



Poquessing Creek Watershed

STORM WATER MANAGEMENT PLAN

Watershed Plan Advisory Committee (WPAC) Meeting No. 4









AGENDA

1 2 2 2 1

Watershed Plan Advisory Committee (WPAC) Meeting No. 4. Status Meeting December 8, 2011 10:00 A.M. Delaware Valley Veteran's Home Review of Problem Areas and Proposed Solutions Poquessing Hydrologic Model

- DRAFT Ordinance Distribution and Review
- DRAFT Report Outline
- Next Steps
- Schedule, Timeline

Review of Stormwater Problem Areas and Proposed Solutions

Generalized Problem Areas

Problem Area Summary

Types of Problems	Source	# of Problems
BEHI Data	URS	18
Sodimontation Sites	PWD	8
Sedimentation Siles	Bensalem	12
Eracion Sitos	PWD	50
EIUSIUIT SILES	Bensalem	6
Flooding	Bing, PASDA (floodplain/floodway boundaries)	243 Buildings
	Bensalem	1
FIS Bridge Backwater Data	FEMA FIS Profiles	42
Stream Impairment (303d)	PASDA	Entire Watershed Impaired

Possible Solutions

 Table II.1. Alternative Runoff Control Techniques per Pennsylvania Stormwater Best

 Management Practices Manual.

Chapter 5. Non-Structural BMPs	Chapter 6, Structural BMPs
BMP 5.4.1 Protect Sensitive and Special Value Features	BMP 6.4.1 Pervious Pavement with Infiltration Bed
BMP 5.4.2 Protect/Conserve/Enhance Riparian Areas	BMP 6.4.2 Infiltration Basin
BMP 5.4.3 Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design	BMP 6.4.3 Subsurface Infiltration Bed
BMP 5.5.1 Cluster Uses at Each Site; Build on Smallest Area Possible	BMP 6.4.4 Infiltration Trench
BMP 5.5.2 Concentrate Uses Area-wide Through Smart Growth Practices	BMP 6.4.5 Rain Garden and Bioretention
BMP 5.6.1 Minimize Total Disturbed Area	BMP 6.4.6 Dry Well or Seepage Pit
BMP 5.6.2 Minimize Soil Compaction in Disturbed Areas	BMP 6.4.7 Constructed Filter
BMP 5.6.3 Re-vegetate and Re-forest Disturbed Areas Using Native Species	BMP 6.4.8 Vegetated Swale
BMP 5.7.1 Reduce Street Impervious Cover	BMP 6.4.9 Vegetated Filter Strip
BMP 5.7.2 Reduce Parking Impervious Cover	BMP 6.4.10 Infiltration Berm and Retentive Grading
BMP 5.8.1 Rooftop Disconnection	BMP 6.5.1 Vegetated Roof
BMP 5.8.2 Storm Sewer Disconnection	BMP 6.5.2 Runoff Capture and Reuse
BMP 5.9.1 Streetsweeping	BMP 6.6.1 Constructed Wetlands
	BMP 6.6.2 Wet Pond or Retention Basin
	BMP 6.6.3 Dry Extended Detention Basin
	BMP 6.6.4 Water Quality Filter
	BMP 6.7.1 Riparian Buffer Restoration
	BMP 6.7.2 Landscape Restoration
	BMP 6.7.3 Soil Amendment and Restoration
	BMP 6.7.4 Floodplain Restoration
	BMP 6.8.1 Level Spreader
	BMP 6.8.2 Special Detention Areas

• BMP's

- Non-Structural
- Structural

This shows another problem area.

- Invasive species have overgrown everything in the overbank area
 - Remove invasive species and replant native species
- There is also severe undercutting of the banks as seen in the photos to the right
 - Regrade stream and plant native species to protect the bank.

Reduce the amount of runoff



POQUESSING WATERSHED

Problem Area - Map ID:		i obient lice intentory	
	PHA45	Comments	
Municipality:	Philadelphia	This problem area was reported by the	
Stream name:	Trib to Poquessing Creek	Philadelphia Water Department. The problem	
Inspected By/Date: DJS/BAK 10-28-2010		area is located along a tributary to Poquessing	
Checked By/Date:	JMY 04-18-2011	Creek . The reach stability was reported as	
Type of Problem (highlight	ed):	intermediate and the bank erosion was classified as high.	
1	Flooding		
2	Deficient Bridge/Culvert		
3	Erosion		
4	Sedimentation		
5	Water/Groundwater Pollution		
6	Other		
		+	
STANDATO	MAR - CAR	Description	
A AL	Complex 1	Banks were also reported as being overgrown with invasive species.	
		Description	

Reduce Peak Flows, Stabilize Stream Bank, Clear Non-Native Species, 5.6.3

Solution



- Used during field views to classify problems and determine potential solutions
- This shows a general problem area.
 - Left side has native vegetation to prevent bank erosion.
 - The right bank has only grass and has been eroded.



POQUESSING WATERSHED

	Poquessing Watershed Act 167	Problem Area Inventory
Problem Area - Map ID:	PHAS	Comments
Municipality:	Lower Southampton	This problem area was reported by the
Stream name:	Trib to Poquessing Creek	Philadelphia Water Department. The subject
Inspected By/Date:	DJS/BAK 10-28-2010	channel is located in a residential area in the
Checked By/Date:	JMY 04-18-2011	northern portion of the watershed. The reach
Type of Problem (highlight	ted):	stability was reported to be degrading and the bank erosion was classified as moderate.
1	Flooding	
2	Deficient Bridge/Culvert	
3	Erosion	
4	Sedimentation	
5	Water/Groundwater Pollution	
6	Other	
The second second		Description
A CONTRACTOR	CALCULAR DE L	The bank on the left side of the picture has been
		plantings and no erosion was observed. Similar stabilization measures could mitigate/prevent erosion on the opposite bank.
		Description
24 (4) 22 - 3		

- Area within Poquessing Valley Park
 - Evidence of ATV trails that are tearing up the banks and causing accelerated erosion.
 - Sedimentation
 - Erosion of stream banks
- Prevent ATV's from riding here
- Regrade stream and plant native species to protect banks.
- Reduce flood volume upstream



POQUESSING WATERSHED

	Poquessing Watershed Act 167	Problem Area Inventory
Problem Area - Map ID:	PHA20 - BEA8	Comments
Municipality:	Philadelphia / Bensalem	This section of stream was reported as a problem
Stream name:	Poquessing Creek	area by the Philadelphia Water Department and
Inspected By/Date:	DJS/BAK 10-28-2010	the city of Bensalem. The problem area is located
Checked By/Date:	JMY 04-18-2011	along Poquessing Creek within Poquessing Valley
Type of Problem (highligh	ted):	Park. The reach was reported as actively degrading and the bank erosion was classified as high.
2	Deficient Bridge/Culvert	
3	Prosion	
4	Sedimentation	
5	Water/Groundwater Pollution	
6	Other - ATV	
0	Ouler Art	
N A THERE A		Description
		The banks are eroded 4 to 5 feet along this portion of the stream.
	A CONTRACTOR	Description
		Bank instability and erosion within this area can also be attributed to the use of recreational vehicles within and along this section of stream. These vehicles can damage the riparian buffer and decrease bank stability in areas where they travel. The photo to the left shows an area where these vehicles travel and the resulting sediment deposit and degraded streambank.
Solution	Reduce P	eak Flows, Stabilize Stream Bank

Reduce Peak Flows, Stabilize Stream Ban

POQUESSING WATERSHED Poquessing Watershed Act 167 100-Year Floodplain Problems Problem Area - Map ID: PH-F22 Comments Number of Buildings Residential 2 Inundated Commercial High volume and backwater from BEB5 causes flooding of Type of problem (Highlighted): this residential area. **High Volume** 2 Backwater from bridge/culvert LEGEND Floodway



Floodplain Problem Areas

0

- Example of problem areas showing locations of inundated buildings
 - Problem PH-F22 is just upstream of Century Lane
 - Backwater from the bridge and high volume cause flooding of these 2 structures

 Used Bing and Google to capture aerials



Problem Classification	Problem Areas	Residential Buildings	Commercial Buildings
Backwater	0	13	5
Backwater & High Volumes	33	94	23
High Volumes	23	103	5
TOTAL	56	210	33



Floodplain Problem Areas

Lower Southampton just south of PA Turnpike, backwater from the Conrail floods buildings

Solution:

0

 Increase capacity of waterway opening in bridge to reduce the amount of flooding

Floodplain Problem Areas





Development in Floodplains



Land Use	Acres in Floodplain	Square Miles in Floodplain	Percentage Area
Agriculture	8.2	0.01	1.2
Commercial	24.5	0.04	3.6
Community Services	5.9	0.01	0.9
Manufacturing: Light Industrial	0.6	<0.1	0.1
Pavement	30.9	0.05	4.5
Recreation	50.3	0.08	7.4
Residential	122.2	0.19	17.9
Vacant	24	0.04	3.5
Water	45.7	0.07	6.7
Wooded	370.6	0.58	54.3
TOTAL	683	1.07	100%

Review of Stormwater Problem Areas and Proposed Solutions

Detailed Problem Areas

Detailed Problem Area Forms

Detailed Problem Area Determination

- Severe Problem Areas that present increased risk to life, property, or environment
- Public/Recreational Lands with SWM Potential
- 11 Detailed Problem Areas Identified
- Detailed Problem Area Analysis
 - Detailed Problem Area Forms
 - Potential Solutions and Watershed Benefits with Associated Cost Estimates
 - Regional Storage Basin Locations

POQUESSING WATERSHED



Problem Area	Municipality	Stream Name	Preferred Solution
PHA50	Lower Southampton	UNT Poquessing Creek	
Description: This problem	area was reported by the Dr	iladelphia Water Departmen	t The subject channel is located in Lower Southa

Description: This problem area was reported by the Philadelphia Water Department. The subject channel is located in Lower Southampton Township at the outfall of a large commercial/industrial area. The reach stability was reported as actively degrading and the bank erosion was classified as high. The upstream drainage area is highly impervious with limited stormwater management facilities. This is resulting in high flow rates and volumes that are causing significant erosion in the downstream channel where the problem area is located.

POQUESSING WATERSHED

Poque	essing Watershed Act 1	67 Detailed Problem	Areas
Problem Area - Map ID:	PHA50	Inspected By/Date:	DJS, BAK/10-28-2010
Municipality:	Lower Southampton	Checked By/Date:	PAD 6-28-2011
		5	

The banks of this tributary are experiencing severe erosion. As evident from the pictures above, the channel has been eroded approximately 10-12 feet below the normal channel depth.

Type of Problem	Erosion		
Drainage Area	RSA #1 - 27.8 acres		
Potential Storage	RSA#1 - 5.25 acre-ft		
Storm Frequency	Existing Peak Discharge (cfs)	Mitigated Peak Discharge (cfs)	Difference (cfs)
2			
5			
10			
50			
100			
500		1	

 Stream Stabilization: This would help to limit erosion and decrease sediment transport downstream.

2) Regional Storage Area 1 (Infiltration, Detention): This storage area would be constructed in the wooded area downstream of the commercial area. An embankment would be constructed near the downstream end of the wooded area and would provide storage in the undisturbed upstream area. This would require limited clearing of vegetation as construction would only occur in the area immediately surrounding the proposed embankment. This storage area has the potential to significantly reduce flow rates for both small and large storms, which would help mitigate severe erosion that is occurring in the downstream channel.

3) Increased Storage, Add/Adjust Control Structure: Increased storage capacity and adding/adjusting the outlet structure to better control release rates.

 Bioretention/Rain Garden: Convert small pockets of open space within the commercial area to bioretention/rain garden type BMPs.

-	Cost Estimate	
)	3)	
)	4)	

Detailed Problem Area Forms

This shows a detailed problem area.

- Significant erosion along an UNT to Poquessing Creek in Lower Southampton Township
- Possible Solutions include the construction of storage areas (detention, infiltration) within and immediately downstream of the commercial /industrial area and localized bioretention/ rain garden cells within the developed area

POQUESSING WATERSHED

Poquessing Watershed Act 167 Detailed Problem Areas

Problem Area	Municipality	Stream Name	Preferred Solution
PHA50	Lower Southampton	UNT Poquessing Creek	

Description: This problem area was reported by the Philadelphia Water Department. The subject channel is located in Lower Southampton Township at the outfall of a large commercial/industrial area. The reach stability was reported as actively degrading and the bank erosion was classified as high. The upstream drainage area is highly impervious with limited stormwater management facilities. This is resulting in high flow rates and volumes that are causing significant erosion in the downstream channel where the problem area is located.



Detailed Problem Area Forms

- This shows a detailed problem area.
 - Severe erosion along Poquessing Creek and shared stream/pond embankment
 - IMMEDIATE action needs to be taken to prevent the pond embankment from collapsing
 - Possible solutions in this area include bank rehabilitation/stabilization.



Description: This section of stream was reported as a problem area by the Philadelphia Water Department. The problem area is located along Poquessing Creek south of Knights Road. The reach stability was reported as intermediate and the bank erosion was classified as high. A pond within this section of stream shares a bank with Poquessing Creek. This embankent is experiencing significant erosion that will eventually lead to a embankment faliure. Therefore, this problem area should be a high priortity because it creates incrased risk to life, property, and the environment.







Flood and Stormwater Control Facilities

Flood and Stormwater Facilities

- Existing Flood Control Project
- Existing Stormwater Control Facility
- Proposed Stormwater Control Facility
- Basin dimensional data collected by PWD





POQUESSING WATERSHED

	Poquessing W	atershed Ac	t 167 100-Year Floodplain Problems						
Problem Area -	Map ID:	PH-F14	Comments						
Number of Buildings	Residential	2							
Inundated	Commercial		Floreding served by backwater from DEDS and birth uplu						
Type of problem (Highlight	ed):		Flooding caused by backwater from BEBo and high volume.						
1	High Volume		Some buildings also seem to be built within the hoodplains.						
2	Backwater from brid	dge/culvert							





- Problem PH-F14 shows where there has been 7 flood claims on one property
- House appears to be built on/near floodway

Recurring Flood Insurance Claims



Total Flood Insurance Claims, 2010 Claim Value (US Dollars)

- \$0 \$5,000.00
- \$5,000.01 \$10,000.00
- \$10,000.01 \$25,000.00
- \$25,000.01 \$50,000.00
- \$50,000.01 \$100,000.00

NOTE: The information contained on this map is legally privileged and confidential. Its use is protected under the privacy act of 1974, 5 U. S. C. section 552(a). Use of the information provided should be restricted to applicable routine use cited in the systems notice published in 56 FR 26415.

- Shows location and monetary value of all claims.
- Locations away from stream signify localized drainage problems
- Locations on/near stream typically signify regional problems

Flood Insurance Claims



Poquessing Hydrologic Model



 SWMM is a dynamic rainfall-runoff simulation model, primarily but not exclusively for urban areas, for single-event or long-term (continuous) simulation.

SWMM Process Model



PWD set up SWMM Model and calibrated it

- Hydrology Inputs
 - Rain gages 3 are used
 - Subcatchments (Subareas)
 - Area
 - Slope of area
 - % impervious
 - Manning "n"-values



Infiltration – Green Ampt

- Hydraulic Inputs
- Links -> Conduits
 - Channel data
 - XS data (Transect)
 - Length
 - Max Depth
- Nodes -> Junctions
 - Invert Elevations



Accept runoff from subcatchments

SWMM Process Model







POI LOCATION MAP



 POI's used to compute the hydrographs and release rates for Poquessing





Individual subcatchments lagged to POI Delaware

Watershed Peak - 14:02



How much data?

• 14 POI's

 Analyzed over 1,900 separate hydrographs



Poquessing Creek Watershed Act 167 Stormwater Management Ordinance

Ordinance Provisions:

TABLE OF CONTENTS

ARTICLE I - GENERAL PROVISIONS ARTICLE II - DEFINITIONS ARTICLE III - STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS ARTICLE IV - STORMWATER MANAGEMENT ARTICLE V - INSPECTIONS ARTICLE VI - FEES AND EXPENSES ARTICLE VII - MAINTENANCE RESPONSIBILITIES **ARTICLE VIII - PROHIBITIONS** ARTICLE IX - ENFORCEMENT AND PENALTIES

Regulated Activities - Regulated Activities - Any Earth Disturbance Activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated Earth Disturbance Activity - Defined under NPDES Phase II regulations as earth disturbance activity of one (1) acre or more with a point source discharge to surface waters or the Municipality's storm sewer system or five (5) acres or more with or without a point source discharge. This includes earth disturbance on any portion of, or during any stage of, a larger common plan of development. Activity involving earth disturbance subject to regulation under 25 PA Code 92, 25 PA Code 102, or the Clean Streams Law.

Directly Connected Impervious Area (DCIA) - An impervious or impermeable surface that is directly connected to a stormwater drainage or conveyance system, leading to direct runoff, decreased infiltration, decreased filtration, and decreased time of concentration.

Disconnected Impervious Area (DIA) - An impervious or impermeable surface that is disconnected from any stormwater drainage or conveyance system, and is redirected or directed to a pervious area, which allows for infiltration, filtration, and increased time of concentration. **Existing Condition** – The dominant land cover during the 5year period immediately preceding a proposed Regulated Activity. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate a lower curve number (CN) or Rational "c" value, such as forested lands.

Redevelopment - Any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and repaving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment.

Section 105. Applicability

All Regulated Activities and all activities that may affect stormwater runoff, including Land Development and Earth Disturbance Activities, are subject to regulation by this Ordinance. This Ordinance shall apply to those portions of the Municipality that lie within the Poquessing Creek Watershed, in accordance with the Stormwater Management Districts established in Section 408, and shall apply only to stormwater BMPs constructed as part of any of the regulated activities listed in this section.

In addition, all applicable development in Philadelphia County must comply with The City of Philadelphia's stormwater regulations, which are available online at http://www.phillyriverinfo.org/programs/subprogrammain.aspx?Id =Regulations.

Section 106. Exemptions

Tables 106.1 summarize the eligibility for exemptions from certain requirements in this Ordinance. "Proposed Impervious Surface" in Tables 106.1a and 106.1b includes new, additional, or replacement impervious surface/cover. "Repaving" existing surfaces without reconstruction (see Section 202) does not constitute replacement.

Table 106.1aEligibility for Exemptions for the Bucks and Montgomery County Portions of the Watershed

				Proposed	d New Impervi	ous Cover							
Ordinance Article or			< 500 sq. ft.		<u>></u> 50	\geq 500 to < 1,500 sq. ft.							
Section	Type of Project	Earth Disturbance <5,000 sq. ft.	Earth Disturbance ≥5,000 sq. ft 1 acre	Earth Disturbance > 1 acre	Earth Disturbance <5,000 sq. ft.	Earth Disturbance ≥5,000 sq. ft 1 acre	Earth Disturbance > 1 acre	All Earth Disturbance Categories					
<u>Article III</u> SWM Site Plan Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No					
Section 404 Nonstructural Project Design	Development and Redevelopment	Yes	No*	No	No*	No*	No	No					
Section 405 Groundwater Recharge	Development and Redevelopment	Yes	No*	No	No*	No*	No	No					
Section 406 WaterVolume Control Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No					
Stream Dark Fragier	Development	Vac	No*	No	No*	No*	No	No					
Requirements	Redevelopment	res	Yes	INO	Yes	Yes	INO	INO					
Stormwater Peak Rate Control and Management Districts	Development and Redevelopment	Yes	No*	No	Yes	No*	No	No					
Erosion and Sediment Pollution Control Plan	Earth Disturbance	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s	See Earth Disturbance Requirement s					

(Refer to municipal earth disturbance requirements, as applicable)

1000

Table 106.1 Eligibility for Exemptions for the Bucks and Montgomery County Portions of the Watershed

				Propose	d New Impervio	us Cover			
Ordinana Articlara			< 500 sq. ft.		2	500 to < 1,500 sq.	ft.	> 1.500 Sq. ft.	
Ordinance Article or Section	Type of Project	Earth Disturbance <5,000 sq. ft.	Earth Disturbance ≥5,000 sq. ft. - 1 acre	Earth Disturbance > 1 acre	Earth Disturbance <5,000 sq. ft.	Earth Disturbance 25,000 sq. ft. - 1 acre	Earth Disturbance > 1 acre	All Earth Disturbance Categories	
Article III SWM Site Plan Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No	
<u>Section 404</u> Nonstructural Project Design	Development and Redevelopment	Yes	No*	No	No*	No*	No	No	
Section 405 Groundwater Recharge	Development and Redevelopment	Yes	No*	No	No*	No*	No	No	
Section 406 WaterVolume Control Requirements	Development and Redevelopment	Yes	No*	No	No*	No*	No	No	
Section 407	Development	Var	No*	No	No*	No*	Na	Na	
Requirements	Redevelopment	165	Yes	110	Yes	Yes	140	DVI	
Section 408									

Table 106.1b

Eligibility for Exemptions for the Philadelphia County Portion of the Watershed

Ordinance		Earth Disturban	nce Associated with De	velopment		
Article or Section	Type of Project	< 5,000 sq. ft.	≥ 5,000 sq. ft. but < 1 acre	≥ 1 acre		
Article III SWM Site Plan	New Development	N/A**	No	No		
Requirements	Redevelopment	N/A**	No	No		
Section 405	New Development	N/A**	No	No		
Requirements	Redevelopment	N/A**	No	No		
Section 406	New Development	N/A**	No	No		
Water Volume Control Requirements	Redevelopment	N/A**	No	No		
Section 407	New Development	N/A**	No	No		
Streambank Erosion (Channel Protection) Requirements	Redevelopment	N/A**	Exempt	Yes (Alternate Criteria)		
<u>Section 408</u> Flood Control /	New Development	N/A**	No	No		
Stormwater Peak Rate Control and Management Districts Requirements	Redevelopment N/A – Not Applicable	N/A** to Section of Ordinanc	No e – Voluntary Requirem	Yes (Alternate Criteria) ents Encouraged		

Section 301. SWM Site Plan Contents B. Maps

Prepare an Existing Resource and Site Analysis Map (ERSAM) showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, stream buffers, floodplains, hydrologic soil groups, closed topographic depressions and recharge areas.

Specific Technical Ordinance Provisions

- Section 401 General Requirements
- Section 402 Permit Requirements for Other Government Entities
- Section 403 Erosion and Sediment Control During Regulated Earth Disturbance
- Section 404 Nonstructural Project Design
- Section 405 Groundwater Recharge Criteria
- Section 406 Water Volume Control Criteria
- Section 407 Stream Bank Erosion Requirements (Channel Protection)
- Section 408 Stormwater Peak Rate Control and Management Districts
- Section 409 Calculation Methodologies

Small Project Stormwater Management Site Plan

A small project site plan is only permitted for projects proposing less than 1,500 square feet of impervious surface and less than 1 acre of earth disturbance.



Suggestion for Peak Rate Control for Small Projects Volume Control as a Surrogate

1500 Square Ft. of new impervious surfaceCN=981500 Square Ft. of original surfaceCN=75

For 100 Year Storm with runoff = 8.5 inches Runoff Volume for CN=75 is 5.5 inches Runoff Volume for CN=98 is 8.5 inches

For District A:

Store 3 inches of runoff volume to reduce to pre-development volume. For an area of 1500 square ft., this is **375** cubic ft. or 2,812 gallons. Construct infiltration trenches to provide at least **350** cubic ft. of storage. Use stacking block storage 3 ft deep and 10'x15' in area. ~ 400 cubic ft.

For District B:

Store 4 inches of runoff volume.

For an area of 1500 square ft., this is 500 cubic ft. or 3750 gallons. Construct infiltration trenches to provide at least 500 cubic ft. of storage Use stacking block storage 3 ft. deep and 10'x18' in area ~ 500 cubic ft.

BMP storage per unit would depend on device used. Drainage could be designed to a central area or multiple locations based on lot shape.

DRAFT Report Outline



Section I. Introduction Section II. Act 167 Section III. General Description of Watershed

- Drainage Area
- Stream Environmental Characteristics
- Data Collection
- Topography and Stream Profile
- Soils
- Geology
- Climate/Precipitation
- Land Cover
- Land Development Patterns



Section IV. Stormwater Problems and Solutions Section V. Watershed Technical Analysis Section VI. Standards and Criteria for Stormwater Control

- Watershed Level Control Philosophy
- National Pollutant Discharge Elimination System (NPDES
- Standards and Criteria Five Phased Approach
 - Groundwater Recharge (Stormwater Infiltration)
 - Water Quality
 - o Stream Bank Erosion
 - o Overbanks Events
 - Extreme Events
- Management District Concept (For Overbank & Extreme Events)
 Redevelopment



lescription: This problem area was reported by the Philadelphia Vater Department. The subject channel is located in Lower Southampto ownship at the outfall of a large commercial/industrial area. The reach stability was reported as actively degrading and the bank erosion w lassified as high. The upstream drainage area is highly impervious with limited stormwater management facilities. This is resulting in high flo ates and volumes that are causing significant erosion in the downstream channel where the problem area is located. **Section VII. Stormwater Improvements** Process to Accomplish Standards and Criteria Alternative Runoff Control Techniques Nonstructural Runoff Controls Structural Runoff Controls Sub-Regional (Combined Site) Storage Regional Detention Facilities 3 Stormwater Quantity Control Exemption **Section VIII. Municipal Ordinance Introduction Section IX. Plan Implementation Section X. Plan Review Adoption and Updating Procedures**



What are TMDL's?

• A TMDL, or total maximum daily load defines the total pollutant loading a water body can receive and still meet applicable *water quality standards*.

• A TMDL report quantifies the necessary reductions in pollutant loadings from each source category (e.g., pasture, cropland, urban land, point sources)

• To translate reductions specified in the TMDL into changes in the watershed, a *TMDL Implementation Plan (IP)* is developed.

• For water quality to improve, best management practices and other corrective actions must be implemented in a systematic approach.

Christina Basin TMDL Implementation Plan, Chester Co.

Municipal Requirements and Participation

- Each municipality will review the impaired streams within their boundaries and develop a list of at least five projects that they could implement.
- The municipalities will participate in monthly planning meetings.
- The municipalities will assist in developing and maintaining the list of water quality projects completed since 2005.
- Each municipality will review their stormwater ordinances and it is strongly recommended that the municipality make changes in their ordinances to meet minimum standards of the Countywide Act 167 Phase I draft ordinance provisions.

 Each municipality will pay their share of Brandywines Valley Association's time for the development of all phases of the Christina Basin Restoration and TMDL Implementation Plan.

 The costs are based on the number of participating municipalities and will not exceed a total of \$ 2,000 without prior consent of the municipalities.

Implementation

Benefits of Municipal Participation

- Municipalities will have a model TMDL Implementation Plan for meeting their TMDL Plan portion of their MS4 requirements.
- Municipality may be required to develop a TMDL plan sometime during the next permit period.
- Implementation of the watershed restoration plan will also help to protect unimpaired streams from further degradation, thereby helping to avoid future TMDL requirements for those streams.

A watershed based restoration plan offers the best opportunity for costeffective water quality improvements and the Plan
By working jointly with multiple municipalities there is the opportunity to pool resources for larger restoration projects and to jointly apply for funding and each municipality shares the water quality improvements from all projects that are implemented.

Next Steps

- Finalize Management Criteria
- Receive Comments Back on DRAFT Ordinance
- Finalize DRAFT Report
- Review Draft Report with PWD
- Distribute Draft Report to Munis.
 & DEP
- Receive Comments Back on DRAFT Ordinance
- Finalize Plan

Schedule, Timeline

	Task Completion Schedule																														
	TASK	2010								2011											2011										
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1.1	Det. basin survey; identify potential areas for regional SWM facilities																														
1.2	Data collection forms																														
1.3	Review obstructions																														
2.1	GIS data collection - compilation																														
2.2	GIS map generation and production																														
3.1	Model coordination																														
3.2	Assess land development patterns																														
3.3	ID stormwater improvements																														
3.4	Develop schedule																														
3.5	Criteria and standards																														
4.1	Progress reports																														
4.2	Draft report and ordinance																														
4.3	Final report and ordinance																														
5.1	Presentation material																														
5.2	PAC presentations																														

Questions ??????