Poquessing Creek Watershed

ACT 167
STORM WATER MANAGEMENT PLAN

Watershed Plan Advisory Committee (WPAC) Meeting No. 3

March 30, 2011

AGENDA

Watershed Plan Advisory Committee (WPAC) Meeting No. 3. Status Meeting

March 30, 2010

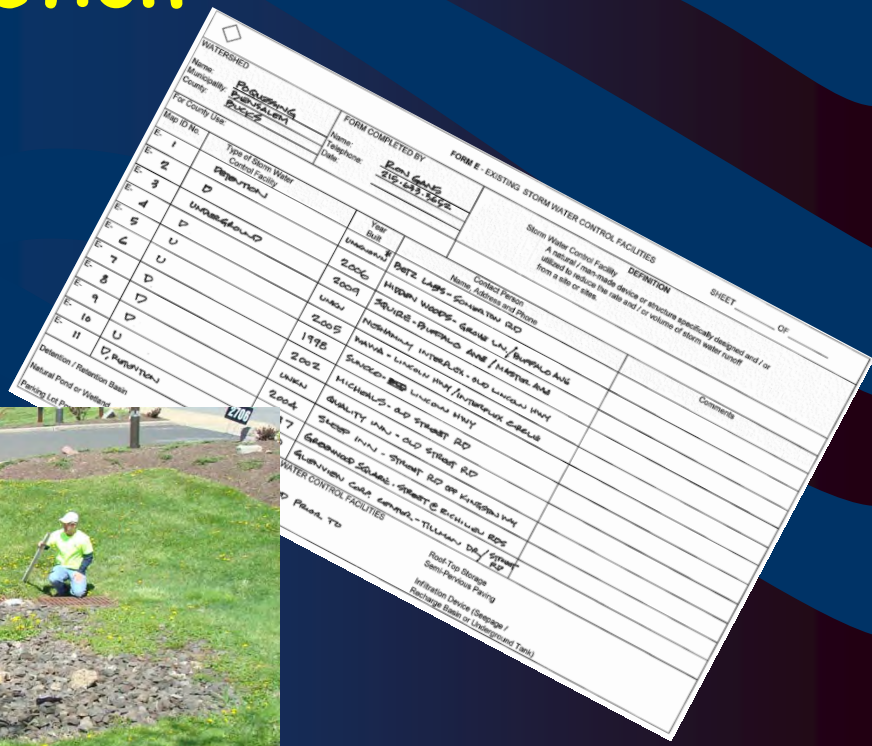
9:00 A.M.

Delaware Valley Veteran's Home

- Review of Goals of the Plan
- Updated Mapping
- Status of Municipal Data Collection Forms
- Problem Areas
- Collection of Comments on Sample Act 167 SW Ordinance (Tacony)
- Next Steps
- Schedule, Timeline

Data collection and analysis

- Past reports / studies
- Detention basins
- Obstructions
- Problem areas
- Municipal data collection



Data Collection Forms

Municipal Participation

Form	Symbol	Description	Types of Examples	Sources of Information
A		Stormwater Problem Areas	Flooding, Drainage, Erosion/Sedimentation	Existing studies or reports, Township Documentation, Personal memory, Township engineer
B		Obstructions	Bridges. Culverts, Fill, Structures	Owner or structure, township files, subdivision applications, roadmaster, township engineer
C		Existing Flood Control Projects	Channel excavation, rip-rap, floodwalls, etc.	Township records, township engineer, owner of facilitiy
D		Proposed Flood Control Projects	Channel excavation, rip-rap, floodwalls, etc.	Township records, township engineer, owner of facilitiy
E		Existing Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivision files, township engineer, owner of facility
F		Proposed Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivision files, township engineer, owner of facility
G		Existing Stormwater Collection Systems	Storm sewers, man-made channels, diversions	Existing plans, township engineer, owner of system
H		Proposed Stormwater Collection Systen	Storm sewers, man-made channels,	Existing plans, township engineer, owner of

Data Collection Form Status

Poquessing - Last Update: 4/27/10					
Municipality	**Bensalem**	**Upper Southampton**	**Lower Moreland**	**Philadelphia**	**Lower Southampton**
Date of Meeting					
Municipal Rep.	Ron Gans		Randee Elton	Joanne Dahme	
Form A	Form/Map Completed		No Areas	Complete	
Form C	No Areas		No Areas	Complete	
Form D	No Areas		No Areas	Complete	
Form E	Form/Map Completed		Form/Map Completed	Complete	
Form F	Form/Map Completed		No Areas	Complete	
Form G	No Form Received		Map Completed/ Form Not Completed **	Complete	
Form H	No Form Received		No Areas	Complete	
Form I	No Areas		No Areas	Complete	
Form J	No Form Received		No Areas	Complete	

Form A - Stormwater Problem Areas

Form C - Existing Flood Control Project

Form D - Proposed Flood Control Project

Form E - Existing Storm Water Control Facilities

Form F - Proposed Storm Water Control Facilities

Form G - Existing Storm Water Collection Systems

Form H - Proposed Storm Water Collection Systems

Form I - Present & Projected Development in the Flood Hazard Area

Form J - Water Quality Problem Areas

** Note says to contact PW Director Steve Woerner - 215-947-3100 if we need further info.

FORM E - EXISTING STORM WATER CONTROL FACILITIES SHEET _____ OF _____

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: POQUESSING	Name: RON GANS	Storm Water Control Facility
Municipality: BENSALEM	Telephone: 215.633.3652	A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
County: BUCKS	Date:	

For County Use:

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E- 1	DETENTION	UNKNOWN *	BETZ LABS - SOMERTON RD	
E- 2	D	2006	HIDDEN WOODS - GROVE LN. / BUFFALO AVE	
E- 3	UNDERGROUND	2009	SQUIRE - BUFFALO AVE / MASTER AVE	
E- 4	D	UNKN	NESHAMINY INTERPLEX - OLD LINCOLN HWY	
E- 5	U	2005	WAWA - LINCOLN HWY / INTERPLEX CIRCLE	
E- 6	U	1998	SUNOCO - [redacted] LINCOLN HWY	
E- 7	D	2002	MICHEALS - OLD STREET RD	
E- 8	D	UNKN	QUALITY INN - OLD STREET RD	
E- 9	D	2004	SLEEP INN - STREET RD OPP KINGSTON WAY	
E- 10	U	1987	GREENWOOD SQUARE - STREET @ RICHILIEU RDS	
E- 11	D, RETENTION	1990	GLENVIEW CORP. CENTER - TILLMAN DR / STRUB RD	

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Pondling

Roof-Top Storage

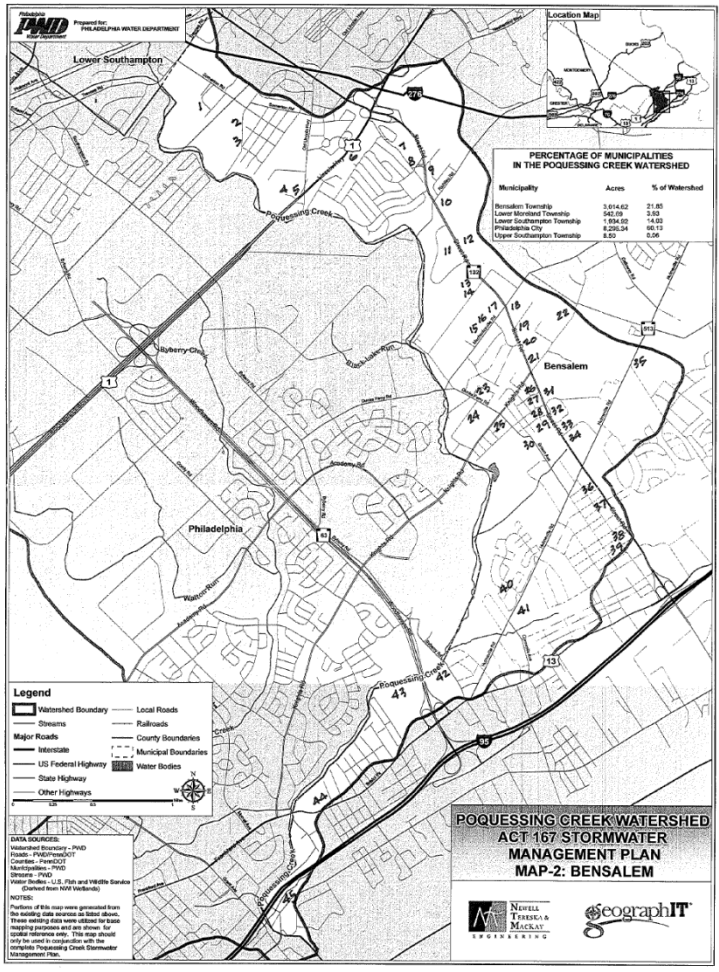
Semi-Pervious Paving

Infiltration Device (Se

Recharge Basin or Ur

* ALL UNKNOWNS OCCURED PRIOR TO 1990

FORM E LOCATIONS



Basin Data Collection

- Basin data collected
  - Length, Width and Depth
  - Inflow pipe sizes and quantity
  - Outfall structure type & size
- Basin data used to determine amount of runoff volume that can be detained
  - Determine potential retrofit ideas

Basin Photos

- Basin off McNulty Rd
  - Runoff from building is eroding basin
  - Plants should be planted on basin floor
- Add meandering natural low flow channel
- Dimensional data collected by PWD

Basin Photos

- Basin off Townsend Rd
  - Two inlets flow directly to outfall
  - One inlet has oily fluid draining to basin
    - Further investigation needed to determine source and cause
- Divert/Treat flow to eliminate water quality impacts
- Plant native vegetation in basin

Problem Areas

Problems in the Watershed

- Increased emphasis on stormwater problems within the watershed
- Majority of the watershed is already developed and minimal potential exists for new development
- The best approach for appropriately managing stormwater within the watershed will be to apply corrective measures to existing problem areas and implement regulations geared towards redevelopment

Problems in the Watershed

- Stream Impairment
- Erosion
- Sedimentation
- Flooding
- Obstructions
- Existing Management
- General vs. Detailed

Problem Areas: Sources:

- Municipal Data Collection Forms A & J
- Flood Insurance Study Profiles
- FEMA Flood Plain Mapping Transposed to Aerial Photography
- FEMA FIS Repetitive Loss Structures
- 303d Streams, DEP
- Other Reports (BEHI)

Classified by:

- Water Quality Related
- Flooding Related

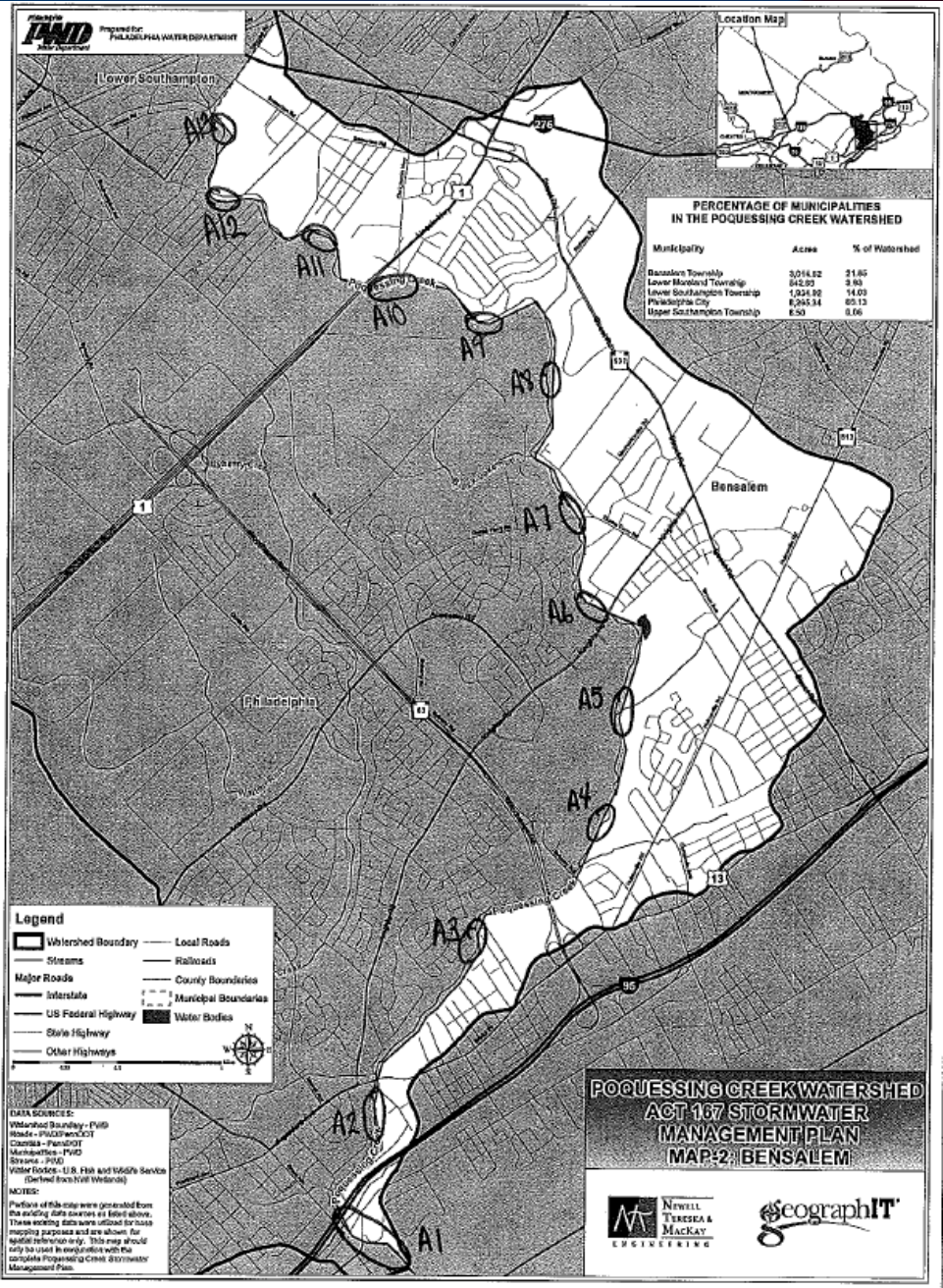
- General Problem Area Category
- Detailed Study Area

FORM A - STORM WATER PROBLEM AREAS SHEET_____ OF _____

WATERSHED	FORM COMPLETED BY	Before Filling Out Form, See Instructions On Back
Name:	Name:	
Municipality:	Telephone:	For County Use:
County:	Date:	

MAP NO. *	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12
Types of Storm Water Problems												
Flooding			X									
Accelerated Erosion	X	X	X	X		X			X		X	
Sedimentation	X	X	X	X	X	X	X	X	X	X	X	X
Landslide	X	X										
Groundwater							X			X		
Water Pollution	X											
Other (Explain)	X	X		X	X			X			X	X
Explanation Line No. (On Back)												
Cause (s)												
Storm Water Volume												
Storm Water Velocity												
Storm Water Direction												
Water Obstruction												
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred												
Year First Known Occurred												
Regularity												
More Than 1 Year												
Less Than 1 Year												
Only During Agnes												
Duration (If Applicable)												
Less Than 1 Day												
1 Day + (Enter Days)												
Property Damage												
Loss of Life/Vital Services												
Private												
More Than One Owner												
Types of Properties												
Number of Properties												
Public (List Types)												
Explanation Line No. (On Back)												
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed												
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities.



Municipality	Type of Problems (A)	Causes of Problems (B)	Occurrences of Problems (C)	Types of Damage (D)
Bensalem Twp.	1, 2, 3, 4, 5 & 6	-	-	-
Philadelphia	1, 2 & 3	-	-	-
Lower Moreland	N/A	N/A	N/A	N/A
L.Southampton	*	*	*	*
U. Southampton Borough	*	*	*	*

N/A No problem areas reported
* No Data Collection Forms Received

Types of Problems

(A)
1. Flooding
2. Accelerated Erosion
3. Sedimentation
4. Landslide
5. Groundwater
6. Water Pollution
7. Other

Causes of Problems

(B)
1. Stormwater Volume
2. Stormwater Velocity
3. Stormwater Direction
4. Water Obstruction
5. Other

Occurrences of Problems

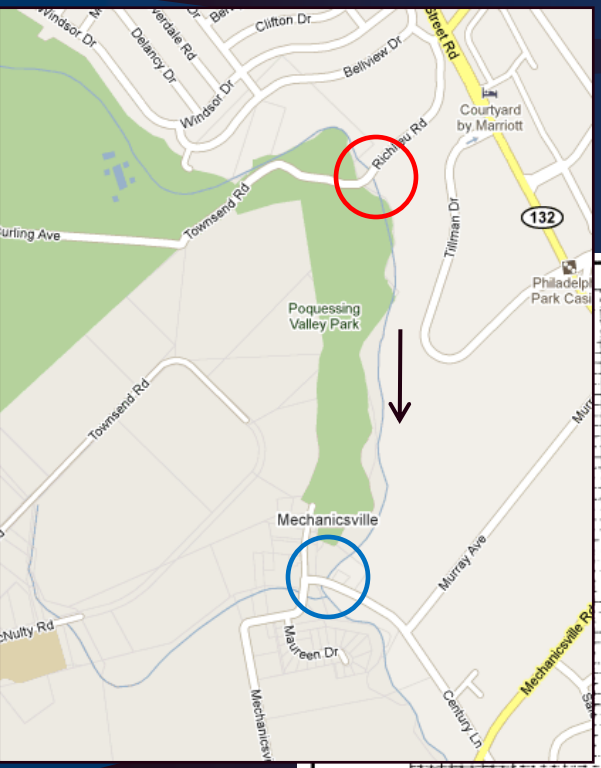
(C)
1. > 1 time per year
2. < 1 time per year
3. Only major flood events

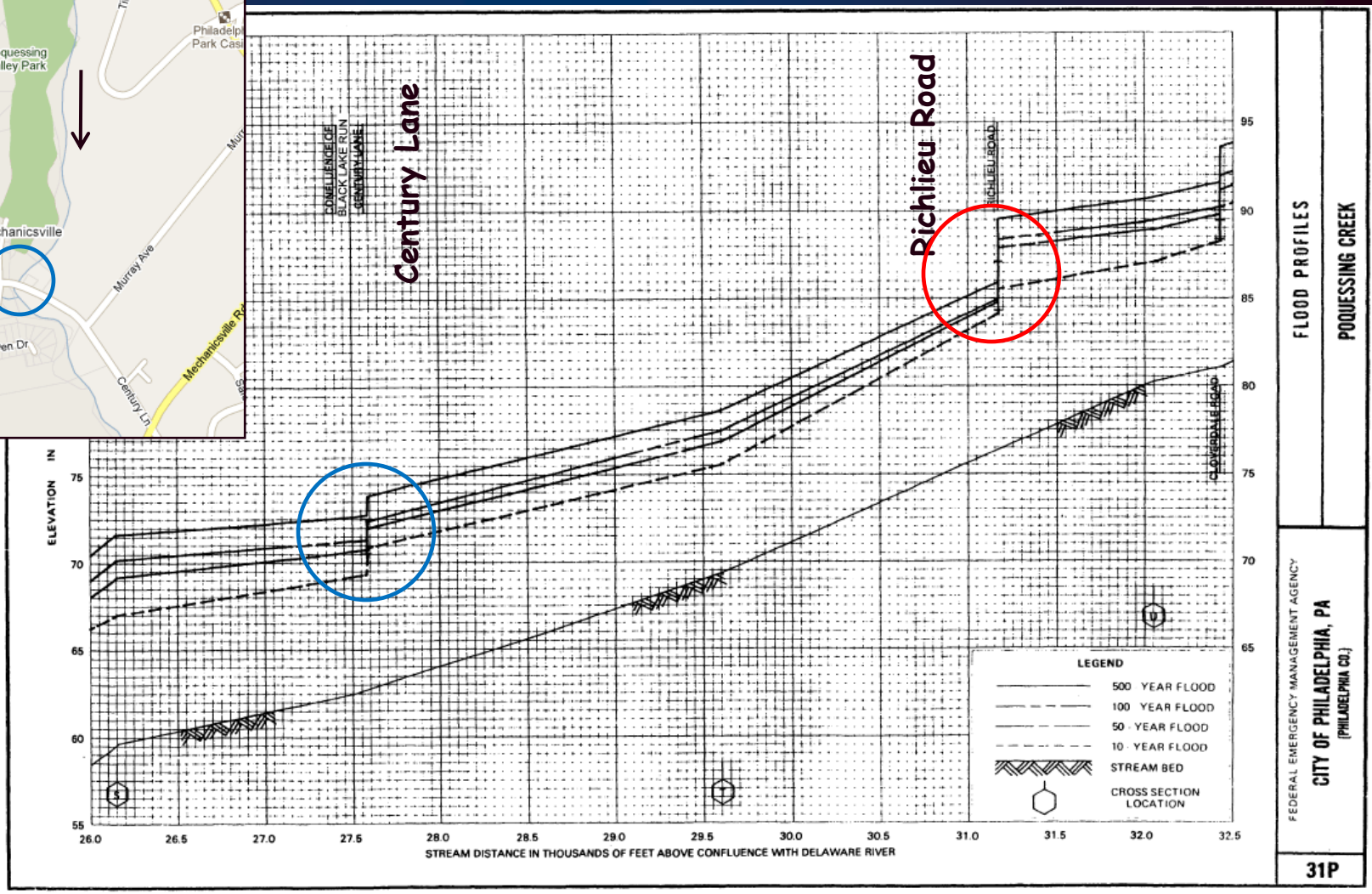
Types of Damages

(D)
1. Loss of life
2. Loss of vital services
3. Property damage

FIS Profile

- Example of bridge with backwater
  - Richlieu Road and Century Lane both show substantial backwater






LSB6
LSB6
LSB7
LSB8
N

POQUESSING WATERSHED

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

Floodplain Problem Areas

- Example of problem areas showing locations of inundated buildings
  - Problem PH-F22 is just upstream of Century Lane as shown in the previous slide
  - Backwater from the bridge and high volume cause flooding of these 2 structures
- Used Bing and Google to capture aerials

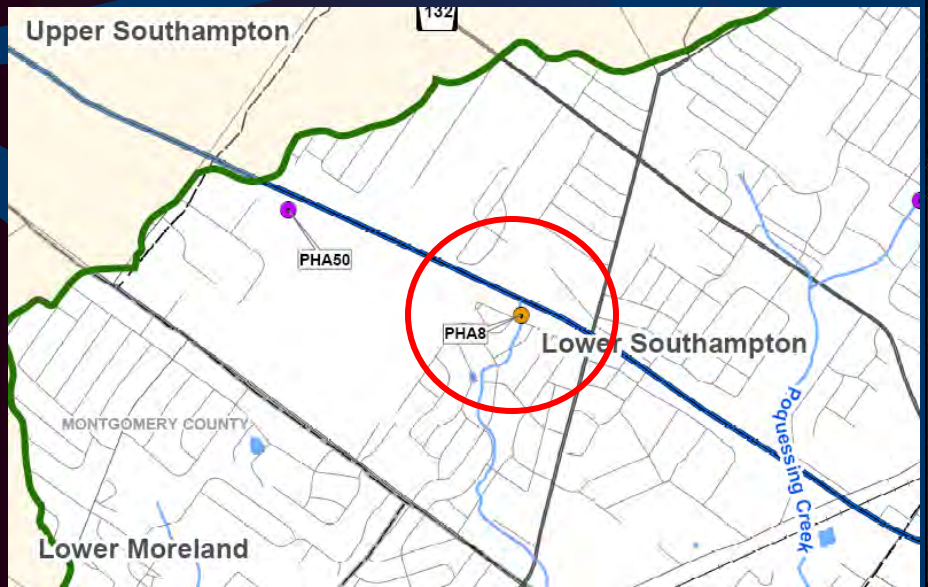
Problem Classification	Problem Areas	Residential Buildings	Commercial Buildings
Backwater	7	63	5
Backwater & High Volumes	25	160	27
High Volumes	24	105	5
TOTAL	**56**	**328**	**37**

Problem Area Summary

Types of Problems	Source	# of Problems
BEHI Data	URS	18
Sedimentation Sites	PWD	8
	Bensalem	12
Erosion Sites	PWD	50
	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

General Problem Area Forms

- 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:	PHA8	Comments
Municipality:	Lower Southampton	This problem area was reported by the Philadelphia Water Department. The subject channel is located in a residential area in the northern portion of the watershed. The reach stability was reported to be degrading and the bank erosion was classified as moderate.
Stream name:	Trib to Poquessing Creek	
Inspected By/Date:	DJS/BAK 10-28-2010	
Checked By/Date:	PAD	
Type of Problem (highlighted):		
1	Flooding	
2	Deficient Bridge/Culvert	
3	Erosion	
4	Sedimentation	
5	Water/Groundwater Pollution	
6	Other	

Description

The banks of this tributary are experiencing significant erosion. Banks were also reported as being overgrown with invasive species.

Description

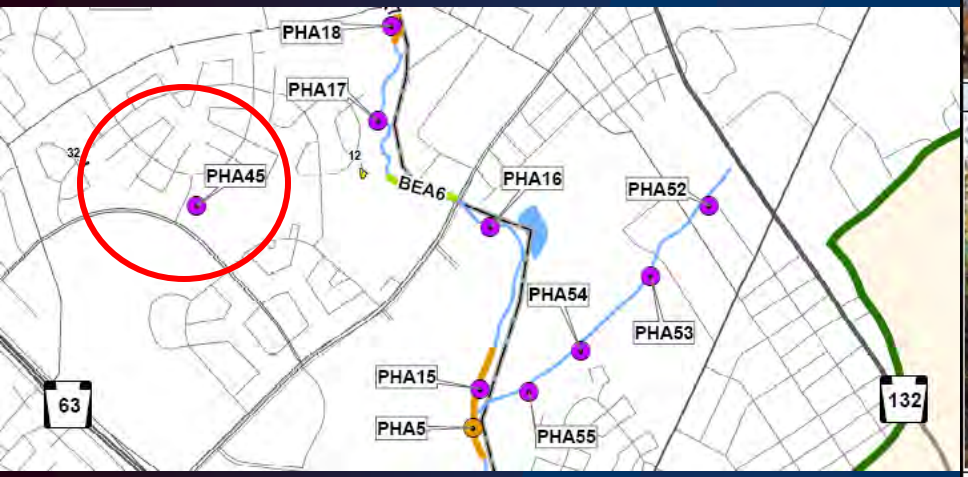
The bank on the left side of the picture has been adequately stabilized with rock and various plantings and no erosion was observed. Similar stabilization measures could mitigate/prevent erosion.

Solution	6C, 6D, 5.4.2, 6.7.1, 6.7.2

General Problem Area Forms

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

Poquessing Watershed Act 167 Problem Area Inventory

Problem Area - Map ID:	PHA45	Comments
Municipality:	Philadelphia	This problem area was reported by the Philadelphia Water Department. The problem area is located along a tributary to Poquessing Creek . The reach stability was reported as intermediate and the bank erosion was classified as high.
Stream name:	Trib to Poquessing Creek	
Inspected By/Date:	DJS/BAK 10-28-2010	
Checked By/Date:	PAD	
Type of Problem (highlighted):		
1	Flooding	
2	Deficient Bridge/Culvert	
3	Erosion	
4	Sedimentation	
5	Water/Groundwater Pollution	
6	Other	

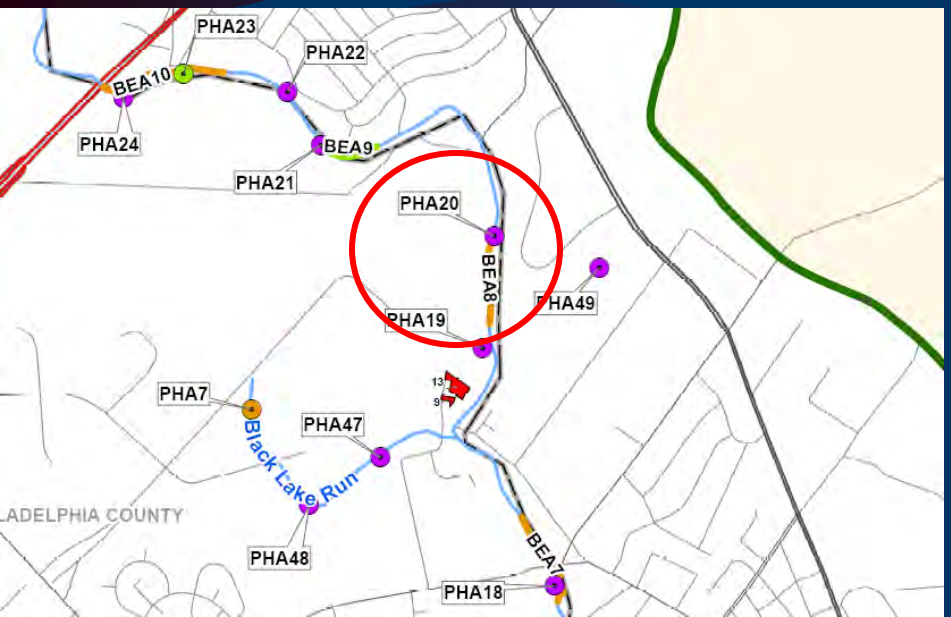
Description
The banks of this tributary are experiencing significant erosion. Banks were also reported as being overgrown with invasive species.

Description
The degradation of the streambanks has lead to subsequent sediment deposits in downstream portions of the tributary. Banks were also reported as being overgrown with invasive species.

Solution

General Problem Area Forms

- 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

		Comments
Problem Area - Map ID:	PHA20 - BEA8	This section of stream was reported as a problem area by the Philadelphia Water Department and the city of Bensalem. The problem area is located along Poquessing Creek within Poquessing Valley Park. The reach was reported to be actively degrading and the bank erosion was classified as high.
Municipality:	Philadelphia / Bensalem	
Stream name:	Poquessing Creek	
Inspected By/Date:	DJS/BAK 10-28-2010	
Checked By/Date:	PAD	
Type of Problem (highlighted):		
1	Flooding	
2	Deficient Bridge/Culvert	
3	Erosion	
4	Sedimentation	
5	Water/Groundwater Pollution	
6	Other - ATV	

Description

The banks of this tributary are experiencing significant erosion. Banks were also reported as being overgrown with invasive species.

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.

Detailed Problem Area Forms

- Detailed Problem Area Determination
  - Regional Storage Basin Locations
  - Severe Problem Areas that present increased risk to life, property, or environment
  - Public/Recreational Lands with SWM Potential
  - 11 Detailed Problem Areas Identified (May include more than one reported problem area)
- Detailed Problem Area Analysis
  - Detailed Problem Area Forms
  - Potential Solutions and Watershed Benefits with Associated Cost Estimates

Poquessing Watershed

Poquessing Watershed Act 167 Problem Area Inventory

Problem Area	Municipality	Stream Name	Preferred Solution
PHA-50	Lower Shouthampton	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 commericial/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 managment facilities This is resulting in high flow rates and volumes that is causing significant erosion in the downstream channel at the problem area location.

Poquessing Watershed

Poquessing Watershed Act 167 Problem Area Inventory

Problem Area - Map ID:	PHA 50	Inspected By/Date:	DJS, BAB
Municipality:	Lower Southampton	Checked By/Date:	

The banks of this tributary are experiencing significant erosion. As evident from the pictures above, the channel has been eroded approximately 10-12 feet below the normal channel depth. Banks were also reported as being overgrown with invasive species.

Type of Problem	Erosion
Drainage Area	
Calculation Methodology	

Storm Frequency	Existing Peak Discharge (cfs)	Mitigated Peak Dischage (cfs)	Difference (cfs)
2			
5			
10			
50			
100			
500			

Potential Solutions

1) Stream Stabilization: Stablize existing stream bank to limit further erosion and decrease sediment trasnport downstream.
2) Regional Storage Area 01 (Bioretention, Infiltration, Dentention) within Commerical Area: Increase storage capactity of green space within commerical area and enhance with additonal vegetation to promote biofiltration/transporation. Increase water quality and decrease peak rate by treating stormwater at the source.
3) Increased Storage, Add/Adjust Control Structure: This area appears to already be depressed and have some sort of outlet structure. Storage could be increased in this area, and an outlet structure could be added/adjusted to better control relase rates from this area.
4) Localized Bioretential/Rain Garden Cells: Several small pockets of open space within the commerical area could be converted to bioretention/rain garden BMPs that will help

Cost Estimate			
1)		3)	
2)		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 Problem Area Inventory

Problem Area	Municipality	Stream Name	Preferred Solution
PHA-50	Lower Shouthampton	UNT Poquessing Creek	

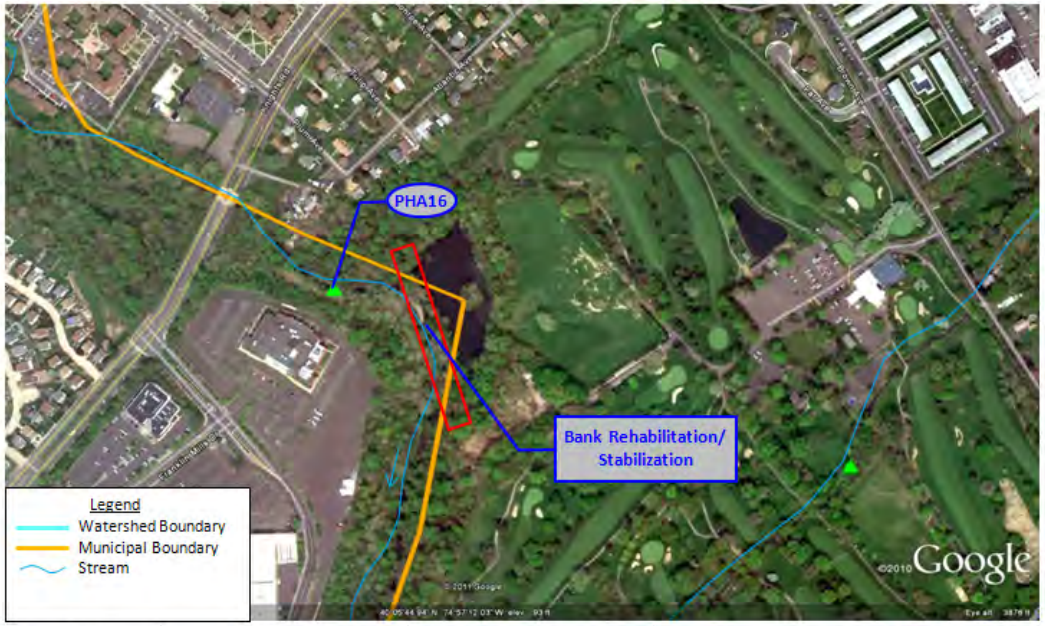
Description: This problem area was reported by the Philadelphia Water Department. The subject channel is located in Lower Southampton Township at the outfall of a large commericial/industrial area. The reach stability was reported as actively degrading and the bank erosion was classified as high. The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

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.

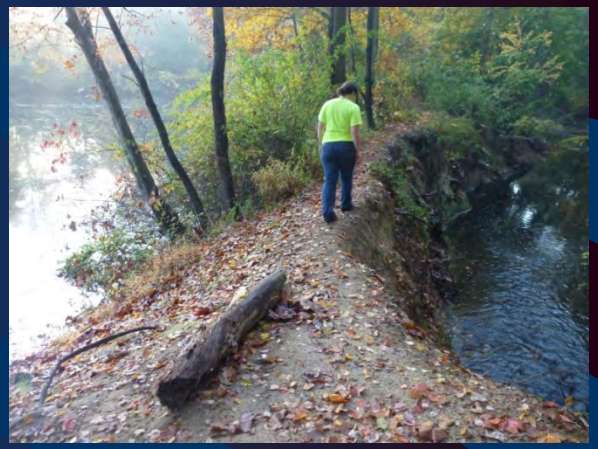
Poquessing Watershed

Poquessing Watershed Act 167 Problem Area Inventory



Problem Area	Municipality	Stream Name	Preferred Solution
PHA-16	Philadelphia/Bensalem	UNT Poquessing Creek	

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.



Detailed Problem Area Forms

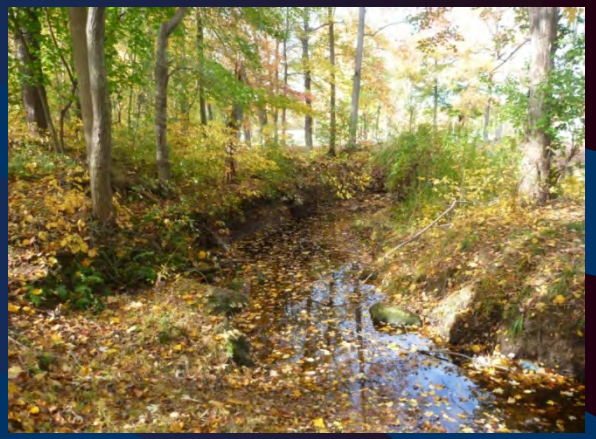
- This shows a detailed problem area.
  - Significant Erosion of an UNT to Poquessing Creek in Bensalem.
  - Possible solutions include construction of a regional storage area(detention, infiltration) and riparian buffer enhancement.

Poquessing Watershed

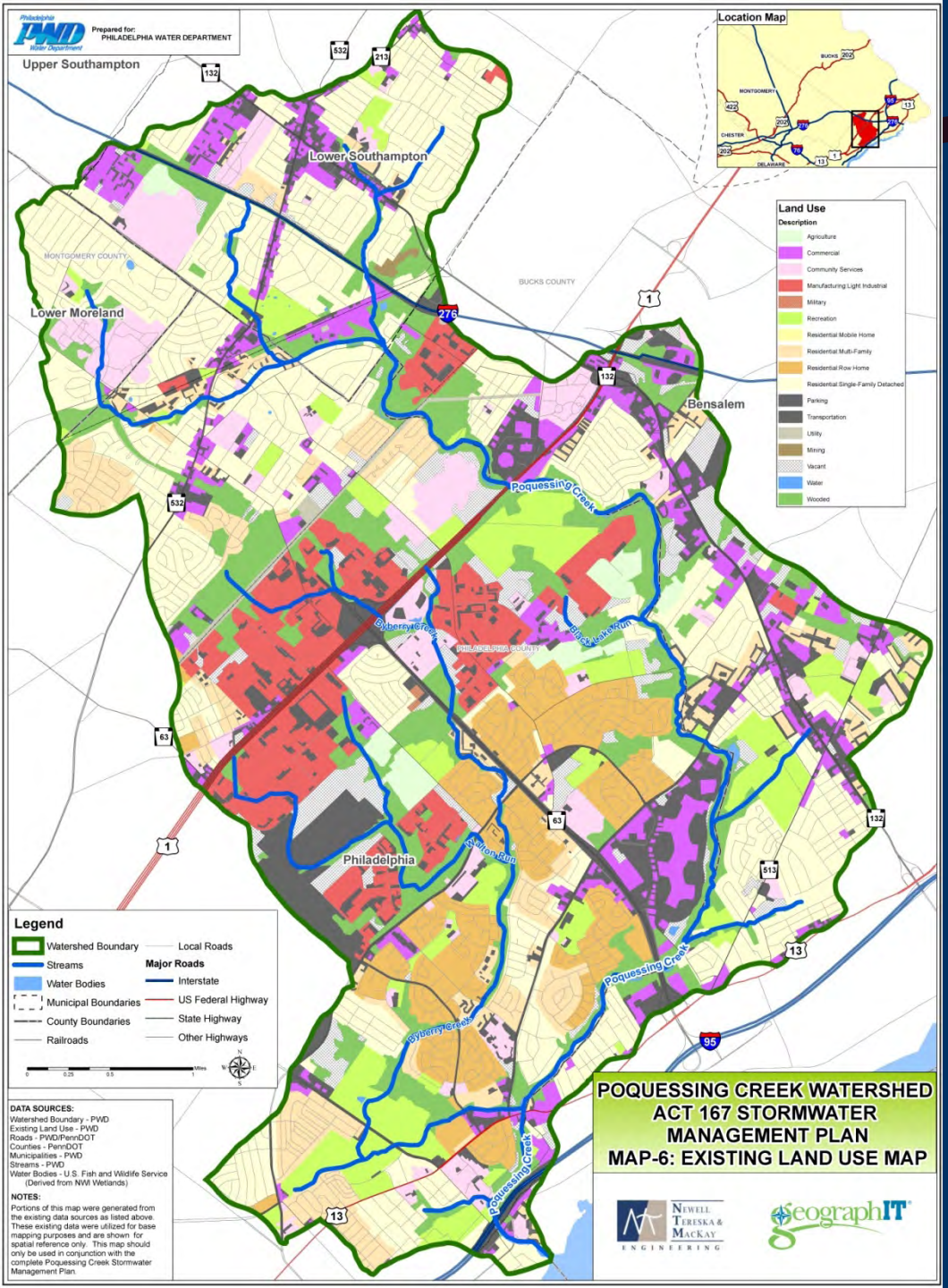
Poquessing Watershed Act 167 Problem Area Inventory

Problem Area	Municipality	Sub Watershed	Stream Name	Preferred Solution
PHA-46	Bensalem		UNT Poquessing Creek	

Description: This problem area was reported by the Philadelphia Water Department. The problem area is located to the west of Hulmeville Rd along a tributary to Poquessing Creek. The reach was reported to be actively degrading and the bank erosion was classified as high. The contributing drainage area consists mainly of residential developments with limited stormwater management controls. This development has diminished riparian buffers along the stream, and is likely the causing the high flows and velocities that are causing the streambanks to erode.

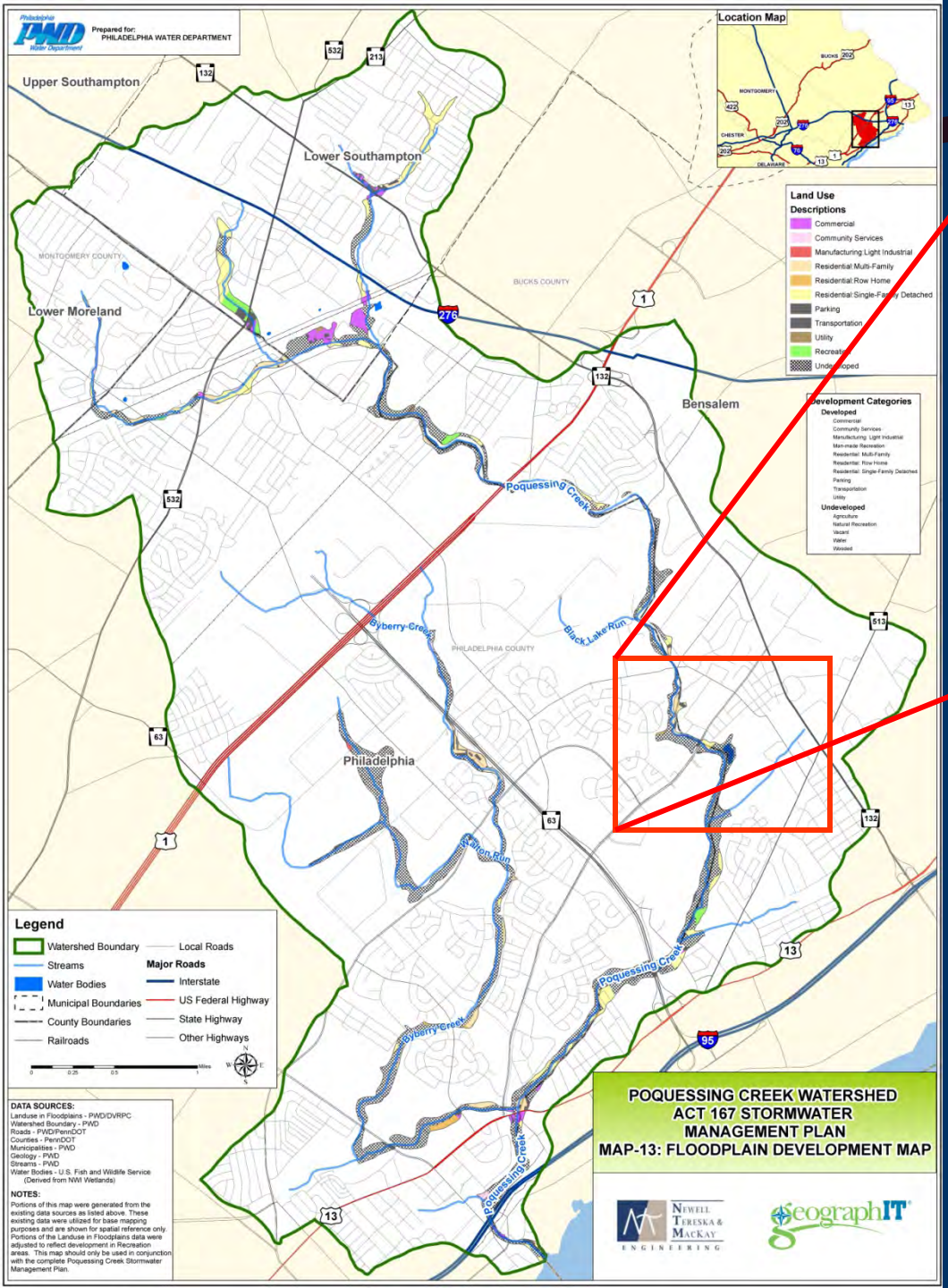



Mapping
©2009 Google



Land Use	Square Miles	Acres	Percent Area
Agriculture	0.26	166.1	1.20
Commercial	1.41	900.0	6.52
Community Services	1.21	776.5	5.63
Manufacturing: Light Industrial	1.56	999.8	7.25
Military	0.01	4.7	0.03
Mining	0.02	10.9	0.08
Parking	1.62	1034.9	7.50
Recreation	1.50	959.7	6.96
Residential: Mobile Home	< 0.01	1.9	0.01
Residential: Multi-Family	1.51	968.4	7.02
Residential: Row Home	1.59	1019.4	7.39
Residential: Single-Family Detached	5.84	3739.2	27.11
Transportation	1.04	663.1	4.81
Utility	0.09	57.4	0.42
Vacant	0.97	622.5	4.51
Water	0.10	62.6	0.45
Wooded	2.83	1809.1	13.11
TOTAL:	**21.55**	**13,796**	**100%**

Development in Floodplains



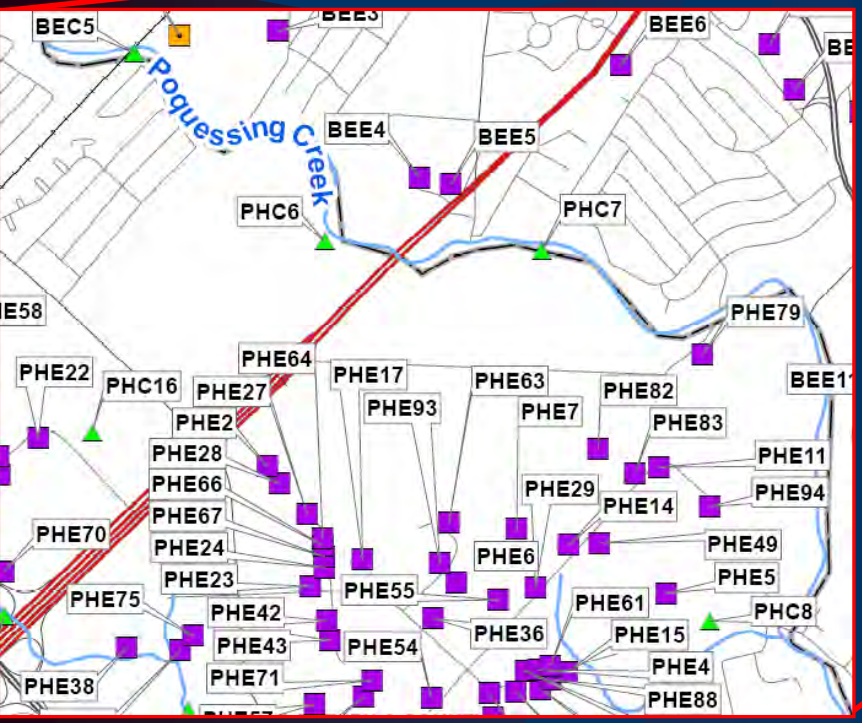
Land Use	Acres in Floodplain	Square Miles in Floodplain	Percentage Area
Agriculture	8.2	0.01	1.2
Commercial	24.5	0.04	3.6
Community Services	5.9	0.01	0.9
Manufacturing: Light Industrial	0.6	<0.1	0.1
Pavement	30.9	0.05	4.5
Recreation	50.3	0.08	7.4
Residential	122.2	0.19	17.9
Vacant	24	0.04	3.5
Water	45.7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

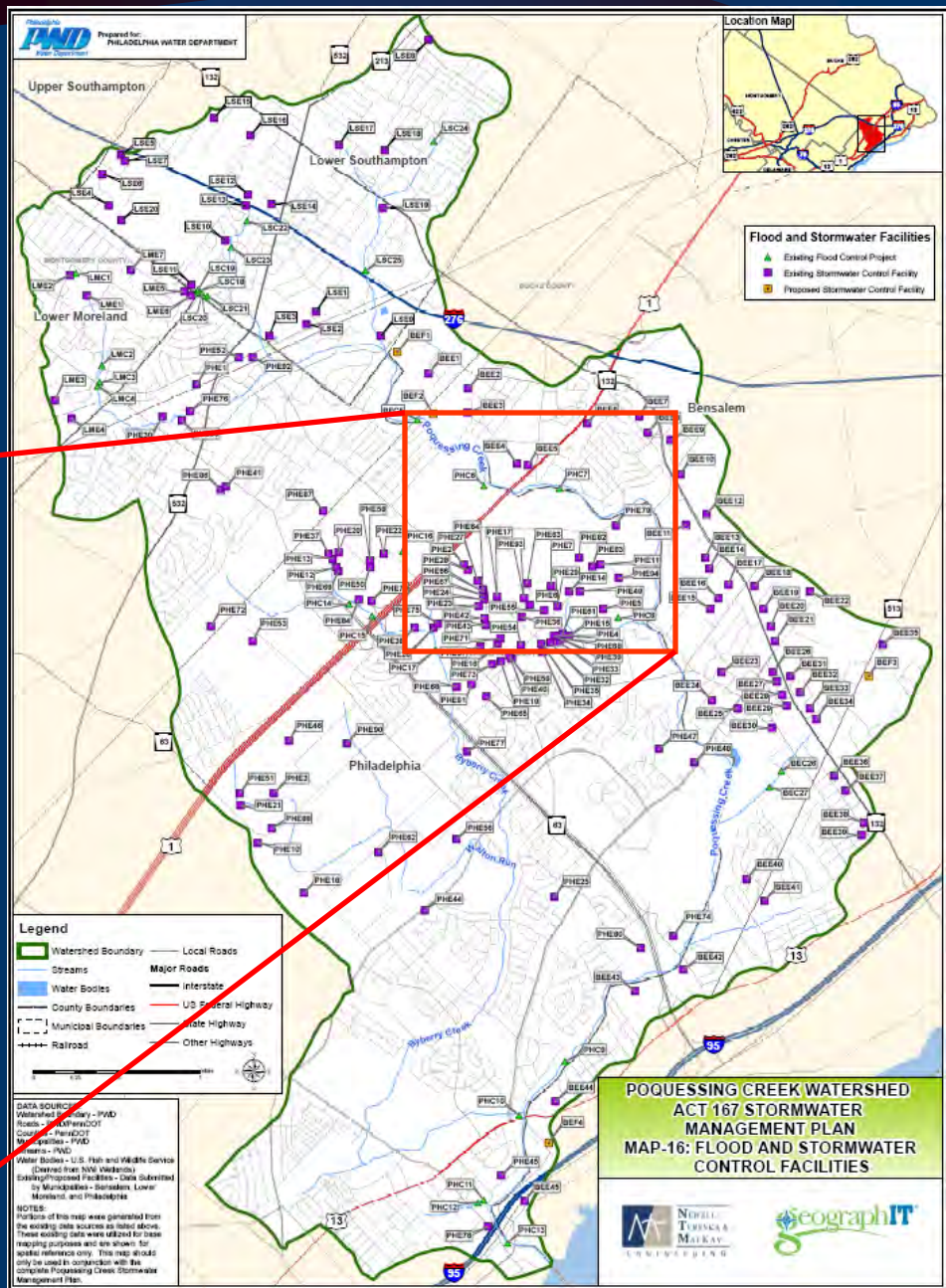
Flood and Stormwater Control Facilities

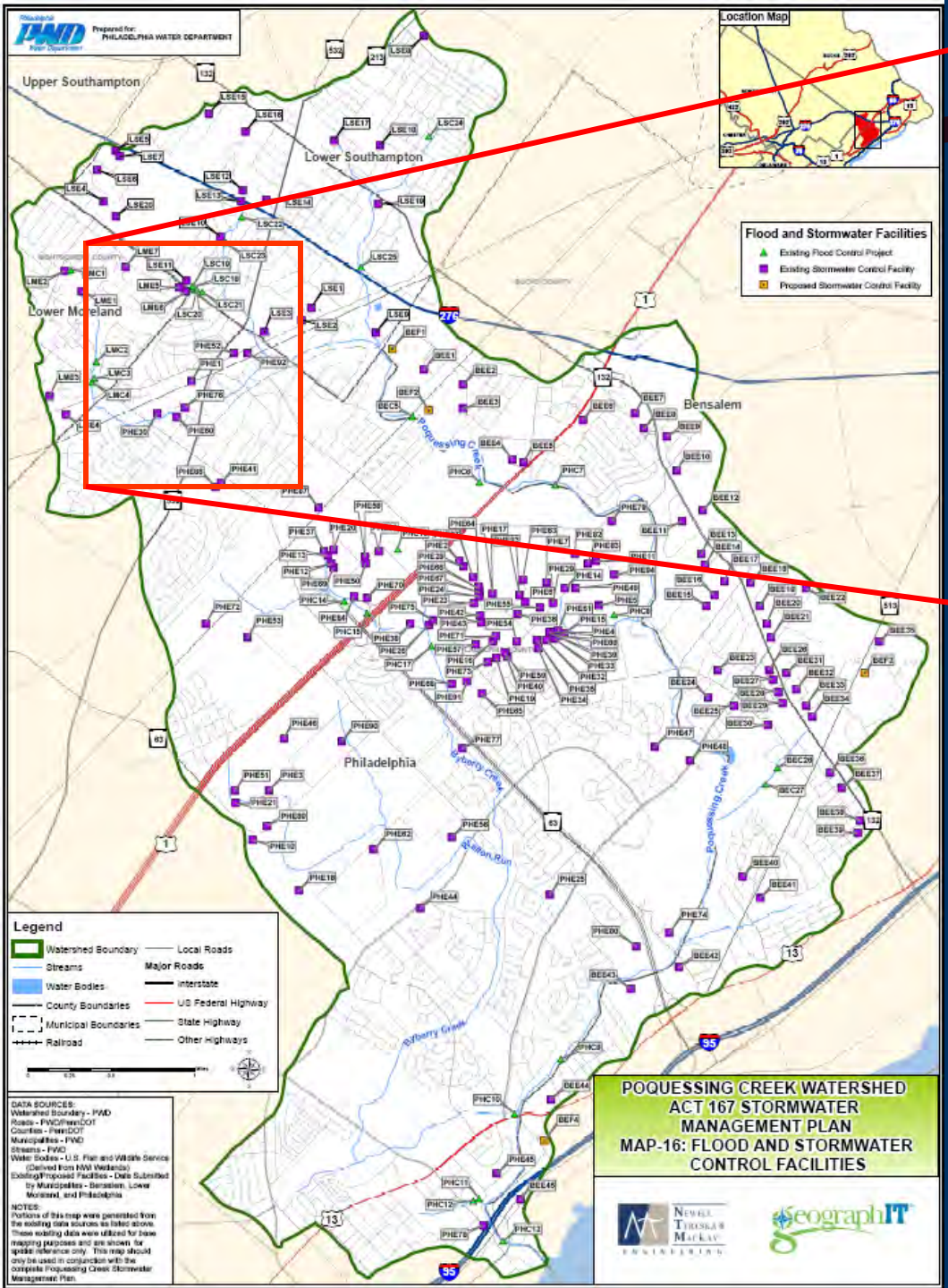
Flood and Stormwater Facilities

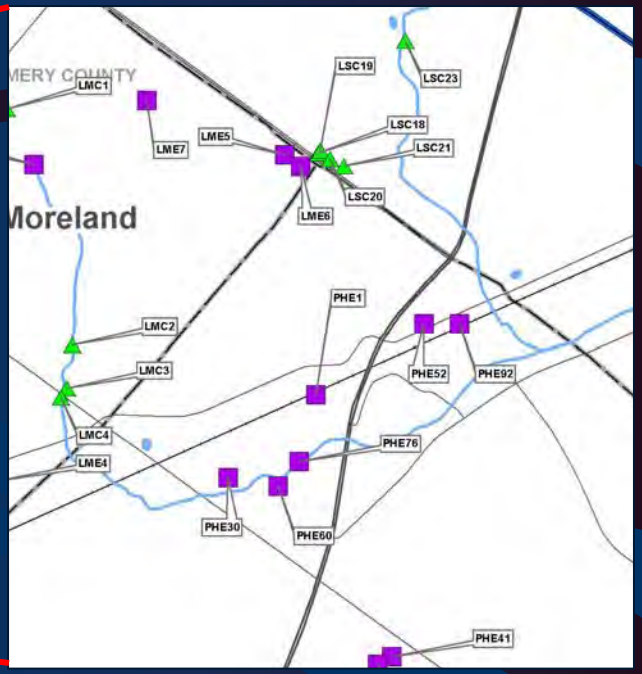
- Existing Flood Control Project
- Existing Stormwater Control Facility
- Proposed Stormwater Control Facility

- **Basin dimensional data collected by PWD**









- **Found basins in Lower Southampton with Google Earth and Bing Maps**

Problem Area Map-15a

Problem Areas

- Problem Area - Sedimentation
- Problem Area - Accelerated Erosion
- Problem Area - Accelerated Erosion and Sedimentation
- Flooding
- Sedimentation
- Accelerated Erosion and Sedimentation

Bank Erosion Hazard Index (BEHI)

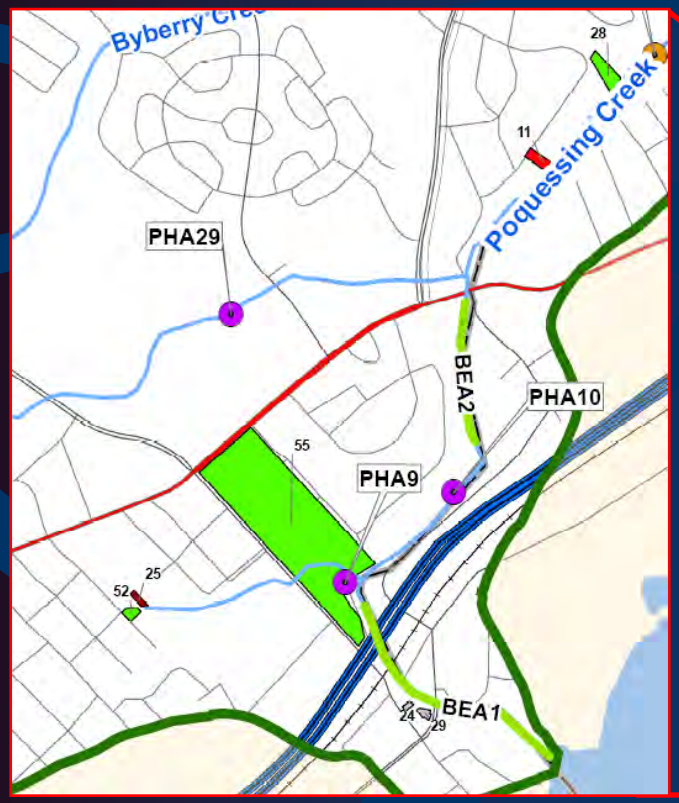
Parcel Rank

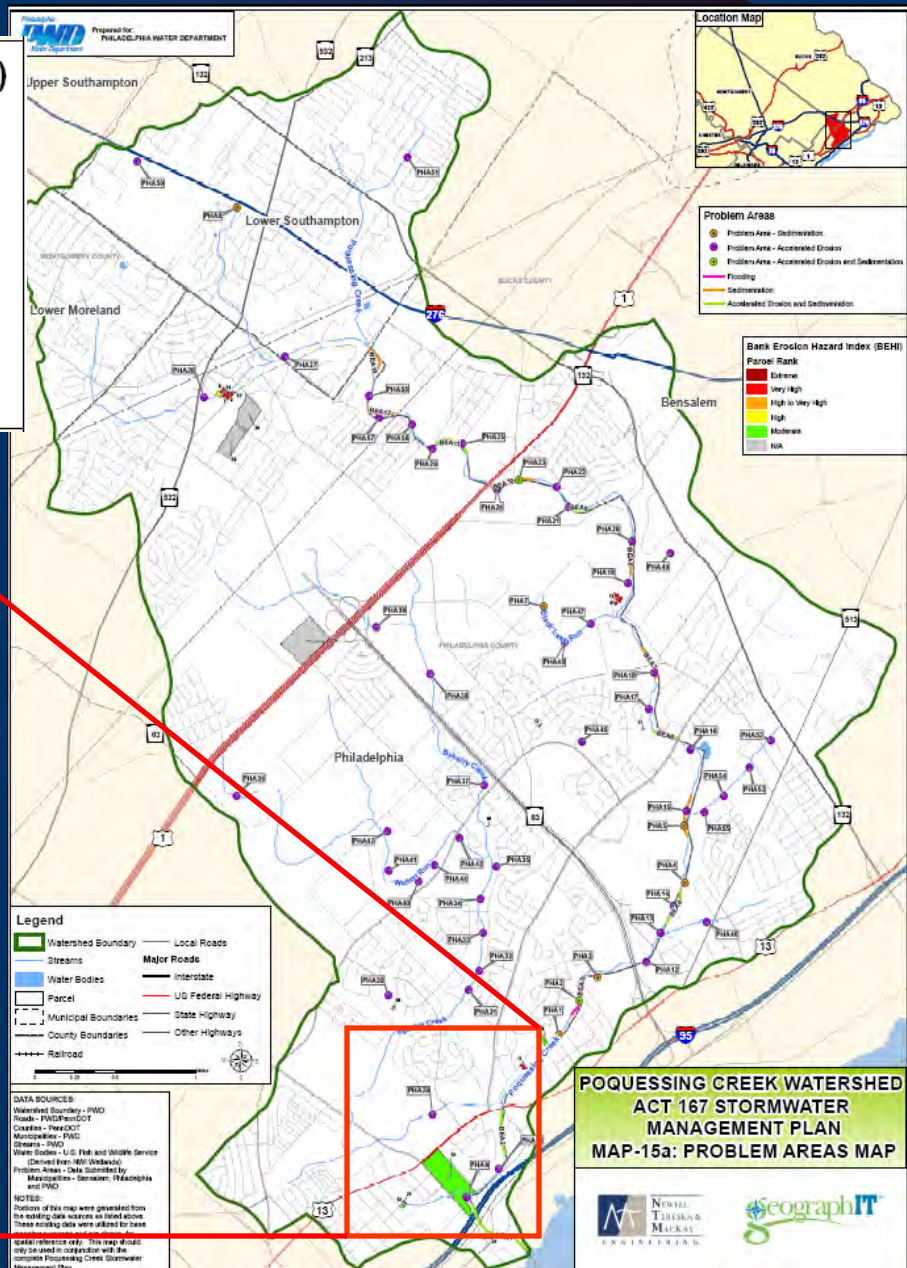
- Extreme
- Very High
- High to Very High
- High
- Moderate
- N/A

Legends

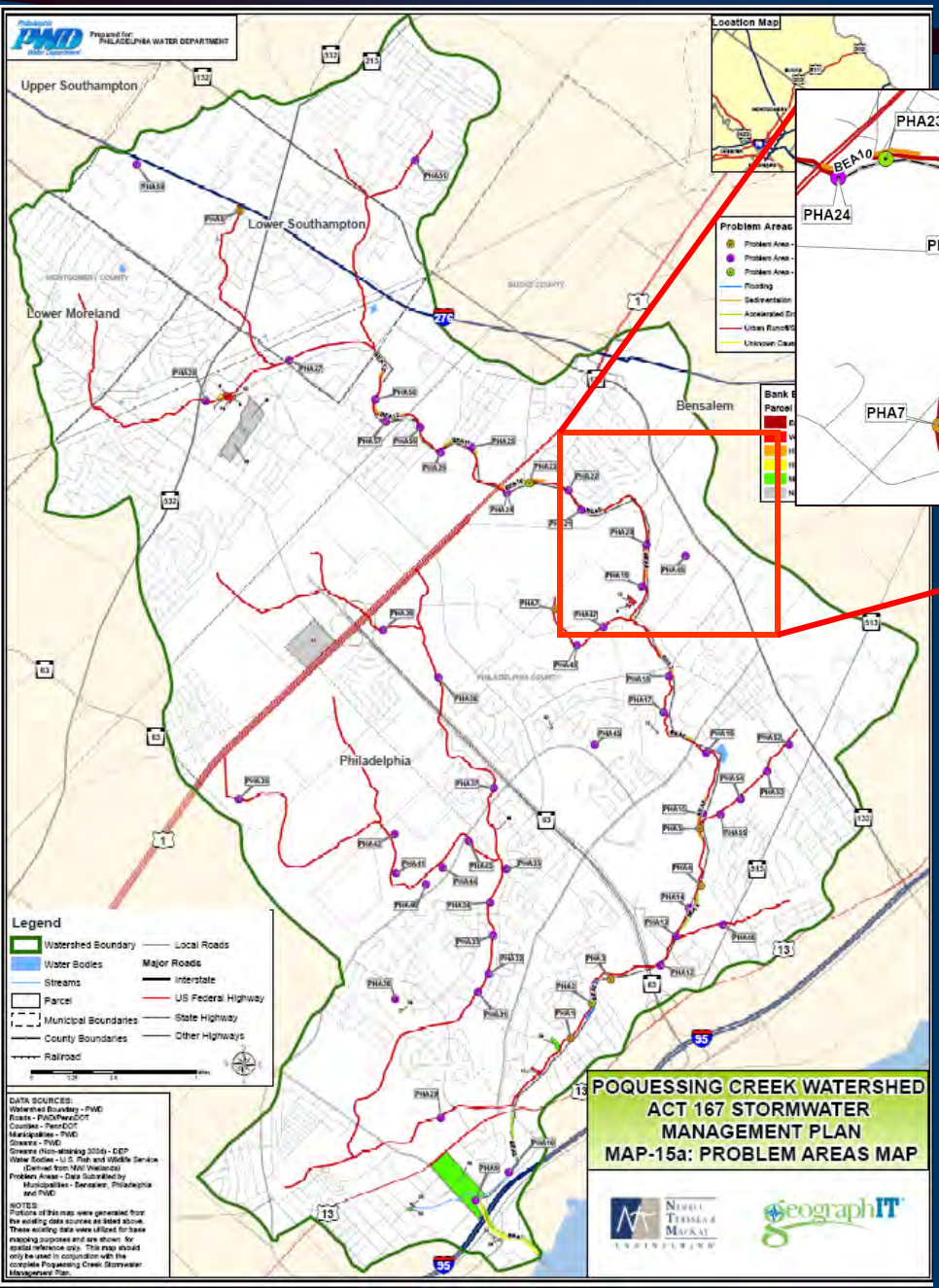
Problems

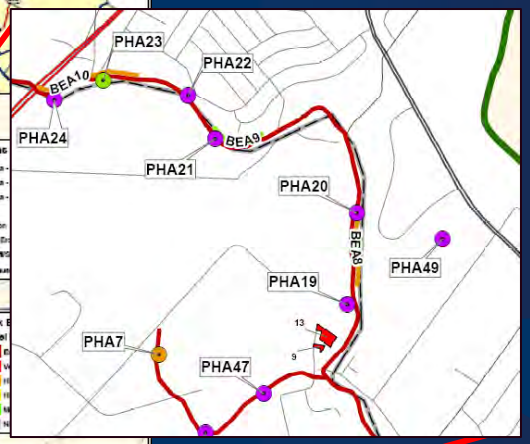
BEHI





New Problem Area Maps MAP-15a





Problem Areas

- Problem Area - Sedimentation
- Problem Area - Accelerated Erosion
- Problem Area - Accelerated Erosion and Sedimentation
- Flooding
- Sedimentation
- Accelerated Erosion and Sedimentation
- Urban Runoff/Storm Sewers
- Unknown Cause - PCB

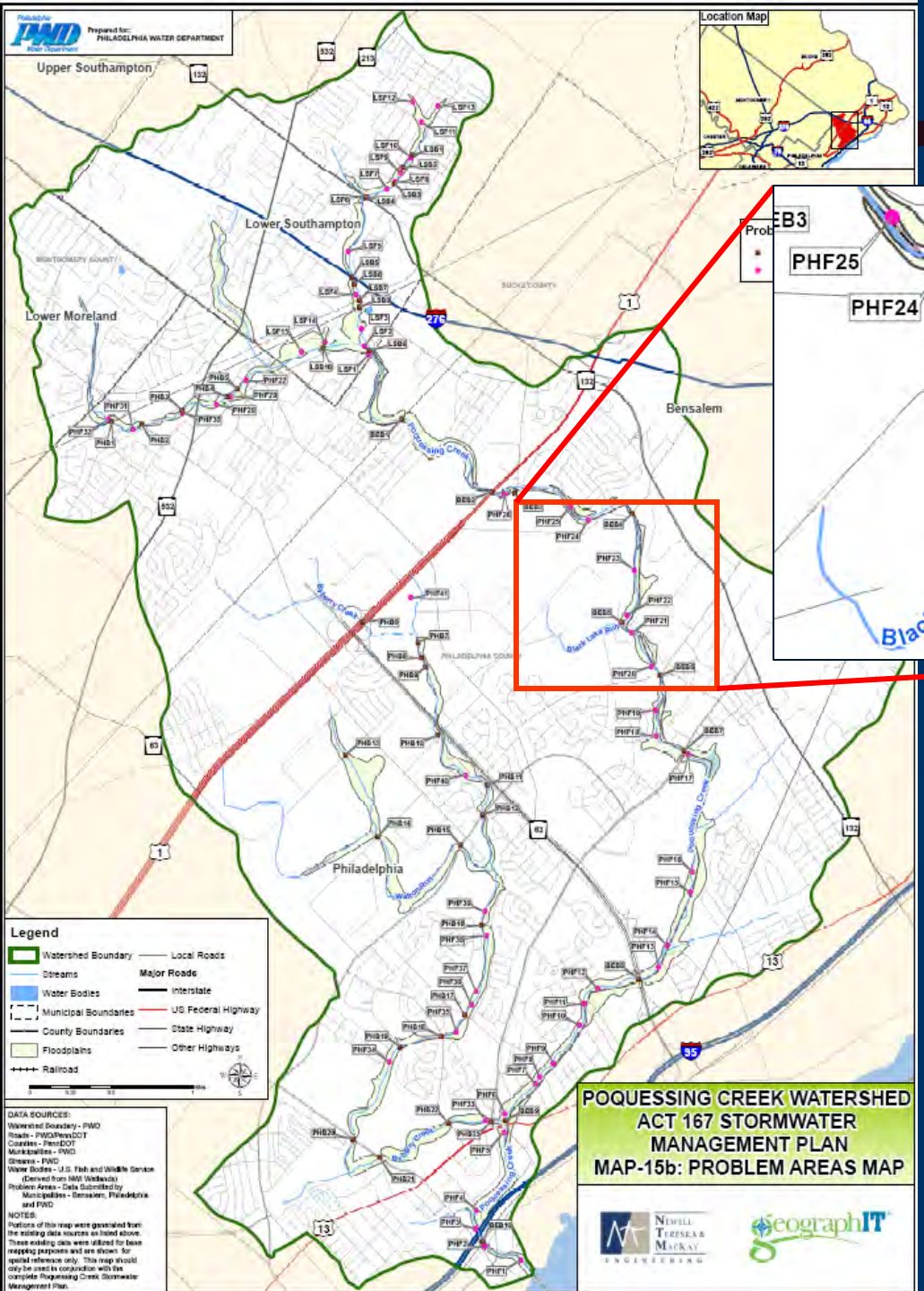
Bank Erosion Hazard Index (BEHI)

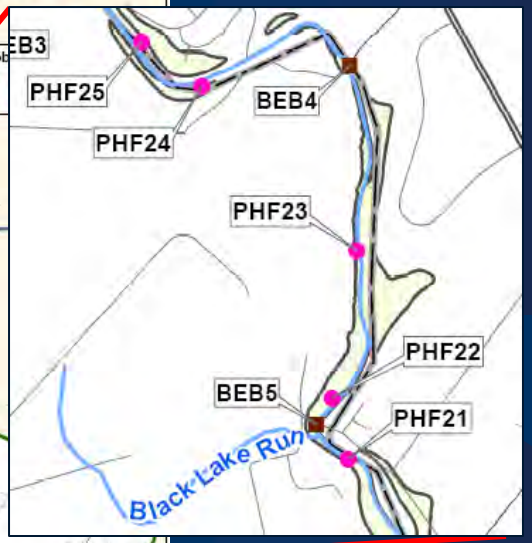
Parcel Rank

- Extreme
- Very High
- High to Very High
- High
- Moderate
- N/A

- Separated problem areas maps to reduce clutter.
  - MAP-15a – water quality and localized problems
    - Township responses to problem areas
    - BEHI Parcel Rank
    - 303d stream data

New Problem Area Maps
MAP-15b





Problem Areas

- FIS Backwater Bridges
- Flooding Areas

- Separated problem areas maps to reduce clutter.
  - MAP-15b – Backwater and flooding
    - FEMA FIS Backwater from bridges
    - Flooding of buildings due to high volume and bridge backwater

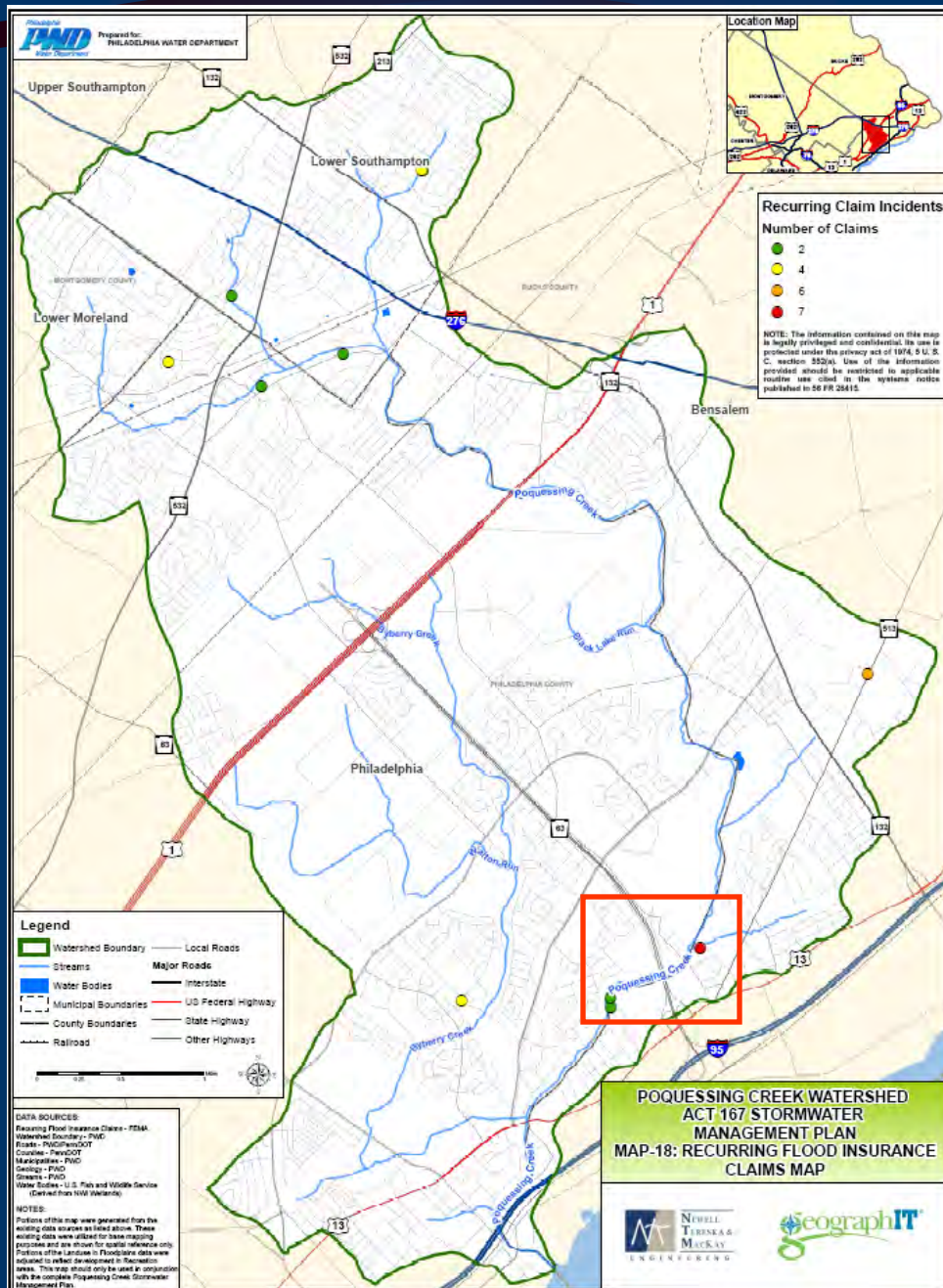
POQUESSING WATERSHED

Poquessing Watershed Act 167 100-Year Floodplain Problems

Problem Area - Map ID:		PH-F14	Comments
Number of Buildings Inundated	Residential	2	Flooding caused by backwater from BEB8 and high volume. Some buildings also seem to be built within the floodplains.
	Commercial		
Type of problem (Highlighted):			
1	High Volume		
2	Backwater from bridge/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



Flood Insurance Claims

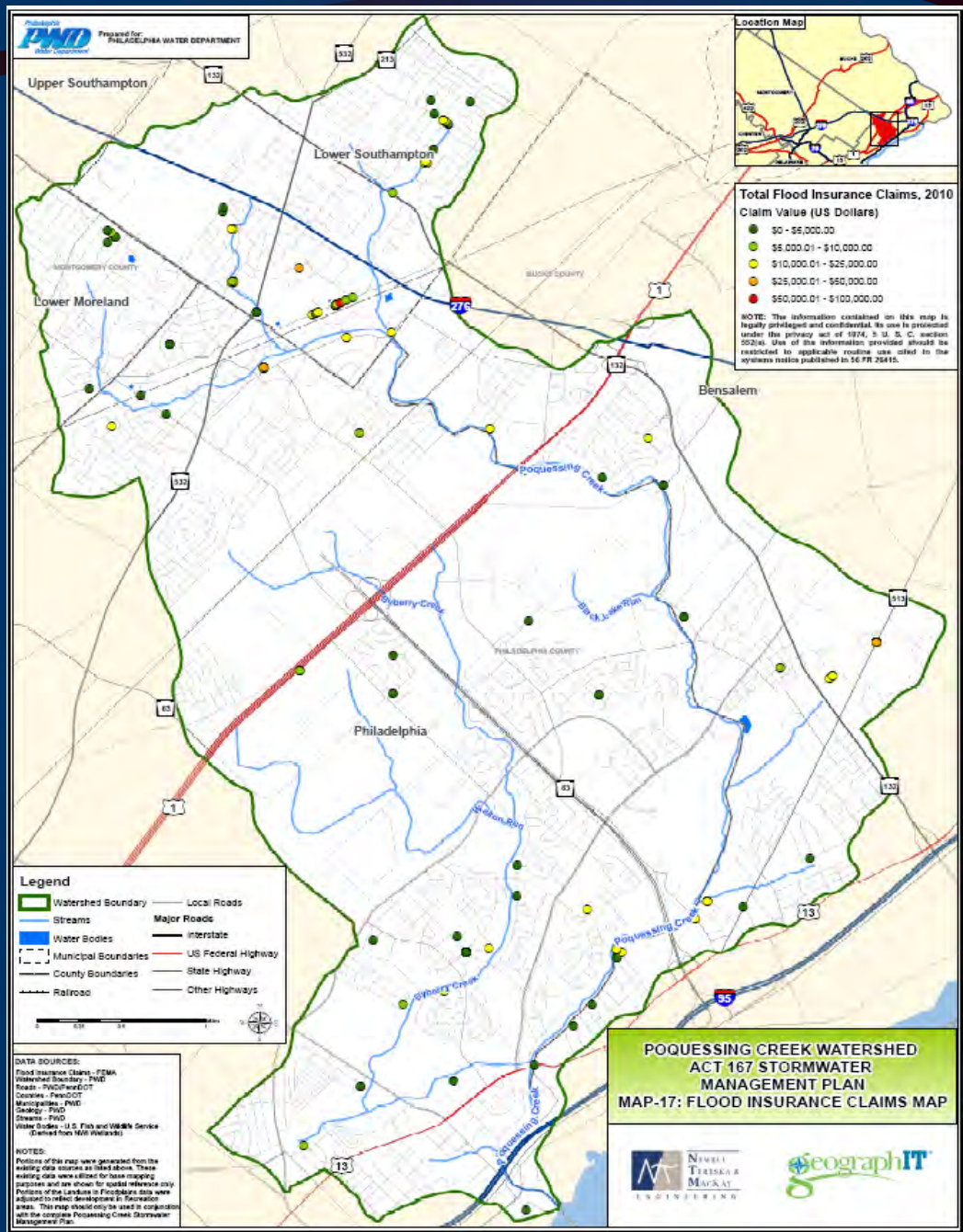
Total Flood Insurance Claims, 2010

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



Possible Solutions

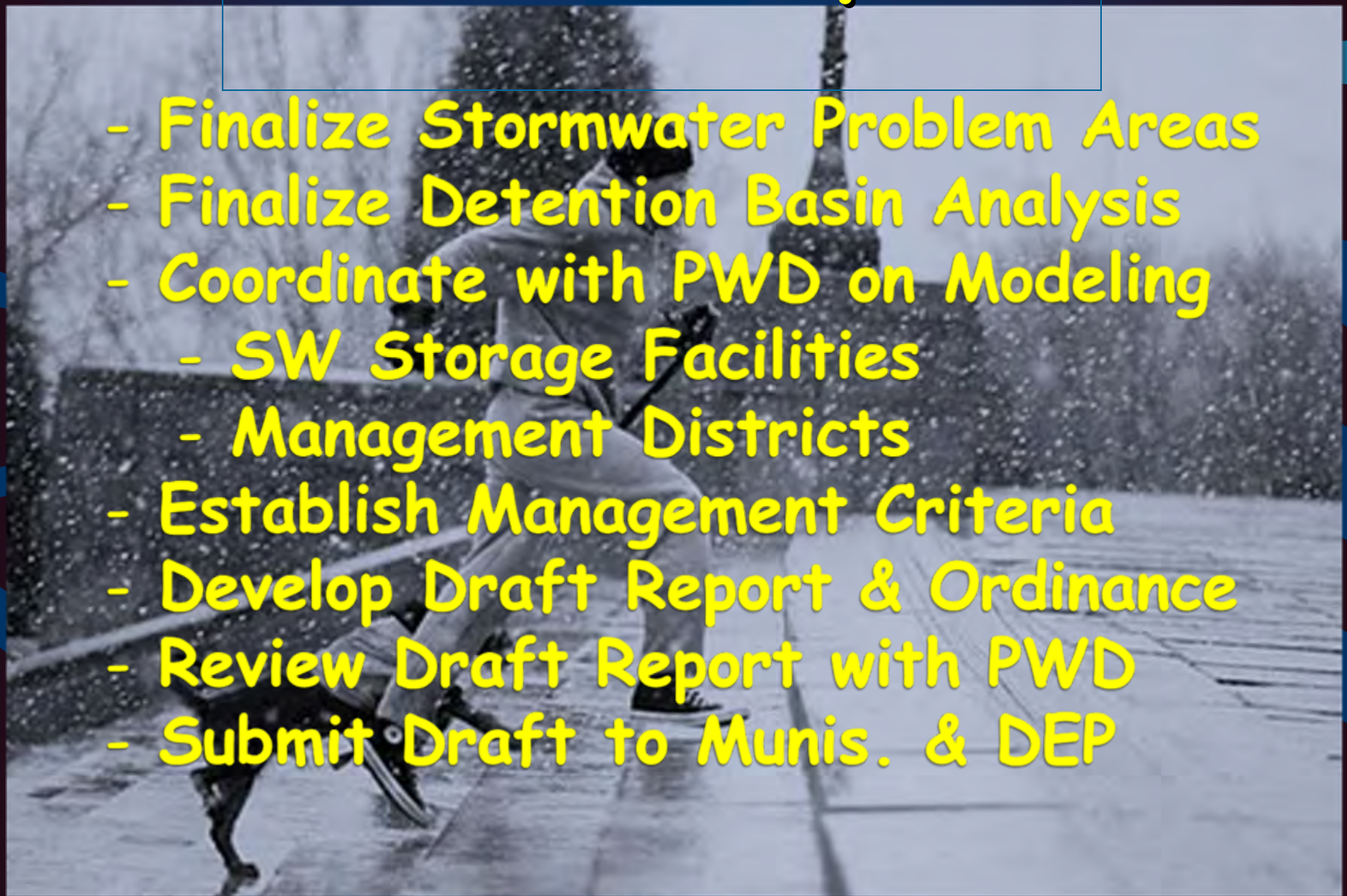
- BMP's
  - Non-Structural
  - Structural

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

Collection of Comments on Sample Act 167 SW Ordinance (Tacony)

Next Steps



- Finalize Stormwater Problem Areas
- Finalize Detention Basin Analysis
- Coordinate with PWD on Modeling
  - SW Storage Facilities
  - Management Districts
- Establish Management Criteria
- Develop Draft Report & Ordinance
- Review Draft Report with PWD
- Submit Draft to Munis. & DEP

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

? ? ? ?

Problem Area Map-15b

Problem Areas

- FIS Backwater Bridges
- Flooding Areas

Legends

FIS Backwater Bridges

Flooding Areas