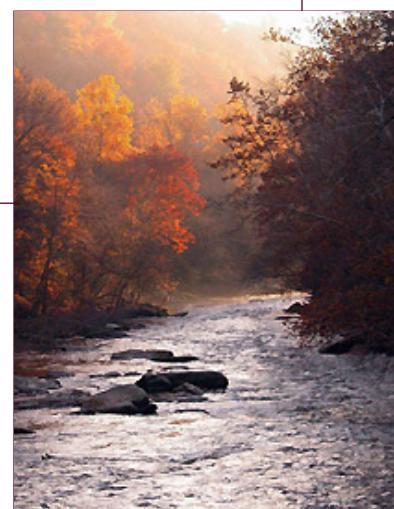


Butler County

Act 167 County-Wide Watershed Stormwater Management Plan for Butler County Phase I – Scope of Study

August 21, 2008



[**BUILDING RELATIONSHIPS.
DESIGNING SOLUTIONS.**]

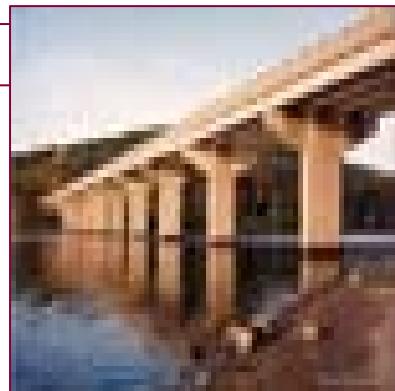
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HRG Project Number: 1803.011

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INTRODUCTION

STORMWATER RUNOFF – ITS PROBLEMS AND ITS SOLUTIONS

The water that runs off the land into surface waters during and immediately following a rainfall event is referred to as stormwater. In watersheds undergoing urban expansion, the volume of stormwater resulting from a particular rainfall event increases because of the reduction of pervious land area (i.e., natural land covered by pavement, concrete, or buildings). That is, the alteration of natural land cover and land contours by residential, commercial, industrial, forestry and farmland uses resulting in decreased infiltration of rainfall and an increased rate and volume of stormwater runoff.

The need for stormwater management in Pennsylvania has been demonstrated repeatedly in the past. As the population of an area increases, land development is inevitable, and the alteration of natural ground surfaces results in decreased infiltration of rainfall. As a result of continued development, the volume and rate of stormwater runoff increases causing environmental impacts including flooding, stream channel erosion and siltation, water quality degradation and reduced groundwater recharge. Cumulative effects of development in some areas of a watershed can result in flooding of natural watercourses with associated costly property damages.

History has shown that individual land development projects are often viewed as separate incidents and not necessarily part of the bigger picture of urbanization. This has also been the case when the individual land development projects are scattered throughout a watershed (within many different municipalities). However, it is now observed and verified that this cumulative nature of individual land surface changes dramatically affects runoff and flooding conditions. This cumulative effect of development in some areas has resulted in flooding of both small and large streams with associated property damages and even causing loss of life. Therefore, given the distributed and cumulative nature of the land alteration process, a comprehensive approach must be taken if a reasonable and practical management and implementation approach or strategy is to be successful.

PENNSYLVANIA STORMWATER MANAGEMENT ACT (ACT 167)

Recognizing the need to deal with serious and growing problems of extensive damage from uncontrolled stormwater runoff, the Pennsylvania General Assembly enacted Act 167. The statement of legislative findings at the beginning of the Pennsylvania Stormwater Management Act (Act 167) sums up the critical interrelationship among development, accelerated runoff, and floodplain management.

Specifically, this statement points out that:

"Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of the people of the Commonwealth, their resources, and the environment."

In past years, stormwater management had been oriented primarily toward addressing the increase in peak runoff rates discharging from individual development sites to protect property immediately downstream. Minimal attention had been given to the effects on locations further downstream (frequently because they were located in another municipality) or to designing stormwater control within the context of an entire watershed. Management of stormwater has typically been regulated on a municipal level with little or no consistency among adjoining municipalities in the same watershed regarding the types or degree of control to be practiced. Since many municipalities do not have stormwater management ordinances or controls, the impacts from stormwater runoff may be exacerbated from additional development.

Act 167 changed this approach by instituting a comprehensive program of stormwater planning and management on a watershed level. The Act requires Pennsylvania counties to prepare and adopt stormwater management plans for each watershed located in the County, as designated by the Pennsylvania Department of Environmental Protection (PADEP). Most importantly, these plans are to be prepared in consultation with municipalities located in the County, working through a Watershed Plan Advisory Committee (WPAC). Due to a recent change in PADEP Act 167 policy, in lieu of providing plans for each designated watershed, Act 167 plans are now being created on a county-wide basis. The plans are intended to provide uniform technical standards and criteria throughout the County for the management of stormwater runoff from new land development sites. The new PADEP policy also stresses the opportunity for municipalities to retrofit existing sites to improve existing water quality impairments or existing problem area flooding sources.

The types and degree of control that are prescribed in the stormwater management plan must be based on the expected development pattern and hydrologic characteristics of each individual watershed within the County. The plan, more specifically the standards and criteria, are to be developed from the technical evaluations performed in the analysis process, in order to respond to the "cause and effect" nature of existing and potential storm runoff impacts in each watershed. The final product of the Act 167 planning process will be a comprehensive stormwater management plan to be developed and implemented with a firm sensitivity to the overall needs (e.g., financial, legal, political, technical, etc.) of the municipalities in Butler County.

ACT 167 PLANNING FOR BUTLER COUNTY

Given the above history and information, the county-wide watershed planning process for Butler County must be designed with the individual watershed characteristics in mind, as well as the resources (technical, political, and economic) of the County. The Phase I - Scope of Study presents the concept and approach that has been developed to fully meet these requirements, as well as the specific requirements of Act 167, for this County-wide watershed stormwater management project.

BENEFITS OF THE PLAN

The purpose and benefit of the study and plan is to provide all of the municipalities in Butler County with an accurate and consistent plan implementation strategy and procedures for comprehensive stormwater management. Currently, there is a great deal of variance within the municipalities regarding implementation and enforcement of stormwater management regulations. Given the nature of storm runoff and its impacts, a critical objective of sound stormwater management planning is to provide for consistency of stormwater management requirements throughout Butler County. Therefore, the primary objective of the technical study and planning process is to develop a technical and institutional support document to

encourage and/or support the consistency of regulations based on county-wide and watershed-wide considerations.

The technical county-wide planning approach recommended by PADEP also provides the municipalities with a considerable amount of useable technical information, such as detailed watershed runoff simulation models, which can be used for other stormwater management purposes. Therefore, as a result of developing the plan, municipalities and Butler County, will realize benefits and/or products that are useable for other planning and engineering purposes. For example, land use updates and environmental data management are necessary for effective planning in a specific watershed. The technical component of the plan will provide unique environmental database management benefits for both the county and municipal use. Another example of the associated benefits of the plan relates to basic public works and/or engineering functions, primarily at the municipal level.

In addition, technical support information provided as a part of the specific watershed modeling effort can be used by public works officials in the design and regulatory permitting efforts for bridge replacement and floodplain management analysis. Further, the stream encroachment permit process, which involves the need to supply detailed stream flow data as part of the application process, can be more efficiently and cost-effectively developed using a calibrated watershed model. Therefore, the benefits of the watershed planning process are extensive, even beyond the important functions of developing comprehensive stormwater management strategies and ordinance provisions.

A new initiative from PADEP indicates that the plan may investigate and provide solutions to correct existing problems. Specifically, the plan will: identify and summarize problem areas; provide much of the hydrology that will be required in the design of proposed solutions; provide potential conceptual solutions to correct these problems; and will specify possible funding streams for project implementation.

APPROACH FOR THE DEVELOPMENT OF THE STORMWATER MANAGEMENT PLAN

In order to implement county-wide comprehensive planning and management of stormwater runoff, it was necessary to take a close look at major watersheds within Butler County during Phase I. Since the Act itself is very dependent on municipal coordination to provide for the planning and management of stormwater throughout their respective municipality, it was necessary to get the attention of, endorsement by, and involvement from each municipality early in the planning process.

In order to initiate municipal level involvement in the overall development of the plan, a Watershed Plan Advisory Committee (WPAC) was formed and consists of the Butler County Planning Commission, all municipalities within the County, the Butler County Conservation District, the Pennsylvania Department of Transportation (PennDOT) office and other interested organizations. Two meetings with the WPAC were held during Phase I to obtain general municipal and organizational commitment to the project and to distribute information request forms. Discussions from these meetings and an evaluation of the information request forms, in conjunction with in-house knowledge from Butler County and PADEP, determined to what level this plan should be created.

THE NEED FOR A COMPREHENSIVE APPROACH FOR STORMWATER MANAGEMENT

The goal of Butler County's Act 167 planning process is to provide a county-wide comprehensive program to assist in the planning and management of stormwater. With coordination of the fifty-seven (57) municipalities in Butler County, the resulting stormwater management ordinance will address severe and ongoing stormwater related problems in critical areas throughout the County. Furthermore, cooperating member municipalities will be able to adopt stormwater management controls that will have a collectively beneficial impact on the waters of Butler County and those "problem" areas that presently remain unmanaged.

The Act itself is divided into two phases of which Butler County has received Phase I funding from PADEP and is highly dependent on gaining support from the municipalities in the early stages of plan development. Phase II will result in the final stormwater management plan and model ordinance. More specifically, the development process for the stormwater management plan is as follows:

Phase I - Scope of Study - Establishing procedures used to prepare the Plan. These procedures are determined by an overall survey of:

- Specific watershed characteristics and hydrologic conditions.
- Stormwater related problems and significant obstructions.
- Alternative measures for control.
- Goals and objectives of the Plan.
- Costs.

Phase II - The Plan - The technical assessment and development of the model ordinance that includes:

- Watershed modeling and planning.
- Development of technical standards and criteria for stormwater management.
- Conceptual solutions to identify problem areas.
- Identification of administrative procedures for implementation of the plan.
- Adoption by Butler County.
- Approval by PADEP.
- Adoption by all fifty-seven (57) municipalities.
- Municipal implementation.

PREVIOUS PLAN EFFORTS

There have been no previous Act 167 Plans prepared for Butler County. However, the following relevant documents have been prepared and will provide a valuable source of information for the development of the Plan:

- Butler County Planning Commission, Butler County Comprehensive Plan Phase I, 1997.
- Butler County Planning Commission, Butler County Comprehensive Plan Phase II, 2003.
- Mackin Engineering, Inc., Northwestern Butler County Multi-Municipal Comprehensive Plan, August 2007.
- Simonds and Simonds Landscape Architects, Zelienople Today and Tomorrow Comprehensive Plan, August 1966.
- Lorenzi, Dodds & Gunnill, Inc., Moraine Area Comprehensive Development Plan, June 1970.
- Western Pennsylvania Conservancy, Connoquenessing Creek Watershed Conservation Plan, February 2008.

GENERAL COUNTY DESCRIPTION

Butler County was formed from parts of Allegheny County on March 12, 1800. The County was named in honor of General Richard Butler, a hero of the American Revolution. Butler County is situated on the Allegheny Plateau Western Pennsylvania. The County encompasses 508,800 acres (795 square miles) and is approximately 23 miles wide by 34 miles long. Butler County occupies the high divide between the Allegheny and Beaver Rivers. The County is part of the Allegheny Plateau and is characterized by irregular terrain, having both sharp hills and valleys along with pockets of moderately sloped terrain. Only the extreme northwest part of the County has been glaciated. Elevations range from 1,500 feet on the summits in the Northern part of the County to 750 feet at the riverbeds in the Southern part of the County. Butler County has a diverse landscape with both rural and urban settings. This is reflected by high-density residential and commercial areas, such as the City of Butler and Cranberry Township, coupled with large land tracts of open space and agricultural land within the County.

POLITICAL JURISDICTIONS

The County is comprised of 57 municipalities. The political jurisdictions include 33 townships, 23 boroughs, and one third class city (Butler). Butler County is classified as a fifth class county and is ranked 20th in the state of 67 counties, with a population of 174,083 according to the 2000 census. The 57 municipalities in Butler County are as follows:

TOWNSHIPS		BOROUGHS		CITIES
Adams	Jackson	Bruin	Seven Fields	Butler
Allegheny	Jefferson	Callery	Slippery Rock	
Brady	Lancaster	Cherry Valley	Valencia	
Buffalo	Marion	Chicora	West Liberty	
Butler	Mercer	Connoquenessing	West Sunbury	
Center	Middlesex	East Butler	Zelienople	
Cherry	Muddy Creek	Eau Claire		
Clay	Oakland	Evans City		
Clearfield	Parker	Fairview		
Clinton	Penn	Harmony		
Concord	Slippery Rock	Harrisville		
Connoquenessing	Summit	Karns City		
Cranberry	Venango	Mars		
Donegal	Washington	Petrolia		
Fairview	Winfield	Portersville		
Forward	Worth	Prospect		
Franklin		Saxonburg		

TRANSPORTATION

Butler County has an excellent geographic location in regard to road networks. The County is served by a number of important major transportation routes, including three interstate highways. Interstate 79 is a four-lane limited-access freeway, which traverses the County in a north/south direction. This road provides a convenient Interstate link between Pittsburgh and Erie. Interstate 80 passes through the extreme northeast corner of the County. I-80 is an arterial highway that crosses the United States in an east/west direction from coast to coast. Interstate 76, part of the Pennsylvania Turnpike System, traverses the State and County in an east/west direction. In addition to the Interstate highways, several other road systems play roles in the County's transportation network. Other major road networks serving areas in Butler County include US Route 422, Route 8, Perry Highway (US-19) and the Allegheny Valley Expressway (Route 28). Overall Butler County has excellent transportation networks serving the most developed segments of the County.

While the Greater Pittsburgh International Airport handles most of the Tri-State's major air traffic, Butler County has four public airports to meet the needs of its residents. These airports and locations are as follows: Butler County Airport (Penn Township), Butler Farm Show Airport (City of Butler), Zelienople Municipal Airport (Borough of Zelienople) and Lakehill Airport (Mars Borough).

Rail is still an important means of transportation in Butler County and the United States. The longest active line is the CXS, which travels the P&W Subdivision from Allegheny County to Lawrence County. The Main Line of the Bessemer and Lake Erie is the second longest line traveling from Mercer County to Allegheny County. The other two railroads are part of the Buffalo and Pittsburgh lines. The Main Line, the larger of the two lines, travels from Eidenau to Armstrong County. The Northern Subdivision travels from Wadesworth to Burin. The final active line is a part of the Western Allegheny Line of the Bessemer and Lake Erie Railroad. It travels from Butler to Armstrong County.

GENERAL DEVELOPMENT PATTERNS

According to the Butler County Comprehensive Plan, most of Butler County is undeveloped, wooded or agricultural land. Only about 20% of Butler's area is subject to intensive development. The Comprehensive Plan determined that different attributes resulted in opportunities for future land use potential in areas throughout the County. These attributes included natural features, access, existing development and other characteristics present in each portion of the County. They helped to identify "growth areas" in Butler County where economic growth and development could be sustained. The Comprehensive Plan identified eight (8) potential growth areas located throughout Butler County. These areas are as follows: Southern Butler County (Cranberry Township), City of Butler, Zelienople, Route 356 Corridor, Route 228 Corridor, Route 68 Corridor, Route 528 Corridor and nearly the entire Interstate 79 Corridor. Each of these areas will have a significant impact on land use and economic development in Butler County.

WATER RESOURCES

Butler County lies entirely within the Ohio River watershed, which has a drainage area of 23,487 square miles in Pennsylvania. Rivers, streams and tributaries throughout the County drain into the Allegheny River, which empties into the Ohio River in Pittsburgh. The Allegheny River watershed (11,770 square miles) is within the Ohio River watershed. Therefore any watercourse that drains into the Allegheny River is not only part of the Allegheny River watershed, but is also part of the larger Ohio River watershed. All precipitation which falls in Butler County is channeled by gravity into nine (9) designated watersheds. The major watersheds are: Allegheny River, Breakneck

Creek, Buffalo Creek, Bull Creek, Connoquenessing Creek, Deer Creek, Slippery Rock Creek, Sullivan Run and Wolf Run. Each of these basins drains surface water into the major streams and rivers running through the County.

Butler County contains over 200 ponds, lakes and reservoirs within its boundary. These ponds, lakes and reservoirs vary greatly in size, from the smallest unnamed pond with an area of less than 0.1 acres, to the largest lake, Lake Arthur, in Moraine State Park with an area of approximately 3,225-acres.

SURFACE WATER QUALITY

The Pennsylvania Chapter 93 Water Quality Standards classify all surface waters according to their water quality criteria and protected water uses. Selected waterbodies that exhibit exceptional water quality and other environmental features are referred to as "Special Protection Waters." Certain activities in those watersheds that could adversely affect surface water are more stringently regulated to protect degradation.

The PADEP Chapter 93 designations of the Butler County waterways are:

PADEP DESIGNATED WATERSHEDS			
Watershed	Chapter 93 Designation	Watershed	Chapter 93 Designation
Unnamed Tributaries to Bear Creek	CWF	Little Connoquenessing Creek	CWF
Rays Run	CWF	Bonnie Brook	WWF
Silver Creek	EV, HQ-CWF	Coal Run	WWF
South Branch Bear Creek	WWF	Breakneck Creek	WWF
North Branch Bear Creek	CWF	Glade Run	WWF
Buffalo Creek	HQ-CWF, HQ-TSF, TSF	Rocklick Run	WWF
Little Buffalo Creek	HQ-TSF	Scholars Run	WWF
Connoquenessing Creek	HQ-WWF, WWF	Sawmill Run	WWF
Unnamed Tributaries to Connoquenessing Creek	WWF	Sullivan Run	WWF
Lowrey Run	WWF	Butcher Run	WWF
Pine Run	WWF	Muntz Run	WWF
Stony Run	WWF	Muddy Creek	HQ-CWF
Thorn Creek	HQ-WWF, WWF, CWF	Doe Run	WWF
Camp Run	WWF	Hazen Run	WWF
Brush Creek	WWF	Slippery Rock Creek	CWF

The PADEP watersheds within Butler County are illustrated in Appendix G.

A list of the streams within the County and their protected use classification are listed in Appendix H.

NPDES MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4)

Polluted stormwater runoff is often transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local rivers and streams without treatment. An MS4 stormwater management program was established by the EPA to improve the nation's waterways by

reducing the quantity of pollutants that stormwater runoff carries into storm sewer systems during rainfall events.

In 1990, EPA promulgated rules establishing Phase I of the National Pollutant Discharge Elimination System (NPDES) stormwater program for those that generally serve populations greater than 100,000. The Stormwater Phase II Rule extends coverage of the NPDES stormwater program to "small" MS4s, which are municipalities located in "urbanized areas" (UAs) as defined by the Bureau of the Census (unless waived by the NPDES permitting authority).

Operators of regulated small MS4s are required to design their programs to reduce the discharge of pollutants to the "maximum extent practicable" (MEP); protect water quality; and satisfy the appropriate water quality requirements of the Clean Water Act. Implementation of these standards requires the development of BMPs and the achievement of measurable goals to satisfy each of the six (6) Minimum Control Measures (MCM). A small MS4 stormwater management program implements the six MCMs to significantly reduce pollutants discharged into receiving waterbodies.

The following table lists all the MS4 communities in Butler County:

Adams Township	Middlesex Township
Buffalo Township	Seven Fields Borough
Cranberry Township	Valencia Borough
Mars Borough	Winfield Township
City of Butler	

SANITARY SEWER OVERFLOWS (SSO)

Sanitary Sewer Overflows (SSOs) are discharges of raw or inadequately treated sewage from municipal sanitary sewer systems. These systems are designed to carry sanitary sewage but not stormwater. An SSO occurs when sanitary sewage is released into areas such as city streets or waterbodies such as streams or rivers rather than being transported to a treatment facility. SSOs often occur when the sanitary system is too small to contain all of the wastewater introduced into the system and further contribute to the degradation of the water quality in streams and rivers.

SSOs are a serious problem within the Butler City area. These problems can be attributed to such things as illegal stormwater connections to existing sanitary sewers; damaged or cracked pipes; excessive stormwater runoff; large storm events; undersized systems; or blockages within a pipe. The SSO problem areas throughout Butler County will be identified and a solution to these problem areas will be recommended during Phase II.

IMPAIRED STREAMS

Pollution of Butler County's waterways primarily occurs in two forms – point source and non-point source discharges. Point source pollutants are easily identified and can be directly traced to their source. Examples of point source pollution are industrial discharges, municipal discharges, stormwater discharges, combined sewer overflow discharges and concentrated animal feeding operations. Non-point sources include all other forms of pollution such as abandoned mine drainage, agriculture, urban runoff, atmospheric deposition, construction activities, on-lot sewage systems, leachate from landfills and silviculture. The Stream Integrated List represents stream assessments in an integrated format for the Clean Water Act Section 305(b) reporting and Section 303(d) listing. Streams are bodies of flowing surface water that form a network to

drain stormwater impoundments such as basins or catchments. PADEP protects four stream water uses: aquatic life, fish consumption, potable water supply, and recreation.

The 305(b) stream segments have been evaluated for those uses. If a stream segment is not attaining any one of the 4 defined uses, it is considered impaired. In Butler County, over 133 miles of stream have been identified as impaired. A complete list of impaired streams and their causes are included in Appendix H. The following table groups the source cause of non-attaining streams in Butler County, as well as the total miles and the percentage of individual causes:

IMPAIRED STREAM CAUSES		
SOURCE CAUSE	MILES	PERCENT
Abandoned Mine Drainage	63.26	47.4%
Source Unknown	18.86	14.1%
Agriculture	15.88	11.9%
Road Runoff	8.59	6.4%
Urban Runoff/Storm Sewers	7.59	5.7%
Surface Mining	4.50	3.4%
Land Development	2.77	2.1%
On site Wastewater	2.57	1.9%
Municipal Point Source	2.15	1.6%
Upstream Impoundment	1.36	1.0%
Small Residential Runoff	1.24	1.0%
Crop Related Agriculture	1.11	0.8%
Flow Regulation/Modification	0.84	0.6%
Construction	0.65	0.5%
Erosion from Derelict Land	0.63	0.5%
Other	0.45	0.3%
Hydromodification	0.39	0.3%
Natural Sources	0.24	0.2%
Package Plants	0.19	0.1%
Petroleum Activities	0.17	0.1%
	133.44	100.0%

As illustrated above, the most cited cause of impairment is abandoned mine drainage with more than 63 miles of streams identified as impaired. Unknown sources are the second leading cause of impairments. It is important to also recognize a significant amount of impairment caused by development such as urban runoff, road runoff, land development, etc.

CLIMATE

Butler County is situated on the Allegheny Plateau in Western Pennsylvania and the climate is classified as humid continental. Most weather systems that affect the area originate in Canada or the Central Plains of the United States and are moved eastward by the prevailing westerlies. The primary source of moisture is the Gulf of Mexico although minor effects of the Great Lakes, Lake Erie in particular, are sometimes experienced. The mean temperature for Butler County is 51°F with a maximum mean monthly temperature of 71°F in July and mean monthly low of 29°F in January. About 56% of the annual precipitation falls during the spring and summer. Precipitation averages approximately 40 inches per year and is fairly evenly distributed throughout the year. June is the wettest month with an average of 4.7 inches per year and February is the driest month with approximately 2.3 inches per year of precipitation. Snowfall averages 40.2 inches per year with most of it falling between January and March.

GEOLOGY/PHYSIOGRAPHY

Pennsylvania is divided into numerous physiographic provinces. A province is defined as a region in which all parts are similar in geologic structure, climate and relief and have a unified geomorphic history. Butler County is situated in the Allegheny Plateau Province of Pennsylvania, which is characterized as a highland eroded by streams to create deep valleys and hilly topography. The smooth to irregular undulating surface, the narrow and relatively shallow valleys, strip mines and reclaimed lands of shale, sandstone, siltstone, limestone and coal are evident in this region. The bedrock of the Allegheny Plateau is nearly horizontal; therefore only one kind of rock is exposed at the surface. The dominant physiography of Butler County is rolling and hilly and consists of broad to narrow ridge tops and many steep-walled valleys. The Connoquenessing Creek has carved a deep, broad valley across the south-central part of the County. The northwest part of the County is smooth to rolling and consists of many low rounded hills and ridges. Poorly drained depressions are scattered throughout the County. The valleys occupied by Slippery Rock and Wolf Creeks are steep sided.

BEDROCK FORMATIONS

The bedrock within Butler County was formed in the Pennsylvania Period, 280 million to 310 million years ago. The bedrock is divided into three major groups based upon the age of the rocks; they are the Pottsville, Allegheny and Conemaugh groups. The project area is underlain by flat lying, generally thin, but locally thick limestone beds. These rocks can affect the environment in three ways: as hazards, as mineral resources and as groundwater reservoirs. This type of bedrock is also susceptible to landslides. The specific geological classifications and descriptions are listed below for each formation found within the bedrock of Butler County:

Pottsville Group (Pennsylvanian Period): Underlies glacial and alluvial deposits in Wolf and Slippery Rock Creeks. It consists dominantly of massive sandstone interbedded with shale and siltstone and thin lenses of coal.

Allegheny Group (Pennsylvanian Period): Cyclic sequences of sandstone, siltstone, shale and coal and major limestone strata in the lower part. Most of the commercially available coal and limestone are in this group.

Conemaugh Group (Pennsylvanian Period): This group is at the surface throughout most of the southern two-thirds of the County. It consists of recurring sequences of sandstone, red and gray shale and siltstone and thin strata of limestone and coal. The rocks of the Conemaugh Group, especially the red shale, locally known as the Pittsburgh Red Beds, are the most landslide-prone in the County.

SOILS

Butler County's land area is comprised of different soils with varying degrees of slope, ranging from nearly level plateaus to severe sloping along the rivers in the County. The Butler County Soil Survey identifies 90 different soil types within the County. These soil types fall within one of the following eleven soil associations: Gresham-Titusville-Frenchtown, Riverhead-Braceville-Wheeling, Atkins-Canadice-Caneadea, Monongahela-Atkins-Caneadea, Hazleton-Cookport-Buchanan, Hazleton-Gilpin-Wharton, Gilpin-Wharton, Cavode-Wharton-Gilpin, Tilsit-Brinkerton-Gilpin, Udorthents-Wharton-Hazleton and Hazleton-Buchanan-Gilpin. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern. The general characteristics and development potentials and limitations for each category of soil are described as follows.

Soil Associations:

Gresham-Titusville-Frenchtown Association; Slopes 0%-15%; 5% of County: Nearly level to steep, very deep, moderately well drained to poorly drained soils formed in glacial till. Located in the northwest part of the County; on smooth to rolling uplands and in depressions and drainageways, all on till plains and moraines; most areas are used for farmlands; good or fair potential for farmland and good potential for woodland and wildlife habitat; fair to poor potential for urban uses; major limitations are seasonal wetness, slow permeability and slope.

Riverhead-Braceville-Wheeling Association; Slopes 3%-30%; 1% of County: Nearly level to steep, very deep, moderately well drained soils formed in glacial outwash. Located in the northwest part of the County; on smooth to rolling uplands and drainageways, on outwash plains, kames, terraces and eskers; most areas are used for farmlands; good potential for farmland, woodland and wildlife habitat; good to poor potential for urban uses; major limitations are slope, available water capacity, seasonal wetness, slow permeability and rapid permeability in the substratum.

Atkins-Canadice-Caneadea Association; Slopes 0%-3%; 3% of County: Nearly level to moderately steep, very deep, poorly drained and somewhat poorly drained soils formed in alluvium and lacustrine sediments. Located on floodplains, lowlands and dissected low-lying benches in the northern half of the County; most areas are in woodland, brush and wetland grasses; a few areas are used for farmland; fair to poor potential for farmland; good or fair potential for woodland and wildlife habitat; poor potential for urban uses; major limitations are frequent flooding, wetness, slow permeability and instability.

Monongahela-Atkins-Caneadea Association; Slopes 3%-15%; 1% of County: Nearly level to sloping, very deep, moderately well drained to poorly drained soils formed in alluvium and slackwater or lacustrine sediment; located along Connoquenessing Creek and Brush Creek; on smooth to rolling terraces, floodplains and small areas on adjacent uplands and foot slopes; most areas are used for farmland and woodland with some used for urban land; has fair potential for farmland and good potential for woodland and wildlife habitat; fair to poor potential for urban uses; major limitations are seasonal wetness, slow permeability, slope and frequent flooding.

Hazleton-Cookport-Buchanan Association; Slopes 0%-70%; 9% of County: Nearly level to steep, deep and very deep, well drained and moderately well drained soils formed in material weathered dominantly from sandstone; located throughout all but the northwest part of the County; on smooth or rolling, broad and narrow ridge tops, side slopes and benches; most areas are used for farmland and woodland; good potential for farmland, woodland and wildlife habitat; good to poor potential for urban uses; major limitations are seasonal wetness, slow permeability and slope.

Hazleton-Gilpin-Wharton Association; Slopes 0%-70%; 15% of County: Nearly level to steep, moderately deep and deep, well drained and moderately well drained soils formed in material weathered dominantly from sandstone and siltstone; located throughout all but the northwest part of the County; is undulating to rolling on uplands, in depressions and in drainageways; most areas are used for farmland and woodland; good potential for farmland, woodland and wildlife habitat; good to poor potential for urban uses; major limitations are seasonal wetness, slow permeability, depth to bedrock and slope.

Gilpin-Wharton Association; Slopes 3%-70%; 24% of County: Gently sloping to very steep, moderately deep and deep, well drained and moderately well drained soils formed in material weathered dominantly from siltstone and shale; located throughout all but the northwest part of the County; on undulating to hilly uplands and associated drainageways; most areas are used for farmland, woodland and urban development; good to fair potential for farmland and good potential for woodland and wildlife habitat; good to poor potential for urban uses; major limitations are depth to bedrock, seasonal wetness, slow permeability and slope.

Cavode-Wharton-Gilpin Association; Slopes 0%-25%; 8% of County: Gently sloping to steep, deep and moderately deep, somewhat poorly drained to well drained soils formed in material weathered dominantly from shale; located throughout all but the northwest part of the County; on smooth to rolling uplands and in associated drainageways; most areas are used for farmland and woodland; fair potential for farmland and good potential for woodland and wildlife habitat; fair to poor potential for urban uses; major limitations are seasonal wetness, unstable soil material, slow permeability, depth to bedrock and slope.

Tilsit-Brinkerton-Gilpin Association; Slopes 0%-8%; 5% of County: Nearly level to moderately steep, moderately deep to very deep, well drained to poorly drained soils formed in material weathered dominantly from shale and siltstone; located throughout the southern half of the County; is smooth and undulating on uplands, in depressions and drainageways; most areas are used for farmland; few areas of woodland are on lowlands and on slopes near drainageways; fair or good potential for farmland and good potential for woodland and wildlife habitat; fair to poor potential for urban uses; major limitations are seasonal wetness, slow permeability, depth to bedrock and slope.

Udorthents-Wharton-Hazleton Association; Slopes 0%-100%; 12% of County: Gently sloping to very steep, very deep and deep, excessively drained to moderately well drained soils formed during strip mining and in material weathered from sandstone, siltstone and shale; located throughout the County, but mainly in the northern half; on ridge tops, side slopes and foot slopes in drainageways; most areas are in native vegetation and woodland; a small part is used as farmland; poor potential for farmland and fair to poor potential for woodland and wildlife habitat; poor potential for urban uses; major limitations are low available water capacity, slope, many small stones on the surface and seasonal wetness.

Hazleton-Buchanan-Gilpin Association; Slopes 0%-70%; 17% of County: Gently sloping to very steep, moderately deep to very deep, well drained and moderately well drained, dominantly very stony soils formed in material weathered from sandstone, siltstone and shale; located near major streams and tributaries in all but the northwest corner of the County; largest areas in the northeast and north-central parts; on ridges, hills, benches, foot slopes and associated floodplains; most areas are in woodland and brushland, few small areas on ridge tops are used for farmland; generally too steep and too stony for farmland; good potential for woodland and wildlife habitat; poor potential for urban uses; major limitations are slope, many large stones on the surface, seasonal wetness and depth to bedrock.

Hydric Soils: A hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils support the growth and regeneration of hydrophytic vegetation. These soils are important to identify and locate because hydric soils are often an

indication of the potential existence of wetland areas. Hydric soils impose restrictions for development of land. These soils have severe surface and subsurface drainage problems resulting in significant development limitations including the placement of septic systems. Refer to the Butler County Soils Survey, which graphically depicts the approximate location of hydric soils throughout Butler County.

Prime Agricultural Soils: Soils that meet certain physical, chemical and slope characteristics are identified as prime agricultural soils or prime farmland. These soils are important in meeting the county's short-term and long-term needs for food. Ultimately these soils will produce the highest yields with minimal input of energy and economic resources. Based upon a predetermined set of criteria, they are designated by the U.S. Department of Agriculture (USDA) and the Natural Resources Conservation Service (NRCS) in each county. The criteria typically includes level to nearly level slopes, well-drained structure, deep horizons, an acceptable level of alkaline or acid components, and the capacity from producing food and crops. There are 17 types of soils that are classified as Pennsylvania Prime Farmland soils within Butler County. The County contains about 83,000-acres of prime farmland. Approximately 16 percent of land in Butler County is classified as prime agricultural soils.

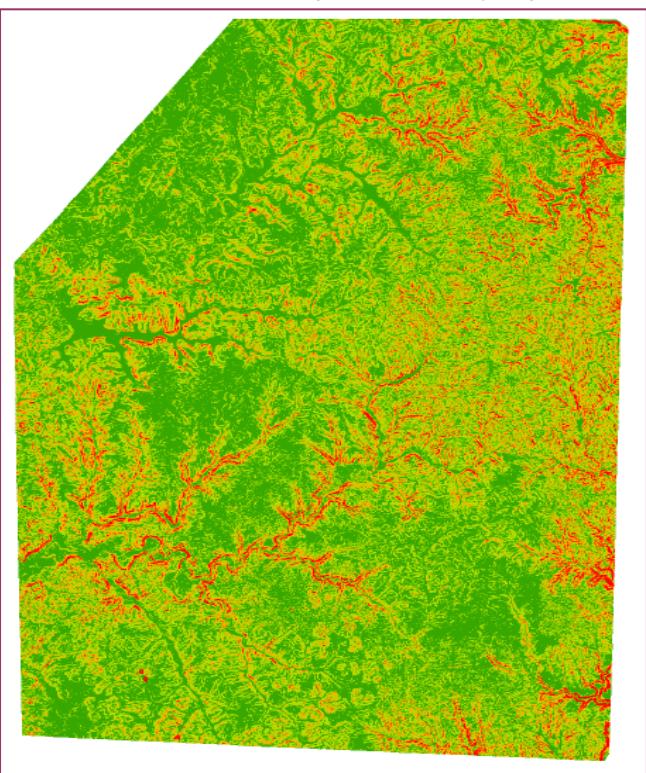
ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas have a unique quality associated with them. Such places could range from a section of a stream with immense biological diversity to a unique ecosystem, such as the displaced prairie at the Jennings Environmental Education Center. By far, the majority of environmentally sensitive areas are found in the northern half of Butler County. The biggest single environmentally sensitive location, the Glade Wildlife Area is located in this region.

SLOPES

The slope of the land is an indication of the developability and use of land. Butler County's land area is comprised of varying degrees of slope, ranging from nearly level plateaus to severe sloping along the rivers of the County. The general characteristics and development potentials and limitations of each category of slope are described as follows:

0-8% Slope: 446.59 square miles, 50.2% of the County. Flat to moderate; capable of all normal development for residential, commercial and industrial uses; involves minimum amount of earth moving; suited to row crop agriculture, provided that terracing, contour planting and other conservation practices are allowed.



Butler County Steep Slopes

8-16% Slope: 296.31 square miles, 33.3% of the County. Rolling terrain and moderate slopes; generally suited only for residential development; site planning requires considerable skill; care is required in street layout to avoid long sustained gradients;

drainage structures must be properly designed and installed to avoid erosion damage; generally suited to growing of perennial forage of crops and pastures with occasional small grain plantings.

16-25% Slope; 116.20 square miles, 13.1% of the County. Steep slopes, generally unsuited for most urban development; individual residences may be possible on large lot areas; uneconomical to provide improved streets and utilities; overly expensive to provide public services; foundation problems and erosion usually present; agricultural uses should be limited to pastures and tree farms.

25-100% Slope; 31.19 square miles, 3.50% of the County. Severe and precipitous slopes; no development of an intensive nature should be attempted; land not to be cultivated; permanent tree cover should be established and maintained; adaptable to open space uses (recreation, game farms and watershed protection).

As demonstrated above, the vast majority of the county is relatively flat. With the exception of very steep slopes (mostly escarpments); slope does not preclude the development potential of the land surface.

FLOODPLAINS/FLOODWAYS

The area of land adjacent to a river, stream or lake that absorbs the occasional overflow of water beyond the banks of those waterbodies is known as the floodplain. Floodplains are important to a community and its environment because they hold back storm flows and reduce destructive flooding downstream. In addition, they are very fertile habitat, providing for good cropland for agriculture as well as providing important shading for stream habitat. Floodplains also provide an important linkage between aquatic and upland habitat.

The steep slopes in the northern part of the County are interlaced with streams and wide floodplains. Like most of Pennsylvania, Butler County has numerous natural ponds, streams and wetlands. These areas include floodplains, which occur naturally throughout their watershed area.

A review of the Federal Emergency Management Agency (FEMA) flood insurance maps and digitized database revealed that 100-year floodplains exist within Butler County. The following waterbodies have delineated floodplains associated with Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS).

WATERBODIES ASSOCIATED WITH FEMA FLOOD INSURANCE STUDY			
Anderson Run	Connoquenessing Cr.	Muddy Creek	Shearer Run
Bear Creek	Crab Run	N. Branch Bear Cr.	Slippery Rock Creek
Blacks Creek	Crooked Run	N. Branch Slippery Rock Cr.	S. Branch Bear Creek
Bonnie Brook	Glade Run	Rocklick Run	Stony Run
Breakneck Cr.	Kaufman Run	Rocky Run	Sullivan Run
Brush Creek	Lake Arthur	Rough Run	Swamp Run
Buffalo Creek	Lake Oneida	Sarver Run	Thorn Creek
Buffalo Run	Lardintown Run	Sawmill Run	Vaur Run
Bull Creek	Lewis Avenue Creek	Scholars Creek	Wolf Run
Butcher Run	Little Mulligan Run	Seaton Creek	Yellow Creek
Camp Run	McDonald Run	Shanks Hollow Run	
Coal Run	McMurray Run	Shannon Run	

WETLANDS

The majority of existing wetlands are concentrated in the north central part of Butler County. Most of the wetlands occur along stream corridors, primarily along Slippery Rock Creek, North Branch Slippery Rock Creek, South Branch Slippery Rock Creek, McDonald Run, McMurry Run, Blacks Creek, Seaton Creek, Muddy Creek, Scholars Run, Yellow Creek, Little Yellow Creek, Big Run and Swamp Run. Wetlands fill a variety of uses including moderating flood waters, recharging groundwater and providing habitat for a variety of flora and fauna. Because of their importance, wetlands are subject to both federal and state regulations.

LAND USE

Land use is also an important feature of stormwater planning. The way land is used directly impacts the way stormwater is transformed into runoff. As evidenced by the existing land use analysis for Butler County, the nature of the county is characterized as a largely rural area with a strong agricultural and manufacturing background. The following table summarizes the existing land uses in Butler County:

EXISTING LAND USES	
LAND CLASSIFICATION	% OF TOTAL LAND USE
High Density-Urban	2.0 %
Medium Density-Urban	2.0 %
Low Density-Urban	2.0 %
High Density-Rural	2.0 %
Low Density-Rural	2.0 %
Industrial	5.0 %
Mixed Development	5.0 %
Wooded	45.0 %
Agricultural/Open Space	30.0 %
Wetlands	2.0 %
Hydrology	2.0 %
Strip-Mined/Disturbed Land	1.0 %
Totals	100.0 %

As summarized above, approximately 80% of the County is undeveloped (wooded, agricultural/open space). The remaining 20% of the County is considered developed (urban), with the two largest developed areas being the City of Butler and Cranberry Township. Some of the critical land uses are analyzed below:

PARKS/GAME LANDS/FOREST RESERVES

Butler County enjoys both plentiful and diverse public recreational opportunities, ranging from small school playgrounds to large State Parks. According to the Pennsylvania Department of Conservation and Natural Resources, there are 72 such park facilities located within the County. By category, there are 38 elementary/high school facilities (829-acres of land), 28 municipal parks (1,093-acres of land), two State Parks (16,586-acres of land) and three State Game Lands (10,182-acres of land). The Glades waterfowl area is located within State Game Lands #95. Butler County also has four forest reserves. The reserves are Miller Woods (48-acres), Slippery Rock Creek Property (96-acres), Connoquenessing Creek Nature Reserve (167-acres) and Middlesex Township Nature Preserve (2-acres).

MANUFACTURING

Manufacturing continues to be a major economic force for Butler County. Today, the primary-metal industry is dominant in the County. Fabricated metal products are second. The other major industries are in the fields of transportation equipment; nonelectrical machinery; stone, glass, clay and concrete products; and petroleum refineries, chemicals and related products.

AGRICULTURE

Agriculture has long been the leading industry for the region and the state. The fertile lands in Pennsylvania have long been associated with farming. In fact, the agriculture industry continues to be a leading economic sector for Butler County and remains a strong element of the fiscal health of the county. According to the U.S. Department of Agriculture, Butler County consists of a total of 1,174 farms encompassing 143,985 acres of land. This agricultural land accounts for 28 percent of the total land area of the County.

The Agricultural Conservation Easement Purchase Program was established under the Agricultural Security Area Law. An agricultural easement provides a landowner the option to sell the development rights of land dedicated to agricultural uses. The land remains under the person's ownership, but may not be developed for any non-agricultural use. Funding to purchase agricultural conservation easements is provided by the state, county, local municipal allocations and private revenue. As of 2006, the Agricultural Conservation Easement program in Butler County had twenty agricultural conservation applications on its waiting list.

The Agricultural Security Area (ASA) program was created by the Pennsylvania legislature, and is administered at the municipal level. ASA's are rural, agricultural areas that are targeted for protection from urban development. They receive special consideration regarding local ordinances affecting normal farming practices, state agency rules and regulations, and in eminent domain condemnation proceedings. ASA's are intended to promote more permanent and viable farming operations over the long term by strengthening the farming community's sense of security in land use and the right to farm. ASA's are created by local municipalities in cooperation with individual landowners who agree to collectively place at least 250 acres in an ASA. Throughout Butler County, there are approximately 3,577-acres included in agricultural security areas.

PHASE I PLANNING PROCESS

AGREEMENT BETWEEN PADEP AND BUTLER COUNTY

An agreement for a Phase I Watershed Stormwater Management Plan Grant for all watersheds of Butler County was made between the Pennsylvania Department of Environmental Protection and Butler County on August 21, 2007.

The agreement was made in order for Butler County to prepare a Stormwater Management Plan in two phases. The first phase (Phase I) is the preparation and submission of a Scope of Study to PADEP for their review and approval. The Scope of Study generally consists of a determination of the level of effort and cost required by Butler County to satisfactorily complete the second phase (Phase II). Phase II includes the preparation and adoption of the Stormwater Management Plan based on the level of effort identified in Phase I.

The Phase I agreement termination date is June 30, 2008.

ENGINEERING CONSULTANT SELECTION

In order to assist in the preparation of Phase I, the Butler County Commissioners selected Herbert, Rowland & Grubic Inc. (HRG) to provide stormwater-planning services to Butler County and complete this Phase I report.

CREATION AND DISTRIBUTION OF AN INFORMATION REQUEST FORM

HRG created the "Butler County Phase I Act 167 Stormwater Management Plan Information Request Form" which was distributed by the Butler County Planning Commission at the WPAC meeting No. 1 to those members in attendance and then to those members not in attendance within one month of the WPAC meeting No. 1. All municipalities and other interested citizen groups and public organizations were encouraged to complete the form. The purpose of the 7 page Information Request Form was to gather various pieces of information to help determine the level of commitment from each municipality, to reveal what the major stormwater issues were that affected each municipality, and to determine the location of existing problem areas, significant obstructions, and stormwater management facilities.

ESTABLISHMENT OF A WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

An additional purpose of the Information Request Form was to gather contact information for representatives of each of the municipalities as well as other concerned organizations, groups, or citizens that would be interested in participating in the Watershed Plan Advisory Committee (WPAC). The purpose of the WPAC is to serve as an access for municipal input, assistance, voicing of concerns and questions, and to serve as a mechanism to ensure that the intermunicipal coordination and cooperation is secured.

As part of a new initiative by PADEP, it is their position that if a representative from each municipality does not volunteer to join the WPAC, then the head of each governing body will be the appointed member to the WPAC. As an appointed member, that member will be provided all correspondence, be considered an active member, and their name will be included in a list as a member of the WPAC contained within the Plan. The head of each governing body will also be asked to assist their municipality in adoption of the provisions and requirements of the final Plan.

WATERSHED PLAN ADVISORY COMMITTEE			
MEMBER	ORGANIZATION	MEMBER	ORGANIZATION
John Evans	City of Butler	Randy Smith	Washington Twp
Ron Olsen / Brian Gilliland	Adams Twp	David Kennedy	Winfield Twp
Charles Stowe	Allegheny Twp	Ken Harley	Worth Twp
Daniel Opalewski	Brady Twp	Larry Pennington	Bruin Boro
Albert Roenigk	Buffalo Twp	Ed Conway	Callery Boro
Cindy Davis	Butler Twp	Ron Lockwood	Cherry Valley Boro
Ron Flatt	Center Twp	George Brothers	Chicora Boro
William Smith	Cherry Twp	Jeff Kopinski	Connoquenessing Boro
JoAnn Duke	Clay Twp	Richard Day	East Butler Boro
Phil Hay	Clearfield Twp	Bruce Toth	Eau Claire Boro
James Halstead	Clinton Twp	Gary Capella	Evans City Boro
Tom Manuel	Concord Twp	Jeff Shumaker	Fairview Boro
John Stokes	Connoquenessing Twp	Gary Habsburg	Harmony Boro
Jason Kratsas	Cranberry Twp	Jonathan Crighton	Harrisville Boro
Dwayne Weber	Donegal Twp	Virgil Cousins	Karns City Boro
Dennis Bryan	Fairview Twp	Ron Olsen / Brian Gilliland	Mars Boro
David R. Lamperski	Forward Twp	Margaret Merryman	Petrolia Boro
John "Jake" Orloski	Franklin Twp	Tom Saunders	Portersville Boro
Richard Crown	Jackson Twp	Nick Vaccarello	Prospect Boro
Evelyn Gross / Leo Rosenbauer	Jefferson Twp	Tom Knights	Saxonburg Boro
John H. Meyer	Lancaster Twp	Bret Cole	Seven Fields Boro
Jason McBride	Marion Twp	Royce Lorentz	Slippery Rock Boro
Walt Walowen	Mercer Twp	William Woods	Valencia Boro
Scot E. Fodi / Mike Spreng	Middlesex Twp	Bill Buchanan	West Liberty Boro
Sean Gramz	Muddy Creek Twp	Jack Grindle	West Sunbury Boro
Donald Hays / Regis Thoma	Oakland Twp	Tom Thompson	Zelienople Boro
Jerry Malurak	Parker Twp		
Doug Roth	Penn Twp		
William McGarvey	Slippery Rock Twp		
Rege Kreh	Summit Twp		
Richard Mizgorski	Venango Twp		

WATERSHED PLAN ADVISORY COMMITTEE MEETINGS

Two (2) Watershed Plan Advisory Committee meetings were held during the Phase I process. The purposes of the meetings were to gather information and provide education to the WPAC.

WPAC Meeting #1 was held on January 10, 2008. The meeting provided an overview of the Act 167 process, provided expectations and potential results and outcomes of the Plan, provided an explanation of the Information Request Form, began the formation of the WPAC membership and concluded with a question and answer period.

WPAC Meeting #2 was held on May 21, 2008. Prior to the meeting, draft copies of the Phase I Report were supplied to the County Planning Commission for review. The purpose of this meeting was to summarize the Phase I report, outline the tasks to be completed during Phase II, and address any comments or concerns of the WPAC at that time and to address WPAC comments after members had a chance to review the posted copy of the Phase I Draft Report.

PHASE I REPORT

The Phase I Report is a scope of study to assist Butler County in the preparation and finalization of a Phase II Act 167 Stormwater Management Plan. This Phase I Report identifies the scope and provides estimated fees to complete the identified Phase II tasks.

SUBMISSION OF PHASE I REPORT TO PADEP

The Phase I Report – Scope of Study was submitted to the Pennsylvania Department of Environmental Protection for their review on August 21, 2008. Finalization of the Phase I Report will lead to an additional contract between Butler County and PADEP for the completion of a Phase II Report.

INFORMATION REQUEST FORM DISCUSSION

INFORMATION REQUEST FORM RESULTS

The Information Request Form was designed to solicit input from each municipality and other interested organizations, relative to specific problem areas throughout Butler County, as well as the needs they may see for stormwater management in their particular municipality. The Information Request Form was distributed, along with an educational handout initially during the WPAC#1 meeting in Phase I and then to those members who did not attend the WPAC#1 meeting. The Information Request Form included a map of the individual municipality and was used to identify locations of problem areas, significant obstructions, and existing or proposed stormwater management facilities. A copy of the Information Request Form is included as Appendix A of this document. In addition, the information contained within the Information Request Forms was instrumental in determining the scope of Phase II planning.

Because the most important part of the Act 167 planning process is the implementation of the final provisions and standards of the Plan, another reason for utilizing this Information Request Form is to develop interest in stormwater management issues by the municipalities. Attempting to obtain municipal "buy-in" of the project was a key element during the entire Phase I process. Obtaining support from these municipalities early in the process will ensure a better end product and hopefully ease the process of adoption and implementation by each municipality within Butler County.

Although Information Request Forms were received from all 57 municipalities (100%) in Butler County, not all municipalities filled them out completely.

Through analysis of the results of the Information Request Forms, it was determined that the two principal stormwater problems are Flooding and Erosion. The responding municipalities also supported (4) or strongly supported (5) this project at a 65% rate.

A summary of the results of the Information Request Forms can be found in Appendix B.

PHASE II DISCUSSION

ITEMS TO BE ADDRESSED IN PHASE II

During Phase I, the WPAC made several decisions regarding certain specific items that should be addressed during the Phase II planning process and the Phase II Final Plan. Refer to Appendix C of this report for a detailed breakdown of the Phase II Scope of Work.

A summary of the specific tasks and subtask shall be as follows:

Task A – Data Collection/Review/Analysis

- SubTask A.1 – Data Collection
- SubTask A.2 – Municipal Ordinance Reviews/Evaluations
- SubTask A.3 – Data Preparation for Technical Analysis

Task B – Technical Analysis

- SubTask B.1 – Implement Volume Controls
- SubTask B.2 – Implement Rate Controls
- SubTask B.3 – Model Subwatersheds of Designated Watersheds
- SubTask B.4 – Provide Conceptual Solutions for Existing Problem Areas
- SubTask B.5 – Goals, Objectives, and Compilation of All Technical Standards
- SubTask B.6 – Implementation of Technical Standards and Criteria
- SubTask B.7 – Economic Analysis
- SubTask B.8 – Regulations for Activities Impacting Stormwater Runoff
- SubTask B.9 – Water Quality Impairments

Task C – Public/Municipal Participation

- SubTask C.1 – Plan Advisory Committee (PAC) Meetings

Task D – Plan Preparation and Implementation

- SubTask D.1 – Plan Report Preparation
- SubTask D.2 – Model Ordinance Preparation
- SubTask D.3 – Plan Adoption and Implementation

One of the most critical issues during Phase I was the determination of which and how many of the PADEP designated watersheds would be modeled during Phase II. According to the Information Request Forms provided by the WPAC, a large number of problem areas were identified throughout Butler County. Portions of these watershed areas would be modeled during Phase II. A significant amount of problem areas and existing stormwater facilities were identified in the Connoquenessing Creek watershed, requiring detailed modeling for the watershed. A number of areas in the Breakneck Creek, Buffalo Creek, Sullivan Run and Slippery Rock Creek watersheds were identified as problem areas and portions of these watersheds will require a detailed analysis. These problem areas will be reviewed in depth to assess whether detailed modeling is required to develop solutions to those problems.

As part of the Phase II work, a Model Ordinance will be created which includes the standards and provisions of the Plan. An important part of the Model Ordinance will be the inclusion of regulations for activities impacting stormwater runoff. These regulations are not meant to discourage the activities, but instead make sure they are completed in a proper manner with due regard to stormwater management.

MUNICIPALITIES RESPONSIBILITIES AFTER THE ADOPTION OF THE PLAN

During the preparation of the Plan, each municipality will participate in its creation through the Plan Advisory Committee (PAC). In addition, several public meetings will be held to educate the general public about the Plan efforts, methods of implementation and other items deemed necessary by the WPAC and County. Therefore, the resulting completed Plan will reflect the municipality's desires in addressing stormwater management consistent with Act 167 requirements.

In accordance with state law, each municipality must implement the Plan. The municipalities will implement the standards of the Plan by adopting the provisions of the Model Ordinance created in the Plan. After the Plan is officially adopted by the County, it will be submitted to the PADEP for approval. Within six months of PA DEP's approval, each municipality must adopt the Model Ordinance.

GENERAL WORK PLAN

PHASE II AGREEMENT

Upon completion and submission of the Phase I report to PADEP, Butler County and PADEP will enter into an agreement to complete the Phase II portion of the project. Funding for the project should be allocated by PADEP prior to the beginning of any of the Phase II tasks. A 75% reimbursement procedure will be implemented between Butler County and PADEP during the Phase II project.

CONSULTANT SELECTION

It is recommended that Butler County secure an engineering consultant to assist in completing at least the technical analysis task of the Phase II project. A qualified consultant knowledgeable in the Act 167 process (including adoption and implementation procedures), stormwater issues in the County, and municipalities within the County, will benefit the County during the Phase II process.

INFORMATION REQUEST FORM

An Information Request Form was distributed during and subsequent to the first WPAC meeting (01/10/2008) during Phase I. The Information Request Form (see Appendix A) solicited information on problem areas, obstructions, existing and proposed stormwater facilities, and flood control facilities. Other information requested relates to municipal ordinances, support for the plan, relative importance of various plan criteria, and interest in best management practices (BMPs). The municipalities were also asked to appoint a WPAC representative. The data collected through the Information Request Form will assist in technical and non-technical aspects of the planning process and in scoping the overall Plan. The problem areas and significant obstructions indicated in the Information Request Forms will need to be analyzed during Phase II and will become the basis of required subwatershed area modeling.

WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

During the Phase I portion of this project, a WPAC was formed. Many of the WPAC members indicated their willingness to volunteer to join the committee through the Information Request Form. In addition, letters were mailed to each municipality requesting them to appoint at least one person from their individual municipality to become a member of the committee. This letter was in response to Section 6(a) of the Pennsylvania Management Act (Act 167), which states "The county shall establish, in conjunction with each watershed stormwater planning program, a watershed plan advisory committee composed of at least one representative from each municipality within the watershed, the county soil and water conservation district and such other agencies or groups as are necessary and proper to carry out the purposes of the committee". Also stated in the letter was PA DEP's position that if a representative from a municipality was not appointed, then the head of the governing body will be appointed to the WPAC.

It is intended that the WPAC will continue to serve as the primary source of plan guidance for the overall planning process throughout Phase II. The committee members will also serve as the primary contact point for the municipalities/organizations that they represent. It is anticipated that each of these municipalities/organizations will continue to have representation in the WPAC.

Through the Information Request Form, the WPAC identified the following organizations as possible WPAC participants:

- Butler County Conservation District
- Saxonburg Area Authority
- Pennsylvania Department of Environmental Protection
- Bear Creek Watershed Alliance
- United States Army Corps of Engineers (Pittsburgh District)
- The Gateway Engineers, Inc.

These organizations and entities were contacted and invited to join the WPAC during Phase I. Additional stakeholders may be identified during Phase II. If appropriate, an invitation to join the WPAC will be extended to these entities.

MUNICIPAL ENGINEERS PARTICIPATION

Two of the WPAC meetings will focus on the more technical aspects of the Plan. These elements include modeling, technical analysis, and development of management criteria. This meeting will be encouraged to be attended by municipal engineers and will focus solely on the engineering aspects of the Plan as opposed to the more general objectives and overall contents of the Plan.

LEGAL ADVISORY PARTICIPATION

Another WPAC meeting will have a purpose to incorporate information between municipal solicitors into the Plan. This committee will focus on implementation of the Model Ordinance from a legal and regulatory framework standpoint.

STANDARDS

The Plan will include criteria for a comprehensive stormwater management strategy that includes two elements:

- Peak Rate Control Management
- Volume Control Management

Peak Rate Control Management – Implementation of Release Rates for various subwatersheds will be developed based on collected data, modeling, engineering judgment, and committee input.

Volume Control Management – Implementation of Control Guidance 1 and Control Guidance 2 from the Pennsylvania Stormwater Best Management Practices Manual.

ROLES OF COUNTY AND CONSULTANT

The division of work and responsibilities between Butler County and the Consultant should be determined prior to the beginning of Phase II tasks. Generally, the County may serve as project coordinator and be responsible for non-technical aspects of the Plan. This may include appropriate data collection, plan composition, mapping, ordinance analysis, and assisting the Consultant with field data collection.

The Consultant would be responsible for technical aspects of the Plan. This includes data review, problem area and significant obstruction analysis, hydrologic modeling, development of

technical criteria, and economic analysis. The Consultant would compose technical components of the Plan text and provide draft and final project mapping.

WORK SCHEDULE

A work schedule was developed during the Phase I process in conjunction with Butler County and the Consultant. The work schedule was formulated to set target dates for various tasks with the intention of completing the project for PADEP review within the Phase II contract period. The proposed Butler County work schedule is illustrated in Appendix E.

REFERENCES

1. Butler County Planning Commission, Butler County Comprehensive Plan Phase I, 1997.
2. Butler County Planning Commission, Butler County Comprehensive Plan Phase II, 2003.
3. United States Department of Agriculture Soil Conservation Service, Soil Survey of Butler County, Pennsylvania, January 1989.
4. Maryland Department of the Environment, 2000 Maryland Stormwater Design Manual Volumes I & II, 2000.
5. Pennsylvania Association of Conservation Districts, Pennsylvania Handbook of Best Management Practices for Developing Areas, November 14, 1997.
6. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, Pennsylvania Stormwater Best Management Practices Manual, December 2006.
7. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, Pennsylvania Model Stormwater Management Ordinance, January 2007.
8. Mackin Engineering, Inc., Northwestern Butler County Multi-Municipal Comprehensive Plan, August 2007.
9. Simonds and Simonds Landscape Architects, Zelienople Today and Tomorrow Comprehensive Plan, August 1966.
10. Lorenzi, Dodds & Gunnill, Inc., Moraine Area Comprehensive Development Plan, June 1970.
11. Western Pennsylvania Conservancy, Connoquenessing Creek Watershed Conservation Plan, February 2008.

APPENDIX A.
INFORMATION REQUEST FORM

ACT 167, BUTLER COUNTY WATERSHEDS

Stormwater Management Plan

Information Request Form

PLEASE COMPLETE THE FOLLOWING AND RETURN THE FORM AND MARKED UP MAP TO:

JOHN RUSNAK, PE	(An addressed envelope with postage is provided for your convenience.)
Herbert, Rowland & Grubic, Inc.	
200 West Kensinger Drive, Suite 400	
Cranberry Township, PA 16066	

person completing FORM

Municipality	
Name	
Phone	
e-mail	

1. Does your municipality HAVE?

*For the Regulations / Ordinances listed, please list where the Regulation / Ordinance is found in the "Location" column.

Use the following abbreviations for the "Location" column:

CP = comprehensive plan

ZO = zoning ordinance

BC = building code

SO = separate ordinance

SL = subdivision/land development ordinance

	Yes	No	Location/Date
Comprehensive Plan	<input type="checkbox"/>	<input type="checkbox"/>	
Zoning Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
Subdivision/Land Development Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
Floodplain Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Stormwater Management Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion Control Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Drainage Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	

2. Is your Municipality considered a small MS4 Municipality under the current NPDES Phase II stormwater regulations? (CIRCLE ONE)

Yes	No
If yes, is your small MS4 Municipality currently in compliance with the NPDES Phase II Permit?	
Yes	No

3. The Watershed Plan will address five key stormwater considerations. These five are listed below. Please indicate how important you believe it is to address each consideration.

CONSIDERATION	Increased flows from stormwater runoff contribute to stream erosion, localized ponding and flooding, may cause damage to infrastructure (roads, sewers, etc.).	Very Important					Not Important				
		5	4	3	2	1	5	4	3	2	1
Peak Flows	Increased flows from stormwater runoff contribute to stream erosion, localized ponding and flooding, may cause damage to infrastructure (roads, sewers, etc.).	<input type="checkbox"/>									
Water Quality	Dissolved and un-dissolved pollutants washed off the land surface – negative impacts to recreation, aesthetics and in-stream habitat.	<input type="checkbox"/>									
Groundwater Recharge	Increased runoff decreases amount of rain that becomes groundwater; decreased groundwater supplies may have negative effects on well water supplies and decrease or dry up stream base flow in dry periods.	<input type="checkbox"/>									
Stream Erosion	Eroding banks and beds may undercut roads and utilities, damages in-stream habitat, clog culverts and bridges.	<input type="checkbox"/>									
Flooding	Larger scale overbank flows such as the 100-year flood associated with extreme storm events	<input type="checkbox"/>									

4. Would you like to see information on any of the following presented at a Watershed Plan Advisory Committee meeting?

	Yes	Maybe	No
Best Management Practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Model/Implemented Ordinances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information on Act 167 reimbursements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other topics you would like to have considered: _____

5. What is the most important stormwater related issue to your municipality?

**5A. DO YOU WORK WITH NEIGHBORING MUNICIPALITIES REGARDING STORMWATER ISSUES / PROBLEMS?
IF SO, WHICH ONES?**

6. THE FOLLOWING LISTS THE TYPES OF STORMWATER RELATED PROBLEMS YOUR MUNICIPALITY MAY BE EXPERIENCING. FOR EACH PROBLEM TYPE, PLACE A CHECK MARK IN THE COLUMN THAT BEST DESCRIBES THE SEVERITY, FREQUENCY AND CAUSE. IF YOUR MUNICIPALITY IS EXPERIENCING A PROBLEM NOT LISTED, PLEASE LIST IT IN THE SPACE MARKED "OTHER".

PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	<input type="checkbox"/>											
Street Flooding	<input type="checkbox"/>											
Property Flooding	<input type="checkbox"/>											
Soil Erosion	<input type="checkbox"/>											
Sediment in Streams	<input type="checkbox"/>											
Stream Bed/Bank Erosion	<input type="checkbox"/>											
Scour at Outfalls	<input type="checkbox"/>											
Property/Infrastructure Damage	<input type="checkbox"/>											
Pollution	<input type="checkbox"/>											
Habitat/Resource Damage	<input type="checkbox"/>											
Other	<input type="checkbox"/>											

7. Stormwater Management plans are required under the Pennsylvania Stormwater Management Act, Act 167. Authorization to proceed with this plan as required by Act 167 has been given by the County Commissioners. The long-term goal of this plan will be to maintain existing hydrologic conditions including groundwater levels, water quality, stream base flow and stream storm flows. With this in mind, what level of support will your municipality or agency provide for this project?

Strongly Support					Strongly Oppose
5	4	3	2	1	
<input type="checkbox"/>					

8. Watershed Plan Advisory Committee meetings are expected to be held approximately 4 times per year for approximately 2 years.

Who will attend meetings on behalf of your municipality or organization?

Name	
Address	
Phone	
e-mail	

9. Would you suggest any other agencies or organizations that should be included on the Watershed Plan Advisory COMMITTEE? If so, please give contact information below:

Name	
Organization	
Address	
Phone	
e-mail	

10. Do you know of any existing or proposed flood control projects in your municipality? (please circle one)

Yes	No
If yes, please describe the project(s) below:	

11. Are existing (public or private) stormwater management facilities (outfalls, basins, etc.) being maintained (i.e. removal of debris from outlet structures, adequate control of vegetation, capacity maintenance, etc.)? (please circle one)

Yes

No

If yes, please describe the locations(s) below:

12. PLEASE PROVIDE ANY INPUT YOU FEEL IS RELEVANT REGARDING CURRENT WATERSHED MANAGEMENT PROCEDURES.

**13. THE FOLLOWING TABLE REQUESTS INFORMATION ON PROBLEM AREAS AND OBSTRUCTIONS.
PLEASE PLACE A CHECK MARK IN THE "P" COLUMN IF THE SITE IS A PROBLEM AREA OR PLACE A
CHECK MARK IN THE "O" COLUMN IF THE SITE IS AN OBSTRUCTION.**

Problem Areas - Areas of ponding or flooding, erosion, stream channel or bank erosion, property damage, safety concerns, etc.

Obstructions - Bridges, pipes, culverts, dams or other physical barriers to stream flow that restrict the channel flow and typically cause ponding or flooding upstream of the structure.

In the "Description" column describe the type, location, & size of the Problem Area or Obstruction, (i.e. "undersized 36-inch CMP where Main Street crosses Sandy Creek". For each site listed, place the Number of the site at the appropriate location on the enclosed map of your Municipality (attached at the end of this packet). If a solution to the Problem Area or Obstruction is proposed, describe the solution in the "Solution" column. Please copy this sheet if additional space is needed.

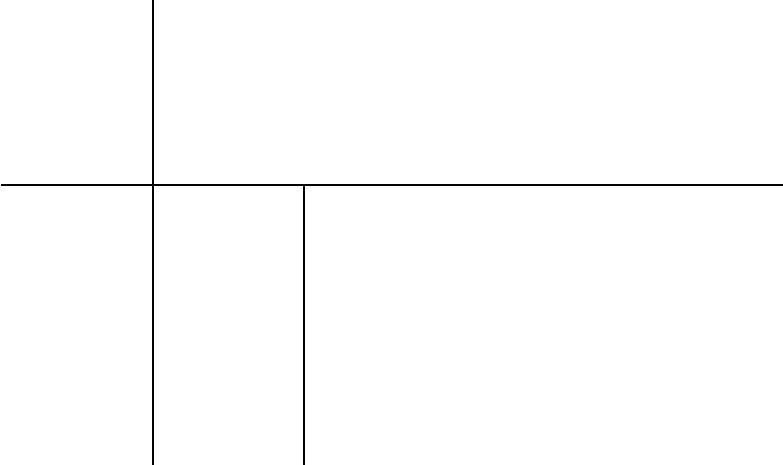
Number	Problem	Obstruction	Description	Solution
EXAMPLE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Undersized 36-Inch CMP where Main Street crosses Plum Run causes ponding upstream	Replace with larger pipe
1	<input type="checkbox"/>	<input type="checkbox"/>		
2	<input type="checkbox"/>	<input type="checkbox"/>		
3	<input type="checkbox"/>	<input type="checkbox"/>		
4	<input type="checkbox"/>	<input type="checkbox"/>		
5	<input type="checkbox"/>	<input type="checkbox"/>		
6	<input type="checkbox"/>	<input type="checkbox"/>		
7	<input type="checkbox"/>	<input type="checkbox"/>		
8	<input type="checkbox"/>	<input type="checkbox"/>		
9	<input type="checkbox"/>	<input type="checkbox"/>		
10	<input type="checkbox"/>	<input type="checkbox"/>		

Please copy this sheet if additional space is needed.

14. The following requests information on existing or proposed storm sewer systems or management facilities. These are storm sewer systems, permanent stormwater detention ponds, underground detention facilities or other systems or facilities intended to collect, convey or detain stormwater. Please letter each site sequentially and place the letter corresponding to each site at the appropriate location on the enclosed map of your municipality. Please copy this sheet if additional space is needed.

Letter	Description
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	

Please copy this sheet if additional space is needed.



APPENDIX B.

INFORMATION REQUEST FORM SUMMARY

Summary Table of information provided by the WPAC through the Information Request Form:

<u>Organization</u>	Q1						MS4	Q2			Q3			Q5	Q5A	Q7	Q10	Q11
	Comp Plan	Zoning Ord	SALDO	Floodplain Regs	SWM Regs	E&S Regs		Peak Flow Rates	Water Quality	Groundwater Recharge	Stream Erosion	Flooding	SW Issues	Work with Neighboring Munic.				
Clinton Township	Y	Y	Y	Y	Y	N	N	5	5	5	5	4	Y		5	N	Y	
Connoquenessing Township	Y	N	Y	N	Y	Y	N	5	3	5	5	3	N		4	N	N	
Concord Township	N	N	Y	N	N	N	N	4	2	2	5	3	Y		1	N	N	
Valencia Borough	N	N	N	N	N	N	N	3	2	2	2	2	Y		3	N	N	
Penn Township	Y	Y	Y	Y	Y	N	N	5	4	4	4	5	Y		5	N	N	
Jackson Township	Y	Y	Y	Y	Y	Y	Y	5	3	2	3	5	Y		5	N	N	
Fairview Borough	N	N	N	N	N	N	Y	1	1	1	1	1				N	Y	
Fairview Township	N	N	N	N	N	N	N	4	5	4	5	5	Y		4	N	Y	
Chicora Borough	N	N	N	N	N	N	N	4	2	2	2	4	Y			N	N	
Callery Borough	N	Y	Y	Y	N	N	N	5	3	1	5	5	Y		5	N	Y	
Cherry Township	N	N	N	Y	Y	N	N	5	4	4	5	4	Y		5	N	Y	
Franklin Township	Y	Y	Y	Y	Y	Y	N	5	3	5	5	2	Y		5	N	Y	
Jefferson Township	Y	N	Y	Y	N	N	N	5	4	5	4	5	Y		4	N	N	
East Butler Borough	N	Y	N	Y	N	N	N	5	2	2	5	3			3	N	Y	
Mercer Township	N	N	Y	N	N	N	N	4	4	4	4	4	Y		3	N	Y	
Allegheny Township	N	N	N	Y	N	N	N	3	3	3	3	3			2	N		
City of Butler	Y	Y		Y	Y			Y	5	5	4	5	5	Y		4	Y	
Harmony Borough	N	Y	Y	N	Y	Y	Y	N	5	5	5	5	5	Y		4	N	N
Clearfield Township	N	N	Y	Y	Y	Y	Y	N	5	3	3	3	5	Y		5	N	Y
Cherry Valley Borough	N	N	N	N	N	N	N	4	2	4	3	4	Y		5	N	Y	
Brady Township	Y	Y	Y	N	N	N	N	2	2	2	2	4	Y		3	N	Y	
Evans City Borough	Y	Y	Y	Y	Y	Y	Y	N	5	3	2	2	5	Y		3	Y	Y
Summit Township	N	Y	Y	Y	Y	Y	N	4	4	3	4	4	Y		4	N	Y	
Muddy Creek Township	Y	N	Y	Y	N	N	N	5	4	4	4	4	Y		4	Y		
Saxonburg Borough	Y	Y	Y	N	Y	N	N	5	3	1	4	5	Y		5	N	Y	
Oakland Township	N	N	Y	N	Y	Y	Y	N	5	5	4	5	4	Y		4	N	Y
Prospect Borough	Y	Y	Y	Y	N	N	N	3	5	1	2	3	Y		4	N	N	
Winfield Township	Y	Y	Y	Y	Y	Y	Y	5	5	5	5	4	Y			N	Y	
Adams Township	Y	Y	Y	Y	Y	Y	Y	5	5	5	5	5	Y		4	Y	Y	
Mars Borough	N	Y	N	N	N	N	N	5	5	5	5	5	Y		4	N	Y	
Butler Township	N	Y	Y	Y	Y	Y	Y	N	5	3	3	5	5	Y		4	Y	Y
Harrisville Borough									4	5	5	5	3			3	Y	Y
Forward Township	Y		Y	Y	Y	N	N	Y	5	5	3	4	5	Y		5	N	Y
Venango Township	N	N	N	N	N	N	N	5	1	1	5	5	Y		3	N	N	
Middlesex Township	Y	Y	Y	Y	Y	Y	Y	Y	5	5	5	5	5	Y		5	N	Y
Connoquenessing Borough	Y	Y	Y	N	Y	Y	Y	N	5	4	3	3	3	Y		5	N	N
West Liberty Borough	Y	N	Y	N	N	N	N	4	5	3	2	2	Y		3			
Zelienople Borough	Y	Y	Y					N	5	4	3	5	5	Y		4	N	Y
Slippery Rock Borough	Y	Y	Y	N	Y	Y	Y	N	5	5	5	5	5	Y		5	N	Y
Seven Fields Borough	Y	Y	Y	Y	Y	Y	Y	Y	3	3	2	3	4	Y			N	Y
Portersville Borough	N	Y	Y	N	N	N	N		3	4	4	2	2	Y		3	N	Y
Bruin Borough	N	N	N	N	N	N	N		5	3	3	3	5	Y		5	N	Y
Buffalo Township	Y	Y	Y	Y	Y	Y	Y	Y	5		5	5	5	Y		5	N	N
Center Township	Y	Y	Y	Y	Y	Y	Y		5	2	3	4	3	Y		5	N	Y
Clay Township	N	N	Y	N	N	N	N		5	4	3	4	5	Y		5	N	Y
Karns City Borough	N	N	N	N	N	N	N		5	5	3	3	5	Y		5	N	
Donegal Township	N	N	Y	N	N	N	N		4	3	4	3	4	Y		5	N	Y
Eau Claire Borough	N	N	N	N	N	N	N		4	4	2	2	4	Y		5	N	Y

Question 1. Does your Municipality HAVE?

Question 2. Is your Municipality considered a small MS4 Municipality under the current NPDES Phase II stormwater regulations? (Yes or No)

Question 3. The Watershed Plan will address five key stormwater considerations. These five are listed below. Please indicate how important you believe it is to address each consideration. (5 – Very Important) to (1- Not Important)

Question 5. What is the most important stormwater related issue to your municipality?

Question 5a. Do you work with neighboring municipalities on stormwater issues/problems? (Yes or No)?

Question 7. What level of support will you provide for this project (5 – Strongly Support) to (1 – Strongly Oppose)?

Question 10. Do you know of any existing or proposed flood control project in your municipality (Yes or No)?

Question 11. Are their existing (public or private) stormwater management facilities being maintained (Yes or No)?

Summary Table of Problem Areas provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
P1	Clinton Township	Wylie Rd South of Elm Ln	Bank Erosion
P2	Clinton Township	Anderson Rd	Flooding Water, Erosion
P3	Clinton Township	Callen Rd	Erosion
P4	Clinton Township	Ivywood Rd at Brewer Rd	Water Ponding
P5	Clinton Township	Deer Creek before Jack Rd	Erosion
P6	Clinton Township	Tower Rd (2 Locations)	Road Surface Sinking
P7	Clinton Township	Westminster Rd near Rt 228	Water Ponding
P8	Clinton Township	Miller Rd near Brewer Rd	Water Ponding
P9	Clinton Township	Goldscheitter Rd near Stark Rd	2 Undersized Pipes
P10	Clinton Township	Victory Rd	Erosion
P11	Clinton Township	Lardintown Rd South of Rt 228	Flooding
P12	Clinton Township	Saxonburg Blvd	Unapproved Driveway Blocking Flow
P13	Concord Township	Manuel Rd	Low Lying Area
P14	Concord Township	Kuhn Rd	Excess Runoff
P15	Concord Township	Kauf Rd	Excess Runoff
P16	Concord Township	Stoops Rd	Flooding
P17	Concord Township	Campbell Rd	Excess Runoff
P18	Concord Township	Cartwright Rd	Excess Runoff
P19	Valencia Borough	Three Degree Rd	Flow Restrictions at Bridge
P20	Valencia Borough	Breakneck Creek	Increase in Flow
P21	Penn Township	Creek Rd in Village of Renfrew	Flooding
P22	Penn Township	Behind Houses in Village of Renfrew	Excess Runoff
P23	Penn Township	Village of Renfrew East of Hicks	Road Flooding
P24	Penn Township	McBride St at Rt 8	Excess Runoff
P25	Penn Township	Beacon Rd West of Meadowbrook	Excess Runoff
P26	Penn Township	Winters Rd	Excess Runoff
P27	Penn Township	Mushrush Rd at Crisswell Rd	Excess Runoff
P28	Penn Township	Morgan Rd	Erosion
P29	Penn Township	Golden City at Township Line	Erosion
P30	Penn Township	N. Dutchtown	Excess Runoff
P31	Penn Township	Stone Quarry	Excess Runoff, Sediment Build-up
P32	Penn Township	Brownsdale Rd to Orchard Rd	Flooding
P33	Penn Township	Hamel Rd	Erosion
P34	Penn Township	Meridian North of Smith	Excess Runoff
P35	Penn Township	Crowe Rd	Excess Runoff, Erosion
P36	Penn Township	Church Rd	Excess Runoff, Erosion
P37	Penn Township	Rockdale Rd	Erosion
P38	Penn Township	Royal Oak Dr	Erosion
P39	Jackson Township	Peters Cove / Hartman Rd	Flooding
P40	Jackson Township	Evergreen Mill Rd	Flooding
P41	Jackson Township	Village Acres	Flooding
P42	Callery Borough	Kline Rd	Erosion
P43	Callery Borough	Main St Extension	Undersized Pipes
P44	Callery Borough	Kline Rd – Mars/Evans City area	Flooding, Bank Erosion
P45	Callery Borough	Center St	Flooding, Bank Erosion
P46	Cherry Township		Runoff/Erosion
P47	Cherry Township		Ponding/Flooding
P48	Cherry Township		Runoff/Erosion
P49	Cherry Township		Runoff/Erosion
P50	Cherry Township		Ponding/Flooding
P51	Cherry Township		Undersized Culvert
P52	Cherry Township		Streambank Erosion
P53	Cherry Township		Runoff/Erosion
P54	Franklin Township	Grindel Rd near Miller Ln	Stream Overflows
P55	Franklin Township	Unionville Rd near County Club Rd	Stream Overflows
P56	Franklin Township	Country Club Rd near Boys Club	Stream Overflows

Summary Table of Problem Areas provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
P57	Franklin Township	Swamp Run Rd near Chestnut Ridge Rd	Stream Overflows
P58	Franklin Township	Ridge Rd near Hewitt Ln	Stream Overflows
P59	Franklin Township	W. Old Rt 422 near Franklin Village	Stream Overflows
P60	Jefferson Township	Multiple Locations	Undersized Pipes
P61	Mercer Township	Harmony Rd	Stream Overflows
P62	Mercer Township	Wick Rd	Erosion
P63	Mercer Township	Creek	Stream Overflows
P64	Mercer Township	Rt 8	Erosion at Railroad Underpass
P65	Mercer Township		Ditch Erosion
P66	Mercer Township		Ditch Erosion
P67	Mercer Township		Property Flooding
P68	City of Butler	City Storm Sewer System	Hydraulically Overloaded
P69	City of Butler	City Storm Sewer System	Obstruction of Pipes
P70	City of Butler	City Storm Sewer System	Undersized Culvert
P71	City of Butler	City Storm Sewer System	Stream Overflow
P72	City of Butler	City Storm Sewer System	Unknown System
P73	City of Butler	City Storm Sewer System	Deep Crossovers
P74	City of Butler	City Storm Sewer System	Ponding
P75	City of Butler	City Storm Sewer System	Ponding
P76	City of Butler	City Storm Sewer System	Stream Beneath Home
P77	City of Butler	City Storm Sewer System	Stream Overflows
P78	City of Butler	City Storm Sewer System	Stream in Poor Condition
P79	City of Butler	City Storm Sewer System	Erosion
P80	City of Butler	City Storm Sewer System	Subsidence
P81	Harmony Borough	Spring St/First St	Flooding
P82	Harmony Borough	Jackson St/Mercer St	Flooding
P83	Harmony Borough	Jackson St/Mercer St	Flooding
P84	Harmony Borough	Moose Front Yard	Flooding
P85	Harmony Borough	Seneca Dr	Undersized Pipes
P86	Harmony Borough	Wood St	Ponding
P87	Harmony Borough	Various Locations	Streambank Erosion
P88	Harmony Borough	Creekside Manor	Flooding
P89	Harmony Borough	Harmony Heights Dr	Detention Pond
P90	Harmony Borough	Spring St	Stormwater Issues
P91	Harmony Borough	Division St between Center/Beaver St	Flooding
P92	Harmony Borough	Various Locations	Undersized Catch Basins
P93	Cherry Valley Borough	Porter Rd	Flooding
P94	Cherry Valley Borough	Oneida Valley Rd near Borchert Rd	Flooding
P95	Cherry Valley Borough	Oneida Valley Rd near Young Ln	Flooding
P96	Brady Township	Beatty Rd	Undersized Culvert
P97	Brady Township	Various Locations in Township	Culvert Replacement
P98	Brady Township	Alexander Rd	Debris in Culvert
P99	Brady Township	Turk Rd	Debris in Culvert
P100	Brady Township	Lindley Rd	Culvert Replacement
P101	Brady Township	McBride Rd	Culvert Replacement
P102	Evans City Borough	Mahan Rd near South St	Restricted Stream Flow
P103	Evans City Borough	N. Jackson St near Harmony Al	Ponding in Streets
P104	Evans City Borough	N. Jackson St	Ponding in Streets
P105	Evans City Borough	N. Washington St	Restricted Stream Flow
P106	Evans City Borough	Near Pioneer Rd	Streambed Obstruction
P107	Summit Township	State Route 38	Flooding
P108	Summit Township	Kaiser Rd	Flooding
P109	Summit Township	Wendelin Rd	Flooding
P110	Summit Township	Herman Rd	Flooding
P111	Summit Township	Private Driveways	Flooding
P112	Summit Township	Stutz Rd	Sedimentation
P113	Summit Township	Stutz Rd	Sedimentation
P114	Summit Township	Saxonburg Rd	Flooding

Summary Table of Problem Areas provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
P115	Summit Township	Shepard Ln	Flooding
P116	Muddy Creek Township	Yellowcreek Rd at Stanford Rd	Flooding
P117	Muddy Creek Township	Fisher Rd at Book Rd	Flooding
P118	Muddy Creek Township	Bloomfield School Rd	Erosion
P119	Muddy Creek Township	Cheeseman Rd	Mine Drainage
P120	Muddy Creek Township	Rt 19 North	Flooding
P121	Saxonburg Borough	Carol Dr near Dinnerbell Rd	Flooding
P122	Saxonburg Borough	Dinnerbell Rd	Flooding
P123	Saxonburg Borough	Cooper Cabin Parking Lot	Flooding
P124	Saxonburg Borough	Short St near Butler St	Flooding
P125	Saxonburg Borough	South of Water St near Butler St	Flooding
P126	Saxonburg Borough	Water St at Butler St	Flooding
P127	Saxonburg Borough	Thelma Dr and N Isabella St	Flooding
P128	Saxonburg Borough	North of Water St	Flooding
P129	Saxonburg Borough	Constitution Ave at Thelma Dr	Flooding
P130	Saxonburg Borough	Constitution Ave near Fisher Rd	Flooding
P131	Saxonburg Borough	Aderhold Rd	Flooding
P132	Saxonburg Borough	Aderhold Rd near Oakwood Ln	Flooding
P133	Prospect Borough	Bearcreek Rd	Retention Pond
P134	Prospect Borough	Prospect Pl	Retention Pond
P135	Prospect Borough	Commercial Development	Lack of Retention
P136	Winfield Township	Long Run Rd	Scouring
P137	Winfield Township	Little Buffalo Stream	Erosion
P138	Winfield Township	Winfield Rd	Erosion
P139	Winfield Township	Brose Rd	Erosion
P140	Winfield Township	Gerner Rd	Sediment Runoff
P141	Winfield Township	Moorehead Rd at Bauer Rd	Erosion
P142	Winfield Township	Cornplanter Stream	Sedimentation
P143	Winfield Township	Becker Rd	Sedimentation
P144	Winfield Township	Cabot Area of Little Buffalo Stream	Erosion
P145	Winfield Township	Rough Run Stream	Erosion
P146	Adams Township	Hespenheide Rd	High Detergents
P147	Adams Township	Mars/Evans City Rd near Hutchman Rd	Positive Coliform Count
P148	Adams Township	Naser Ln	Nitrate/Phosphate Contamination
P149	Adams Township	Breakneck Creek	Flooding
P150	Adams Township	Meredith Dr	Sedimentation
P151	Adams Township	Three Degree Rd	Flooding
P152	Adams Township	Sunset Ct	Erosion/Flooding
P153	Adams Township	Hespenheide Rd	Inadequate Storm Sewer System
P154	Mars Borough	Spring Ave at Clarks Ln	Flooding
P155	Mars Borough	Crowe Ave near Reserve Alley	Erosion
P156	Mars Borough	Off Pittsburgh St near Gilkey Rd	Pipe Collapse
P157	Butler Township	Sylvan Dr to Pierce Ave	Flooding
P158	Butler Township	Havenhill Dr	Flooding
P159	Butler Township	Butler Rd from Ferguson Ave to Schaffner	Flooding
P160	Butler Township	Acre Ave from Whitestone to Rt 68	Flooding
P161	Butler Township	Valley St at E. Brady	Flooding
P162	Butler Township	Cupps Rd from Meredian Rd to Conn Twp	Flooding
P163	Butler Township	Plateau St	Flooding
P164	Butler Township	Clark Ave near Oliver Dr	Flooding
P165	Butler Township	Pittsburgh Pike Rd	Flooding
P166	Butler Township	Brady St near Delwood Rd	Flooding
P167	Butler Township	Colonial Ave to S. Duffy Rd	Flooding
P168	Butler Township	Willard Ave near Gregden Rd	Flooding
P169	Butler Township	Miller St near Highland Ave	Flooding
P170	Butler Township	Cecilia St near Hansen Ave	Flooding
P171	Butler Township	Sawmill Run Rd near Miller St	Flooding
P172	Butler Township	Bullcreek Rd near Green Manor Dr	Flooding

Summary Table of Problem Areas provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
P173	Butler Township	Cottage Ave near Harrison Ave	Flooding
P174	Butler Township	Bellefield Rd near Beverly Rd	Flooding
P175	Butler Township	Evergreen St near Logan St	Flooding
P176	Butler Township	Meadow Ave near Evergreen St	Flooding
P177	Butler Township	Alameda Rd south of Rt 356	Flooding
P178	Butler Township	Thornwood Rd	Flooding
P179	Butler Township	S. Eberhary Rd	Flooding
P180	Butler Township	Bessmer Ave at Acton Rd	Flooding
P181	Harrisville Borough	W. Prairie St	Flooding
P182	Forward Township	Horseshoe Ln at end of Wahl Rd	Flooding
P183	Forward Township	Needlepoint Rd	Erosion/Flooding
P184	Forward Township	Evans City Park Rd	Erosion/Flooding
P185	Forward Township	Community Park Rd at Needlepoint Rd	Insufficient Structures
P186	Forward Township	Ash Stop Rd	Flooding
P187	Forward Township	Ash Stop Rd near Spithaler Rd	Flooding
P188	Forward Township	Eckstein Rd	Flooding
P189	Forward Township	Glenwood Ave	Flooding
P190	Forward Township	Glade Run at Leisie Rd	Flooding
P191	Forward Township	John School Rd at Glade Run	Flooding
P192	Forward Township	Valencia Rd at Glade Run	Flooding
P193	Forward Township	Creek Rd near Renfrew	Flooding
P194	Forward Township	Old Rt 68 near Connoquenessing Ck	Flooding
P195	Middlesex Township	Sandy Hill Rd	Flooding
P196	Connoquenessing Borough	Off Tulip Dr near Harmony St	Runoff
P197	Connoquenessing Borough	Along Dogwood Ln	Runoff
P198	Center Township	Brewster Rd	Flooding
P199	Center Township	Moore Rd	Flooding
P200	Center Township	Rt 38 along Connoquenessing Creek	Flooding
P201	Donegal Township	Conerty Rd	Flooding
P202	Donegal Township		Flooding
P203	Donegal Township	Hickey Bottom Rd	Flooding
P204	Donegal Township	Rt 68 from Chicora to Bish Rd	Flooding
P205	Marion Township	Dematteis Rd along Slippery Rock Creek	Flooding
P206	Marion Township	Ray Rd along Slippery Rock Creek	Flooding
P207	Marion Township	Boyers Rd	Flooding
P208	Karns City Borough		Acid Mine Drainage
P209	Karns City Borough		Runoff
P210	Buffalo Township	Kepple Rd	Flooding
P211	Buffalo Township	Monroe Rd	Flooding
P212	Buffalo Township	Old Pike Rd	Acid Mine Drainage
P213	Parker Township		Flooding
P214	Parker Township		Flooding
P215	Parker Township		Flooding
P216	Parker Township		Acid Mine Drainage
P217	Parker Township		Flooding
P218	Parker Township		Poor Water Quality
P219	Parker Township		Flooding
P220	Parker Township		Flooding
P221	Clay Township		Flooding
P222	Clay Township		Flooding
P223	Clay Township		Flooding
P224	Clay Township		Flooding
P225	Clay Township		Flooding
P226	Clay Township		Flooding
P227	Clay Township		Flooding
P228	Washington Township		Flooding
P229	Washington Township		Flooding
P230	Washington Township		Flooding

Summary Table of Problem Areas provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
P231	Washington Township		Flooding
P232	Washington Township		Flooding
P233	Slippery Rock Township	University Baseball Field	Overflowing Pond
P234	Bruin Borough	Bear Creek	Flooding
P235	Bruin Borough		Acid Mine Drainage
P236	Bruin Borough		Runoff
P237	Bruin Borough		Flooding
P238	Bruin Borough	Post Office	Flooding
P239	Lancaster Township	Little Yellow Creek Rd	Flooding
P240	Lancaster Township	Yellow Creek Rd	Flooding
P241	Lancaster Township	Little Creek Rd	Flooding
P242	Lancaster Township	Little Creek Rd	Flooding
P243	Lancaster Township	Scott Ridge Rd at Victory Terrace Dr	Erosion
P244	Zelienople Borough	W New Castle St near Market St	Undersized Pipe
P245	Zelienople Borough	Fairlawn Blvd and Wayne Ave	Flooding
P246	Zelienople Borough	Between E New Castle St and E Spring St	Flooding
P247	Zelienople Borough	North View and Clay	Flooding
P248	Zelienople Borough	Green Ln to New Castle St	Ponding
P249	Zelienople Borough	Spruce St	Undersized Pipe
P250	Zelienople Borough	Jefferson St at Beaver St	Flooding
P251	Zelienople Borough	Beaver St between Main & Clay St	Ponding
P252	Zelienople Borough	Hazel St	Flooding
P253	Zelienople Borough	Pine St	Flooding
P254	Zelienople Borough	Market St between Rt 68 & Chestnut St	Ponding
P255	Zelienople Borough	Market St at Ziegler St	Ponding
P256	Zelienople Borough	Peach St between McKim & Pine St	Ponding
P257	Zelienople Borough	Park Ln between Short & Main St	Flooding
P258	Zelienople Borough	Northview Dr between Short & Main St	Flooding
P259	Zelienople Borough	Oliver Ave between Grandview & Maria	Erosion/Flooding
P260	Zelienople Borough	Perry Way from Main to Boro Line	Flooding
P261	Zelienople Borough	Division St between Beaver & Spring St	Ponding
P262	Zelienople Borough	Spring St between Division & High St	Ponding
P263	Zelienople Borough	New Castle St between Oliver & Main St	Ponding
P264	Zelienople Borough	Main St between Grandview & Culvert	Flooding
P265	Zelienople Borough	New Castle St between Main & Market St	Flooding
P266	Zelienople Borough	Jefferson St between New Castle & Spring	Flooding
P267	Zelienople Borough	Railroad Tracks between Rt 19 & Green Ln	Flooding
P268	Zelienople Borough	Madison Dr between Rt 588 & Rt 288	Flooding
P269	Zelienople Borough	Halstead Blvd between Grandview/NCastle	Undersized Ditches
P270	Zelienople Borough	Peach St at Ziegler Ext	Ponding
P271	Zelienople Borough	Walnut St between Green Ln & Front St	Flooding
P272	Zelienople Borough	Rosewood Plan	Flooding
P273	Zelienople Borough	Timberbrook Plan	Flooding
P274	Zelienople Borough	Muntz Rd between Jackson Twp/Rt 68	Runoff/Erosion
P275	Zelienople Borough	Benville Rd between Marion Twp/Rt 68	Runoff/Erosion
P276	Zelienople Borough	Lower Areas of Boro near Conn. Creek	Flooding
P277	Slippery Rock Borough	Intersection of Kelly Blvd & N Main St	Flooding
P278	West Sunbury Borough	S Main St	Runoff
P279	West Sunbury Borough	Washington St	Flooding/Runoff
P280	West Sunbury Borough	Russell Ave at Washington St	Overflows
P281	West Sunbury Borough	E Church St	Erosion
P282	Cranberry Township	Fox Run	Flooding
P283	Cranberry Township	Brookston	Flooding
P284	Cranberry Township	Powell & Holiday	Flooding

Summary Table of Stormwater Facilities provided by WPAC through Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
S1	Clinton Township	Knoch Rd	Underground 15" System (10 Coll. Boxes)
S2	Penn Township	Kelly Chevrolet	Underground Facility
S3	Penn Township	Oak Trace Development	Open Detention Pond
S4	Penn Township	Enterprise Used Cars	Underground Facility
S5	Penn Township	Kendall, Inc.	Open Detention Pond
S6	Penn Township	Raducz Stone Quarry	Open Detention Pond
S7	Penn Township	Saxonburg Area Authority WWTP	Open Detention Pond
S8	Penn Township	Thornridge Estates	Open Detention Pond
S9	Penn Township	Nesbit Landscaping	Underground Facility
S10	Penn Township	Penn Township Municipal Building	Open Detention Pond
S11	Penn Township	Succop Conservancy	Open Detention Pond
S12	Penn Township	Butler County Airport	Open Detention Pond
S13	Penn Township	Turmoil	Open Detention Pond
S14	Callery Borough	Drains into Breakneck Creek	Aging System
S15	Franklin Township	E&E Chestnut Developers	Stormwater Detention Pond
S16	Franklin Township	Franklin Oaks Developers	Stormwater Detention Pond
S17	Franklin Township	Acorn Woods Developers	Stormwater Detention Pond
S18	Franklin Township	CR Properties	Stormwater Detention Pond
S19	Franklin Township	S&S Market	Stormwater Detention Pond
S20	Franklin Township	Specialty Precast	Stormwater Detention Pond
S21	Franklin Township	Church of the Living Word	Stormwater Detention Pond
S22	Franklin Township	Federkeil/Newcomb	Stormwater Detention Pond
S23	Franklin Township	Franklin Mobile Home Village	Stormwater Detention Pond
S24	Franklin Township	Frank Rodgers Mountview Lane	Stormwater Detention Pond
S25	Franklin Township	Nazarene Center	Stormwater Detention Pond
S26	Jefferson Township	Countryside Plan of Lots – Alana Dr	Stormwater Detention Pond
S27	Jefferson Township	Stoneybrook Plan of Lots – Stoneybrook Dr	Stormwater Detention Pond
S28	Jefferson Township	Saxonburg Sewer Authority	Stormwater Detention Pond
S29	Jefferson Township	So. Butler County School District	Stormwater Detention Pond
S30	Jefferson Township	Penn United Technology – Rt 356	Stormwater Detention Pond
S31	Jefferson Township	Concordia Lutheran Ministries – Rt 356	Stormwater Detention Pond
S32	Jefferson Township	Carl Leicher – Constitution Ave	Stormwater Detention Pond
S33	Jefferson Township	St. Luke's Church & School – Hannahstown Rd	Stormwater Detention Pond
S34	Jefferson Township	The Plantation Plan of Lots – Rebecca St	Stormwater Detention Pond
S35	Clearfield Township	Clearfield Elementary School	Stormwater Detention Pond
S36	Evans City Borough	Between Mahan Rd and S. Washington St	Stream
S37	Evans City Borough	Along Evans City Rd	Stormwater Detention Pond
S38	Muddy Creek Township	Along New Castle Rd	Stormwater Detention Pond
S39	Adams Township	Cloverdale Dr	Stormwater Detention Facility
S40	Adams Township	Chapel Ridge Ln	Stormwater Detention Facility
S41	Adams Township	Union Church Rd	Stormwater Detention Facility
S42	Adams Township	Ramblewood Ln	Stormwater Detention Facility
S43	Adams Township	Forsythe Rd	Stormwater Detention Facility
S44	Adams Township	Sophia Ln	Stormwater Detention Facility
S45	Adams Township	Myoma Rd	Stormwater Detention Facility
S46	Adams Township	Myoma Rd	Stormwater Detention Facility
S47	Adams Township	Myoma Rd	Stormwater Detention Facility
S48	Adams Township	Aiken Ln	Stormwater Detention Facility
S49	Adams Township	Oak Leaf Dr	Stormwater Detention Facility
S50	Adams Township	Crider Rd at Hidden Oak Dr	Stormwater Detention Facility
S51	Adams Township	Rt 228 near Adams Ridge Blvd	Stormwater Detention Facility
S52	Adams Township	W. Vanderbilt Dr	Stormwater Detention Facility
S53	Adams Township	Crider Rd	Stormwater Detention Facility
S54	Adams Township	Rt 228 near Heritage Creek Dr	Stormwater Detention Facility
S55	Adams Township	Kaufman Run Rd	Stormwater Detention Facility
S56	Adams Township	Braddock Ct	Stormwater Detention Facility
S57	Adams Township	Clarks Ln	Stormwater Detention Facility
S58	Adams Township	Clarks Ln	Stormwater Detention Facility
S59	Adams Township	Lily Vue Dr	Stormwater Detention Facility
S60	Adams Township	Meredith Dr	Stormwater Detention Facility
S61	Adams Township	Meredith Dr	Stormwater Detention Facility

Summary Table of Stormwater Facilities provided by WPAC through Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
S62	Adams Township	Meredith Dr	Stormwater Detention Facility
S63	Adams Township	Adams Ridge Blvd	Stormwater Detention Facility
S64	Adams Township	Clubside Dr at Adams Ridge Blvd	Stormwater Detention Facility
S65	Adams Township	Kaufman Run Rd	Stormwater Detention Facility
S66	Adams Township	Adams Pointe Blvd North	Stormwater Detention Facility
S67	Adams Township	Rt 228 near Pittsburgh St	Stormwater Detention Facility
S68	Adams Township	Caromar Dr near Placid Ct	Stormwater Detention Facility
S69	Adams Township	Independence Way	Stormwater Detention Facility
S70	Adams Township	Valleybrook Dr	Stormwater Detention Facility
S71	Adams Township	Three Degree Rd near Downieville Rd	Stormwater Detention Facility
S72	Adams Township	Norwegian Spruce Dr	Stormwater Detention Facility
S73	Adams Township	Hespenheide Rd	Stormwater Detention Facility
S74	Adams Township	Hespenheide Rd	Stormwater Detention Facility
S75	Adams Township	Warrendale Rd near Finch Rd	Stormwater Detention Facility
S76	Adams Township	Apple Hill Ct	Stormwater Detention Facility
S77	Adams Township	Camp Trees Rd near Jennifer Ln	Stormwater Detention Facility
S78	Adams Township	Three Degree Rd near Sunset Ct	Stormwater Detention Facility
S79	Adams Township	Brookside Cr	Stormwater Detention Facility
S80	Butler Township	Moraine Commons	Stormwater Facilities
S81	Butler Township	Technology Drive Commercial Park	Stormwater Facilities
S82	Butler Township	Fairways at Krendale	Stormwater Facilities
S83	Butler Township	Sheetz Store	Stormwater Facilities
S84	Butler Township	Butler Farm Show	Stormwater Facilities
S85	Butler Township	Fourteenth St	Stormwater Facilities
S86	Butler Township	Meridian Pines	Stormwater Facilities
S87	Butler Township	Deer Run	Stormwater Facilities
S88	Butler Township	Heather Dr	Stormwater Facilities
S89	Butler Township	Casa Bella Development	Stormwater Facilities
S90	Butler Township	Wright Electric	Stormwater Facilities
S91	Butler Township	Afton Subdivision	Stormwater Facilities
S92	Butler Township	Moraine Pointe Plaza	Stormwater Facilities
S93	Butler Township	Goodwill	Stormwater Facilities
S94	Butler Township	Stirling Village	Stormwater Facilities
S95	Butler Township	Heartland Estates	Stormwater Facilities
S96	Butler Township	Westwood Manor	Stormwater Facilities
S97	Butler Township	Sharon Dr/Rural/Boyd/Seneca	Stormwater Facilities
S98	Butler Township	Butler Commons	Stormwater Facilities
S99	Butler Township	Duffy Rd	Stormwater Facilities
S100	Butler Township	Camelot Dr	Stormwater Facilities
S101	Butler Township	Township Building	Stormwater Facilities
S102	Butler Township	Township Salt Storage Facility	Stormwater Facilities
S103	Butler Township	Township Park	Stormwater Facilities
S104	Butler Township	Alameda Plaza	Stormwater Facilities
S105	Butler Township	Alameda Park	Stormwater Facilities
S106	Butler Township	Woodbury	Stormwater Facilities
S107	Butler Township	North Boundary St	Stormwater Facilities
S108	Butler Township	Villa Dr	Stormwater Facilities
S109	Butler Township	American Legion	Stormwater Facilities
S110	Butler Township	Butler High School	Stormwater Facilities
S111	Butler Township	Family Bowl Away	Stormwater Facilities
S112	Butler Township	Dubbs Ln	Stormwater Facilities
S113	Butler Township	Fairfield Inn	Stormwater Facilities
S114	Butler Township	Butler County Community College	Stormwater Facilities
S115	Butler Township	Chesapeake Plaza	Stormwater Facilities
S116	Butler Township	Sugar Creek	Stormwater Facilities
S117	Butler Township	October Dr	Stormwater Facilities
S118	Butler Township	Metzger Ave	Stormwater Facilities
S119	Butler Township	Morton Ave	Stormwater Facilities
S120	Butler Township	Sheetz Store	Stormwater Facilities

Summary Table of Stormwater Facilities provided by WPAC through Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
S121	Butler Township	Dutchtown Village	Stormwater Facilities
S122	Butler Township	Spooner Ln	Stormwater Facilities
S123	Butler Township	September Dr	Stormwater Facilities
S124	Butler Township	Courtside Lane Apartments	Stormwater Facilities
S125	Butler Township	St. John's Church	Stormwater Facilities
S126	Butler Township	Butler Hospital	Stormwater Facilities
S127	Butler Township	Feree Property on Rt 8 South	Stormwater Facilities
S128	Butler Township	Baglier GMC	Stormwater Facilities
S129	Butler Township	Kiddie City	Stormwater Facilities
S130	Butler Township	Easter Seals	Stormwater Facilities
S131	Butler Township	American Glass Research	Stormwater Facilities
S132	Butler Township	Mama Rosa's Restaurant	Stormwater Facilities
S133	Butler Township	Commercial Development - Hansen Ave	Stormwater Facilities
S134	Butler Township	Maple Grove	Stormwater Facilities
S135	Butler Township	Armstrong Utilities	Stormwater Facilities
S136	Butler Township	Comfort Ln	Stormwater Facilities
S137	Butler Township	Bauman Bus Company	Stormwater Facilities
S138	Butler Township	St. Michael's Church	Stormwater Facilities
S139	Butler Township	Commercial Building - 256 New Castle Rd	Stormwater Facilities
S140	Butler Township	Commercial Development - 280 New Castle	Stormwater Facilities
S141	Butler Township	Commercial Development - 151Rt 8	Stormwater Facilities
S142	Butler Township	Commercial Development - 142 Rt 8	Stormwater Facilities
S143	Butler Township	McQuistion Elementary Schools	Stormwater Facilities
S144	Butler Township	Commercial Development - 173 New Castle	Stormwater Facilities
S145	Butler Township	Commercial Development - 640 Hansen Ave	Stormwater Facilities
S146	Butler Township	S&T Bank	Stormwater Facilities
S147	Forward Township	Meadow Ridge Partner Plan	Stormwater Facilities
S148	Forward Township	Shipley Plan - Wilson's Ridge	Stormwater Facilities
S149	Forward Township	Shipley Plan - Wilson's Ridge	Stormwater Facilities
S150	Connoquenessing Borough	Hidden Springs Development	Stormwater Facilities
S151	Connoquenessing Borough	Maplewood Plan	Stormwater Facilities
S152	Connoquenessing Borough	Leslie Farms Plan	Stormwater Facilities
S153	Penn Township	Target Truck	Open Detention Facility
S154	Penn Township	Pool King	Open Detention Facility
S155	Penn Township	Mars Bank	Underground Detention Facility
S156	Penn Township	Penn Fencing	Open Detention Facility
S157	Penn Township	Premier Upholstery	Underground Detention Facility
S158	Penn Township	Tri-State Electric	Underground Detention Facility
S159	Penn Township	Lambert Feed	Open Detention Facility
S160	Penn Township	Jeff Anderson - Anderson Rd	Open Detention Facility
S161	Penn Township	Chris Haas - Crisswell Rd	Open Detention Facility
S162	Penn Township	Carlson - Crisswell Rd	Open Detention Facility
S163	Penn Township	McGuire - Winters Rd	Open Detention Facility
S164	Penn Township	Kunzler - Robinson Run Rd	Open Detention Facility
S165	Penn Township	Kathy Sullivan - Royal Oak Rd	Open Detention Facility
S166	Penn Township	Scot Gumto - Saw Mill Ln	Open Detention Facility
S167	Buffalo Township	High Point	Open Detention Facility
S168	Buffalo Township	Wood Berry Plan	Open Detention Facility
S169	Buffalo Township	Mormon Church	Open Detention Facility
S170	Buffalo Township	Julia Rd	Open Detention Facility
S171	Buffalo Township	S Pike Rd	Open Detention Facility
S172	Buffalo Township	Oak Dr	Open Detention Facility
S173	Buffalo Township	Sarvers Mills	Open Detention Facility
S174	Buffalo Township	Riemer Rd	Open Detention Facility
S175	Buffalo Township	Stream View Dr	Open Detention Facility
S176	Buffalo Township	Contour Dr	Open Detention Facility
S177	Buffalo Township	Bluebird Ln	Open Detention Facility
S178	Oakland Township	Thorn Run Lake	Drinking Water Facility
S179	Oakland Township	Oneda Valley Lake	Drinking Water Facility

Summary Table of Stormwater Facilities provided by WPAC through Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
S180	Oakland Township	Boydstown Lake	Drinking Water Facility
S181	Clay Township	Dassa Elementary	Detention Facility
S182	Clay Township	Hunter Ridge	Detention Facility
S183	Slippery Rock Township	Kiebler	Detention Facility
S184	Slippery Rock Township	Weathervane	Detention Facility
S185	Slippery Rock Township	Slippery Rock Real Estate Development	Detention Facility
S186	Slippery Rock Township	Cooperleaf	Detention Facility
S187	Lancaster Township	Jubilee Farms Subdivision	Detention Facility
S188	Lancaster Township	Hazel Manor Subdivision	Detention Facility
S189	Lancaster Township	Harmony Woods Subdivision	Detention Facility
S190	Lancaster Township	Harmony Ridge Subdivision	Detention Facility
S191	Zelienople Borough	Passavant Health Center	Detention Facility
S192	Zelienople Borough	Glade Run	Detention Facility
S193	Zelienople Borough	Burton Manor	Detention Facility
S194	Zelienople Borough	Glade Run Schoolhouse	Detention Facility
S195	Zelienople Borough	Zelienople Borough	Storm Sewers
S196	Zelienople Borough	St. Gregory Assembly Hall	Detention Facility
S197	Zelienople Borough	Passavant Retirement Homes	Detention Facility
S198	Zelienople Borough	Timberbrook Townhomes	Detention Facility
S199	Slippery Rock Borough	Giant Eagle Plaza	Detention Facility
S200	Slippery Rock Borough	Borough Park near Evergreen Ct	Detention Facility
S201	Slippery Rock Borough	Kelly Blvd	Detention Facility
S202	Slippery Rock Borough	Kelly Blvd & Spruce Dr	Underground Detention Facility
S203	Slippery Rock Borough	Kelly Blvd	Underground Detention Facility
S204	Slippery Rock Borough	Kelly Blvd	Underground Detention Facility
S205	Slippery Rock Borough	Kelly Blvd & Grove City Rd	Detention Facility
S206	Slippery Rock Borough	Off Spruce Dr	Detention Facility
S207	Slippery Rock Borough	Grove City Rd	Detention Facility
S208	Slippery Rock Borough	Grove City Rd	Detention Facility
S209	Slippery Rock Borough	Kelly Blvd & Willow Dr	Detention Facility
S210	Slippery Rock Borough	Kelly Blvd & Evergreen Ct	Detention Facility
S211	Slippery Rock Borough	Arlington Dr	Detention Facility
S212	Slippery Rock Borough	Kelly Blvd & Willow Dr	Detention Facility
S213	Slippery Rock Borough	N Main St & Parklane Dr	Detention Facility
S214	Slippery Rock Borough	Jefferson Ct	Detention Facility
S215	Slippery Rock Borough	Elm St & New Castle St	Underground Detention Facility
S216	Slippery Rock Borough	E Cooper St & S Main St	Underground Detention Facility
S217	Slippery Rock Borough	Midway St & S Main St	Underground Detention Facility
S218	Slippery Rock Borough	W Cooper St	Detention Facility
S219	Slippery Rock Borough	Cornish Dr	Detention Facility
S220	Slippery Rock Borough	S Main St & Midway St	Underground Detention Facility
S221	Slippery Rock Borough	S Main St & Midway St	Underground Detention Facility
S222	Slippery Rock Borough	S Main St & High St	Detention Facility
S223	Slippery Rock Borough	New Castle St & Normal Ave	Underground Detention Facility
S224	Slippery Rock Borough	Grove City Rd & Franklin St	Detention Facility
S225	Slippery Rock Borough	Off Grove City Rd	Detention Facility
S226	West Sunbury Borough	Storm Sewer System	Undersized/Old

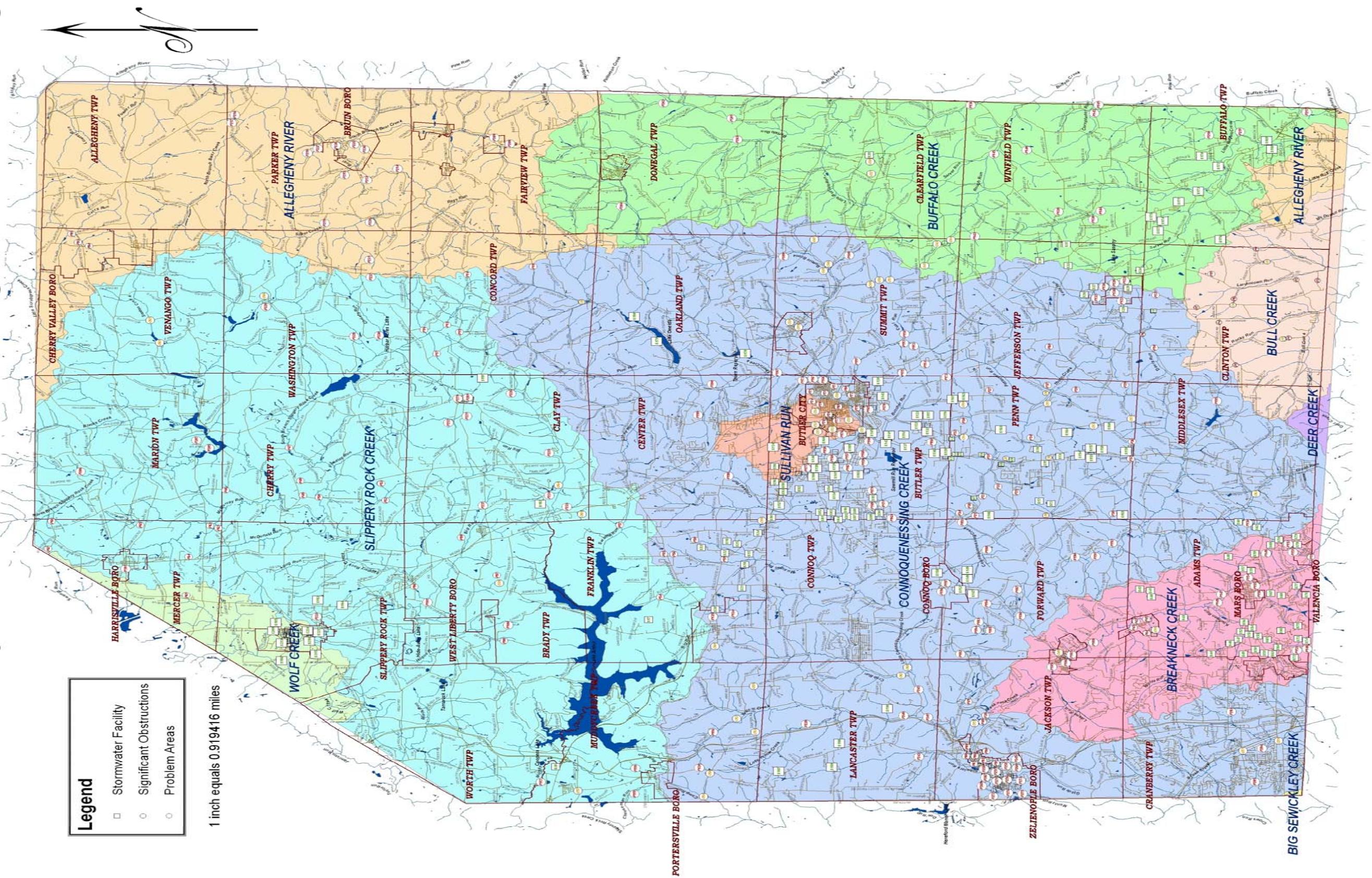
Summary Table of Obstructions provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
O1	Clinton Township	Wylie Rd near Elm Ln	Undersized 12" CMP
O2	Clinton Township	Stark Rd at Hidden Hill	Undersized 24" Concrete Pipe
O3	Clinton Township	Westminster Rd at Miller Rd	Undersized Concrete Pipe
O4	Clinton Township	Westminster Dr	Erosion
O5	Concord Township	Old State Rd	
O6	Penn Township	Dodds Rd at Rockdale Rd	Flooding
O7	Penn Township	McBride St at Rt 8	Undersized Facilities
O8	Penn Township	Rt 8	Water Ponding, Undersized Pipe
O9	Penn Township	Meridian Rd at Monroe	Undersized 36" Pipe
O10	Penn Township	N. Crisswell Rd	Stream Flooding
O11	Penn Township	Dodds Rd at Woodland	Undersized Pipes
O12	Penn Township	Anderson at Welsh	Undersized Pipes
O13	Penn Township	Robinson Run Rd	Driveway Runoff
O14	Penn Township	Plank Rd	Undersized 30" Pipe
O15	Jackson Township	Senns Bridge on Evergreen Mill Rd	Flooding at Bridge
O16	Callery Borough	Elgin Ln	Undersized Pipes
O17	Callery Borough	Breakneck St	Undersized, Deteriorating Pipes
O18	Franklin Township	Mt. Chestnut G.C. along Purvis Rd	Runoff, Undersized Pipe
O19	East Butler Borough	Grant Ave	Bridge
O20	East Butler Borough	Sherman Ave near Old E. Butler Rd	Bridge
O21	City of Butler	Sullivan Run	Flooding/Erosion
O22	City of Butler	City Storm Sewer System	Erosion
O23	City of Butler	City Storm Sewer System	Filled with Debris
O24	City of Butler	Sullivan Run	Bank Erosion
O25	City of Butler	West Penn St Bridge	Sediment Accumulation
O26	City of Butler	West Brady St Bridge	Sediment Accumulation
O27	City of Butler	West New Castle St Bridge	Sediment Accumulation
O28	City of Butler	West Cunningham St Bridge	Sediment Accumulation
O29	City of Butler	City Storm Sewer System	Undersized Pipes
O30	City of Butler	City Storm Sewer System	Undersized Pipes
O31	City of Butler	City Storm Sewer System	Siltation
O32	City of Butler	City Storm Sewer System	Siltation
O33	City of Butler	City Storm Sewer System	Clogged Pipes
O34	City of Butler	City Storm Sewer System	Clogged Pipes
O35	City of Butler	City Storm Sewer System	Obstructions
O36	Harmony Borough	Germain St to Mercer St	Undersized 24" Pipe
O37	Clearfield Township	Various Locations throughout Township	Debris in Creek Beds
O38	Clearfield Township	Various Locations throughout Township	Maintaining Culverts
O39	Brady Township	Various Locations in Township	Obstructed Ditches
O40	Evans City Borough	Jefferson St at S. Washington St	Bridge Obstruction
O41	Evans City Borough	Along S. Washington St	Encroachment along Stream
O42	Summit Township	Osche Rd	Undersized Culverts
O43	Summit Township	Osche Rd	Undersized Culverts
O44	Summit Township	Star Grill Rd	Undersized Culverts
O45	Summit Township	Schnur Rd	Undersized Culverts
O46	Summit Township	Carbon Center Rd	Undersized Culverts
O47	Summit Township	McGrady Hollow Rd	Undersized Culverts
O48	Summit Township	Keck Rd	Sediment in Stream
O49	Summit Township	Keck Rd	Undersized Culverts
O50	Summit Township	Giebel Rd	Flooding
O51	Summit Township	Giebel Rd	Flooding
O52	Muddy Creek Township	Stanford Rd	Undersized Pipes
O53	Muddy Creek Township	Sawyer Rd	Undersized Pipes
O54	Muddy Creek Township	Baudermill Rd to Levis Rd	Undersized Pipes
O55	Muddy Creek Township	Stonechurch Rd	Undersized Pipes
O56	Muddy Creek Township	Hufnagel Rd at Baudermill Rd	Undersized Pipes
O57	Muddy Creek Township	Rt 19 at Johnson Rd	Ponding Water
O58	Saxonburg Borough	Carol Dr near Dinnerbell Rd	Undersized Pipes

Summary Table of Obstructions provided by the WPAC through the Information Request Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION
O59	Saxonburg Borough	State St at Constitution Ave	Sediment Build Up
O60	Prospect Borough	Wilson Ln	Stream Crossing
O61	Venango Township	S. Erico Rd	Beaver Dam
O62	Venango Township	McJunkin Rd	Undersized Pipes
O63	Middlesex Township	Parks Rd near Rt 228	Undersized Pipe
O64	Clay Township	Beaver Dam	Beaver Dam
O65	Clay Township	Under Bridge	Siltation
O66	Washington Township	Bridge	Low Bridge
O67	Lancaster Township	Crab Run Rd Bridge	Flooding
O68	Lancaster Township	Little Creek Rd Bridge	Flooding
O69	Zelienople Borough	Community Park to Spring St	Undersized Pipes
O70	Zelienople Borough	Walnut St Bridge	Undersized Pipes
O71	Zelienople Borough	Linden St	Undersized Pipes
O72	Zelienople Borough	Front St	Undersized Pipes
O73	Zelienople Borough	Front St	Undersized Pipes
O74	Zelienople Borough	New Castle St between Division & Oliver	Undersized Pipes
O75	West Sunbury Borough	Along E Concord St	Runoff
O76	Cranberry Township	Franklin Rd	Undersized Culvert
O77	Cranberry Township	Rochester Rd	Undersized Culverts
O78	Cranberry Township	Freedom Rd	Undersized Culverts
O79	Cranberry Township	Rolling Rd	Undersized Culvert

Butler County, Stormwater Management Planning



Summary Tables of Stormwater Problems from WPAC Information Request Form:

Adams Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X			X			X			X	
Street Flooding			X									
Property Flooding		X			X			X			X	
Soil Erosion		X			X			X			X	
Sediment in Streams		X			X			X			X	
Stream Bed/Bank Erosion		X			X			X			X	
Scour at Outfalls		X			X			X			X	
Property/Infrastructure Damage			X									
Pollution		X			X			X			X	
Habitat/Resource Damage		X			X			X			X	
Other												

Allegheny Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X				X		X				
Street Flooding			X									
Property Flooding		X									X	
Soil Erosion		X				X						
Sediment in Streams		X			X							
Stream Bed/Bank Erosion		X				X						
Scour at Outfalls			X									
Property/Infrastructure Damage			X									
Pollution		X										
Habitat/Resource Damage			X									
Other												

Brady Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									X
Street Flooding		X			X			X				
Property Flooding		X			X			X				
Soil Erosion		X						X				
Sediment in Streams			X									X
Stream Bed/Bank Erosion			X									X
Scour at Outfalls			X									X
Property/Infrastructure Damage		X						X				
Pollution			X									X
Habitat/Resource Damage			X									X
Other												

Bruin Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X										
Street Flooding		X									
Property Flooding	X										
Soil Erosion		X									
Sediment in Streams		X									
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage		X									
Pollution		X									
Habitat/Resource Damage		X									
Other											

Buffalo Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X						X			
Street Flooding											
Property Flooding		X							X		
Soil Erosion											
Sediment in Streams		X									
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage		X									
Other											

City of Butler											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X				X				X	X	
Street Flooding	X				X				X	X	
Property Flooding	X				X				X	X	
Soil Erosion		X			X						
Sediment in Streams		X			X						
Stream Bed/Bank Erosion		X				X					
Scour at Outfalls		X				X					
Property/Infrastructure Damage		X								X	
Pollution		X									
Habitat/Resource Damage			X								
Other											

Butler Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X				X					X	X
Street Flooding	X			X					X		
Property Flooding	X			X					X		
Soil Erosion	X				X			X			
Sediment in Streams	X				X						X
Stream Bed/Bank Erosion	X				X						X
Scour at Outfalls	X				X			X			
Property/Infrastructure Damage	X				X				X	X	X
Pollution			X								
Habitat/Resource Damage			X								
Other			X								

Callery Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X	X		X				X	X	X		X
Street Flooding		X		X				X	X	X		X
Property Flooding	X			X				X	X	X		X
Soil Erosion	X			X				X	X	X		X
Sediment in Streams	X			X				X	X	X	X	X
Stream Bed/Bank Erosion	X			X				X	X	X		X
Scour at Outfalls												
Property/Infrastructure Damage	X	X		X				X	X	X		X
Pollution			X					X	X	X		X
Habitat/Resource Damage		X		X				X	X	X		X
Other: (Sub Surface Water)												

Center Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X										
Street Flooding		X									
Property Flooding		X									
Soil Erosion	X										
Sediment in Streams	X										
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage		X									
Pollution		X									
Habitat/Resource Damage		X									
Other: (Sub Surface Water)											

Cherry Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X			X			X			
Street Flooding		X		X				X			
Property Flooding		X		X				X			
Soil Erosion	X			X				X			
Sediment in Streams		X			X			X			
Stream Bed/Bank Erosion	X				X			X			
Scour at Outfalls		X			X			X			
Property/Infrastructure Damage		X			X			X			
Pollution			X								
Habitat/Resource Damage			X								
Other: (Sub Surface Water)											

Cherry Valley Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X					X				X
Street Flooding	X						X	X	X		
Property Flooding		X					X	X			
Soil Erosion			X								
Sediment in Streams		X						X			
Stream Bed/Bank Erosion	X						X	X			
Scour at Outfalls		X									
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage			X								
Other: (Sub Surface Water)											

Chicora Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding											
Street Flooding											
Property Flooding											
Soil Erosion											
Sediment in Streams											
Stream Bed/Bank Erosion											
Scour at Outfalls											
Property/Infrastructure Damage											
Pollution											
Habitat/Resource Damage											
Other: (Sub Surface Water)											

Clay Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X									
Street Flooding		X									
Property Flooding		X									
Soil Erosion		X									
Sediment in Streams		X									
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage		X									
Pollution		X									
Habitat/Resource Damage		X									
Other: (Sub Surface Water)											

Clearfield Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X		X				X			
Street Flooding		X		X				X	X		
Property Flooding			X	X							
Soil Erosion		X		X				X			
Sediment in Streams	X			X				X			
Stream Bed/Bank Erosion	X			X				X			
Scour at Outfalls		X			X			X			
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage			X								
Other: (Sub Surface Water)			X								

Clinton Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X			X					X	
Street Flooding		X			X					X	
Property Flooding		X			X					X	
Soil Erosion	X						X	X			
Sediment in Streams	X						X	X			
Stream Bed/Bank Erosion		X			X			X			
Scour at Outfalls		X				X				X	
Property/Infrastructure Damage		X				X				X	
Pollution			X	X				X			
Habitat/Resource Damage		X				X		X			
Other											

Concord Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X						X			X		X
Street Flooding	X							X		X		
Property Flooding	X								X			
Soil Erosion	X								X			
Sediment in Streams		X							X			
Stream Bed/Bank Erosion	X								X			
Scour at Outfalls		X								X		
Property/Infrastructure Damage		X							X			
Pollution		X										X
Habitat/Resource Damage		X										X
Other												

Connoquenessing Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									
Street Flooding			X									
Property Flooding		X			X				X			
Soil Erosion		X			X				X			
Sediment in Streams		X				X		X				
Stream Bed/Bank Erosion			X									
Scour at Outfalls		X										
Property/Infrastructure Damage			X									
Pollution			X									
Habitat/Resource Damage			X									
Other: (Sub Surface Water)			X									

Connoquenessing Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X			X							X
Street Flooding	X				X					X		
Property Flooding	X				X				X			
Soil Erosion	X				X							X
Sediment in Streams	X				X			X				
Stream Bed/Bank Erosion	X				X			X				
Scour at Outfalls	X				X			X				
Property/Infrastructure Damage			X									
Pollution			X									
Habitat/Resource Damage			X									
Other: (Sub Surface Water)			X									

Cranberry Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X				X		X	X			
Street Flooding			X									
Property Flooding		X						X	X			
Soil Erosion			X					X				
Sediment in Streams		X						X	X			
Stream Bed/Bank Erosion		X						X	X			
Scour at Outfalls			X									
Property/Infrastructure Damage			X									
Pollution			X									
Habitat/Resource Damage			X									
Other												

Donegal Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X										
Street Flooding		X										
Property Flooding		X										
Soil Erosion		X										
Sediment in Streams		X										
Stream Bed/Bank Erosion		X										
Scour at Outfalls		X										
Property/Infrastructure Damage		X										
Pollution		X										
Habitat/Resource Damage		X										
Other												

East Butler Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X		X	X			X				X
Street Flooding												
Property Flooding												
Soil Erosion												
Sediment in Streams												
Stream Bed/Bank Erosion		X		X	X							X
Scour at Outfalls												
Property/Infrastructure Damage												
Pollution												
Habitat/Resource Damage												
Other												

Eau Claire Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X										
Street Flooding		X										
Property Flooding		X										
Soil Erosion		X										
Sediment in Streams		X										
Stream Bed/Bank Erosion		X										
Scour at Outfalls		X										
Property/Infrastructure Damage		X										
Pollution		X										
Habitat/Resource Damage		X										
Other												

Evans City Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X						X	X			X	
Street Flooding		X			X			X	X	X		
Property Flooding		X					X	X	X	X		
Soil Erosion		X						X	X	X		
Sediment in Streams	X				X			X	X		X	
Stream Bed/Bank Erosion	X				X					X	X	
Scour at Outfalls		X			X						X	
Property/Infrastructure Damage		X					X	X	X		X	
Pollution			X									
Habitat/Resource Damage			X									
Other: (Sub Surface Water)												

Fairview Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									
Street Flooding			X									
Property Flooding		X						X				
Soil Erosion			X									
Sediment in Streams		X						X				
Stream Bed/Bank Erosion			X									
Scour at Outfalls				X								
Property/Infrastructure Damage												
Pollution												
Habitat/Resource Damage												
Other: (Sub Surface Water)												

Fairview Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X					X					X
Street Flooding		X					X		X			
Property Flooding			X									
Soil Erosion	X						X	X				
Sediment in Streams	X						X	X				
Stream Bed/Bank Erosion	X						X	X				
Scour at Outfalls	X						X	X				
Property/Infrastructure Damage			X									
Pollution			X									
Habitat/Resource Damage			X									
Other												

Forward Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X			X								
Street Flooding		X		X								
Property Flooding	X			X								
Soil Erosion	X			X								
Sediment in Streams		X			X							
Stream Bed/Bank Erosion	X				X							
Scour at Outfalls			X									
Property/Infrastructure Damage	X			X								
Pollution		X		X								
Habitat/Resource Damage		X		X								
Other												

Franklin Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X			X			X				
Street Flooding	X				X			X				
Property Flooding	X				X			X				
Soil Erosion	X			X				X				
Sediment in Streams	X							X				
Stream Bed/Bank Erosion	X							X				
Scour at Outfalls	X							X				
Property/Infrastructure Damage			X									
Pollution		X						X				
Habitat/Resource Damage			X									
Other												

Harmony Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X					X		X			
Street Flooding			X								
Property Flooding		X						X			
Soil Erosion		X						X			
Sediment in Streams		X									X
Stream Bed/Bank Erosion			X					X			
Scour at Outfalls			X								
Property/Infrastructure Damage		X						X			
Pollution			X								
Habitat/Resource Damage			X								
Other											

Harrisville Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X			X				X			
Street Flooding			X								
Property Flooding	X			X				X	X		
Soil Erosion		X									
Sediment in Streams			X								
Stream Bed/Bank Erosion			X								
Scour at Outfalls			X								
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage			X								
Other											

Jackson Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X				X			X			
Street Flooding	X			X				X	X	X	
Property Flooding	X				X			X	X	X	
Soil Erosion			X								
Sediment in Streams	X				X						X
Stream Bed/Bank Erosion			X								
Scour at Outfalls	X				X			X	X	X	
Property/Infrastructure Damage			X								
Pollution	X				X						X
Habitat/Resource Damage			X								
Other: (Sub Surface Water)											

Jefferson Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X				X			X	X			
Street Flooding		X			X			X	X			
Property Flooding		X			X			X	X			
Soil Erosion	X				X			X	X			
Sediment in Streams	X				X			X	X			
Stream Bed/Bank Erosion	X	X			X			X	X			
Scour at Outfalls	X				X			X	X			
Property/Infrastructure Damage			X	X								
Pollution			X									
Habitat/Resource Damage			X									
Other												

Karns City Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	X											
Street Flooding		X										
Property Flooding	X											
Soil Erosion		X										
Sediment in Streams		X										
Stream Bed/Bank Erosion		X										
Scour at Outfalls		X										
Property/Infrastructure Damage		X										
Pollution	X											
Habitat/Resource Damage		X										
Other: (Sub Surface Water)												

Lancaster Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X				X					X	
Street Flooding		X				X					X	
Property Flooding		X				X					X	
Soil Erosion			X									
Sediment in Streams			X									
Stream Bed/Bank Erosion			X									
Scour at Outfalls			X									
Property/Infrastructure Damage			X									
Pollution			X									
Habitat/Resource Damage			X									
Other: (Sub Surface Water)	X			X					X			

Marion Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X										
Street Flooding		X									
Property Flooding	X										
Soil Erosion		X									
Sediment in Streams	X										
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage		X									
Pollution		X									
Habitat/Resource Damage		X									
Other. (Sub Surface Water)											

Mars Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X									
Street Flooding		X									
Property Flooding	X				X			X			
Soil Erosion	X				X			X			
Sediment in Streams	X				X					X	
Stream Bed/Bank Erosion	X				X					X	
Scour at Outfalls		X									
Property/Infrastructure Damage	X						X				X
Pollution		X									
Habitat/Resource Damage		X									
Other		X									

Mercer Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X				X			X			
Street Flooding	X				X			X	X	X	
Property Flooding	X				X			X	X		
Soil Erosion	X				X				X		
Sediment in Streams	X				X				X		
Stream Bed/Bank Erosion	X										
Scour at Outfalls		X									
Property/Infrastructure Damage	X				X			X			
Pollution											X
Habitat/Resource Damage											X
Other. (Sub Surface Water)											X

Middlesex Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X						X	X	X		
Street Flooding		X							X			
Property Flooding		X							X			
Soil Erosion		X							X			
Sediment in Streams		X							X			
Stream Bed/Bank Erosion		X						X	X			
Scour at Outfalls		X							X			
Property/Infrastructure Damage		X						X	X			
Pollution		X										X
Habitat/Resource Damage		X							X			
Other												

Muddy Creek Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X		X				X				
Street Flooding		X		X					X	X		
Property Flooding		X		X				X	X	X		X
Soil Erosion		X		X								X
Sediment in Streams		X		X								X
Stream Bed/Bank Erosion		X			X			X				
Scour at Outfalls		X			X							X
Property/Infrastructure Damage												X
Pollution												X
Habitat/Resource Damage												X
Other												X

Oakland Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X	X								X
Street Flooding			X	X								X
Property Flooding		X										X
Soil Erosion			X									X
Sediment in Streams			X									X
Stream Bed/Bank Erosion			X									X
Scour at Outfalls			X									X
Property/Infrastructure Damage			X									X
Pollution			X									X
Habitat/Resource Damage			X									X
Other												

Parker Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X			X						
Street Flooding		X			X						
Property Flooding		X			X						
Soil Erosion		X				X					
Sediment in Streams		X				X					
Stream Bed/Bank Erosion		X				X					
Scour at Outfalls		X				X					
Property/Infrastructure Damage		X			X						
Pollution		X			X						
Habitat/Resource Damage		X		X							
Other											

Penn Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X					X	X		X	
Street Flooding		X			X			X			
Property Flooding		X			X			X	X		
Soil Erosion		X				X		X			
Sediment in Streams		X		X				X			X
Stream Bed/Bank Erosion		X				X		X			
Scour at Outfalls			X								
Property/Infrastructure Damage		X				X		X	X		
Pollution			X								
Habitat/Resource Damage			X								
Other: (Sub Surface Water)											

Petrolia Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X									
Street Flooding		X									
Property Flooding		X									
Soil Erosion		X									
Sediment in Streams		X									
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage			X								
Pollution		X									
Habitat/Resource Damage		X									
Other: (Sub Surface Water)											

Portersville Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									
Street Flooding		X						X				
Property Flooding	X							X				
Soil Erosion	X											
Sediment in Streams	X											
Stream Bed/Bank Erosion	X											
Scour at Outfalls	X											
Property/Infrastructure Damage	X											
Pollution	X											
Habitat/Resource Damage	X											
Other												

Prospect Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									
Street Flooding		X							X			
Property Flooding	X								X			
Soil Erosion	X								X			
Sediment in Streams			X									
Stream Bed/Bank Erosion			X									
Scour at Outfalls			X									
Property/Infrastructure Damage		X								X		
Pollution		X									X	
Habitat/Resource Damage		X										
Other	X											

Saxonburg Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X				X		X	X	X		
Street Flooding	X						X	X	X	X		
Property Flooding	X					X		X	X	X		
Soil Erosion		X		X						X		
Sediment in Streams	X					X		X		X		
Stream Bed/Bank Erosion	X			X				X	X	X	X	
Scour at Outfalls		X		X				X				
Property/Infrastructure Damage	X					X		X	X	X		
Pollution			X	X					X			
Habitat/Resource Damage		X	X						X			
Other												

Seven Fields Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding												
Street Flooding												
Property Flooding		X					X	X	X			
Soil Erosion												
Sediment in Streams												
Stream Bed/Bank Erosion												
Scour at Outfalls												
Property/Infrastructure Damage		X				X						
Pollution												
Habitat/Resource Damage												
Other												

Slippery Rock Borough												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding			X									X
Street Flooding		X				X			X	X		
Property Flooding	X							X	X	X		
Soil Erosion			X									
Sediment in Streams			X									
Stream Bed/Bank Erosion			X									
Scour at Outfalls			X									
Property/Infrastructure Damage		X				X		X	X	X		
Pollution			X									
Habitat/Resource Damage			X									
Other		X						X	X	X		

Slippery Rock Township												
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding		X										X
Street Flooding			X			X				X		
Property Flooding		X										X
Soil Erosion		X			X							X
Sediment in Streams		X			X				X			
Stream Bed/Bank Erosion		X										X
Scour at Outfalls			X	X								X
Property/Infrastructure Damage			X			X						X
Pollution			X			X						X
Habitat/Resource Damage			X				X					X
Other												X

Summit Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X		X						X	X	
Street Flooding	X		X						X	X	
Property Flooding	X			X					X	X	
Soil Erosion	X		X								X
Sediment in Streams	X		X								X
Stream Bed/Bank Erosion	X		X								X
Scour at Outfalls	X			X							X
Property/Infrastructure Damage	X			X					X	X	
Pollution	X		X								X
Habitat/Resource Damage											X
Other											

Valencia Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X		X					X			
Street Flooding			X								
Property Flooding	X		X					X			
Soil Erosion											
Sediment in Streams	X		X						X		
Stream Bed/Bank Erosion			X								
Scour at Outfalls			X								
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage			X								
Other: (Sub Surface Water)			X								

Venango Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding	X				X				X		X
Street Flooding	X			X					X		
Property Flooding											
Soil Erosion											
Sediment in Streams	X		X						X		
Stream Bed/Bank Erosion											
Scour at Outfalls											
Property/Infrastructure Damage											
Pollution	X							X			
Habitat/Resource Damage	X										
Other											

Washington Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X									
Street Flooding		X									
Property Flooding		X									
Soil Erosion		X									
Sediment in Streams		X									
Stream Bed/Bank Erosion		X									
Scour at Outfalls		X									
Property/Infrastructure Damage		X									
Pollution		X									
Habitat/Resource Damage		X									
Other											

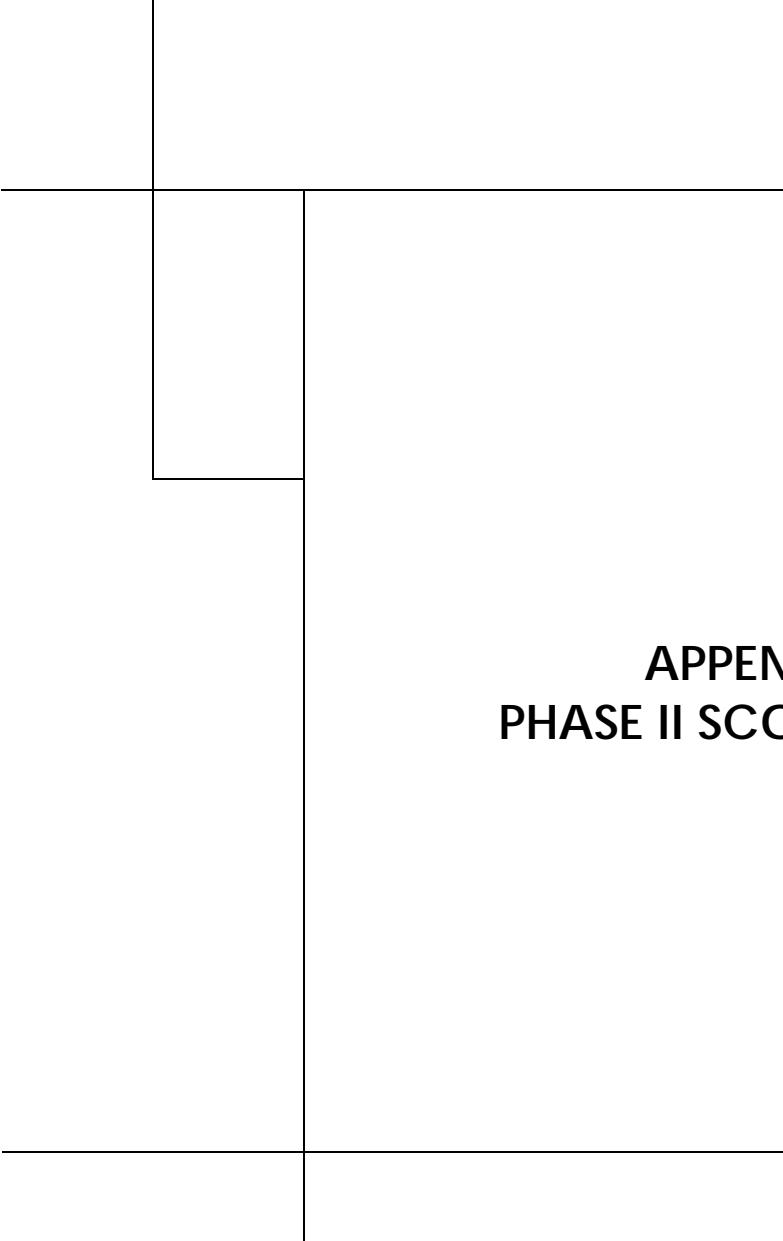
West Liberty Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X			X				X		
Street Flooding			X								
Property Flooding		X				X			X		
Soil Erosion			X								
Sediment in Streams		X			X				X		
Stream Bed/Bank Erosion		X			X				X		
Scour at Outfalls			X								
Property/Infrastructure Damage			X								
Pollution			X								
Habitat/Resource Damage		X				X			X		
Other: (Sub Surface Water)											

West Sunbury Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X					X			X	
Street Flooding		X					X			X	
Property Flooding		X			X				X		
Soil Erosion		X					X	X			
Sediment in Streams		X					X	X			
Stream Bed/Bank Erosion		X					X				
Scour at Outfalls		X					X				
Property/Infrastructure Damage		X				X		X		X	
Pollution		X						X			
Habitat/Resource Damage		X						X			
Other: (Sub Surface Water)											

Winfield Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X				X		X			
Street Flooding		X			X				X		
Property Flooding		X				X			X		
Soil Erosion		X		X				X			
Sediment in Streams		X		X				X			
Stream Bed/Bank Erosion		X		X				X			
Scour at Outfalls		X		X							
Property/Infrastructure Damage		X		X				X			
Pollution		X		X							
Habitat/Resource Damage		X			X						
Other. (Sub Surface Water)											

Worth Township											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X			X			X			
Street Flooding		X			X			X			
Property Flooding		X				X		X			
Soil Erosion	X										
Sediment in Streams			X								
Stream Bed/Bank Erosion	X							X			
Scour at Outfalls			X								
Property/Infrastructure Damage		X						X			
Pollution			X								
Habitat/Resource Damage			X								
Other			X								

Zelienople Borough											
PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE			
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development
Stream Flooding		X				X					X
Street Flooding		X				X					X
Property Flooding	X			X					X		
Soil Erosion		X				X		X			
Sediment in Streams	X			X				X			
Stream Bed/Bank Erosion	X			X				X			
Scour at Outfalls	X			X				X			
Property/Infrastructure Damage		X		X					X		
Pollution		X			X						X
Habitat/Resource Damage						X					X
Other	X			X					X		



APPENDIX C. PHASE II SCOPE OF WORK

Phase II Scope of Work

The COUNTY shall prepare Phase II of the PLAN in accordance with the tasks described in this Appendix C. For the purpose of carrying out work described in this Appendix C, the Butler County Planning Commission shall be considered as the COUNTY and shall assume all responsibilities deemed to be assumed by COUNTY. The COUNTY, with the help of the consultant, will accomplish the technical and non-technical components of the PLAN.

The final Phase II Report and associated Model Ordinance shall be considered as the PLAN.

The Pennsylvania Department of Environmental Protection shall be considered as the DEPARTMENT.

The selected engineering firm shall be considered as the CONSULTANT.

The Phase II contract between Butler County and The Pennsylvania Department of Environmental Protection shall be considered as the AGREEMENT.

Project Administration

The COUNTY shall be responsible for, but not limited to, overall administration of all tasks, including the preparation of invoices and progress reports, organizing and/or attending meetings, attending to budgeting and organizational matters, and participating in teleconferences regarding the PLAN.

This task also covers the administrative work required to initiate the AGREEMENT between the DEPARTMENT and the COUNTY, and to initiate selection of a CONSULTANT and, upon selection, to initiate contracts between the COUNTY and the CONSULTANT and to lay out a framework for the critical coordination aspect with the municipalities. Activities include defining the framework for accomplishing various elements of the PLAN, scheduling of time and defining the budget, progress reporting procedures and formats, and finalizing the work schedule. It will also include the preparation for and holding the Phase II start-up meeting between the DEPARTMENT, the COUNTY, and the CONSULTANT.

This task also includes the delineation of work for Phase II between the COUNTY and the CONSULTANT.

Project Billing

The COUNTY shall complete all of the tasks (A through D) and report the progress and status of the PLAN. The COUNTY shall prepare and submit quarterly invoices and report the status of work accomplished to the DEPARTMENT pursuant to the terms and conditions specified in the AGREEMENT.

TASK A - Data Collection/Review/Analysis

SubTask A.1 - Data Collection

This task will involve the necessary efforts to gather, review, and analyze the required data to complete the technical and institutional planning steps for the PLAN. The CONSULTANT and COUNTY will work jointly to collect data from county offices, municipalities, and local, state, and federal agencies that will aid in preparation of the PLAN. The data will consist of information concerning existing and future conditions throughout Butler County. All data collection activities will be accomplished by gathering available information from the WPAC or from the Information Request Form that was distributed to the municipalities during Phase I.

Data to be collected will include, but may not be limited to (and will be based on available information and/or Information Request Form results):

1. Comprehensive land use plans.
2. Existing municipal ordinances.
3. Stormwater-related problems areas and proposed conceptual solutions.
4. Existing and proposed flood control projects.
5. Existing and proposed stormwater control facilities.
6. A listing of existing and proposed stormwater collection and control facilities, including a designation of those areas to be served by stormwater collection and control facilities within a 10-year period, an estimate of the design capacity and costs of such facilities, a schedule and the proposed methods of financing the development, construction, and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities, where this information is readily available.
7. Soils.
8. Geology.
9. Significant water obstructions.
10. Topographic and other readily available mapping.
11. Aerial photographs.
12. Previously completed engineering and planning studies.
13. Stream flow and rain gauge data and other water quality information.
14. FEMA FIS floodplain information.

Necessary field investigations will be accomplished to gather and/or confirm the data. This task also involves the review and preliminary analysis of the technical data that has

been obtained for consistency and usability. It also includes the review of the institutional data collected through the Phase I Information Request Form process for consistency and usability in the final PLAN.

Problem Areas and Obstructions Inspection/Summary/Proposed Solutions

A detailed investigation will be performed to evaluate any problem areas and obstructions identified during Phase I. Those problem areas and obstructions recognized as "significant" would be field evaluated. Detailed modeling will be completed for the subwatershed where these "significant" problem areas or obstructions occur (SubTask B.3), then these sites shall be designated as points-of-interest, and associated design storm flows will be developed. A collection of past studies/investigations including any PennDOT hydrologic computations, if possible, will be compiled and reviewed for proposed solutions. The PLAN will summarize these problem areas and obstructions, provide proposed solutions, and will specify possible sources of funding to pursue for implementation. The PLAN will make suggestions for other programs/activities to deal with the issues raised during the planning process. The identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds.

Although the identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds, the Act 167 program will not provide funds to correct infrastructure problems or implement conceptual solutions. It will however, provide for a systematic approach and help to identify potential sources of funding to correct the problems, and will, through the preparation and implementation of stormwater ordinances, provide administrative means to correct existing problems and prevent future problems from uncontrolled runoff from future development and activities that may affect stormwater.

Review of Existing Plans/Studies/Reports/Programs

A comprehensive review of related documents and/or programs will be performed and a coordinated list of goals and objectives from each of the documents will be developed.

Anticipated Product

The product will include the information listed above, gathered and organized in such a way as to be usable for both short and long term municipal and county stormwater planning (including updates). A final data summary will be prepared that will identify and/or catalogue the collected data and funding streams.

SubTask A.2 - Municipal Ordinance Reviews/Evaluations

This task will involve the detailed evaluation of the provided municipal ordinances in order to prepare a municipal ordinance comparison matrix. This matrix is intended to display (for both the actual preparation of the implementation PLAN and also for the municipal education process), the current stormwater management provisions in the various municipal ordinances for all municipalities within Butler County. The objectives and the preparation of the matrix are to easily and effectively see the similarities and differences, as well as the consistency/inconsistency, between the various municipal

ordinances in the County. The matrix will be used to develop ordinance provision recommendations for the various municipalities.

Anticipated Product

The product will be a complete matrix of stormwater management ordinance provisions for the municipalities, which identify the current status of ordinance provisions as they relate to stormwater management.

SubTask A.3 - Data Preparation for Technical Analysis

This task involves the engineering work necessary to transform the information collected under SubTask A.1 into a Geographic Information System (GIS) database that can be used for the later technical tasks and map (plate) production. Included will be the preparation of "land characteristics" GIS data layers for modeling and display purposes. All data will be incorporated into the GIS database on an as needed basis.

The GIS data layers will include:

- Base Mapping – Existing base map information (roads, streams, municipal boundaries, text, etc.) will be collected and the most accurate data will be utilized to develop the County's base map. All data will be projected into the coordinate system utilized by Butler County. All data from various sources will be merged into a seamless base map.
- Land Use/Land Cover Information – Current aerial (photographic and/or digital images), available GIS land use files, and zoning maps will be collected and formatted into the format required for hydrologic modeling based on NRCS (formerly SCS) land use classifications. Land development projects completed subsequent to existing data will be added as necessary.
- Future Land Use Conditions – Future projected planning information will be overlaid on the existing land use conditions mapping to determine the future land use scenario for development at a 10-year build-out condition.
- Soils Information – The County Soils Survey maps will be modified and/or prepared to illustrate NRCS hydrologic soils groups instead of individual soil types. Overlay mapping will be necessary to prepare the hydrologic soils group map necessary for modeling.
- Digital Elevation Models – Digital Elevation Models (DEMs) will be utilized and evaluated for watershed and subwatershed delineation and to assign slope category information to the subwatersheds for which detailed modeling will be completed. The DEMs will be merged to form a seamless watershed map and projected to the appropriate coordinate system.
- Digital Raster Graphics (DRGs) – Ortho digital USGS topographical maps will be compiled and utilized to evaluate NRCS land use classifications and to determine the location of significant obstructions and problem areas.

- Geology – If available, digital geologic maps that include pertinent geologic features (limestone, sandstone, etc.) will be developed for the County and be extracted and displayed as part of the PLAN.
- Obstructions – Obstructions will be located on the appropriate base map and data or attributes will be attached or linked to the locations.
- Problem Areas, Flood Control Structures, Stormwater Management Facilities – These items will be located on the appropriate base map and data or attributes will be attached or linked to the locations.
- Floodplains – Available FEMA FIS floodplain data will be transposed to the appropriate base map and displayed with the development in Butler County.

A summary of data sources will be supplied (simplified Metadata) and will include data type (coverage, shape file, image), source, projection, and year.

Delineation of Subwatersheds

As required, the watersheds and subwatersheds will be delineated by the CONSULTANT on a base map at a scale that results in a manageable map size and adequate detail. Subwatersheds will be established based on the collected data and results of field reconnaissance. This breakdown of the watersheds by major tributary drainage courses and points-of-interest will be the basis for the hydrologic and hydraulic analyses. The CONSULTANT will determine the size of the subwatersheds; however delineations of subwatersheds smaller than three (3) square miles requires the COUNTY's concurrence.

The subwatersheds will be delineated based on the following:

1. The location of existing regionally significant stormwater management problems, as identified by the WPAC in the Information Request Form, during the field reconnaissance, or from data compiled in any previous studies or reports.
2. The location of significant regional stormwater and flood control obstructions such as highway bridges and culverts, or stormwater control facilities.
3. Confluence points of tributaries, as deemed appropriate and significant relative to regional stormwater management planning based on engineering judgment and good modeling practice.
4. Other points of interest, such as stream gage or water quality monitoring stations, locations of water quality concerns, potential flood control project sites, significant outfall locations downstream of existing developments, or where significant development is anticipated and projected to occur.

This task will also include mapping of relevant regional watershed planning information onto GIS data layers. This mapped information will include:

1. Floodplain Areas - The approximate floodplain limits plotted over the watershed base map or the highlighting of those stream segments for which FEMA detailed or approximate Flood Insurance Studies are available.

2. Regionally significant stormwater obstructions and their capacities - "Significant" obstructions will be those that are identified in the Information Request Form and/or which are confirmed by the CONSULTANT as being areas where insufficient capacity exists to pass the necessary storm flows, thereby resulting in a flooding hazard to persons or property, or those obstructions that would act as regionally significant impoundments that may affect watershed modeling and the watershed stormwater response.
3. Storm Sewer Systems - Areas where significant storm sewer systems exist will be indicated generally on the final base map.
4. Existing local, state, and federal flood protection and stormwater management facilities.
5. Proposed stormwater facilities within the 10-year planning period - Where known and confirmed by the municipalities through the Information Request Form completion process.
6. Regionally Stormwater Related "Problems" - Those areas indicated in the Information Request Form and where confirmed by the CONSULTANT through technical modeling/analysis (for example, flooding points or areas of streambank erosion).

Anticipated Product

The product will be completed GIS watershed data layers and maps. The maps completed for this task will be preliminary and will be modified and finalized as a part of the final PLAN preparation efforts.

TASK B - Technical Analysis

The technical analysis will describe the analytical processes involved with developing a strategy to regulate existing and new land development and activities that may affect stormwater runoff. Since stormwater runoff has a direct impact on flooding, water quality, and groundwater recharge, this analysis will consider the following objectives:

- Implement non-point source pollution removal methodologies.
- Preserve and restore natural stormwater runoff regimes and natural course, current, and cross section of Waters of the Commonwealth, to the maximum extent practicable.
- Preserve, protect, maintain, and restore groundwater recharge and recharge areas.
- Protect stream channel and land areas from erosion.
- Restore and preserve flood carrying capacity of streams.
- Manage extreme flood events.

These objectives will be accomplished under SubTasks B.1 to B.9.

SubTask B.1 - Implement Volume Controls

Establish the Design Storm Method (Control Guidance 1 in The Pennsylvania Stormwater Best Management Practices Manual) and the Simplified Method (Control Guidance 2 in The Pennsylvania Stormwater Best Management Practices Manual) consistent with the Department of Environmental Protection, Bureau of Watershed Management's Pennsylvania Model Stormwater Management Ordinance.

SubTask B.2 - Implement Rate Controls

Establish a minimum 100% release rate for all lands contained within Butler County. More restrictive release rates may be developed in subwatersheds with existing problem areas or intense development pressures.

SubTask B.3 - Model Subwatersheds of Designated Watersheds

This task involves the hydrologic modeling, quantitative computations, and evaluations necessary to analyze runoff characteristics of the subwatersheds under existing and future conditions. It will also establish the need and extent of release rates for the subwatersheds. The Connoquenessing Watershed and portions of the Breakneck Creek, Sullivan Run, Buffalo Creek and Slippery Rock Creek watersheds will be modeled to determine peak flow rates. Subwatersheds chosen will be based on existing problem areas or future development pressures based on input provided by the WPAC. Existing and future land use and land cover will be used to determine existing and future peak rates of discharge. Input data including rainfall information, drainage network layouts and capacities, travel times within subwatersheds, significant obstructions, and GIS based data will be added to develop the selected hydrologic model.

Model Calibration

The individual subwatershed models will be run to get preliminary results. The models will be calibrated to verify the results. Calibration efforts will include the adjustment of the model parameters to accurately simulate the natural runoff conditions of the subwatershed. Consideration will be given to all calibration techniques including, but not limited to: use of any available gauging information, comparison with rainfall and

runoff information from similar watersheds, comparison with Flood Insurance Study information, and regression analyses. As necessary, calibration will be performed at multiple points within the subwatersheds to assure the most accurate modeling.

Design Storm Selection

Subsequent to calibration of the model, the model will be run for the 2-, 10-, 25-, 50- and 100-year storm events under various durations. An analysis on downstream impacts during these storms will be performed to determine the required design storm(s) based on the subwatershed hydrologic response of the five (5) storms.

Model Runs

The calibrated models will be run for the selected subwatersheds under the determined design storm(s) for both the existing and future projected land uses.

This will also involve the detailed evaluation of modeling results to perform a problem identification analysis (i.e., a "cause and effect" analysis). This will concentrate on identifying the downstream storm runoff impacts of projected future land development projects. This evaluation will consider both the increases in current downstream storm runoff problems, as well as anticipated projected downstream runoff problems.

This work step also consists of performing a technical evaluation of the hydrologic analysis for existing and future land use conditions (estimated 10-year build out) and recommending standards and criteria to regulate land development activity which impacts stormwater runoff. This subtask may also involve performing a release rate analysis and a preliminary distributed storage analysis, and developing criteria and standards for the management of both overbank flooding events (2-, 10- and 25-year storms) and the extreme flooding events (50- and 100-year storms), to be determined by the WPAC.

SubTask B.4 - Provide Conceptual Solutions for Existing Problem Areas

Based on the results of SubTask B.3, this information will be used to develop alternative conceptual solutions for the problem areas identified in the Information Request Form and other problem areas as identified by the WPAC. Problem areas may generally consist of flooding, stream channel or bank erosion, property damage, detention basins (retrofitting), etc. The developed solutions will be conceptual in nature (i.e. no final engineering or specification will be completed). These conceptual solutions will be presented as recommendations to the municipalities. It will be up to the individual municipality's discretion whether or not to implement the conceptual solutions to the problem areas. The municipality will also be responsible to acquire funding sources to implement the final solutions.

SubTask B.5 - Goals, Objectives, and Compilation of All Technical Standards

Stormwater problems will be restated as goals and objectives for the Act 167 planning process. The goals and objectives need to:

- Satisfy all regulatory requirements (including correcting water quality impairments related to stormwater or urbanization appearing in the EPA 303(b) and (d) lists, or impairments associated with approved TMDLs).

- Meet the purpose and policy of Act 167.
- Meet regulatory and permit requirements associated with the NPDES MS4 program.
- Meet local requirements and objectives established by the WPAC.

When restated as engineering performance standards for the PLAN, the goals and objectives become the basis for the standards and criteria for regulation and control of land development and activities that may affect stormwater.

The standards and criteria will provide a basis for the selection and application of analytical methodologies and BMPs for the implementation of stormwater controls.

The candidate stormwater management strategies that meet the identified goals and objectives (i.e. show how the proposed standards and criteria for the Final Report and Model Ordinance meet the goals and objectives set by the WPAC) will be prepared and presented to the WPAC.

The proposed standards and criteria need to address the following control requirements:

1. Apply to all areas covered by the PLAN.
2. Establish release rate percentages (if applicable) or other levels of control of runoff.
3. Specify design flood frequencies and computational methodologies for design of stormwater management measures.
4. Provide specifications for construction and maintenance of stormwater management systems (if applicable).
5. Provide conceptual solutions to both regional and local problems areas.
6. Summary and prioritization strategies for long-term potential solutions.
7. Identify funding sources for correction of existing problems related to infrastructure.
8. Maintain consistency with concurrent studies including a summary of what tasks will be completed so as to avoid duplication of effort.
9. Provide a fee schedule for: submissions of permit applications, review of permit applications, construction inspections, periodic inspections, and enforcement actions.
10. An implementation strategy, including funding, for retrofit measures, if necessary.

The recommendations will be presented in layman's language, keeping in mind that they are directed towards local municipalities and are to address solutions to stormwater management issues. The technical standards and criteria developed as a part of this task will apply to all areas covered by the PLAN.

Water quality BMP information will be presented including recommendations for the implementation of water quality BMPs for land development and activities to minimize stormwater impacts from land development and activities. This educational effort will primarily involve discussions, presentations, and handouts on BMP technology to municipal officials during regularly scheduled WPAC meetings. Information available from PADEP and other sources will be distributed.

Methods for controlling stormwater runoff quantity and quality will be evaluated and included in the Model Ordinance.

SubTask B.6 - Implementation of Technical Standards and Criteria

This subtask will involve the identification of the necessary ordinance provisions for each municipality. Included will be the modification of the Model Ordinance and/or recommendations for updating existing municipal ordinances, including but not limited to, subdivision and land development, zoning, erosion and sediment control, and building code ordinances to effectively implement the technical standards and criteria for stormwater management throughout Butler County. A design example will be provided to show how to incorporate the various aspects of the Model Ordinance into the stormwater management design process.

Anticipated Product

The product will be the charts, tables, figures, plates, and graphs needed to present the technical analysis including evaluation of both water quantity and water quality requirements. The product will also include modeling results, the technical interpretation of the modeling results, and the definition of the technical standards and criteria for use in the preparation of the PLAN. The product will also include the identification of necessary recommended municipal ordinance provisions to implement the technical standards, including a complete stormwater management Model Ordinance.

SubTask B.7 - Economic Analysis

This subtask will involve an economic analysis of implementing the technical standards and provisions of the PLAN with respect to different types of development within the County (residential, commercial, industrial). A design example for each type of development will be created and estimated costs will be associated with the design example to demonstrate how implementation of the standards and provisions can be cost effective to developers.

Anticipated Product

The product will be a design example for each type of development within the County.

SubTask B.8 - Regulations for Activities Impacting Stormwater Runoff

This subtask will involve the research and development of standards and provisions regarding regulating activities that may impact stormwater runoff. These activities may include agriculture. The activities will only be regulated in regards to stormwater management controls and protecting water quality requirements to ensure the protection of health, safety, and property of the people and Waters of the Commonwealth.

Anticipated Product

The product will be a section in the Model Ordinance addressing activities that may impact stormwater runoff.

SubTask B.9 - Water Quality Impairments

This subtask involves the research and identification of water quality impairments throughout Butler County from the 303(b) and 303(d) lists and designated Total Maximum Daily Loads (TMDLs).

Anticipated Product

The product will be to identify how to protect the existing uses and for waters not attainting, how to improve the water quality to the designated use.

TASK C – Public/Municipal Participation

SubTask C.1 – Meetings

Coordination efforts and/or activities will continue throughout the duration of the project and will be organized to include the necessary meetings with the COUNTY, CONSULTANT, DEPARTMENT, and WPAC.

In addition to the WPAC, the County will conduct committee meetings to educate and solicit input and comment from the public, municipal governments (elected officials, engineers, and solicitors), and other interest groups such as watershed associations. These meetings will require both Municipal Engineer and Legal Advisory Participation.

As previously indicated, the WPAC consists of representatives from each municipality in Butler County, as well as the Butler County Conservation District, and other interested groups. The WPAC meetings will be held to provide education on the planning process and to receive advice from the municipal officials to assure the PLAN fits the needs of the municipalities while soliciting valuable technical and institutional data and other information. The advisory role of the WPAC during the development of the PLAN is vital to the ultimate adoption and implementation process.

The Municipal Engineers Participation meeting will focus on technical issues and will consist of municipal engineers from each municipality and any invited engineering, technical, or scientific individuals. This meeting will provide a technical forum to assist the COUNTY and CONSULTANT during the preparation of the technical portions of the PLAN by evaluating watershed modeling, water quality efforts, and the establishing of overall technical standards.

The Legal Advisory Participation meeting will focus on legal issues and will include the solicitors representing each municipality. This meeting will be convened to educate the municipal solicitors on the ordinance adoption and implementation requirements of the PLAN and to receive comments and direction in the finalization of the Model Ordinance.

A BMP Workshop for the municipalities and municipal engineers will be developed and conducted. The presentation of the workshop shall be based on The Pennsylvania Stormwater Best Management Practices Manual. The workshop will contain one or more examples showing the design and construction of BMPs, including design calculations, review procedures, and approval of permit applications.

Meetings of these committees may be held separately or combined, as the County desires.

The following table outlines the proposed meetings and public hearing schedules including the purpose of each meeting:

-- WPAC #1 and WPAC #2 Meetings were held during Phase I.

Meeting	Purpose of Meeting	Meeting Schedule
WPAC 3	Review Phase I, discuss problem areas and obstructions from Questionnaire Form, present GIS maps and data, and review overall goals of Phase II. Discuss future meetings, makeup, combinations, schedules.	Beginning of Phase II
Municipal Engineers Participation 1	Potential separate meetings to review the project status, review technical aspects of the PLAN, including initial modeling runs, calibration efforts, and review of technical standards (Control Guidance 1 & 2). Purpose is to receive comments and direction in the development of the Model Ordinance. Meetings may be combined if so desired by the County.	Middle of Task B
Municipal Engineers Participation 2	Potential separate meetings to present final technical modeling results, present technical standards and criteria; discuss water quality issues, and preliminary ordinance provisions for the municipalities. Review final modeling runs and present draft PLAN and address previous comments. Meetings may be combined if so desired by the County.	End of Task B
Legal Advisory Participation 1	Potential separate meetings to present final draft and review municipal implementation procedures. Educate the municipal solicitors on the ordinance adoption and implementation requirements of the PLAN. Meetings may be combined if so desired by the County.	End of Phase II
Public Hearing	Conduct the public hearing as required by Act 167 to present the final PLAN to the public.	End of Phase II
BMP Workshop	Educate municipalities on implementing stormwater quality through the BMP Workshop.	End of Phase II
Municipal Workshop	Municipal Implementation Workshop: Provide assistance to municipalities on implementation of the PLAN including adaptation, enactment, and implementation of the ordinances and other action items.	Within 3 months of DEP's approval of the PLAN
Public Implementation Workshop	Public Implementation Workshop: Provide introduction and overview of the PLAN to public.	Within 6 months of DEP's approval of the PLAN

This task will also involve the production and distribution of a meeting agenda and meeting minutes updating the members, municipal officials, interest groups and the public on the program, status, and issues of the PLAN. The agenda and minutes will be created for each meeting during Phase II.

Anticipated Product

The product will include correspondence and meeting notes/minutes from the individual committee meetings. In addition, the presentation materials prepared for the individual committee meetings will constitute a defined product of this subtask for the overall project.

TASK D - PLAN Preparation and Implementation

SubTask D.1 - Final Phase II Report Preparation

Components of the previous task and subtasks will be included, or at least referred to in the PLAN. In this way the PLAN shall contain such provisions as are reasonably necessary to manage stormwater such that storm runoff from land development or other activities in each municipality shall not adversely affect health, safety, property, and water quality. In addition, the PLAN shall consider and be consistent with other existing municipal, county, regional and state environmental and land use plans and local and state laws and regulations. The PLAN shall include the following:

- A description of the hydrologic characteristics of the subwatersheds; the existing and future land uses and their impacts on stormwater runoff and stormwater collection systems; the available runoff control techniques and their efficiencies in the subwatersheds; a list of significant obstructions; and available FEMA FIS floodplain information. The available floodplain information will either be included in the PLAN or their sources will be referenced.
- Based upon the results of the subwatershed modeling, the technical evaluation resulting in the criteria and standards governing the use of stormwater management controls throughout the subwatersheds. An important aspect of the technical components of the PLAN will be the delineation of subwatersheds with specific management strategies. This determination will be accomplished based upon an evaluation of any land development activities on critical drainage points throughout Butler County. Peak discharge tables will be compiled for the critical drainage points from the hydrologic model runs involved in the modeling effort. BMP tables and data on their effectiveness and applicability will be presented or referenced.
- The tables for the rainfall depths for various frequency durations, which are computed as part of the hydrologic, modeling.
- Approximate floodplain limits for areas where detailed FIS studies are available. Where detailed flood control engineering plans for proposed remedial measures are available from municipality, county, or private agencies, a summary analysis and evaluation of those plans will be included in the PLAN. Where detailed plans are not available, preliminary recommendations relating to such measures will be provided.
- Recommendations for solutions to the existing drainage problems will only be conceptual in nature indicating the type of approach needed and inter-municipal cooperation issues. Identification of sites for potential restoration and/or protection projects that would qualify for Pennsylvania's "Growing Greener" Funds will be identified.
- Recommendations for new drainage facilities to prevent future problems due to new land development and a discussion regarding inter-municipal arrangements for funding the projects will also be discussed.
- Priorities for Implementation. The conclusions and recommendations of the goals and objectives of the PLAN will be summarized. Recommended actions will be

listed according to agency, municipality, or individual responsible for each action. Priority of recommended actions will be based on chronological order, importance, hydrologic significance, or other factors as may be appropriate. This will include type and location of potential watershed projects that could be considered under Pennsylvania's "Growing Greener" grant program.

- PLAN Update. As a part of the implementation strategy for the PLAN, specific steps and/or procedures will be established for pursuing and completing the PLAN as required by Act 167. Specific circumstances will be identified and described in the PLAN document that will "trigger" a decision to update. For example, land development circumstances (such as major changes in the type and/or amount of proposed land development, and in excess of that which was assumed for the preparation of the original PLAN) will be identified as reasons for pursuing an update of the PLAN prior to the required 5-year time frame identified in Act 167.

The preliminary outline for the PLAN is as follows:

Part I

Section I	-	Introduction
Section II	-	Butler County Description
Section III	-	Significant Problem Areas and Obstructions
Section IV	-	Watershed Level Stormwater Management Planning
Section V	-	Technical Analysis
Section VI	-	Existing Municipal Regulations
Section VII	-	Economic Impact of Stormwater Management Standards
Section VII	-	Goals, Objectives, and Additional Recommendations
Section IX	-	PLAN Implementation and Update Procedures
Section X	-	References

Part II

Model Ordinance

Plates:

- Existing Land Use Base map.
- Future (10-year) Land Use Base map.
- Subwatersheds used for hydrologic analysis including information on applicable release rate management strategies.
- Hydrologic soil groups and development and floodplains.
- Stream obstructions, flooding, and problem areas.
- Areas where storm sewer networks exist (if available) and projected future storm sewer networks.

Anticipated Product

The product will be the final Phase II Report. The Phase II Report will be prepared in both digital and paper formats.

SubTask D.2 - Model Ordinance Preparation

A Model Ordinance, which includes the provisions and standards developed during Phase II, will be created consistent with the Department of Environmental Protection Pennsylvania Model Stormwater Management Ordinance. The WPAC will make a determination on whether drainage and construction standards will be included.

Anticipated Product

The product will be the final Model Ordinance. The Model Ordinance will be prepared in both digital and paper formats.

SubTask D.3 - PLAN Adoption

The PLAN will include the final Phase II Report and the Model Ordinance. One copy of the draft PLAN will be transmitted to the official agency and governing body of each involved municipality, each member of the WPAC, and the DEPARTMENT by official correspondence. The involved municipalities, WPAC, and DEPARTMENT will then review the draft PLAN. Their review will include an evaluation of the PLAN's consistency with other plans and programs affecting stormwater management. The reviews and comments will be submitted to the COUNTY by official correspondence. The review comments will be received, tabulated, and responded to appropriately and the draft PLAN will be revised accordingly.

Prior to final PLAN adoption, and as necessary, meetings will be held with each municipality individually as identified in WPAC meetings and municipal training schedule; to identify specific ordinance changes and method(s) of incorporation of the standards and criteria into municipalities' existing ordinance framework. In addition, the meeting(s) can also serve to provide clarification of any remaining questions or concerns that municipalities may have concerning the implementation of the PLAN.

The COUNTY will hold a public hearing concerning the PLAN. A notice for the public hearing will be published at least two (2) weeks before the hearing date. The public hearing notice will contain a brief summary of the principal provisions of the PLAN and a reference to the sites and/or website where copies of the PLAN may be examined or purchased at cost. The COUNTY will review the comments received at the public hearing and appropriate modifications in the PLAN will be made as applicable.

The Butler County Commissioners will vote by resolution on the adoption of the PLAN. The resolution will have to be carried by an affirmative vote of at least a majority of the Commissioners, and should refer expressly to the maps, charts, textual matter, and other materials intended to comprise the PLAN. Upon positive resolution, this action will then be recorded on the adopted PLAN.

The COUNTY will then submit to the DEPARTMENT a letter of transmittal, and three (3) copies of the adopted PLAN, along with a digital version and GIS data layers, the review by the official Planning agency and/or governing body of each municipality, Butler County Planning Commission, regional Planning agencies (Section 6(c) of Act 167), public hearing notice and minutes (Section 8(a) of Act 167), and the resolution of adoption of the PLAN by the COUNTY (Section 8(b) of Act 167). The letter of transmittal will state that the COUNTY has complied with all procedures outlined in Act 167 and will request the DEPARTMENT to approve the adopted PLAN. The COUNTY will also submit to

the DEPARTMENT a current list of all names, addresses, and phone numbers of the municipalities, municipal engineers, and solicitors located in Butler County. Subsequent to the DEPARTMENT's approval of the PLAN, seventy-five (75) copies of the PLAN will be printed and distributed.

As desired by the County, the adopted PLAN could be posted on the COUNTY's and/or CONSULTANT's websites.

All backup material including hydrologic and hydraulic analyses of the subwatersheds will be retained at the COUNTY office for future use during PLAN updates or any other reference.

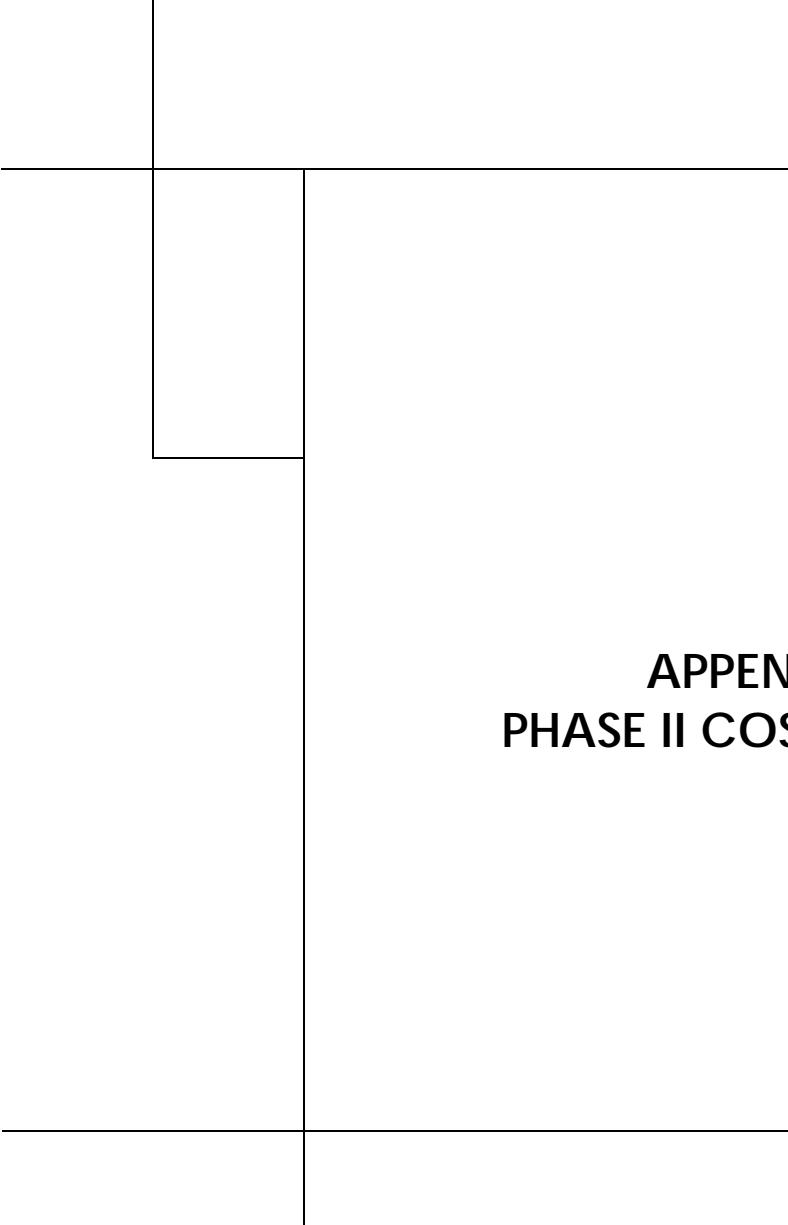
Anticipated Product

The product of this subtask will include the official documentation regarding PLAN adoption and implementation process, including the necessary documentation from the COUNTY certifying the adoption of the PLAN, an adopted PLAN, and associated Plates.

The Plan will contain, at a minimum, the following items:

1. A survey of existing runoff characteristics in minor as well as large storms, including the impact of soils, slopes, vegetation, and existing development.
2. A survey of existing significant obstructions, their capacities, and associated storm return periods.
3. An assessment of projected and alternative land development patterns in Butler County, and the potential impact of runoff quantity, velocity, and quality.
4. An analysis of existing and future development in flood hazard areas, and its sensitivity to damages from future flooding or increased runoff.
5. A survey of existing drainage problems and proposed conceptual solutions.
6. A review of existing and proposed stormwater collection systems and their impacts.
7. An assessment of alternative runoff control techniques and their efficiency in the individual subwatershed.
8. An identification of existing and proposed local, State, and Federal flood control projects located in Butler County and their design capacities.
9. A designation of those areas to be served by stormwater collection and control facilities within a ten (10) year period, an estimate of the design capacity and costs of such facilities, a schedule and proposed methods of financing the development, construction and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities.
10. An identification of FIS delineated floodplains throughout Butler County.

11. Criteria and standards for the control of stormwater runoff from existing and future development, which are necessary to minimize dangers to property and life and carry out the purposes of Act 167.
12. A BMP Workshop to inform engineers and local officials about enhanced water quality and groundwater recharge stormwater management techniques (information on BMPs is also to be included or referenced in the PLAN).
13. Priorities for implementation of conceptual solutions.
14. Provisions for periodically reviewing, revising, and updating the PLAN.
15. Provisions as are reasonably necessary to manage stormwater such that land development or activities in each municipality do not adversely affect health, safety, and property in other municipalities of Butler County and in drainage basins to which the watershed is tributary.
16. Consideration for consistency with other existing municipal, county, regional, and State environmental and land use plans.



APPENDIX D.
PHASE II COST PROPOSAL

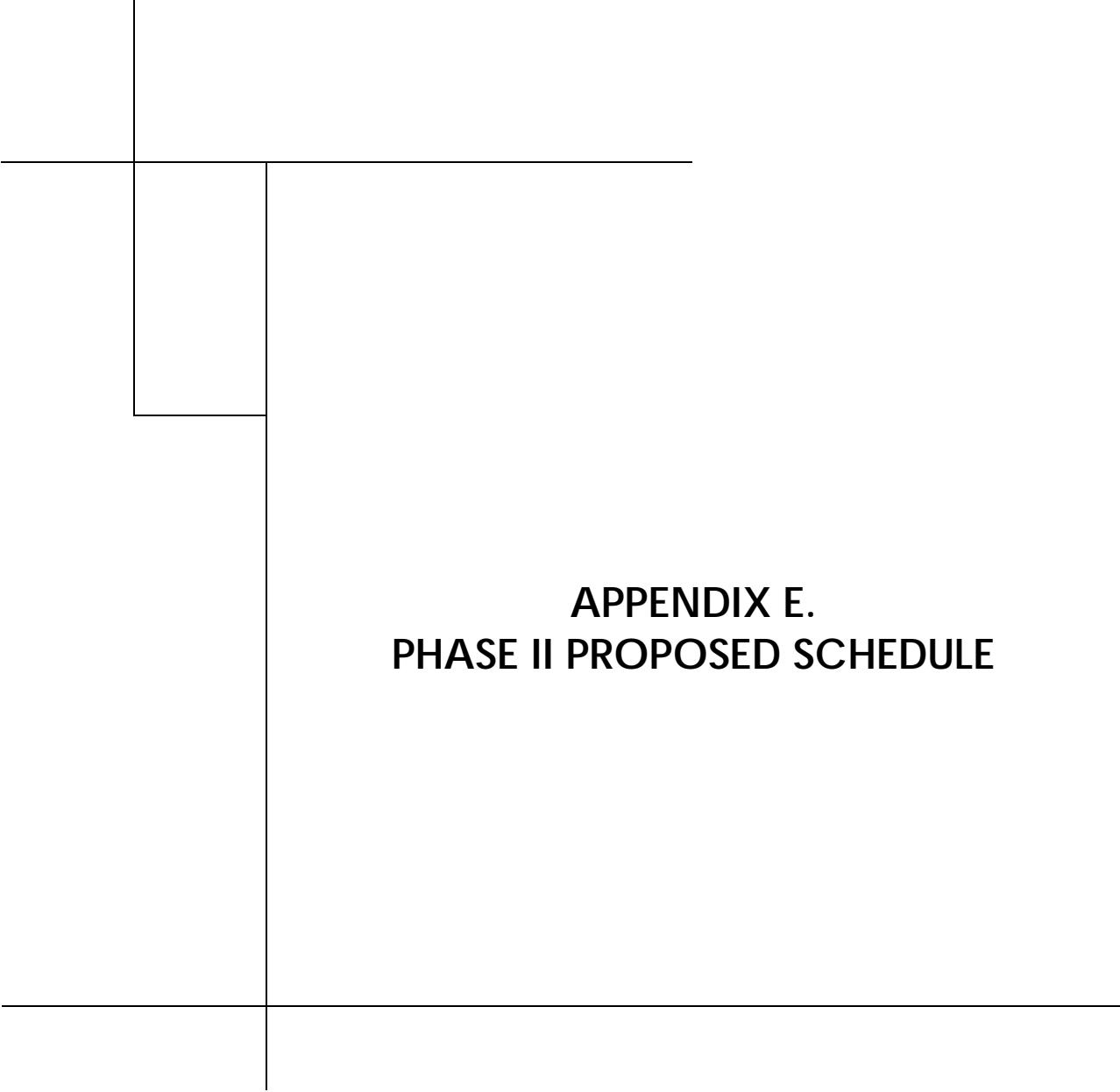
Phase II Cost Proposal

The estimated cost associated with completing the Phase II work is Three Hundred Thirty Four Thousand, Two Hundred, Twenty-Three Dollars (\$334,223.00) as per the following breakdown:

TASK DESCRIPTION	TIME	EXPENSES	TOTAL
Task A – Data Collection/Review/Analysis	\$61,655.00	\$6,500.00	\$68,155.00
Task B – Technical Analysis	\$121,952.00	\$13,000.00	\$134,952.00
Task C – Public/Municipal Participation	\$41,204.00	\$4,550.00	\$45,754.00
Task D – PLAN Preparation and Implementation	\$47,140.00	\$5,200.00	\$52,340.00
Task E – Project Management & Administration	\$29,772.00	\$3,250.00	\$33,022.00
PHASE II PROJECT TOTALS	\$301,723.00	\$32,500.00	\$334,223.00

Budget Appropriations for the associated Fiscal Year Periods are estimated to be as follows:

Fiscal Year	Proposed Act 167 Phase II Budget Appropriation
2009 (July 1, 2008 – June 30, 2009)	\$117,814
2010 (July 1, 2009 – June 30, 2010)	\$118,575
2011 (July 1, 2010 – June 30, 2011)	\$68,548
2012 (July 1, 2011 – June 30, 2012)	\$29,286
TOTAL	\$334,223

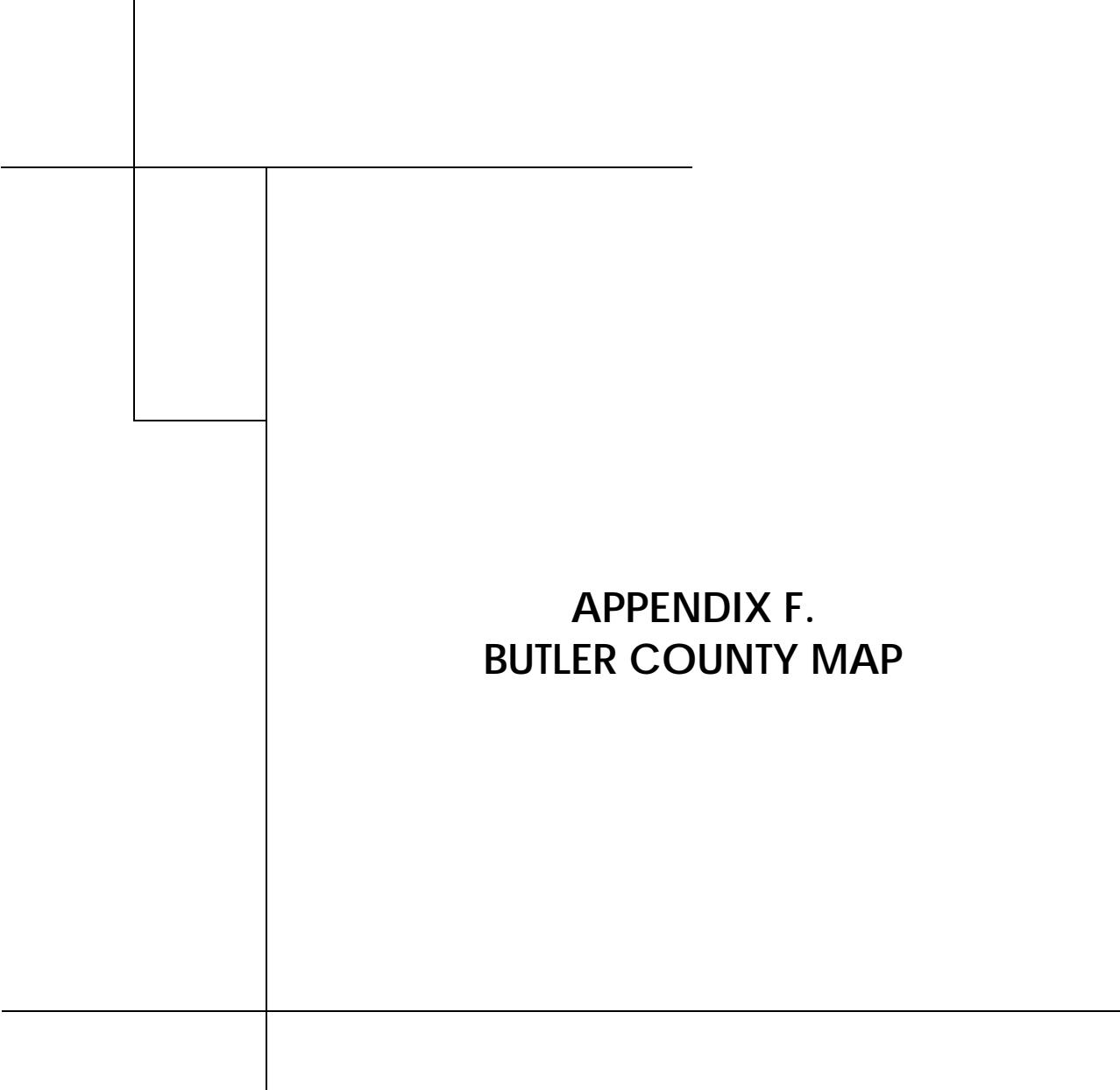


APPENDIX E.
PHASE II PROPOSED SCHEDULE

Phase II Proposed Schedule

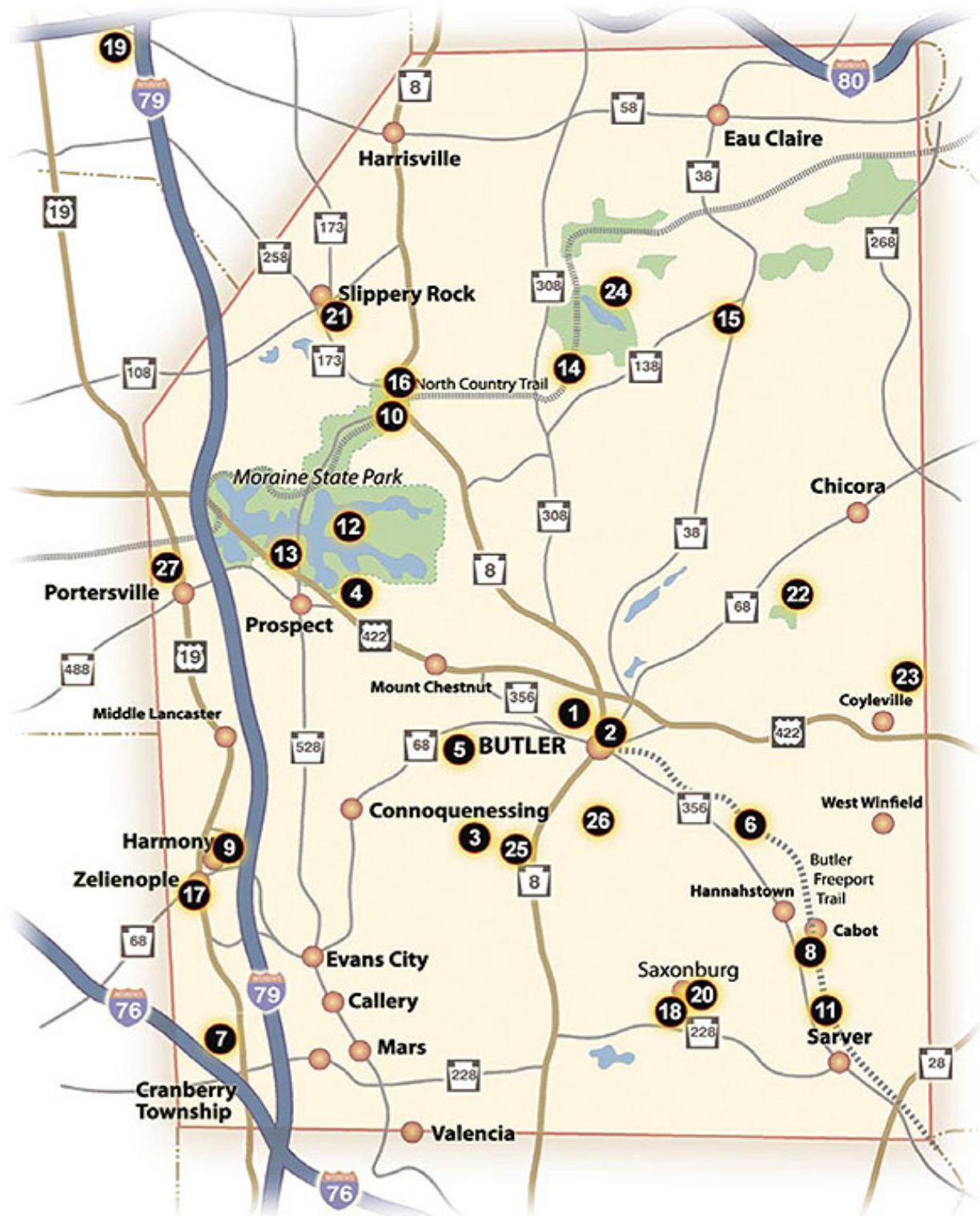
The proposed Phase II Schedule is as follows:

ANTICIPATED DATE	MILESTONE	FY
2008		
August	PADEP and Butler County Phase II Contract Executed	2009
September	WPAC Meeting #3	
October	Field View of Problem Areas/Modeling	
2009		
March	Conceptual Solutions to Problem Areas	
June	PAC Meeting #1	
October	Draft Phase II Report	2010
December	Draft Model Ordinance	
2010		
April	PAC Meeting #2	
July	Finalize Phase II Report, Model Ordinance, and Plates	2011
September	PAC Meeting #3 and BMP Workshop	
December	Public Hearing	
2011		
March	Commissioners Approval of Phase II Plan	
May	Phase II Report Submission to PADEP	
September	PADEP Approval of Phase II Plan	2012
November	Municipal Implementation Workshop #1	
2012		
January	Municipal Implementation Workshop #2	
March	Public Workshop #1	
June	PADEP and Butler County Phase II Contract Expiries	



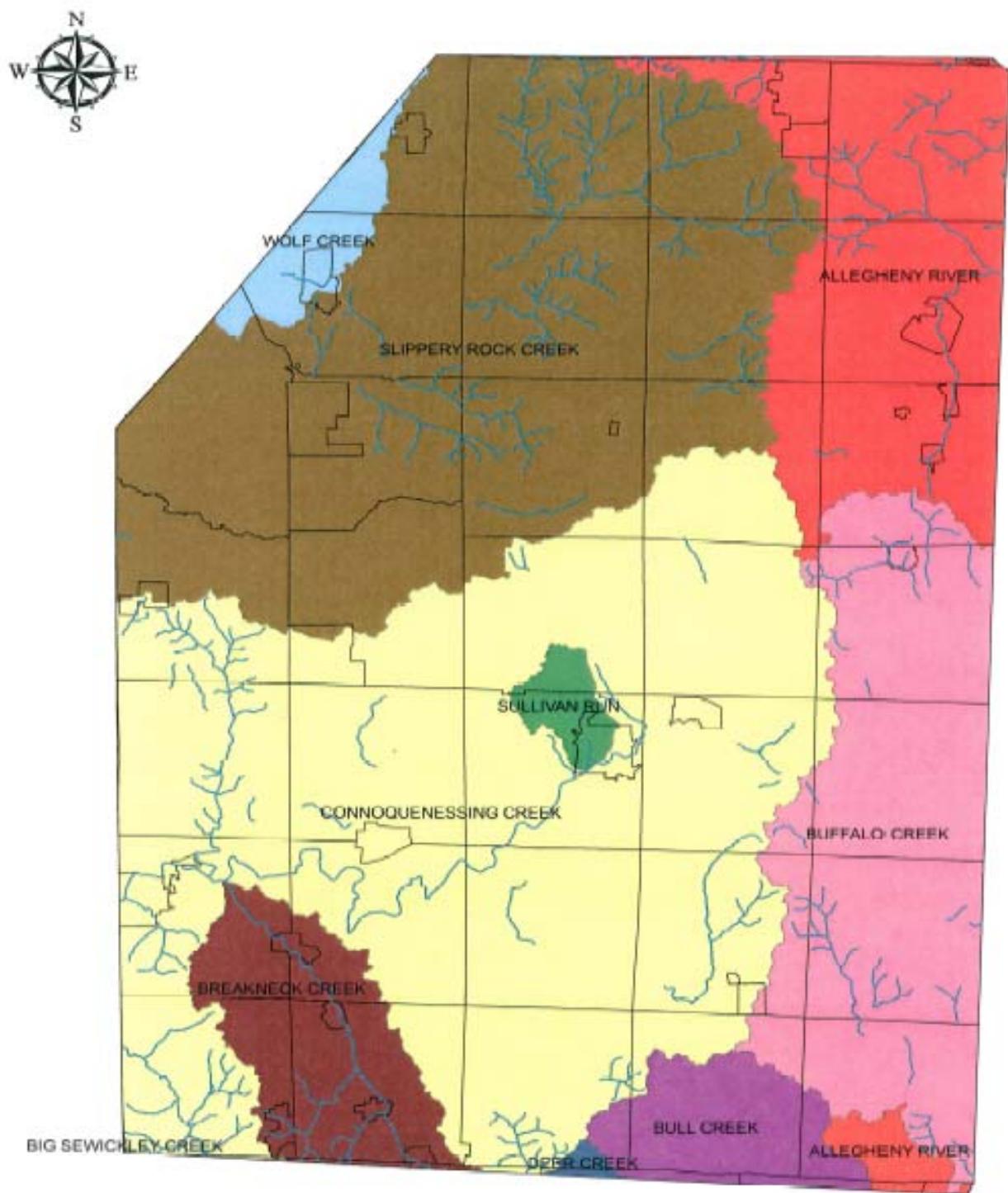
APPENDIX F.
BUTLER COUNTY MAP

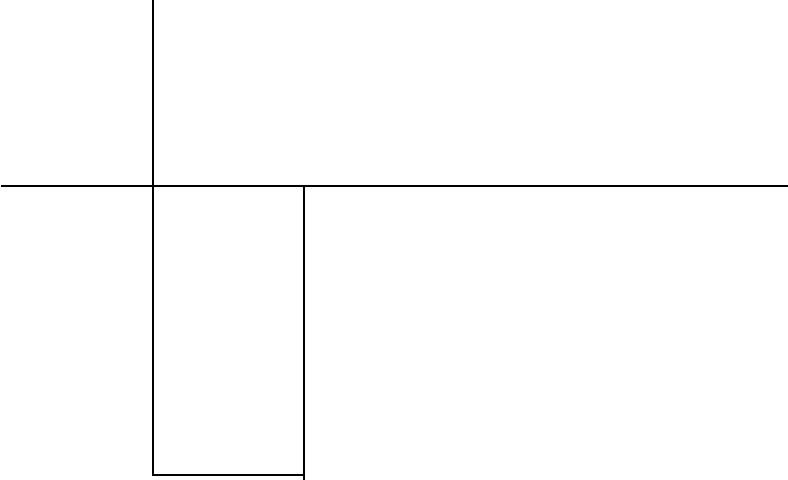
BUTLER COUNTY MAP



**APPENDIX G.
BUTLER COUNTY
ACT 167 DESIGNATED WATERSHEDS**

ACT 167 DESIGNATED WATERSHEDS

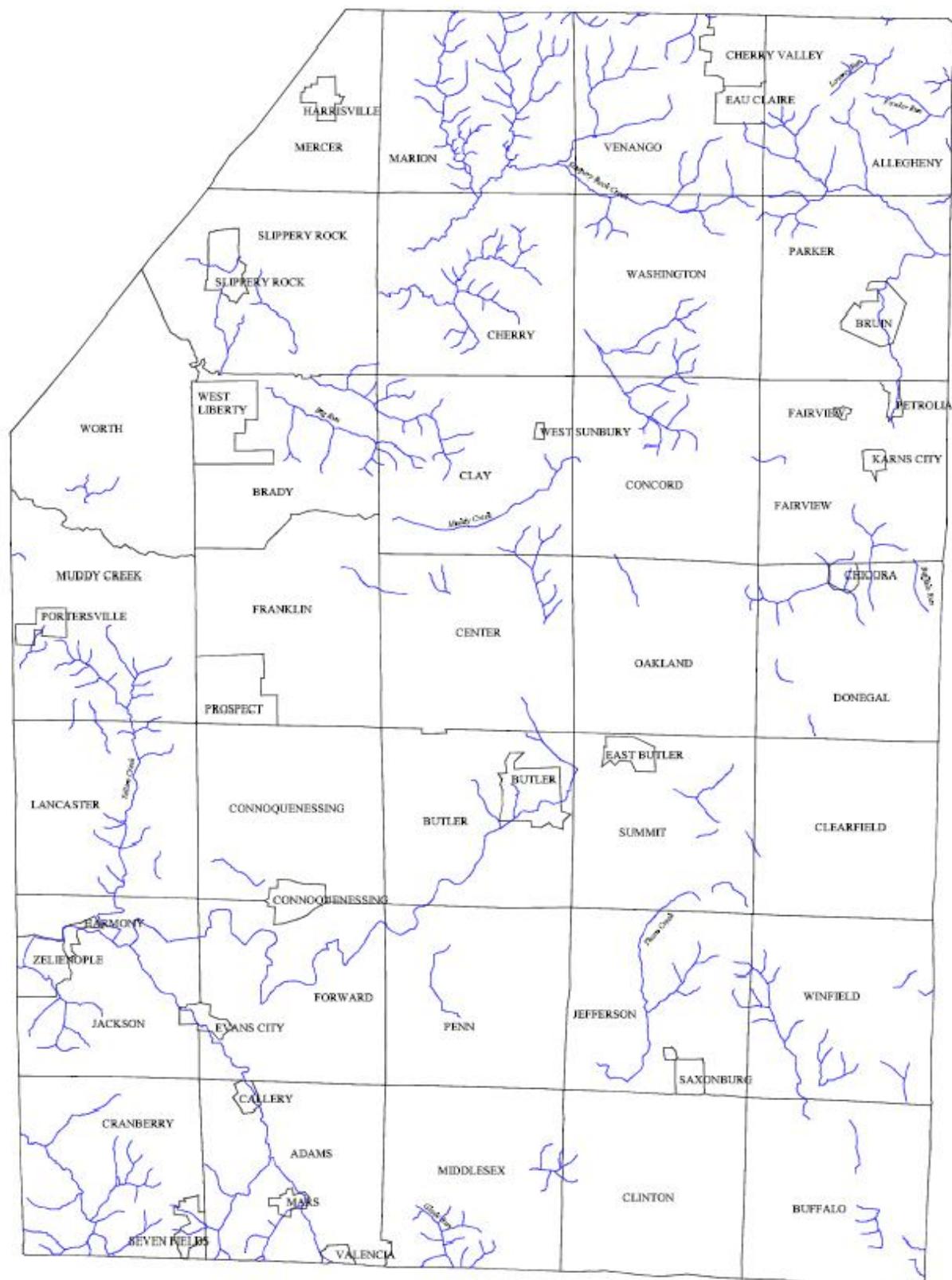




APPENDIX H.
STREAM QUALITY DATA



BUTLER COUNTY NON-ATTAINING STREAMS



STREAM NAME	SOURCE CAUSE	MILES
Bear Creek	Municipal Point Source – Nutrients; Source Unknown – Cause Unknown	0.95
	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – pH	0.21
Big Run	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – Siltation	1.50
Blacks Creek	Abandoned Mine Drainage – Metals	1.59
Bonnie Brook	Source Unknown – Cause Unknown	0.73
Breakneck Creek	Upstream Impoundment – Siltation; Source Unknown – Cause Unknown	1.10
	Urban Runoff/Storm Sewers – Siltation	0.78
	Urban Runoff/Storm Sewers – Siltation; Source Unknown – Cause Unknown	2.33
Brush Creek	Construction – Siltation; Urban Runoff/Storm Sewers – Water/Flow Variability; Urban Runoff/Storm Sewers – Siltation	0.65
	Municipal Point Source – Organic Enrichment/Low D.O.	0.07
	Source Unknown – Pathogens	0.35
	Urban Runoff/Storm Sewers – Water/Flow Variability; Urban Runoff/Storm Sewers – Siltation; Municipal Point Source – Organic Enrichment/Low D.O.; Agriculture – Cause Unknown; Agriculture – Cause Unknown; Construction - Siltation	1.21
Buffalo Creek	Abandoned Mine Drainage – Metals	0.57
	Municipal Point Source – Nutrients	0.08
	Urban Runoff/Storm Sewers – Siltation; On site Wastewater – Nutrients	0.72
Buffalo Run	On site Wastewater – Nutrients	0.46
Camp Run	Abandoned Mine Drainage – Metals	0.44
Christy Run	Agriculture – Siltation; Agriculture – Turbidity	1.09
Connoquenessing Creek	Abandoned Mine Drainage – Suspended Solids	0.02
	Source Unknown – Salinity/TDS/Chlorides; Source Unknown – Nutrients	7.53
	Urban Runoff/Storm Sewers – Siltation	0.92
Findlay Run	Crop Related Agric – Turbidity; Grazing Related Agric – Siltation	0.44
Fowler Run	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – pH	1.02
Glade Run	Agriculture – Siltation; Agriculture – Nutrients	1.57
	Road Runoff – Cause Unknown; Small Residential Runoff – Cause Unknown; Urban Runoff/Storm Sewers – Cause Unknown	0.93
	Source Unknown – Salinity/TDS/Chlorides; Source Unknown – Nutrients	0.01
Kaufman Run	Agriculture – Siltation; Urban Runoff/Storm Sewers – Siltation	0.63
	Land Development – Siltation; Urban Runoff/Storm Sewers – Siltation	0.72
Little Buffalo Creek	Agriculture – Nutrients; Agriculture – Siltation	0.55
	Agriculture – Nutrients; On site Wastewater – Nutrients; Removal of Vegetation – Other Habitat Alterations	0.12
	On site Wastewater – Nutrients	1.00
Little Buffalo Run	Natural Sources – Nutrients; Natural Sources – Siltation	0.24
Little Connoquenessing Creek	Abandoned Mine Drainage – Metals	1.58
Little Scrubgrass Creek	Abandoned Mine Drainage – Metals	0.75

STREAM NAME	SOURCE CAUSE	MILES
Lowrey Run	Abandoned Mine Drainage – Metals	0.79
Muddy Creek	Source Unknown – Cause Unknown	0.83
	Surface Mining – Metals; Abandoned Mine Drainage – Metals	1.05
North Branch Bear Creek	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – pH	1.93
	Abandoned Mine Drainage – pH	0.40
North Branch Slippery Rock Creek	Abandoned Mine Drainage – Metals	1.60
Rough Run	Other – Nutrients; Other – Siltation	0.45
Seaton Creek	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – pH	1.26
Slippery Rock Creek	Abandoned Mine Drainage – Metals	2.08
	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – Siltation	1.93
South Branch Bear Creek	Abandoned Mine Drainage – Metals	0.09
	Municipal Point Source – Nutrients; Abandoned Mine Drainage – Metals	1.05
South Branch Slippery Rock Creek	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – Siltation	2.33
	Source Unknown – Cause Unknown	1.53
Sullivan Run	Source Unknown – Cause Unknown	0.34
Swamp Run	Agriculture – Siltation	0.63
Thoms Run	Abandoned Mine Drainage – Metals	0.21
Thorn Creek	Source Unknown – Mercury	2.48
Yellow Creek	Abandoned Mine Drainage – Metals	2.63
Unnamed	Abandoned Mine Drainage – Metals	21.63
Unnamed	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – pH	4.04
Unnamed	Abandoned Mine Drainage – Metals; Abandoned Mine Drainage – Siltation	10.20
Unnamed	Abandoned Mine Drainage – Other Inorganics; Abandoned Mine Drainage – Metals	0.91
Unnamed	Abandoned Mine Drainage – pH	3.08
Unnamed	Abandoned Mine Drainage – Suspended Solids	0.47
Unnamed	Agriculture – Nutrients; Agriculture – Siltation	1.03
Unnamed	Agriculture – Nutrients; Agriculture – Siltation; Habitat Modification – Other Habitat Alterations	0.59
Unnamed	Agriculture – Nutrients; Habitat Modification – Cause Unknown	1.39
Unnamed	Agriculture – Nutrients; On site Wastewater – Nutrients; Removal of Vegetation – Other Habitat Alterations	0.58
Unnamed	Agriculture – Nutrients; Road Runoff – Siltation; Agriculture – Siltation	0.84
Unnamed	Agriculture – Siltation; Agriculture – Nutrients	3.69
Unnamed	Agriculture – Siltation; Agriculture – Turbidity	1.05
Unnamed	Agriculture – Siltation; Construction – Siltation	0.43
Unnamed	Agriculture – Turbidity	1.69
Unnamed	Crop Related Agric – Turbidity; Grazing Related Agric – Siltation	0.67

STREAM NAME	SOURCE CAUSE	MILES
Unnamed	Erosion from Derelict Land – Siltation	0.63
Unnamed	Flow Regulation/Modification – Water/Flow Variability	0.84
Unnamed	Hydromodification – Other Habitat Alterations	0.39
Unnamed	Land Development – Siltation	0.99
Unnamed	Land Development – Siltation; Urban Runoff/Storm Sewers – Siltation	1.06
Unnamed	On site Wastewater – Nutrients	0.85
Unnamed	On site Wastewater – Nutrients; Removal of Vegetation – Other Habitat Alterations	0.26
Unnamed	Package Plants – Nutrients; Crop Related Agric – Nutrients	0.19
Unnamed	Petroleum Activities – Metals; Abandoned Mine Drainage – Metals	0.17
Unnamed	Road Runoff – Cause Unknown; Small Residential Runoff – Cause Unknown; Urban Runoff/Storm Sewers – Cause Unknown	1.53
Unnamed	Road Runoff – Cause Unknown; Small Residential Runoff – Siltation	0.86
Unnamed	Road Runoff – Siltation; Small Residential Runoff – Cause Unknown	5.27
Unnamed	Small Residential Runoff – Siltation; Road Runoff – Siltation	1.24
Unnamed	Source Unknown – Cause Unknown	5.06
Unnamed	Surface Mining – Metals	2.07
Unnamed	Surface Mining – Siltation	0.13
Unnamed	Surface Mining – Siltation; Surface Mining – Turbidity	1.25
Unnamed	Upstream Impoundment – Water/Flow Variability; Upstream Impoundment – Siltation	0.26
Unnamed	Urban Runoff/Storm Sewers – Nutrients; Urban Runoff/Storm Sewers – Siltation; Removal of Vegetation – Other Habitat Alterations	0.95
Unnamed	Urban Runoff/Storm Sewers – Siltation	0.51
Unnamed	Urban Runoff/Storm Sewers – Siltation; On site Wastewater – Nutrients	0.17
	TOTAL	133.44