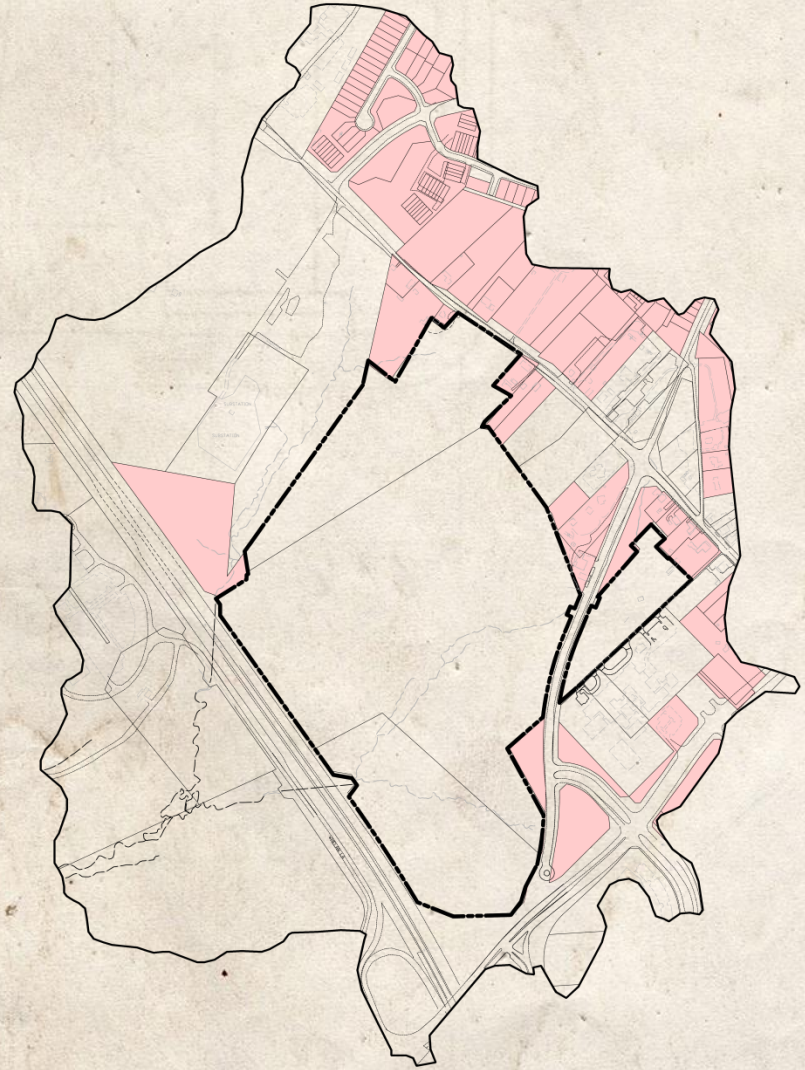
6 — Gateway Center
24 % Impervious
(Total Area 55,007 Sq. Ft.)
(Impervious Area 13,127 Sq. Ft.)

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions



Residential Zone

Residential Areas
28 % Impervious
(Total Area 2,863,747 Sq. Ft.)
(Impervious Area 810,341 Sq. Ft.)

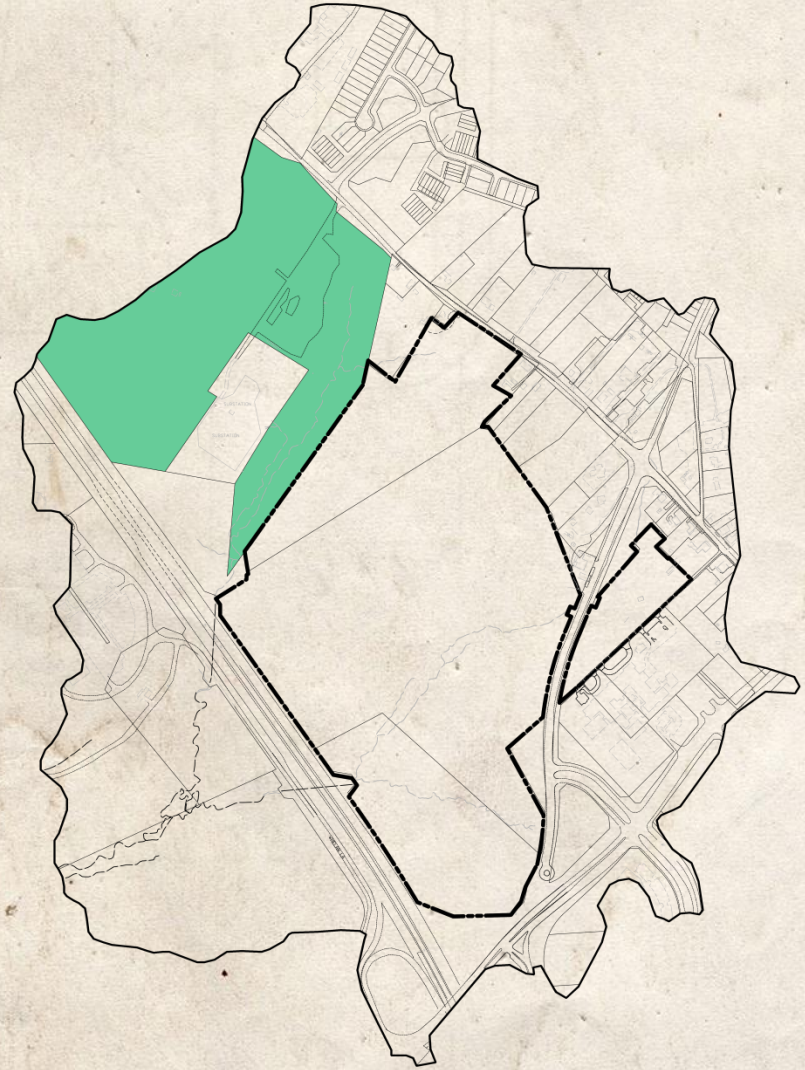
PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions

Egan Property



Egan Property
(Total Area approximately 45 acres
Impervious Approximately 4 acres
Ag. Land approximately 26 acres)

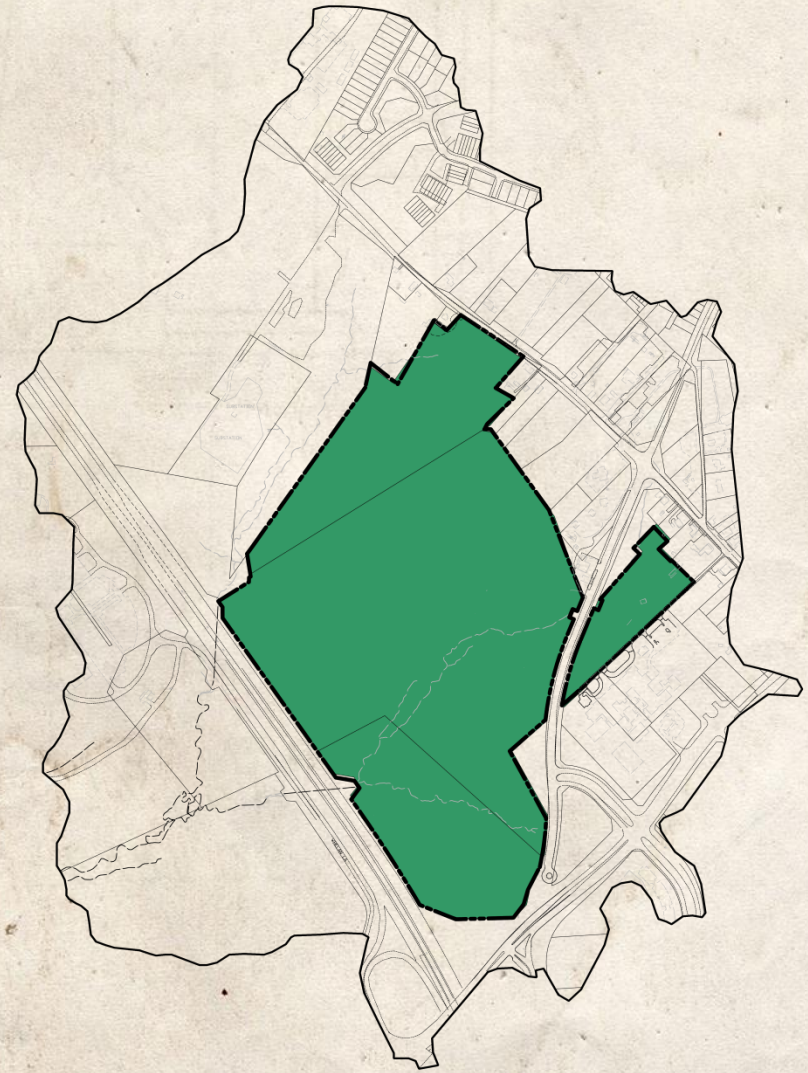
PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Sub-Watershed LSTM 206 Existing Conditions

Streamside



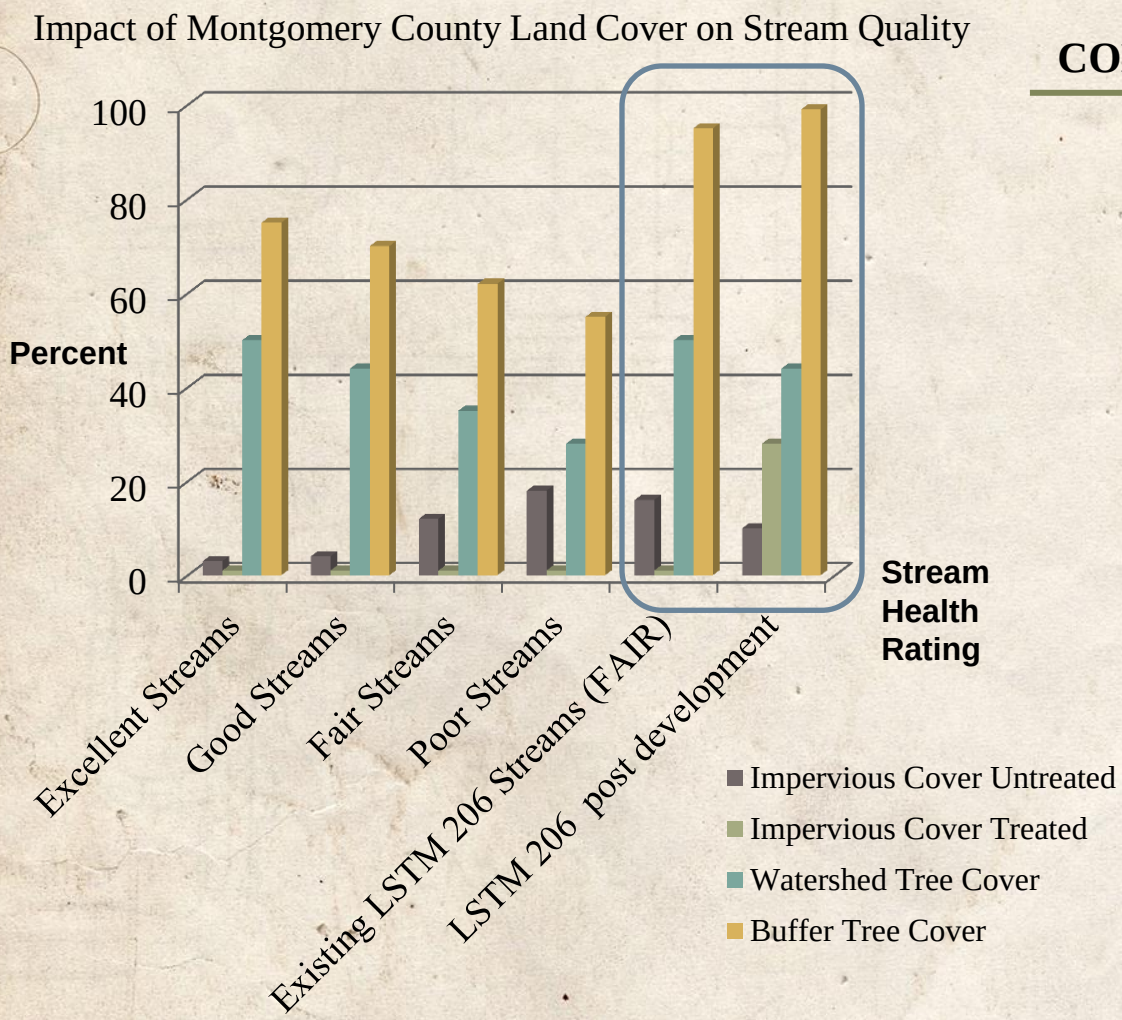
Streamside
30 Acres of Ag. Land
(Total Area 5,090,767 Sq. Ft.)

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

How Streamside compares to the County's Stream Health Land Impact Rating System



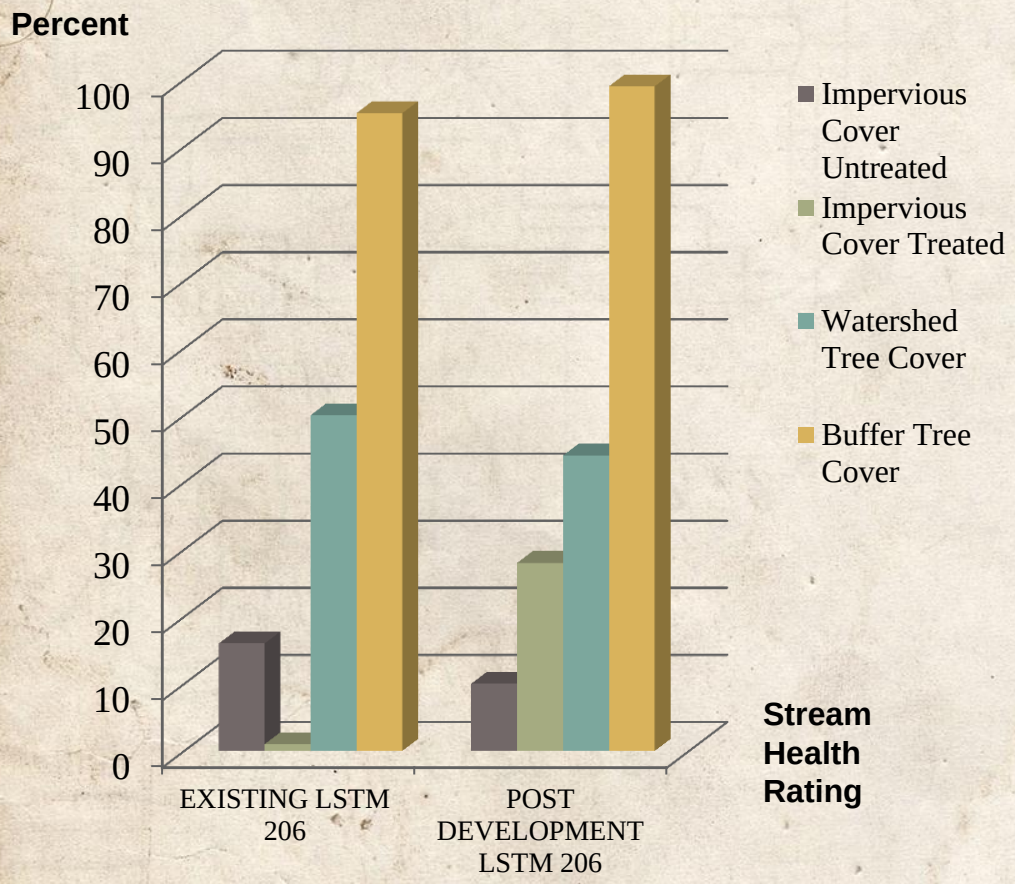
How are Streamside's EXISTING CONDITIONS different from the model?

- Streamside, within LSTM 206 has an overall FAIR rating.
- Streamside impervious equates to Poor stream quality.
- Streamside Watershed Tree cover equates to Excellent streams.
- Streamside Buffer tree cover exceeds Excellent streams.

BUT EXISTING STREAMSIDE IS RATED FAIR

How Streamside compares to the County's Stream Health Land Impact Rating System

Impact of Montgomery County Land Cover on Stream Quality



What does this tell us?

POST CONSTRUCTION, STREAMSIDE STREAM HEALTH CAN IMPROVE TO **GOOD**

- Untreated and unregulated Stormwater from existing development is degrading the Streamside stream quality.
- Forested buffers are working to raise the stream quality rating.
- Retrofits and responsible development will further improve existing conditions.

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

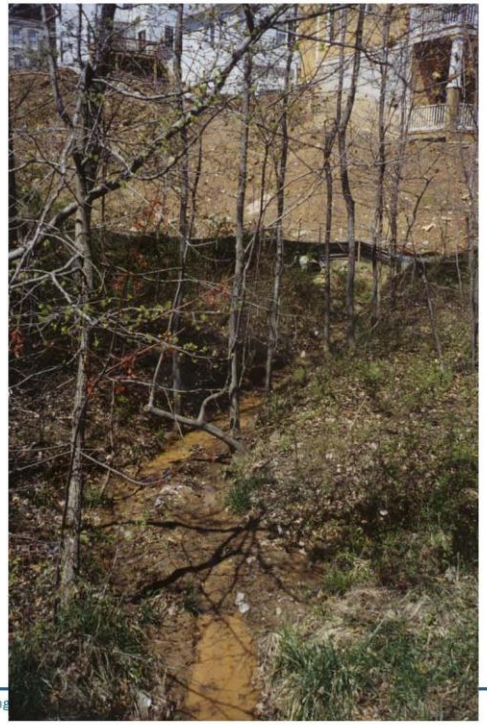
Water Quality

Slide 39

What We Want to Avoid with TMC

10 Mile Creek Area Limited Amendment

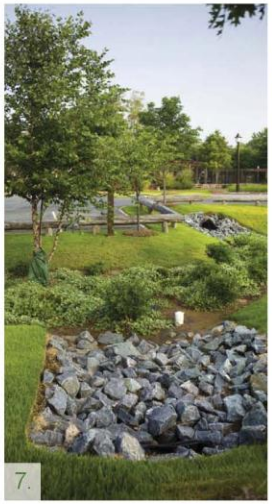
Water Quality



www.montgomeryplanning

What ESD Looks Like

Sustainable Site Elements



1. Green Roofs
2. Rainwater Harvesting/ Rain Barrels/Cisterns
3. Greywater Reuse (Irrigation & Building)
4. Permeable Paving
5. Rain Gardens

6. Infiltrative Trenches/ Vaults/Runnels
7. Vegetative Swales
8. Street Trees
9. Planter Boxes
10. Renewable Energy

What ESD Looks Like

Sustainable Site Elements

11. Riparian Stream Buffers
12. Downspout/Pervious Area Disconnection
13. Cool Roofs
14. Open Space/Tree Canopy Preservation
15. Green Streets

16. Natural Treatment Systems
17. Wetland Creation & Restoration
18. Soil Amendment/ Modifications
19. Native Plants

The Peterson Companies LandDesign Loiederman Soltesz Associates, Inc. CREATE Via Design

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Hydrology

Slide 37

What Master Plan Stage 4 hopes to avoid with future development in TMC

10 Mile Creek Area Limited Amendment

Hydrology

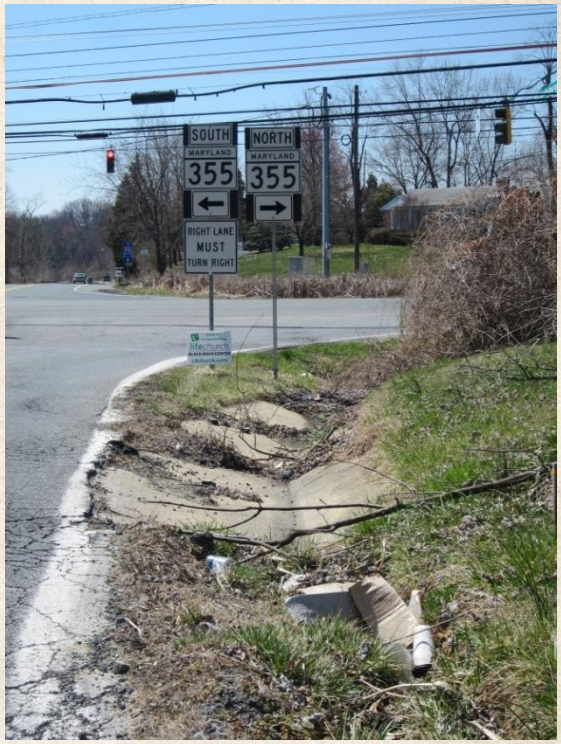
More frequent flooding

Changes in baseflow

Increased flood peaks

www.montgomeryplanning.org/10milecreek

Streamside Existing Conditions



Untreated stormwater runoff is picking up pollutants and debris from the urban environment. Outdated SWM techniques are channeling this untreated flow directly into streams channels and adjacent wetlands.

Streamside Existing Conditions

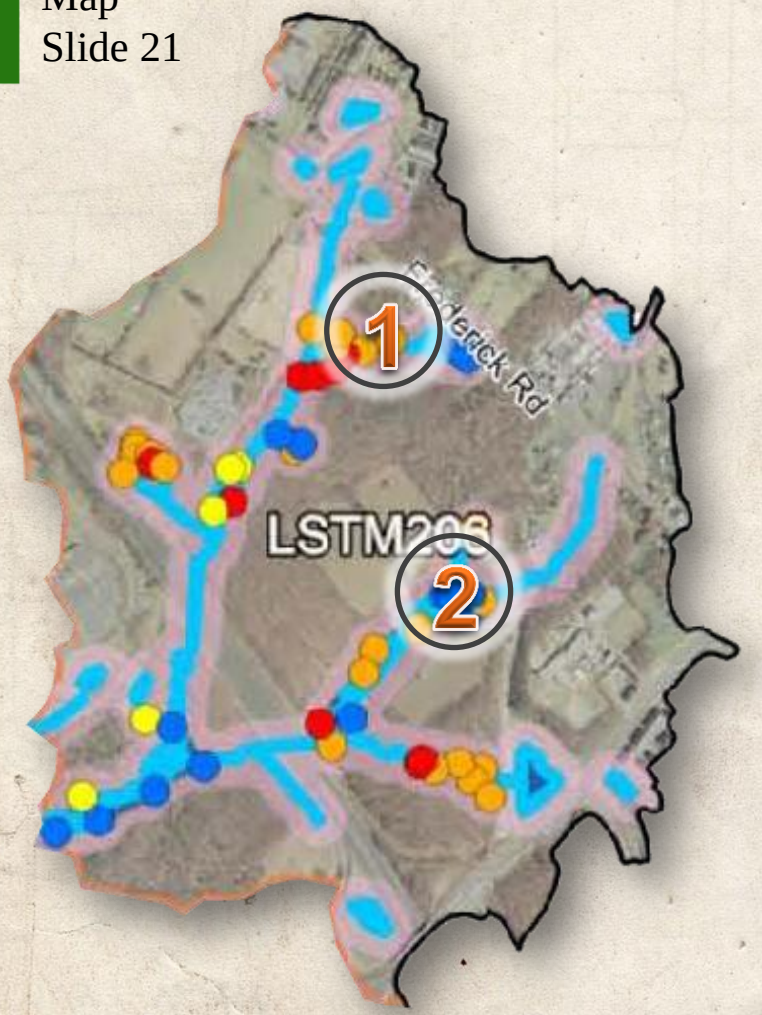
Direct untreated runoff from Route 355 to stream

Excessive nutrients cause algae to choke habitat

Channelized flow intensifies velocities

Hydrology – Seeps & Springs at Streamside Today

Map
Slide 21



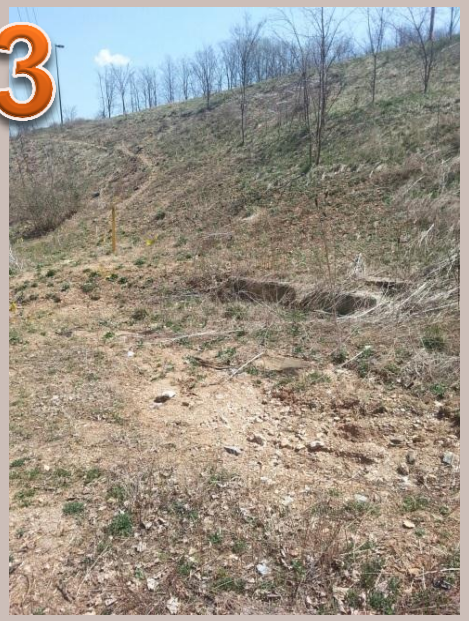
Offsite illegal drainage from well discharge pipe feeding wetland system.

Illegal discharge from existing well house, sump pumps,
And abandoned septic/well systems.

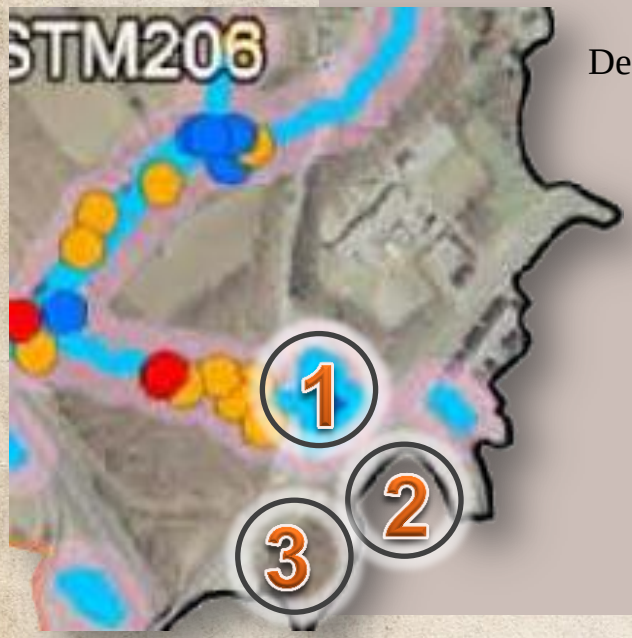
Artificial Hydrology

- Visible sources are well and sump pump discharge pipes, and untreated overflows from outdated SWM practices.
- Probable additional sources are improperly abandoned septic and well systems, and failing outdated SWM practices.

Hydrology – Seeps & Springs at Streamside Today



Map
Slide 21



Degradation from Artificial Hydrology

- Creates artificial channels that currently pull agricultural and urban pollutants into the stream system.
- Pulls groundwater out of its natural underground channels to subsurface flows.
- Artificial extended surface flow contributes to heightens stream temperatures.

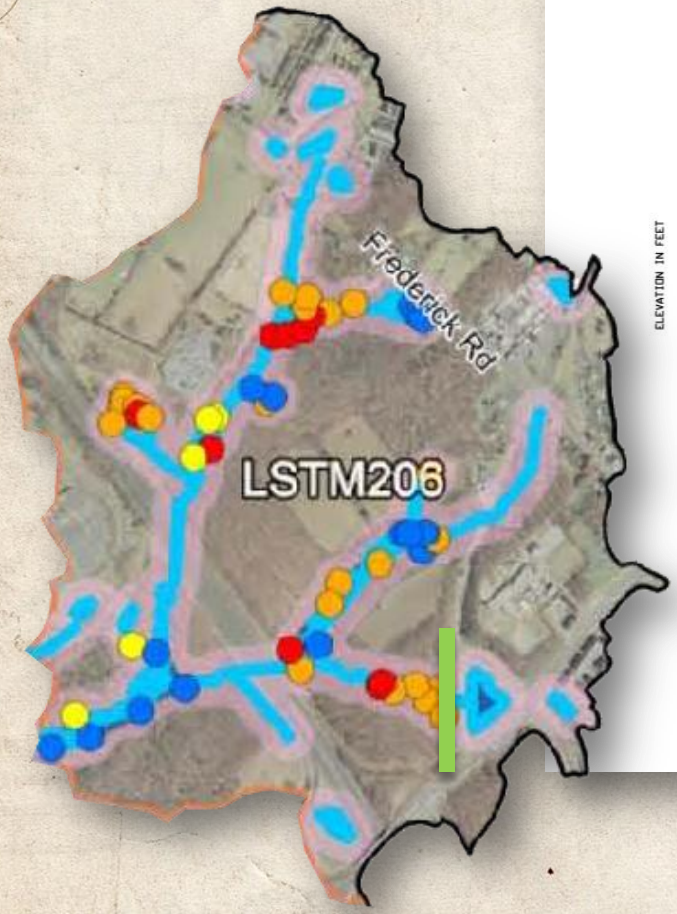
1 Outdated SWM Pond

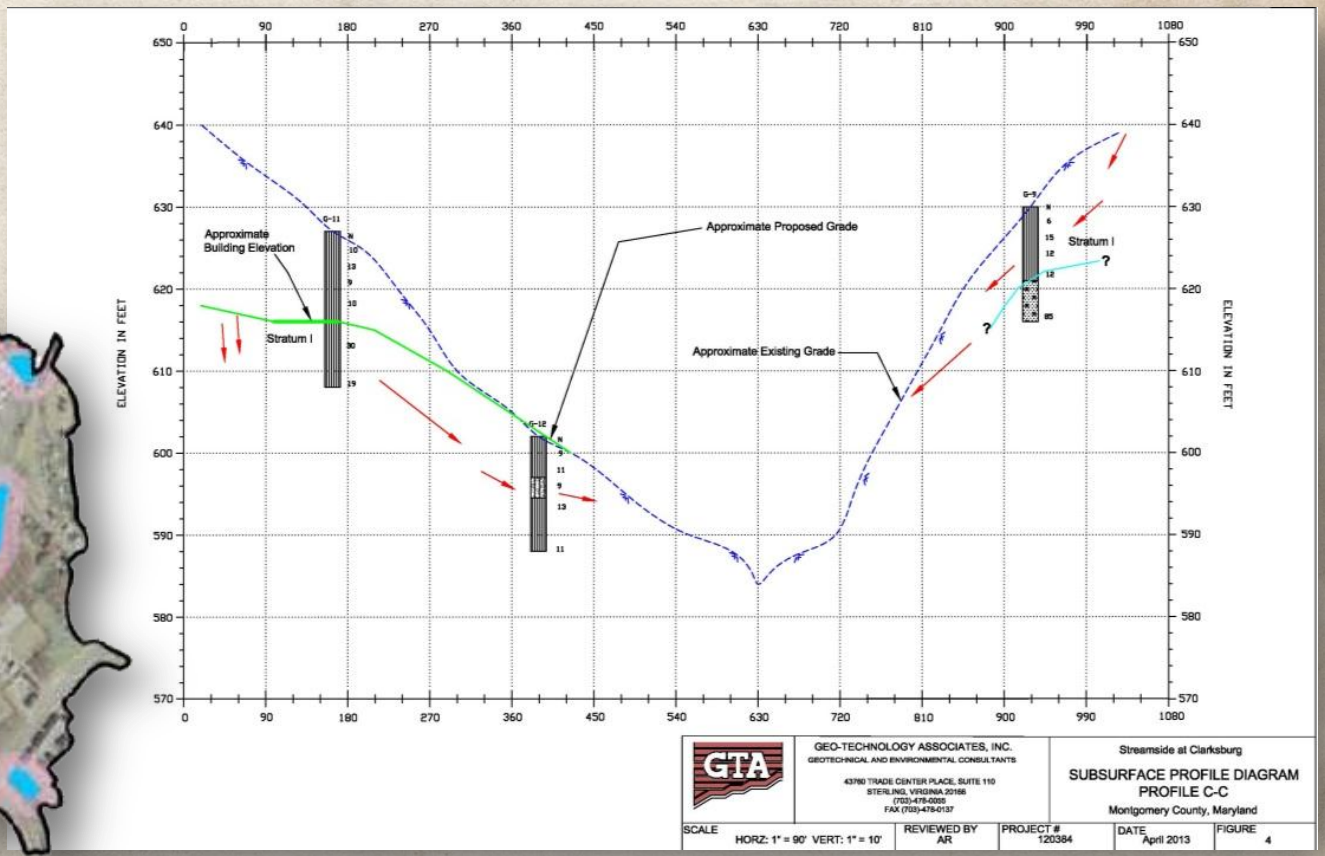
2 MD- 121 Failing Outfall

3 I-270 Runoff Rills

Hydrology

Map
Slide 21





Soil borings support the idea that natural seeps are infrequent in the 206 sub-watershed

Geomorphology

The study of the physical features of the surface of the earth and their relation to its geological structures

Slide 38

What impacts to the Geomorphology could do the Pristine Areas of TMC

10 Mile Creek Area Limited Amendment

Geomorphology (Stream Form)

INCREASING DEVELOPMENT IN WATERSHED

www.montgomeryplanning.org/10milecreek

Existing Geomorphology of Miles Coppola Today

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Regenerative Step Pool Storm Conveyance (RSPSC)

Initial installation

One Year Later

Six Years Later

- Regenerative SPSCs are open-channel conveyance structures that convey surface storm flow to ground water flow via surface pools and a bio-retentive and infiltrating soil media.

Benefits of RSPSCs

- Reduces flow velocity
- Removes suspended nutrient and pollutant particles
- Increased infiltration rates

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

What can Stream Enhancement do to improve manmade impacts to stream geomorphology/biology/habitat

Existing Stream– Miles Coppola Site

Western-most Channel

Central Channel

Example of an Enhanced stream

Degraded channel reconnected to floodplain

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

Streamside at Clarksburg

Habitat & Aquatic Life

Slide 40

What MNCPPC says Degraded Habitat Looks Like

10 Mile Creek Area
Limited Amendment

Habitat and Aquatic Life

www.montgomeryplanning.org/10milecreek

What Streamside Habitat Looks Like Today

Remnants of Concrete Channels

Debris

Excessive Algae and Sediment

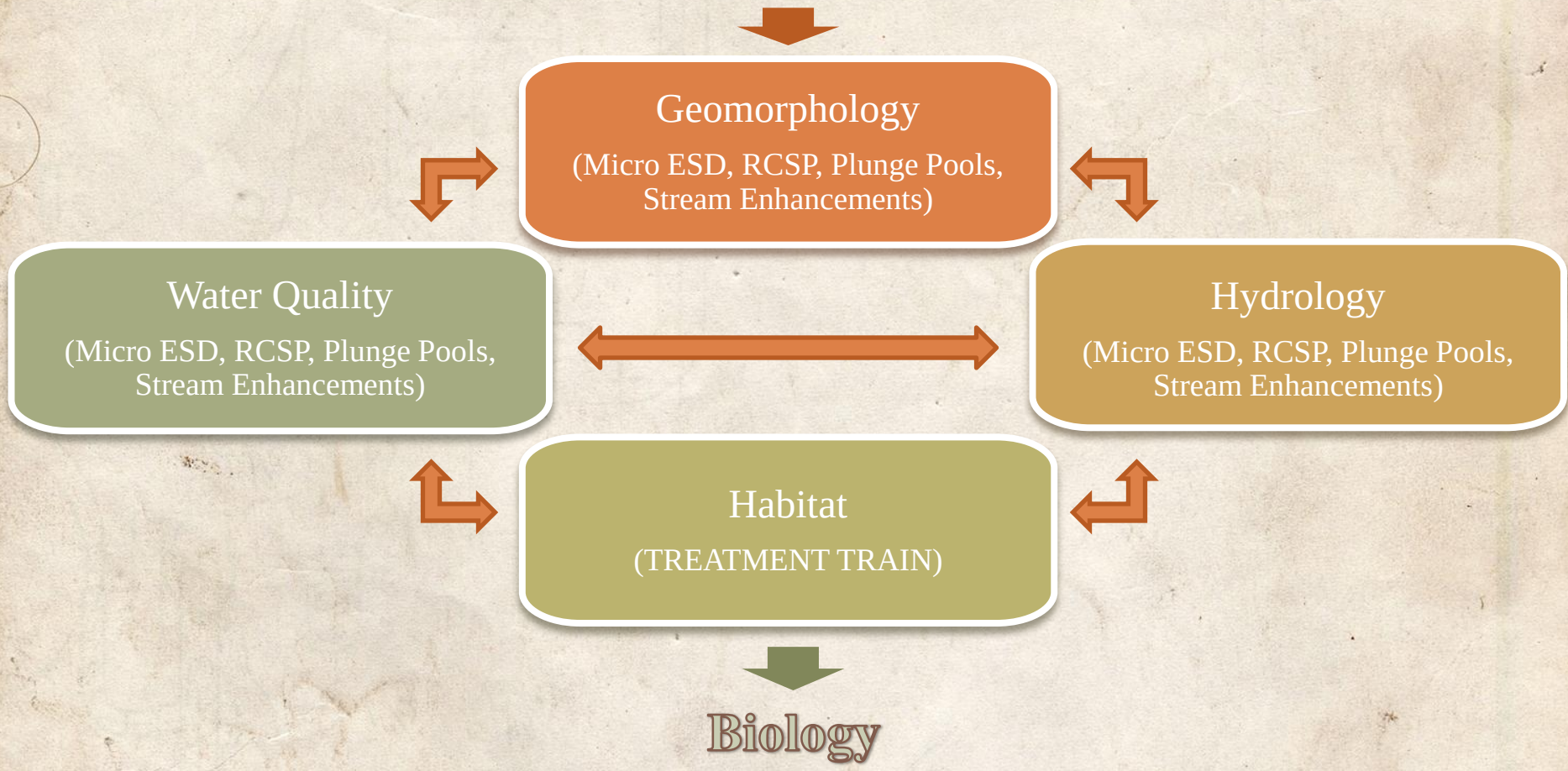
Scoured Stream Channels

PETERSON COMPANIES

Loiederman Soltesz Associates, Inc.

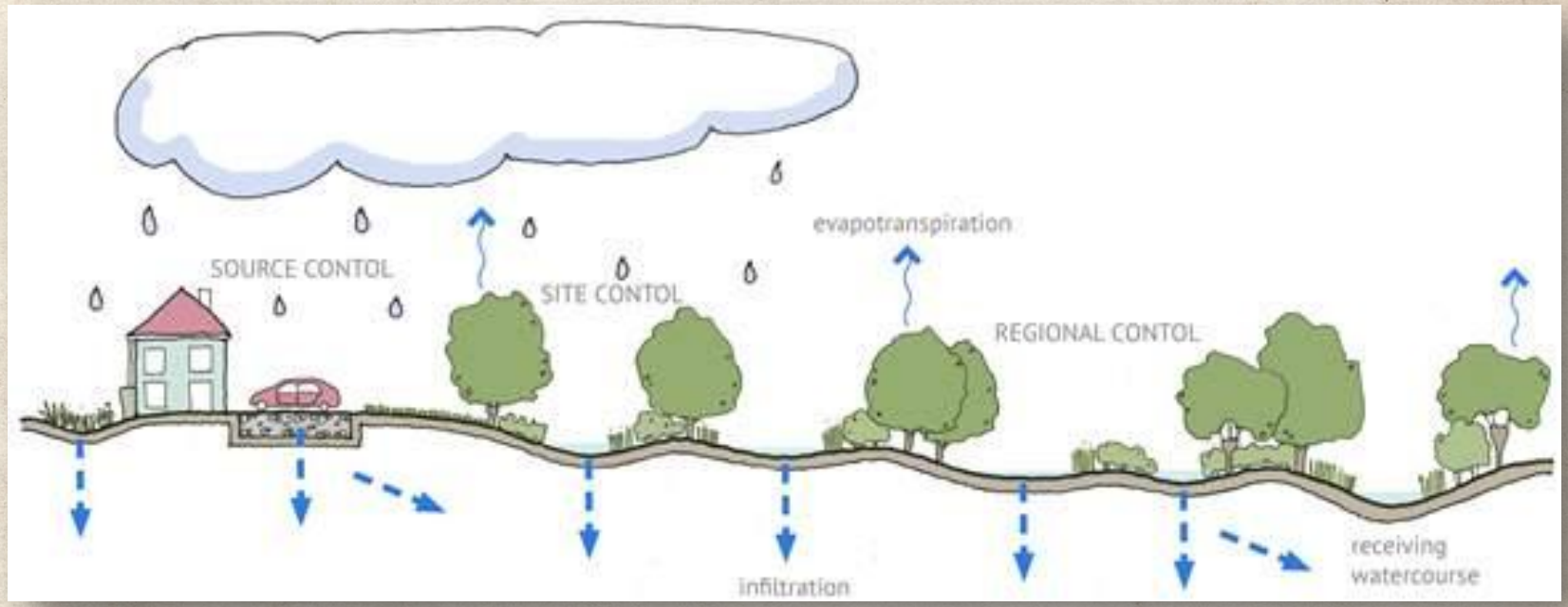
Streamside at Clarksburg

Streamside Development



The Project will result in a GOOD quality stream with improved biological conditions.

Treatment Train Examples



MICROBIORETENTION, PERMEABLE PAVEMENT, GREEN ROOF, CISTERNS ⇨ BIORETENTION, SUBSURFACE GRAVEL WETLANDS, GRASS SWALES ⇨ REGENERATIVE STEP POOL CONVEYANCE, PLUNGE POOLS, INCREASED FORESTED RIPARIAN BUFFERS ⇨ STREAM AND WETLAND ENHANCEMENTS

Treatment Train Stormwater Management addresses rainfall and runoff through a series of ESD practices, beginning at the source and ending at the receiving watercourse. Repetitive pollutant removal, infiltration, and velocity control work together to emulate a pre-development condition.

What Environmental MNCPPC says Site Design Can Do

Slide 56

Limited Amendment

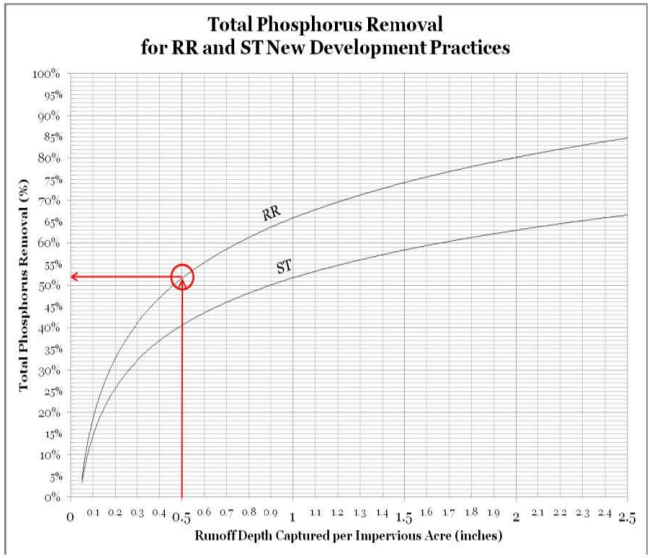
What is ESD Good At?

Hydrology:

- Excellent performance for reducing runoff volumes

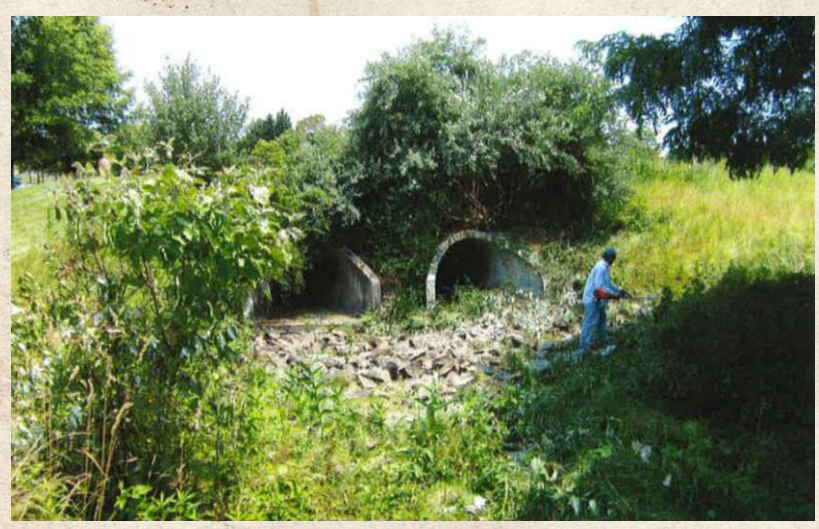
Water Quality

- Pollutant removal is typically better than traditional BMPs
- Better than ponds for in-stream temperature



www.montgomeryplanning.org/10milecreek

MNCPPC	Streamside at Clarksburg
What are the concerns for ESD	**How do we address concerns on Streamside Property**
Lack of proper maintenance	Peterson Companies has a proven track record of excellent SWM maintenance and community stewardship



The Milestone bog maintenance program

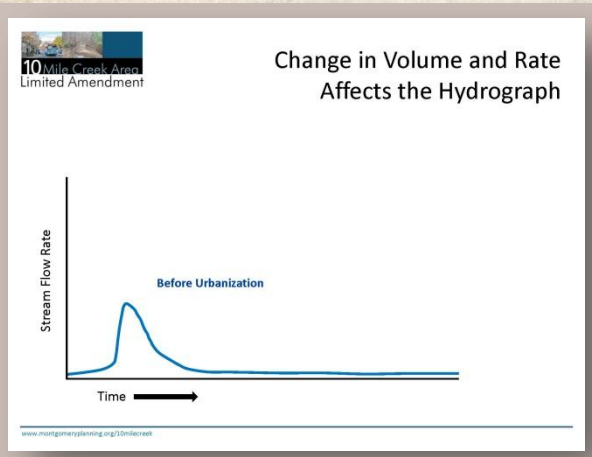
MNCPPC	Streamside at Clarksburg
What are the concerns for ESD	**How do we address concerns on Streamside Property**
Does not control impacts created during construction phase	New stringent Sediment and Erosion Control regulations are now in place protect the environment during construction
Soil Compaction	Engineered remediation practices Mechanical Amendments (deep till) Organic Amendments & plantings
Overflows will not be treated	Treatment Train Approach
Dissolved Chemicals added to Groundwater	Phytoremediation and specific soil mixes to address individual pollutants.

MNCPPC	Streamside at Clarksburg
What MNCPPC says ESD CAN'T do to remove POLLUTANTS and REDUCE VELOCITY:	**What CAN BE DONE on the Streamside Site to remove more pollutants and reduce velocity:**
Remove ALL pollutants	Runoff currently from agricultural land will be converted to a responsible developed parcel with a treatment train approach.
	Larger storms not fully treated by micro practices will flow through "treatment trains" to remove more pollutants, curb volume, and increase infiltration.
Address velocity from larger storm events	Augment forests to provide a forested 175' stream valley buffer throughout site.
	Augment existing wetlands and provide stream enhancements to improve WQ of stormwater received from existing untreated development.
	Remediate compacted soils in both existing and newly developed areas.

MNCPPC	Streamside at Clarksburg
What MNCPPC says ESD Can't Do for STREAM BIOLOGY:	**What CAN BE DONE on the Streamside Site to improve STREAM BIOLOGY:**
Does not preserve or enhance stream biology	Stream enhancement and velocity controls to existing uncontrolled outfalls will improve habitat and biology by reducing sediment and nutrient loads, and scouring
	Stop illegal pumping and repair outfalls

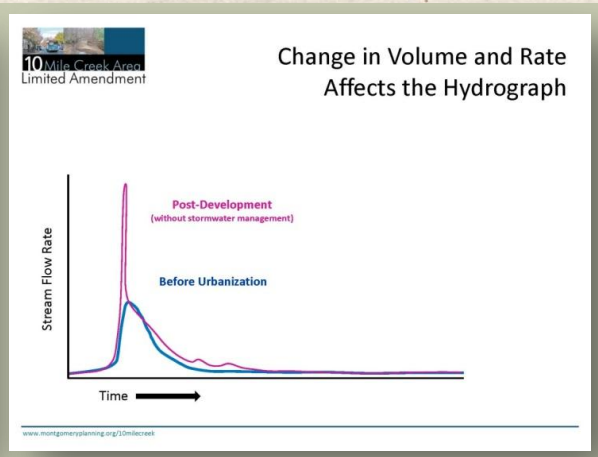
MNCPPC	Streamside at Clarksburg
What MNCPPC Says ESD Can't Do To protect HABITAT	**What CAN BE DONE on the Streamside Site to protect HABITAT:**
Can't reproduce loss of natural drainage area	Augmentation to wetlands can mitigate modified drainage area
Can't reproduce natural soil function	Remediation of soil can speed up restoration of soil function
	Forest augmentation to provide continuous forested 175' Stream Valley Buffer will improve absorption rates

Now VS Post-Development Hydrograph Models



Slide 33

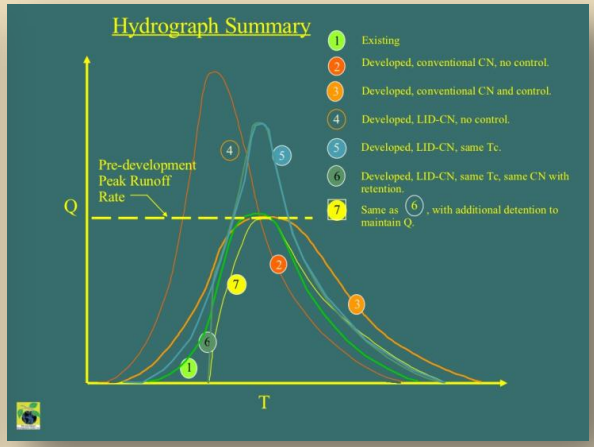
Pre development conditions show a moderate storm surge that tapers over time.



Slide 34

Pre development conditions at Streamside TODAY flow similarly the POST DEVELOPMENT hydrograph above because SWM controls are lacking and/or outdated.

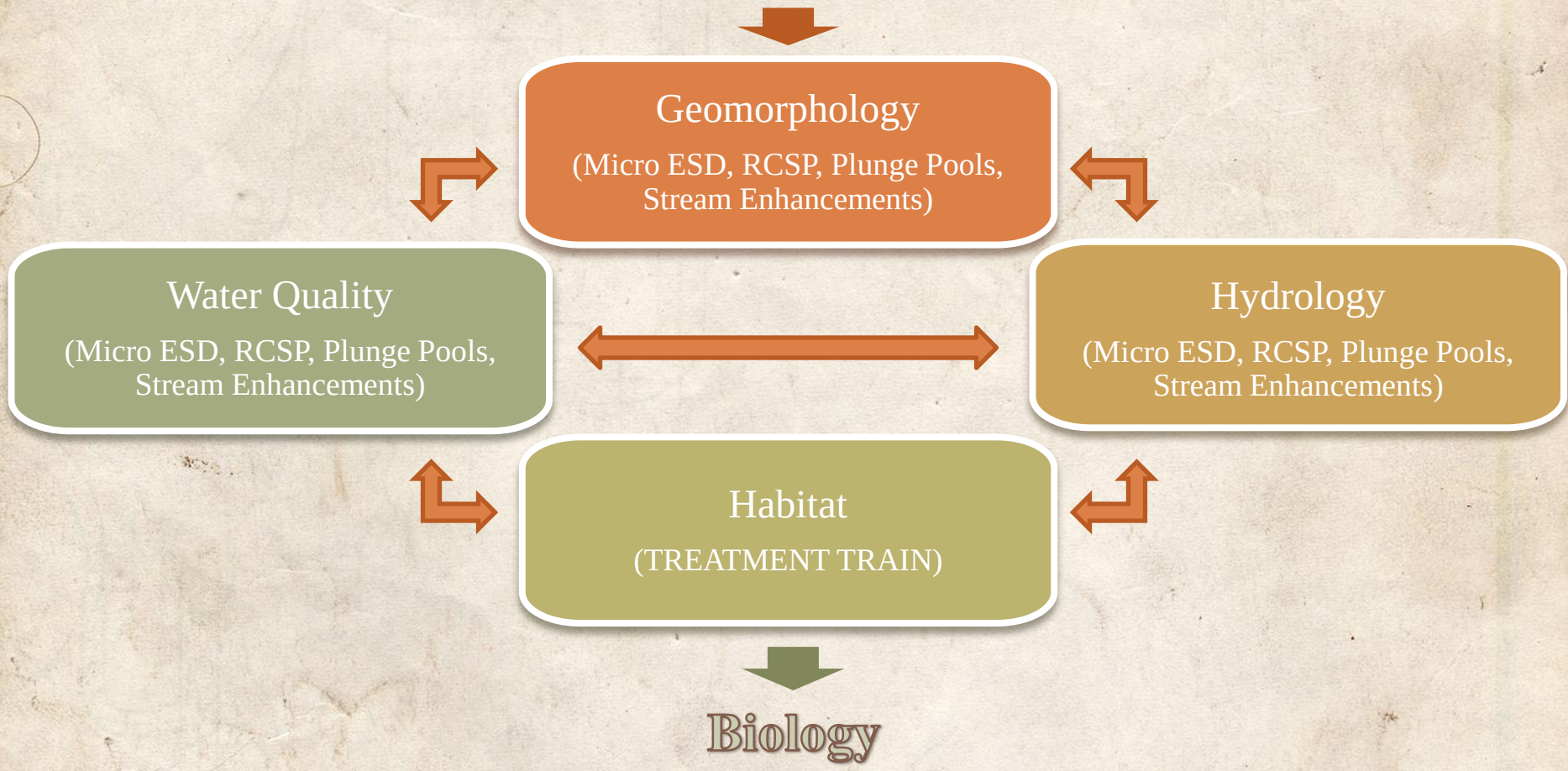
- Direct discharge into creeks
- Failing outfalls
- Illegal discharge into creeks and wetlands



Post development conditions at Streamside will closely align with #7 on the model developed by Low Impact Design Center.

- ESD stormwater management throughout new development.
- Supplemental detention provided as a result of treatment train approach
- Strategic enhancements and retrofits to existing impervious areas

Streamside Development



The Project will result in a GOOD quality stream with improved biological conditions.