

HRG

Herbert, Rowland & Grubic, Inc.
Engineering & Related Services

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West Goshen Township Stormwater Quality Plans

July 26, 2017



Herbert, Rowland & Grubic, Inc.

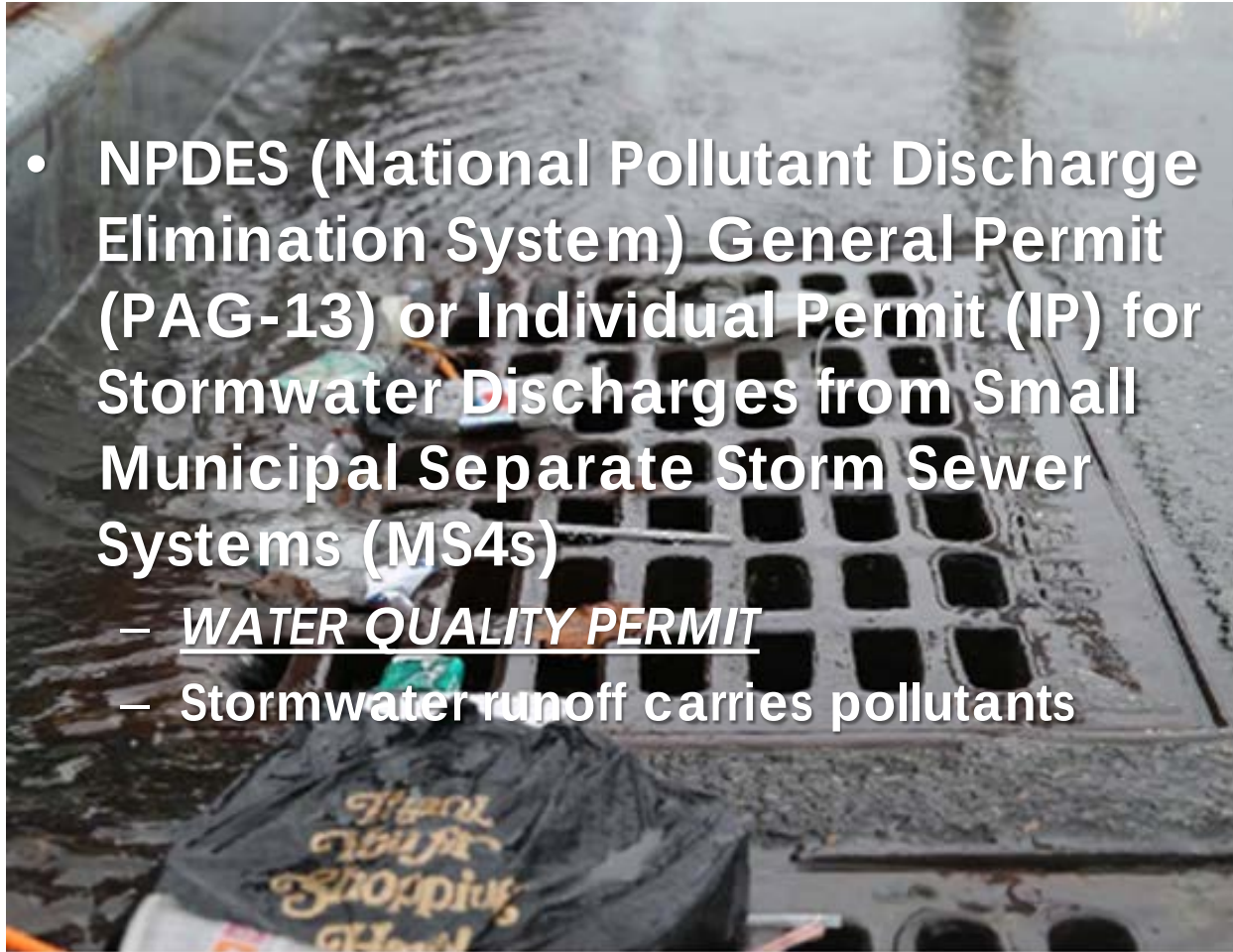
- Headquartered in Harrisburg, PA
- +200 employees
- Municipal services for +50 years
- **Erin Letavic, M.Eng, P.E., Project Manager**
 - 13 years MS4 experience
 - eletavic@hrg-inc.com



[BUILDING RELATIONSHIPS.
DESIGNING SOLUTIONS.]

MS4 Permit

- NPDES (National Pollutant Discharge Elimination System) General Permit (PAG-13) or Individual Permit (IP) for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)
 - WATER QUALITY PERMIT
 - Stormwater runoff carries pollutants



MS4 (Municipal Separate Storm Sewer System)

The system within the “*Urbanized Area*” that collects, conveys, or manages stormwater

- Pipes
- Inlets
- Swales
- Detention BMPs
- Infiltration BMPs
- Water Quality BMPs
- Outfalls – Goose Creek, Christina River, East Branch Chester Creek, Chester Creek

Two Stormwater Runoff Problems

- Economic Progress (land development)
 - Problem #1: Increase in **quantity**
 - Problem #2: Decrease in **quality**
- Aging Infrastructure
 - Problem #1: **Funding** challenges
 - Problem #2: What **design** standards?

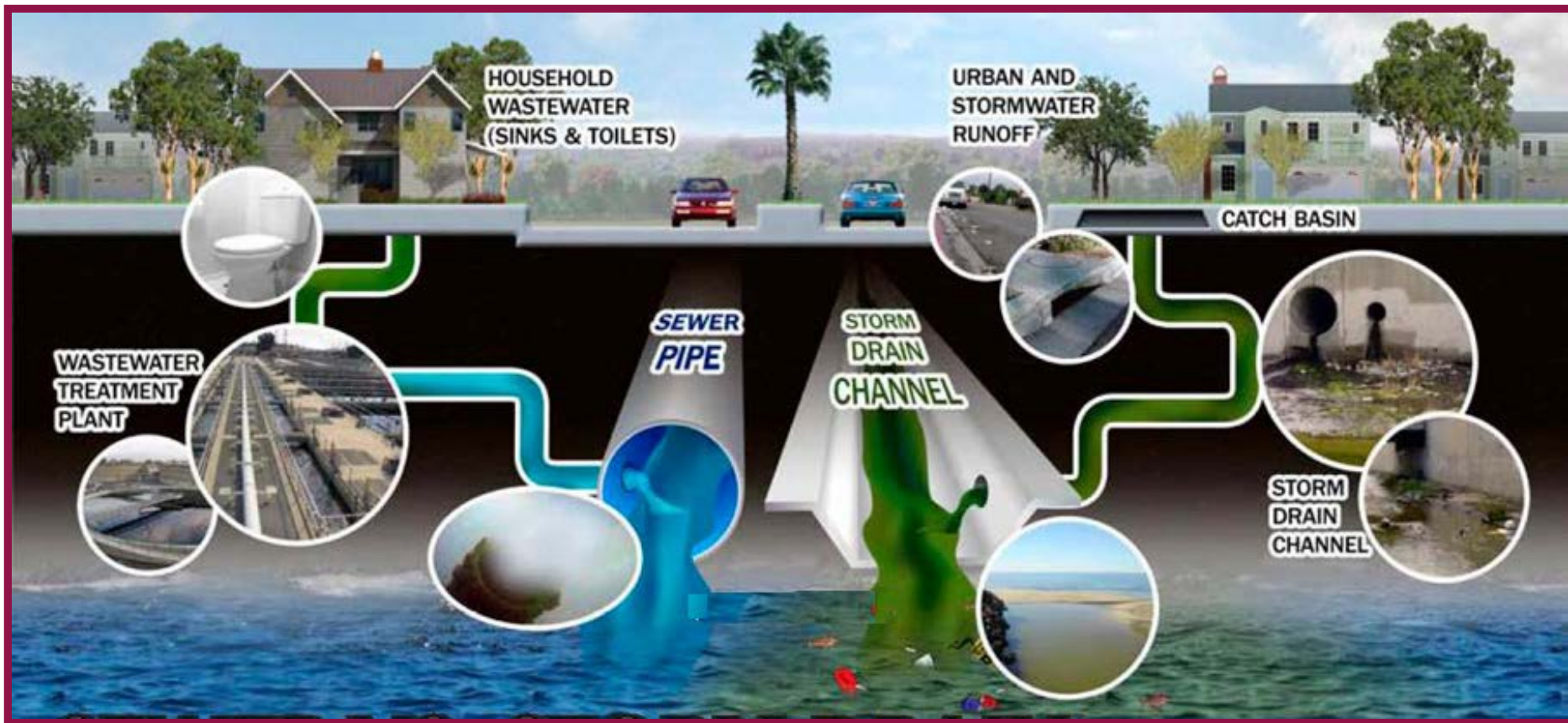


Sanitary Sewer

(Treated)

Storm Sewer

(Untreated)



Stormwater Pollutants

- Sediment
- Nutrients (nitrogen & phosphorus)
- Bacteria
- Oxygen Demand
- Oil and Grease
- Metals
- Toxic Chemicals
- Chlorides
- Thermal Impacts
- Pesticides & Herbicides



Impaired Watersheds

Christina River & Goose Creek (Total Maximum Daily Loads)

- Sediment
- Nutrients
(nitrogen & phosphorus)

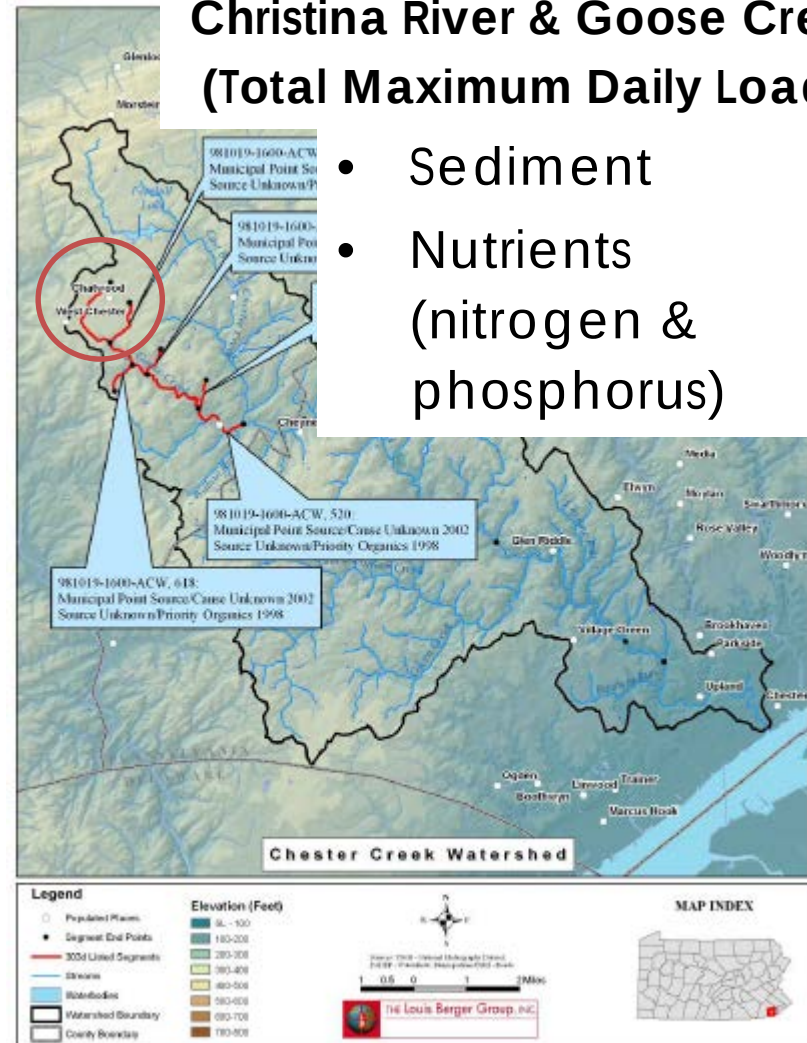
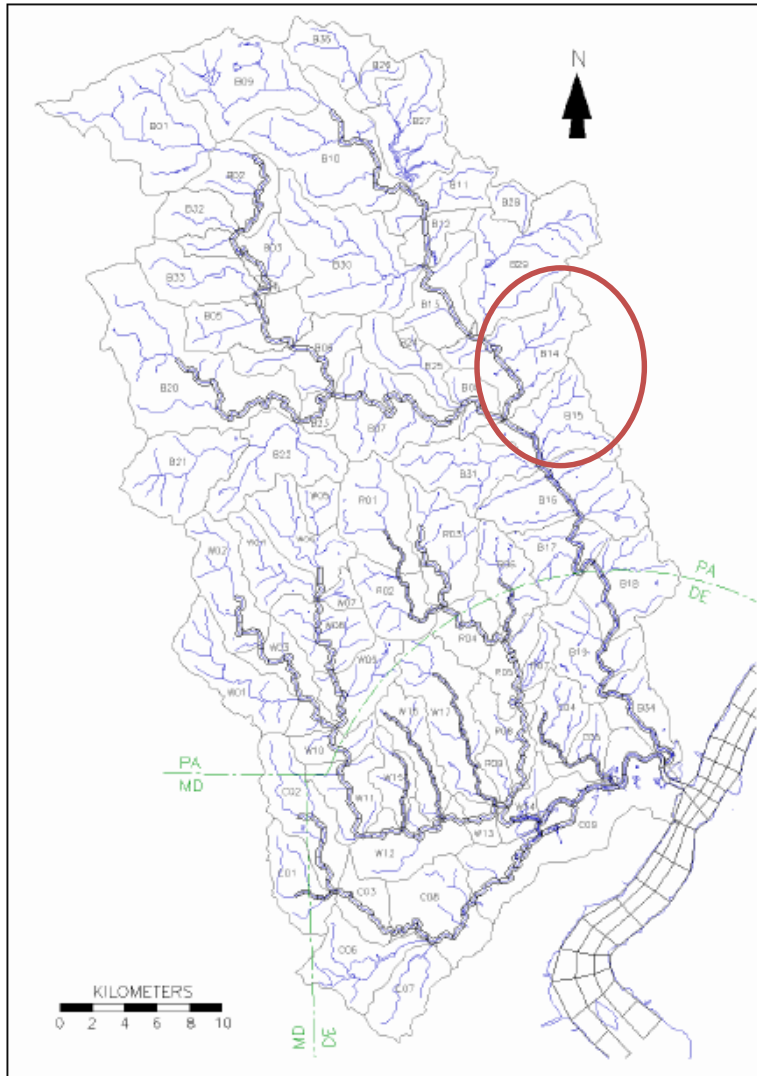


Figure 1-1. Christina River Basin delineation of HSPF model subbasins and EFDC model grid

Figure 1-1: Impaired Segments in the Goose Creek Watershed



Pollutant Reduction Requirements

Brandywine Creek/ Christina River TMDL (Total Maximum Daily Load)

Pollutant: Sediment
Required Reduction: 61%

(Restore recreation and
protection of aquatic life)

Goose Creek TMDL (Total Maximum Daily Load)

Pollutant: Phosphorus
Required Reduction: 54%

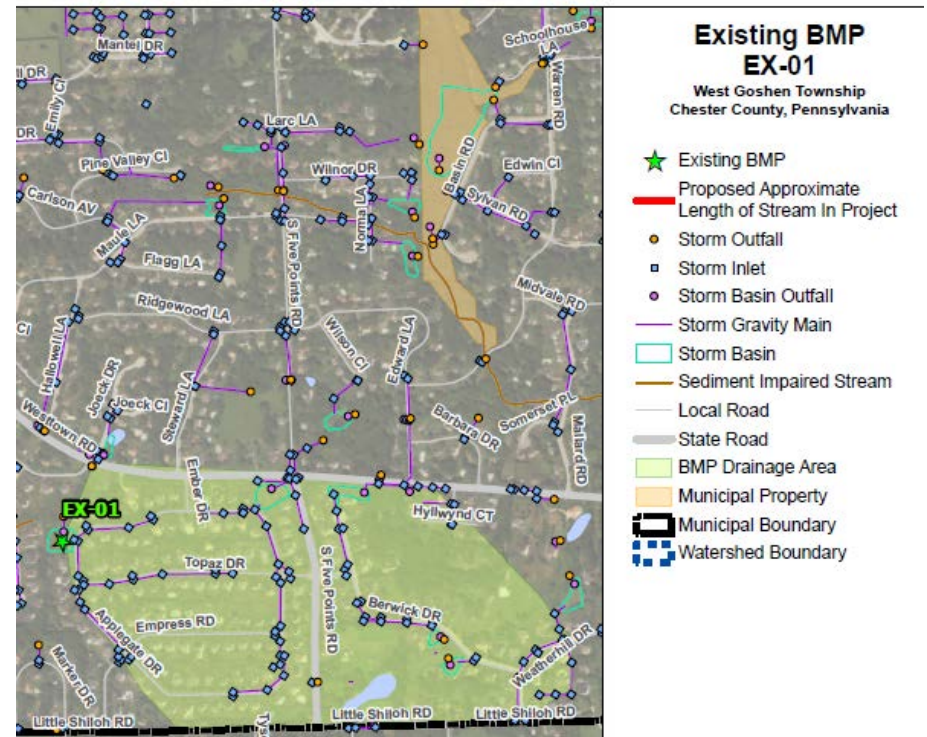
(Protection of aquatic life)

Chester Creek/East Branch Chester Creek PRP (Pollutant Reduction Plan)

Pollutant: Sediment
Required Reduction: 10%

TMDL Plan Development

- Previously developed in 2015
- Updated in 2017
 - New MS4 Requirements
 - East Branch Chester Creek/Chester Creek Impairment
 - Updated stream restoration credit
- Modeling
 - MapShed Software



Bicking Basin Retrofit

2018 Permit Implementation

- Permittees are **automatically expected to comply** with latest permit terms.
 - ✓ Pollution Control Measures (PCMs)
 - ✓ Updated list of authorized non-stormwater discharges
 - ✓ Increased public involvement
 - ✓ Clearer requirements requiring public access
 - ✓ Updated TMDL and new Pollutant Reduction Plans

2018 Permit Regulatory Changes

Pollution Reduction Plans (PRPs)

- PRP requirement extended to a wider group of MS4s.
- PRPs required for all waters impaired by nutrient or sediment loadings that do not have a TMDL.
- Just having a plan is not enough; the plan needs to be implemented in a demonstrative way.
- Project implementation in a 5-year period – completion by 2023.



2018 Permit Regulatory Changes

Pollution Reduction Plans (PRPs)

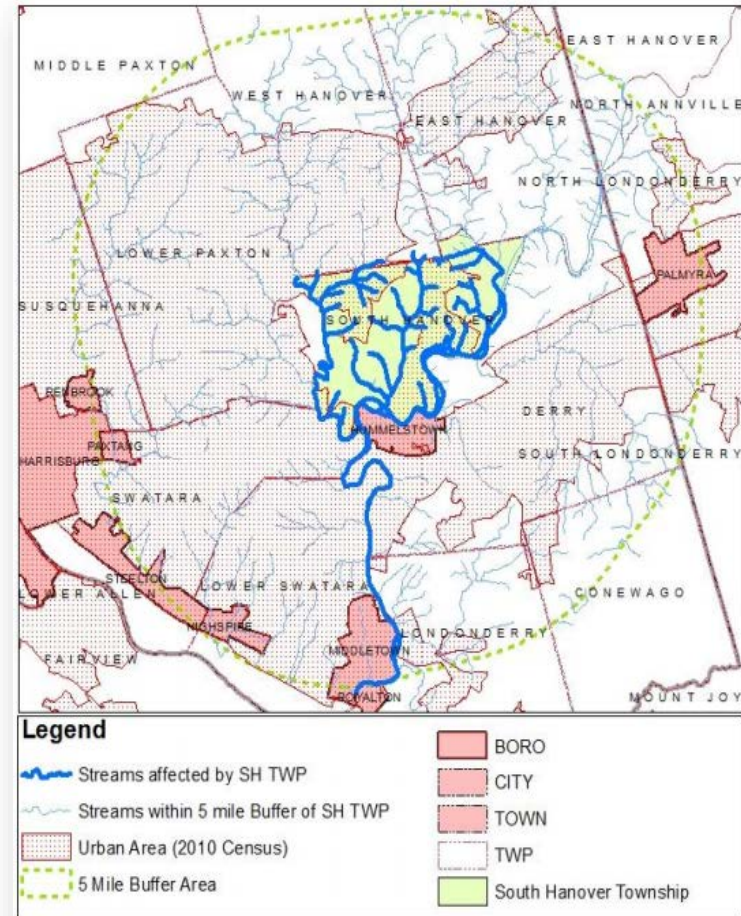
- **PRP Requirement Table** provided in the draft permit identifies specific requirements relating to remediation of impaired waters (pre-TMDL).
- These requirements go **above and beyond** implementation of the MCMs as part of an MS4's stormwater management program.



2018 Permit Regulatory Changes

PRP Requirements Table

- Selection of impaired waters included on Table
 - 5-mile buffer drawn around each municipality's urbanized area (UA)
 - Drainage areas delineation within the buffer
 - If stormwater from UA was expected to flow into impaired waters within the buffer, impaired waters were selected for the Table



2018 Permit Regulatory Changes

TMDL Plans

Current Permit	2018 Permit
➤ Two-part TMDL Plan • TMDL Strategy with NOI/application • TMDL Design details due 1 year after permit issuance ➤ TMDL Plan required for all pollutants with an “applicable WLA” ➤ MS4 eligible to be covered under PAG-13	➤ One TMDL Plan ➤ Nutrients/sediment WLA • TMDL Plan required • Not eligible for PAG-13 permit ➤ WLA for other pollutant (not nutrients/sediment) • TMDL plan not required, PAG-13 remains an option

TMDL Plan Development

- Modeling
 - MapShed Software
 - Pollutant loading assumptions according to land use & instream erosion
 - BMP benefits
 - Detention basin naturalization
 - Stream buffers

Urban Scenario BMP Editor

Detention Basins

Detention basin volume (m³)

Basin dead storage (m³)

Basin surface area (m²)

Basin days to drain

Basin cleaning month

Stream Protection

Vegetative buffer strip width (m)

Fraction of streams treated (0-1)

Total streams in non-ag areas

Streams w/bank stabilization (km)

Infiltration/Bioretention

Amount of runoff retention (cm)

Fraction of area treated (0-1)

Constructed Wetlands

Total area urban land (Ha)

Fraction of area treated (0-1)

Street Sweeping

	Times/month		Times/month
January	0	July	1
February	0	August	1
March	0	September	1
April	1	October	1
May	1	November	0
June	1	December	0

Impervious Surface Reduction

	% Red	% Area		% Red	% Area
LD Mixed	0	0	LD Residential	0	0
MD Mixed	0	0	MD Residential	0	0
HD Mixed	0	0	HD Residential	0	0

CSN Tool Data

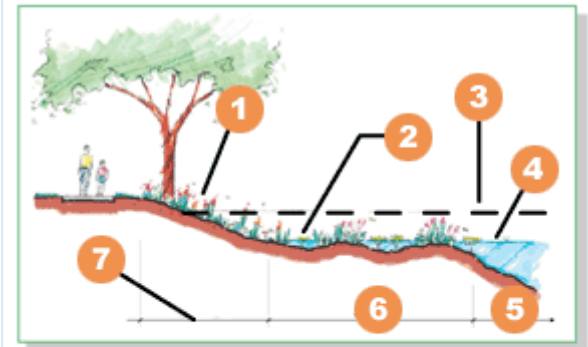
	Pollutant Load Reduced	Development Type*
Storm Event Simulated (cm) 0.0	TSS (kg) 0.0	☐ LD Residential ☐ LD Mixed
Area Simulated (Ha) 0	TN (kg) 0.0	☐ MD Residential ☐ MD Mixed
Selected Dev Type Area (Ha) 0	TP (kg) 0.0	☐ HD Residential ☐ HD Mixed

* if no residential area, use "Mixed" type

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TMDL Plan Development

- Detention basin naturalization
- Stream restoration/buffer



- | | | |
|---------------------|----------------------|---------------------|
| 1 Prairie Plantings | 4 Normal Water Level | 7 Dry-Mesic Prairie |
| 2 Wetland Plantings | 5 Open Water | |
| 3 High Water Level | 6 Wetland Shelf | |



TMDL Plan Development

- Detention basin naturalization
- **Stream restoration/buffer**





Short-term Sediment Load Reduction

- Combined Planning Area
- Focus projects within TMDL watersheds

Table 10: Short-Term Pollutant Load Reduction (Appendix F)

Watershed	Impairment	Existing Pollutant Load**	Percent Reduction Required	Reduction Required (lbs./yr.)	Short-Term Pollutant Loading Goal (lbs./yr.)
Combined TMDL Planning Area	Sediment / Siltation	3,743,069	10%	374,307	3,368,762

**Based on Combined TMDL Planning Area calculated using Mapshed modeling software

Short-term Sediment Load Reduction

Table 11: Proposed BMPs for Short-term Sediment Load Reduction Strategy (Appendix F)

BMP Type	Location (Lat. / Long.)	Map Reference	Watershed	TSS Reduction (lbs/yr)
Hamilton Drive Detention Basin Retrofit	39.995733° , -75.611727°	BMP-01	Lower East Branch Brandywine	13,800
Farren Drive Detention Basin Retrofit	39.998006° , -75.612304°	BMP-02	Lower East Branch Brandywine	13,200
Hagerty Lane Stream Restoration	39.948947° , -75.581787°	BMP-03	Chester Creek	132,250
Westtown Road Stream Restoration	39.958095° , -75.584041°	BMP-04	Chester Creek	198,375
Westtown Road Detention Basin Retrofits & Constructed Wetlands	39.958095° , -75.584041°	BMP-05	Chester Creek	20,600
Total Reduction Achieved				378,225 lbs./yr.
Required Reduction				374,307 lbs./yr.

Proposed Implementation Schedule

Table 12: Implementation Schedule for Proposed Short-term BMPs

BMP Type	Location (Lat. / Long.)	Map Reference	Permitting & Engineering Design (Permit Year)	Construction (Permit Year)
Hamilton Drive Detention Basin Retrofit	39.995733° -75.611727°	BMP-01	1	2
Farren Drive Detention Basin Retrofit	39.998006° -75.612304°	BMP-02	1	2
Hagerty Lane Stream Restoration	39.948947° -75.581787°	BMP-03	2	3
Westtown Road Stream Restoration	39.958095° -75.584041°	BMP-04	3	4-5
Westtown Road Detention Basin Retrofits & Constructed Wetlands	39.958095° -75.584041°	BMP-05	3	4-5



Long-Term Pollutant Load Reduction

Table 13: Long-Term Pollutant Load Reduction (Appendix F)

Watershed	Impairment	Short-term Load Reduction (lbs./yr.)	Short-term Load Reduction (%)	Long-Term Load Reduction Goal	Remaining Reduction Required (lbs./yr.)
Christina River Basin	TSS	217,368	26%	504,233.5	286,865.9
Goose Creek Watershed	TP	62.8 ***	5%	581.2 lbs./yr.	518.4

***Based on correlation made under "Presumptive Approach," 10% TSS reduction equivalent to 5% reduction in TP.

Next Steps

- Public comment period closes August 25, 2017
- Revise report September 2017
- Submit report September 15, 2017
- Implementation – upon Individual Permit Approval

Questions?