

POLLUTANT REDUCTION PLAN (PRP)

UPPER MILFORD TOWNSHIP LEHIGH COUNTY PENNSYLVANIA

**September 17, 2018
(Revised October 29, 2018)**

PREPARED FOR:



**UPPER MILFORD TOWNSHIP
5671 Chestnut Street
PO Box 210
Old Zionsville, PA 18068**

PREPARED BY:



HanoverEngineering

**252 Brodhead Road, Suite 100
Bethlehem, PA 18017-8944
610.691.5644 • Fax 610.691.6968**

Hanover Project UMIL18-12

Table of Contents

I. Introduction	1
II. Public Participation	1
A. Public Notice Language	1
B. List of Public Comments	2
C. List of Comments and Record of Consideration	2
III. Mapping	3
A. Upper Milford Township’s Urbanized Area and MS4 Responsibilities.....	3
B. Land Uses within the MS4 Planning Area.....	5
C. MS4 Zone.....	5
D. Surface Waters	6
IV. Pollutant Loadings.....	6
A. Methods.....	6
B. Existing Stormwater BMPs in the Planning Area	7
C. Pollutant Load Calculation	8
D. Pollutant Load Reduction Requirements.....	9
V. BMPs Selected to Achieve the Minimum Required Reductions in Pollutant Loading	10
A. Summary of Alternatives and Selection of BMPs	10
B. Pollutant Removal Calculations	11
C. Operation and Maintenance Requirements.....	12
VI. Summary	15

Appendices

- A Public Notice**
- B MapShed 2011 Land Use and MS4 Planning Area**
- C Calculations for Proposed BMP Sediment Load Reductions**
- D Proposed BMP Locations and Watersheds**
- E Project Designs (to be updated as prepared)**

I. Introduction

Upper Milford Township is a rural community located to the immediate southwest of the City of Allentown in Lehigh County, Pennsylvania. The Township is approximately 18.01 square miles in size with a total population of approximately 7,292 according to the 2010 census. Approximately 4,464.1 acres (6.98 square miles) is classified as Urbanized Area (UA), in accordance with the most recent U.S. Census data. The portion of the UA that contributes stormwater to known stormwater outfalls into streams with sediment impairments is approximately 594.3 acres (0.93 square miles); this area is known as the Planning Area for the development of this Pollutant Reduction Plan (PRP). Within the Township, there are approximately 25.59 miles of State Highways and approximately 54.59 miles of Local Township Roads.

This Pollutant Reduction Plan (PRP) was developed for the Township as a requirement of Permit PAI#132204 for their Municipal Separate Storm Sewer System (MS4). The PRP outlines the actions the Township will take to address pollutant loads to the streams within the Township and downstream waterways. These actions include public participation, mapping of outfalls and other discharges, calculation of pollutant loads, implementation of stormwater Best Management Practices (BMPs), and undertaking operations and maintenance (O&M) activities.

II. Public Participation

Public participation is an essential part of the PRP because it enhances buy-in from residents, business owners, and landowners that may have an impact on pollutant discharges, can uncover missing elements or errors in calculations, and builds cooperative partnerships among the Township and other entities.

The Township advertised the development of the PRP via Public Notice on September 5, 2018 in The Press, which is a group of weekly newspapers of general circulation published weekly by The Times News, LLC. The notice was printed and published in the regular edition and issue of The Press on the September 5, 2018 and stated the PRP would be available for review and comment from September 17, 2018 through October 17, 2018, from 8:00 am to 4:00 pm at the Township Office. A digital copy of the PRP was also made available on the Township website during that period. Proof of publication in The Press with a copy of the public notice is provided in Appendix A. The public was given 30 days to provide comments on the contents of the PRP. The Township also held a public meeting on September 20, 2018, to receive verbal commentary on the contents of the PRP. A presentation about the PRP was provided by the Township's Consultant during the regularly scheduled meeting of the Board of Supervisors held on September 20, 2018, providing an additional opportunity for comment by the Board of Supervisors, Township staff, and the public.

A. Public Notice Language

PUBLIC NOTICE

NOTICE IS HEREBY GIVEN that the Upper Milford Township Board of Supervisors will receive public comments on the proposed Pollutant Reduction Plan (PRP) required for the 2019-2024 NPDES

Municipal Separate Storm Sewer Systems (MS4) Permit.

The proposed PRP is available for review at the Township Office located at 5671 Chestnut Street, Old Zionsville, PA 18068, from 8:00 a.m. to 4:00 p.m., Monday through Friday, September 17 through October 17, 2018. Digital copies are also available at www.uppermilford.net. Requests for copies may be made by contacting the Township at 610-966-3223 or info@uppermilford.net.

The Township will accept written comments for 30 calendar days from the date of this notice, which must be postmarked no later than October 17, 2018, and addressed to Edward Carter, Township Manager, at the address listed above. Email comments may also be submitted to info@uppermilford.net.

The email subject line shall include "Comments – Upper Milford Township PRP." The Township Board of Supervisors will provide an opportunity for interested parties to provide comments during their regularly scheduled meeting on September 20, 2018, at 7:30 p.m. at the address listed above.

Edward Carter, Township Manager

B. List of Public Comments

No public comments were received by the Township. A public presentation on the plan was provided by Hanover Engineering on September 20, 2018, at which the following comments and/or questions were posed by attendees:

1. How will removing 8,700 lbs of sediment from the streams help, as it does not seem to be all that much material?
2. What is the cost to retrofit a stormwater basin?
3. How is the Township to pay for implementation of this plan?

C. List of Comments and Record of Consideration

The following list includes responses in consideration of comments from the public presentation of the plan to the Township:

1. How will removing 8,700 lbs of sediment from the streams help, as it does not seem to be all that much material? **Response: This is a requirement for the MS4 Permit. Removing sediments and nutrients to this level has been determined necessary and effective for water quality improvement by State and Federal agencies.**
2. What is the cost to retrofit a stormwater basin? **Response: Based on common basin characteristics, it likely will cost in the range of \$50,000/each to retrofit for the basins proposed as part of this plan.**
3. How is the Township to pay for implementation of this plan? **Response: The Township has options but the current method that is being recommended is to implement a Stormwater Fee to cover the program costs. Hanover Engineering will assist the Township in development of the strategy for implementing a Stormwater Fee or other means of funding for the program.**

III. Mapping

A. Upper Milford Township’s Urbanized Area and MS4 Responsibilities

The Township is located within five (5) HUC12 watersheds, including the Little Lehigh Creek-Lehigh River Creek Watershed, Liebert Creek-Little Lehigh Creek Watershed, Perkiomen Creek Watershed, Saucon Creek Watershed, and Hosensack Creek Watershed (see Figures 1 and 2). The Township’s Urbanized Area (UA) is found in all five (5) HUC12 Watersheds, and contains sixty-nine (69) MS4 regulated discharges with a total drainage area of 1,084.6 acres (1.69 square miles), as shown in Figure 1. Remaining lands within the UA are either not municipal-owned or have been determined to not produce concentrated discharges of stormwater runoff to or from municipal land or infrastructure into “waters of the Commonwealth/United States.” The Planning Area within the UA is limited to the MS4 regulated outfalls in all HUC12 Watersheds except the Hosensack Creek Watershed, which is not listed as having any sediment impairments within the Township of within five (5) miles of the downstream-most MS4 regulated discharge point. Within the other four (4) HUC12 Watersheds, there are thirty-nine (39) MS4 regulated discharges. The total drainage area for Planning Area is 594.3 acres (0.93 square miles).

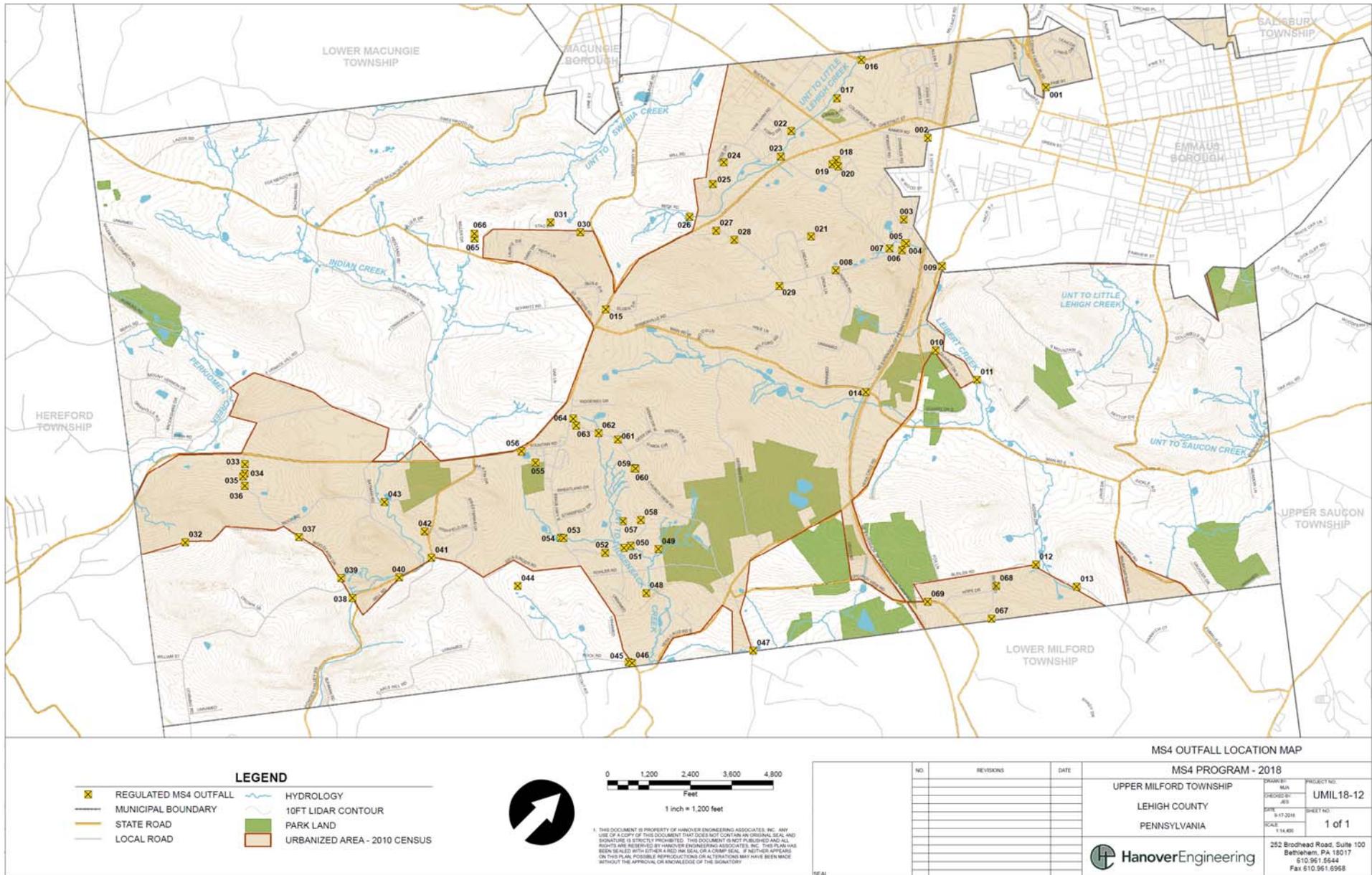


Figure 1: Map of Urbanized Area (UA) for Upper Milford Township

B. Land Uses within the MS4 Planning Area

Land uses within the MS4 Planning Area are comprised of primarily low-density residential and forested land, with lesser areas classified as hay/pasture, cropland, open land, turf/golf, low density mixed urban, medium density mixed urban, and high-density mixed urban uses. The land uses determined through the use of MapShed modeling software are summarized below in Table 1 and are shown in Appendix B.

Table 1. Land Use Areas within the MS4 Planning Area for Upper Milford Township

Land Use Type	Saucon Creek HUC12 Area (acres)	Perkiomen Creek HUC12 Area (acres)	Aggregated HUC12 Area* (acres)	Total MS4 Planning Area (acres)
Hay/Pasture	1.00	0.03	16.91	17.94
Cropland	<0.01	10.31	33.81	44.12
Mixed Forest	0.03	97.21	57.86	155.10
Low-Density Residential	19.90	29.05	180.25	229.20
Medium-Density Residential	---	---	52.38	52.38
Low-Density Mixed Urban	---	---	7.34	7.34
Medium-Density Mixed Urban	---	---	30.04	30.04
High-Density Mixed Urban	0.26	2.53	14.90	17.69
Turf/Golf	---	---	<0.01	0.00
Open Land	0.16	3.64	36.22	40.02
TOTAL MS4 PLANNING AREA	21.35	142.81	430.15	594.31

* Aggregated HUC12 Watersheds – Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek

C. MS4 Zone

The Township has three (3) MS4 Zones, with the respective Urbanized Areas draining into the Little Lehigh Creek-Lehigh River, Liebert Creek-Little Lehigh Creek, Saucon Creek, and Perkiomen Creek HUC12 Watersheds, with the Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek HUC12 Watersheds being aggregated since they drain to the same stream system. Urbanized Areas are comprised primarily of low-density residential and forested land, with lesser areas classified as hay/pasture, cropland, open land, turf/golf, low density mixed urban, medium density mixed urban, and high-density mixed urban. Based on field evaluations conducted during 2003-2018, there are many smaller land areas within the Township's Urbanized Areas that do not contribute concentrated flows to Township-owned or operated facilities, or which do not contribute concentrated flows from Township-owned or operated facilities into nearby streams, and therefore do not have MS4 regulated outfalls and are not part of the Planning Area for the development of this Pollutant Reduction Plan. The mapping provided in Appendix B shows the MS4 regulated outfalls and respective drainage areas within Upper Milford Township.

D. Surface Waters

Ultimately, all stormwater discharges from the Urbanized Area (UA) in the Township are to the Little Lehigh Creek, Perkiomen Creek, and Saucon Creek River, all of which are in the Delaware River Basin. The Little Lehigh Creek is classified as High Quality – Cold Water Fishes (HQ-CWF) and Migratory Fishes (MF) and is listed as being impaired for recreational use due to pathogens and for aquatic life use due to siltation. The Perkiomen Creek is classified High Quality – Cold Water Fishes (HQ-CWF) and Migratory Fishes (MF) and is listed as being impaired for aquatic life use due to nutrients and siltation. The Saucon Creek is classified as High Quality Cold Water Fishes (HQ-CWF) and Migratory Fishes (MF) and is listed as being impaired only for recreational use due to pathogens and for aquatic life use due to siltation. The Pennsylvania Department of Environmental Protection (DEP) has included these waterways and other waterways within the Township and downstream areas on their MS4 Requirements Table, last revised March 5, 2018, as indicated below in Table 2:

Table 2. MS4 Requirements Table for Upper Milford Township

MS4 Name	NPDES ID	Individual Permit Required	Reason	Impaired Downstream Waters Names	Requirement(s)	Other Cause(s) of Impairment
Upper Milford Township	PAI132204	Yes	SP, IP	Little Lehigh Creek	Appendix B-Pathogens (5), Appendix E-Siltation (5)	
				Swabia Creek	Appendix B-Pathogens (5), Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Lehigh River	Appendix E-Organic Enrichment/Low D.O., Siltation, Suspended Solids (5)	
				Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	
				Perkiomen Creek	Appendix E-Nutrients, Siltation (5)	Thermal Modifications (5)
				Saucon Creek	Appendix B-Pathogens (5), Appendix E-Siltation (5)	
				Leibert Creek	Appendix B-Pathogens (5), Appendix E-Siltation (5)	

NOTE: In watersheds where sediment is listed as a concern, the MS4 permittee must reduce sediment loading by 10 percent; where nutrients are listed as a concern, the MS4 permittee must reduce phosphorus by 5 percent and nitrogen by 3 percent. PA DEP assumes that the 5 percent reduction for phosphorus to be met with the 10 percent reduction in sediment.

IV. Pollutant Loadings

A. Methods

MapShed Version 1.5.1 was used to calculate the existing sediment load within the designated MS4 Planning Area of Upper Milford Township. Loads from individual drainage areas were aggregated for each of the three (3) HUC12 watersheds within the Urbanized Area of Upper Milford Township (see Figure 2). Urbanized Areas with MS4 outfalls into streams impaired by siltation are only found within the Saucon Creek, Little Lehigh Creek, and Perkiomen Creek HUC12

watersheds. All other MS4 regulated outfalls within the Township drain to the Indian Creek, which does not contain any stream segments that are listed as being impaired by sediments, including downstream reaches within five (5) miles. The drainage areas to MS4 regulated outfalls and respective Planning Areas within the three (3) HUC12 watersheds within the Township were modeled, separately, for the development of this Plan.

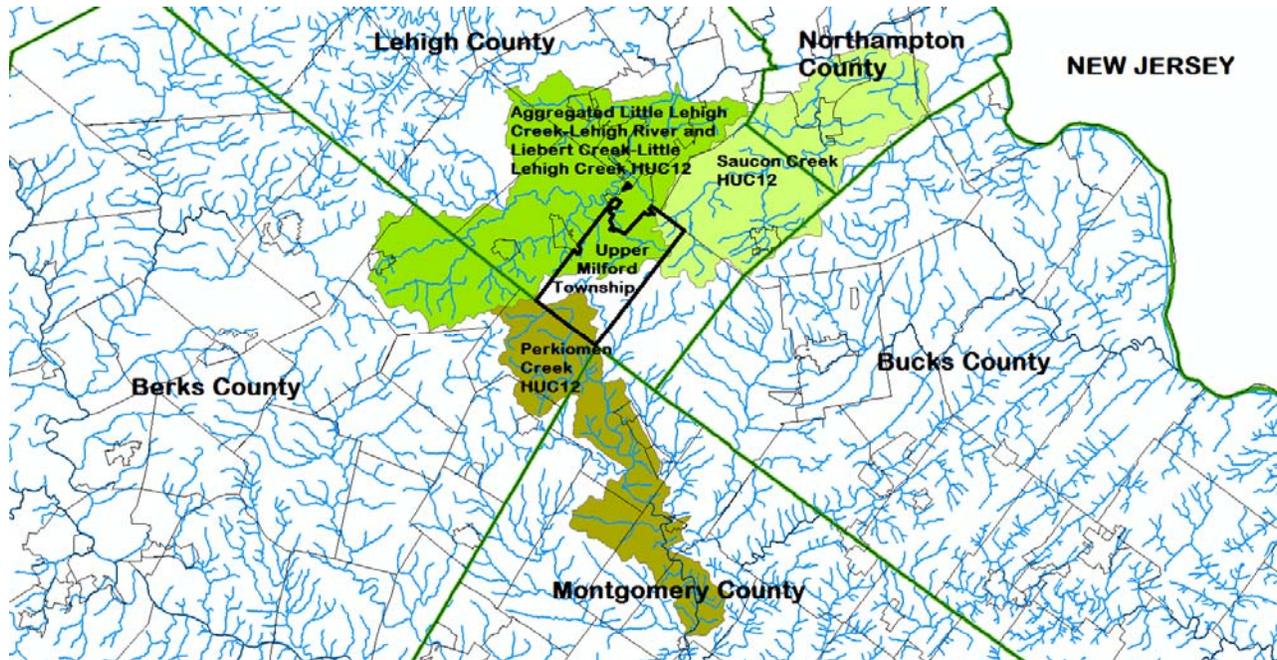


Figure 2: Map of MapShed Basins for Upper Milford Township

B. Existing Stormwater BMPs in the Planning Area

Upper Milford Township was historically an agricultural and rural community located to the immediate southwest of the City of Allentown and Emmaus Borough. The western end of the South Mountain runs through the middle of the Township and is primarily wooded with lower density residential development scattered throughout. Lower-lying areas along the mountain were primarily farmland, offering better soils and lesser slopes more conducive to farming activities. Several State roads run through the Township, as well, along with the Pennsylvania Turnpike Northeast Extension (I-476). Local roads are scattered throughout, generally following old farm roads or as part of newer land development projects.

In recent decades, many farms throughout the Township were converted to residential development. The majority of the newer land development activities required varying degrees of stormwater management and water quality protection, including older facilities aimed largely at conveyance and flood protection to newer facilities aimed at improving and protecting water quality. Most older land uses did not include proper stormwater management or sediment pollution control.

Although many of the newer land development projects included stormwater management facilities, none of the BMPs were determined to qualify for significant reductions to the existing sediment load.

C. Pollutant Load Calculation

To model the existing sediment load for the MS4 Planning Areas in Upper Milford Township using the MapShed program, base model runs were completed for the Saucon Creek, Perkiomen Creek, and Little Lehigh Creek HUC12 watersheds. The Planning Area for the Township is primarily within the Little Lehigh Creek HUC12 watershed, with smaller portions within the Saucon Creek and Perkiomen Creek HUC12 watersheds. There is also a portion of the Urbanized Area with several MS4 regulated outfalls within the Hosensack Creek HUC12 watershed; although this area is not part of the Planning Area, since the stream is not listed as “impaired.” The Saucon and Perkiomen Creeks are not listed as being impaired within the Township, but are listed as being impaired within five (5) miles of several of the Township’s MS4 regulated outfalls within both watershed areas. Therefore, these outfalls and their drainage areas were part of the Planning Area for this Plan. The three (3) HUC12 watersheds that comprise the Planning Area all drain to different receiving watercourses, and therefore, base model runs were conducted separately for each watershed.

MapShed was used to determine land uses and sediment runoff coefficients, or loading rates, for the Urbanized Area and Planning Areas within Upper Milford Township. ArcMap was then used to develop drainage areas to all previously identified MS4 outfalls. The Existing Pollutant Loading for sediment was then calculated for the Planning Area using the respective land use data and previously derived land use loading coefficients. See Table 3, below, for land use loading rates and respective Existing Pollutant Loading calculations.

Following a thorough review of mapping and records, as well as field evaluations, the overall Planning Area does not contain any active, functioning, and maintained stormwater Best Management Practices designed and implemented for water quality improvement. Therefore, no credit for sediment loading reduction was applied to the calculation of the Existing Sediment Load from the Planning Area.

Table 3. MapShed Sediment Land Use Loading Rates and Calculated Pollutant Loads for Planning Areas within the Saucon Creek, Perkiomen Creek, and Little Lehigh Creek HUC12 Watershed Areas

Land Cover	Sediment Loading Rate (lbs/ac/yr)	Area (ac)	Sediment Load (lbs/yr)
Saucon Creek HUC12			
High-Density Mixed Urban	167.5	0.26	43.6
Hay/Pasture	129.6	1.00	129.5
Cropland	1,536.3	0.00	3.4
Mixed Forest	16.2	0.03	0.5
Low-Density Residential	35.5	19.90	706.5
Open Land	212.3	0.16	34.1
Subtotal		21.35	917.5

Perkiomen Creek HUC12			
High-Density Mixed Urban	154.9	2.53	392.1
Hay/Pasture	84.9	0.03	2.6
Cropland	1,044.6	10.31	10,770.4
Mixed Forest	10.0	97.21	972.1
Low-Density Residential	33.0	29.08	959.7
Open Land	124.4	3.64	453.2
Subtotal		142.81	13,550.0
Aggregated HUC12 Watersheds – Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek			
Low-Density Mixed Urban	36.0	7.34	264.5
High-Density Mixed Urban	163.9	14.90	2,442.8
Hay/Pasture	101.3	16.91	1,712.3
Cropland	1,235.0	33.81	41,759.1
Mixed Forest	13.8	57.86	797.2
Forested Wetland	7.2	0.42	3.0
Turf/Golf	23.7	0.00	0.0
Low-Density Residential	36.0	180.25	6,492.4
Medium-Density Residential	163.9	52.38	8,586.2
Medium-Density Mixed Urban	163.9	30.04	4,923.9
Open Land	158.9	36.22	5,755.0
Subtotal		430.15	72,736.4
TOTAL		594.31	87,203.9

Based on these existing load calculations, it was determined that the Township’s total existing sediment loading is 87,203.9 lbs/year.

D. Pollutant Load Reduction Requirements

Based on these existing load calculations it was determined that the Township’s existing sediment loading is 87,203.9 lbs/year. Based on the MS4 Program requirement to reduce sediment pollution by at least 10% from the Planning Area, the minimum sediment reduction required is 8,720.4 lbs/year, as summarized below in Table 4.

Table 4. Pollutant Load Reduction Requirements for the MS4 Planning Area within Upper Milford Township

Planning Area Name	Total Acres	Land Use Sediment Load (lbs)
Saucon Creek HUC12 Watershed		
Existing Load	21.35	917.5
Existing BMP Load Reduction	0	0
Finalized Existing Load		917.5
Required 10% Reduction		91.8

Perkiomen Creek HUC12 Watershed		
Existing Load	142.81	13,550.0
Existing BMP Load Reduction	0	0
Finalized Existing Load		13,550.0
Required 10% Reduction		1,355.0
Aggregated HUC12 Watersheds – Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek		
Existing Load	430.15	72,736.4
Existing BMP Load Reduction	0	0
Final Existing Load		72,736.4
Required 10% Reduction		7,273.6
TOTAL FINAL EXISTING LOAD		
		87,203.9
TOTAL REQUIRED 10% REDUCTION		
		8,720.4

V. BMPs Selected to Achieve the Minimum Required Reductions in Pollutant Loading

Based on the 10% sediment load reduction targets established above, Upper Milford Township has identified potential BMPs to meet the minimum load reductions during the next 5-year permit term. BMPs for stormwater management were determined, based on available public land, existing facilities, and potential for pollutant removal. All potential stormwater BMPs listed in the BMP Effectiveness Values table provided by PA DEP were considered. A list of the BMPs selected for Upper Milford Township to meet sediment loading reduction goals is provided below in Table 5, with a location map provided in Appendix D.

A. Summary of Alternatives and Selection of BMPs

The Township identified and evaluated BMPs, according to the following criteria:

- Sediment reduction
- Cost-effectiveness of pollutant reduction
- Ownership (public vs. private land, single party vs. multi-party ownership)
- Funding and workforce availability
- Community benefit (site accessibility, flooding relief, aesthetics, etc.)
- Connectivity to other completed or proposed stormwater BMPs
- Timeframe to implement

The purpose of the evaluation was to determine the most cost-effective BMPs that would benefit water quality and the community. The highest priority BMPs are included in this PRP. The BMPs selected are a list of good opportunities that the Township has identified and may use to meet their required sediment reduction. The Township is not committing to implementing all the BMPs listed in this PRP, as that would exceed their required reduction. The actual implemented BMPs will be based on further site evaluation, negotiations with stakeholders, detailed design criteria, permitting complexity, and cost. The plan will be adjusted and revised, as new opportunities arise and as necessary to accomplish reduction goals with the most cost-effective BMPs.

The Township will continuously evaluate cost-effective opportunities to meet required reductions. These could include working jointly with other municipalities on a joint project if viable opportunities arise. The Township will also evaluate opportunities to work with future private developers or land development applicants where cooperative efforts merit consideration. As new opportunities are selected for implementation to meet sediment reduction requirements, this PRP will be amended, advertised for public comment, and resubmitted to PA DEP.

B. Pollutant Removal Calculations

The total minimum sediment reduction required for the Township is 8,720.4 lbs/year, with 91.8 lbs/year, 1,355.0 lbs/year, and 7,273.6 lbs/year for the Saucon Creek, Perkiomen Creek, and Little Lehigh Creek HUC12 Watersheds, respectively, as shown above in Table 4. As planned, the required minimum 10% sediment load reduction will be achieved for each of the three (3) major drainage areas with sediment impairments associated with Upper Milford Township. For the Perkiomen Creek HUC12 Watershed, where nutrients are also listed as an impairment, it is assumed per PA DEP guidance that the required 5% reduction for phosphorus will be met with the 10% reduction in sediment.

Since MapShed was used to determine pollutant loading coefficients for the land uses within the Township and to calculate the existing loads, the same data were used to calculate the load reductions resulting from the implementation of the proposed stormwater BMPs. Sediment removal efficiency values were taken from the PA DEP BMP Effectiveness Values table (3800-PM-BCW0100M) and applied to the pollutant loadings calculated for each proposed BMP to determine the reductions expected for each proposed BMP. Watersheds for proposed BMPs were developed in ArcMap using available Geographic Information Systems (GIS) data, including parcels, 2-foot Lidar topography, and land use data.

For the Planning Area within the Saucon Creek HUC12 watershed, three (3) proposed BMPs will remove sediment at 616.8 lbs/year, which subtracted from the required sediment reduction of 91.8 lbs/year results in a surplus removal value of 525.1 lbs/year, assuming that all potential BMPs would be implemented.

For the Planning Area within the Perkiomen Creek HUC12 watershed, three (3) proposed BMPs will remove sediment at 5,295.0 lbs/year, which subtracted from the required sediment reduction of 1,355.0 lbs/year results in a surplus removal value of 3,940.0 lbs/year, assuming that all potential BMPs would be implemented.

For the Planning Area within the Aggregated HUC12 Watersheds – Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek, three (3) proposed BMPs will remove sediment at 19,412.3 lbs/year, which subtracted from the required sediment reduction of 7,273.6 lbs/year results in a surplus removal value of 12,138.7 lbs/year, assuming that all potential BMPs would be implemented.

The stormwater BMPs listed in Table 5 will be considered for implementation by the Township to meet their required sediment reduction. The Township is not committing to implement each BMP listed. BMPs will be chosen based on additional evaluation of cost-benefit once more detailed planning has been completed. The combination of selected BMPs will meet the required 10% reduction for sediment load from the Planning Area within the Township and will be implemented by the next 5-year permit term, or as formally extended. A summary of all the currently proposed BMPs and how they meet the required 10% load reduction is shown below in Table 5. Calculations for BMP sediment load reductions are provided in Appendix C. BMP project locations are shown in Appendix D. BMP designs will be added to this PRP as Appendix E, as they are completed, approved, and implemented.

C. Operation and Maintenance Requirements

With regard to existing and future stormwater BMPs that may be constructed on private property and not managed by the Township, the Township's Stormwater Management Ordinance requires legally binding Operation and Maintenance (O&M) provisions which must be completed for facilities not dedicated to or accepted by the Township. The Township's MS4 permit indicates and requires regular inspection by facility owners and Township staff at least one (1) time during each 5-year permit term. The Stormwater Management Ordinance also specifies regular inspection intervals by the owners, who are responsible for maintenance under various situations. Operation and Maintenance requirements for all stormwater management BMPs proposed for meeting the required MS4 Program pollutant reductions, including responsible parties, activities, and schedules are listed below in Table 5. The Township will be responsible for implementation of selected BMPs, as well as for regular inspections, sediment removal, and reconstruction of facilities, as needed to maintain full efficiency and functionality for sediment removal.

Table 5. Summary of Proposed BMPs in the Planning Areas of Upper Milford Township

BMP ID	BMP Type	Sediment Load Reduction (lbs/yr)	Percent of Total Reduction	Landowner	Installation Responsibility	Funding Mechanism	Operation & Maintenance Responsibility	Operation & Maintenance Activities/Schedule
Saucon Creek HUC12 Watershed								
067	Bioretention Basin A/B Soils w/Underdrain	616.8	100%	Michael K. & Dinah M. Greer 3189 Faith Road Emmaus, PA 18049-4828 PIN: 640302782406	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
Subtotals			100.00%					
Aggregated HUC12 Watersheds – Little Lehigh Creek-Lehigh River and Liebert Creek-Little Lehigh Creek								
033	Bioswale	5,047.7	95.33%	Pamela Koeshartanto, ET AL 6873 Tollgate Road Zionsville, PA 18092-2151 PIN: 548221273198	Township	Stormwater Fee/Grant Funds	Township	Annually, cut back perennial plants. Twice per year, check vegetation for condition, remove woody vegetation, remove accumulated sediments.
036	Bioswale	247.3	4.67%	Brian D. Fasick 6730 Woodlawn Drive Zionsville, PA 18092-2335 PIN: 548220512196	Township	Stormwater Fee/Grant Funds	Township	Annually, cut back perennial plants. Twice per year, check vegetation for condition, remove woody vegetation, remove accumulated sediments.
Subtotals			100.00%					
001	Bioretention Basin A/B Soils w/Underdrain	3,701.9	19.07%	Michael J. & Kimberly A. Boger 3494 Miriam Drive Emmaus, PA 18049-1565 PIN: 549415137167	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
002	Bioswale	3,627.3	18.69%	St. Ann's Catholic Cemetery 415 S. 6 th Street Emmaus, PA 18049-3703 PIN: 548490687997	Township	Stormwater Fee/Grant Funds	Township	Annually, cut back perennial plants. Twice per year, check vegetation for condition, remove woody vegetation, remove accumulated sediments.
016	Bioretention Basin A/B Soils w/Underdrain	7,219.0	37.19%	Indian Mills, LP 1150 S. Cedar Crest Blvd. Allentown, PA 18103 PIN: 548472536530	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
018	Bioretention Basin A/B Soils w/Underdrain	1,933.9	9.96%	Smith Family Trust Attn: Robert K. & Evelyn L. Smith 4144 Mink Road Emmaus, PA 18049-5251 PIN: 548389215287	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
019	Bioretention Basin A/B Soils w/Underdrain	321.9	1.66%	Sarah E. Taylor 4166 Mink Road Emmaus, PA 18049-5251 PIN: 54388297113	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
020	Bioretention Basin A/B Soils w/Underdrain	1,095.9	5.65%	Edgar L. & Dolores Hausman 4160 Champagne Drive Emmaus, PA 18049-5257	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from

				PIN: 548389408161				sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
022	Bioretention Basin A/B Soils w/Underdrain	349.4	1.80%	Todd M. & Suzanne M. Garloff 4117 Ford Drive Emmaus, PA 18049-5365 PIN: 54836877458	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
031	Bioretention Basin A/B Soils w/Underdrain	1,163.1	5.99%	Bogdan Shafranski 2372 Lancaster Street East Meadow, NY 11554 PIN: 548332511725	Township	Stormwater Fee/Grant Funds	Township	Monthly, perform trash removal, inspect outlet for obstructions/clogging, and inspect inlet grates. Quarterly, street sweep parking lot. Annually, skim sand media and pump oil and grit from sediment chamber (once 50% full). Every two to three years, replace sand media (or as needed).
TOTALS			100.00%					

VI. Summary

Upper Milford Township plans to complete the planning and permitting stages of the listed projects during the next two (2) years to help ensure that the projects will be completed within the upcoming 2019-2024 permit term. The Township desires to ensure that the projects will be designed to meet the current and upcoming requirements and reduction goals, which may mean that this PRP will be revised as design and permitting are completed. Additional BMPs will be added to the plan, as necessary or as opportunities present, to improve stormwater management within the Township. Updates on each of the proposed BMPs and the implementation status of the PRP will be included in all future MS4 reporting submitted to PA DEP. The Township is currently preparing to implement a stormwater fee to fund the installation of all proposed BMPs. Whenever practicable, the Township will apply for available funding for stormwater improvements. Fee revenues may serve as matching funds for potential grant funding where required.

Appendix A

Public Notice

PROOF OF PUBLICATION

THE PRESS GROUP NEWSPAPERS

East Penn Press * Parkland Press * Northwestern Press * Whitehall-Coplay Press
* Northampton Press * Salisbury Press * Catasauqua Press * Bethlehem Press

ALLENTOWN, LEHIGH COUNTY, PENNSYLVANIA

Commonwealth of Pennsylvania)
County of Carbon) ss.

Scott A. Masenheimer, being duly sworn according to law does depose and say:

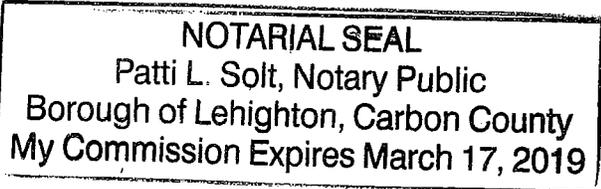
- 1. THAT The Press is a group of weekly newspapers of general circulation published weekly, by The Times News, LLC. Its place of business is Allentown, Lehigh County, Pennsylvania.
2. THAT The Press was established on April 9, 1959.
3. THAT the affiant is the Publisher of The Press newspapers and as such is authorized by the owner, The Times News LLC, to take this affidavit.
4. THAT the affiant is not interested in the subject matter of the notice or advertising.
5. THAT all of the allegations of this affidavit as to time, place and character of publication are true.
6. THAT copy of the notice or advertising attached hereto was printed and published in the regular editions and issues of The Press on the following dates:
SEPTEMBER 5, 2018

Signature of Scott A. Masenheimer

Sworn to and subscribed before me, this 7th day of September A.D., 2018

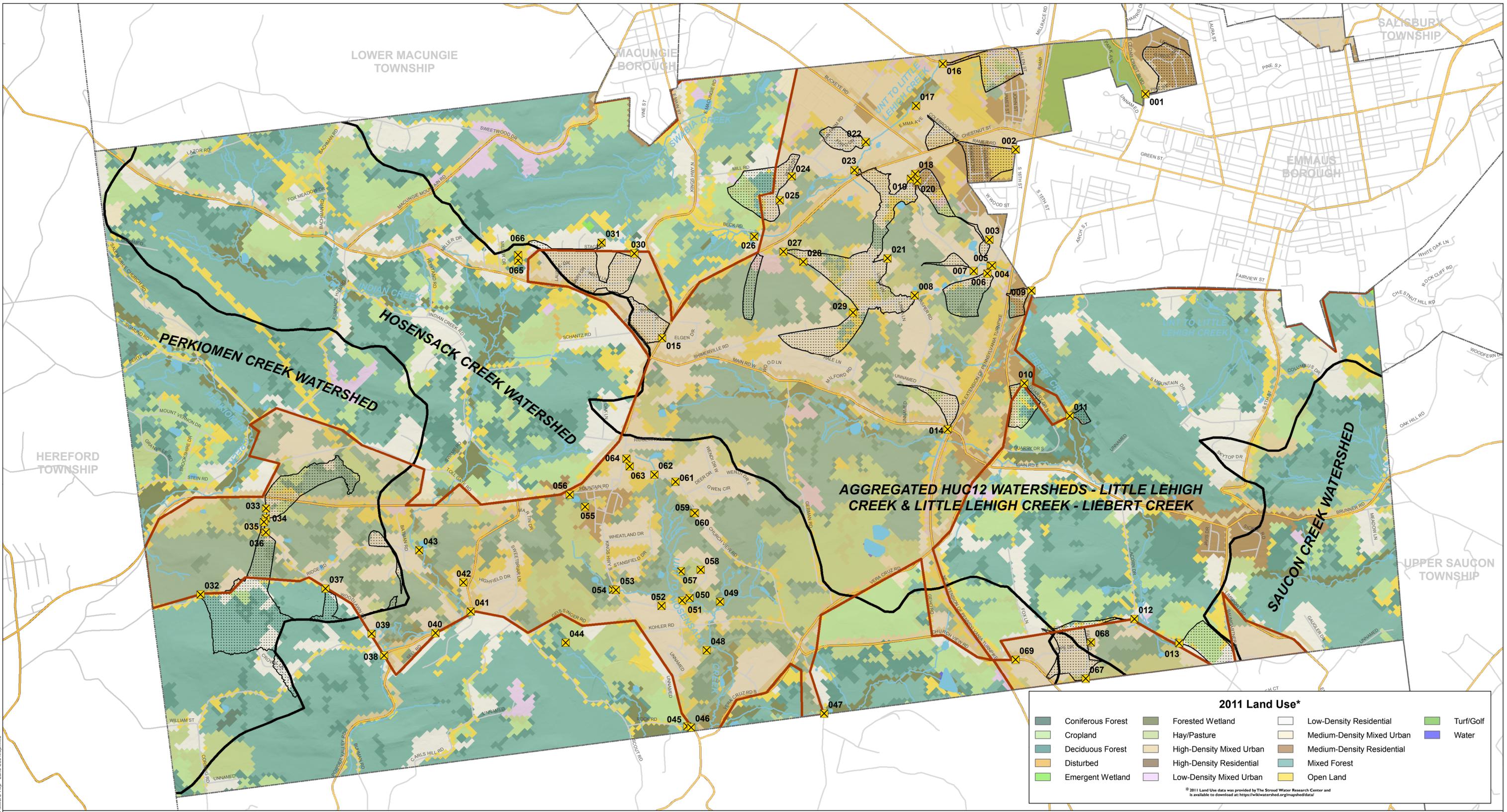
Signature of Patti L. Solt

PUBLIC NOTICE
NOTICE IS HEREBY GIVEN that the Upper Milford Township Board of Supervisors will receive public comments on the proposed Pollutant Reduction Plan (PRP) required for the 2019-2024 NPDES Municipal Separate Storm Sewer Systems (MS4) Permit.
The proposed PRP is available for review at the Township Office located at 5671 Chestnut Street, Old Zionsville, PA 18068, from 8:00 a.m. to 4:00 p.m., Monday through Friday, September 17 through October 17, 2018. Digital copies are also available at www.uppermilford.net. Requests for copies may be made by contacting the Township at 610-966-3223 or info@uppermilford.net.
The Township will accept written comments for 30 calendar days from the date of this notice, which must be postmarked no later than October 17, 2018, and addressed to Edward Carter, Township Manager, at the address listed above. Email comments may also be submitted to info@uppermilford.net.
The email subject line shall include "Comments - Upper Milford Township PRP." The Township Board of Supervisors will provide an opportunity for interested parties to provide comments during their regularly scheduled meeting on September 20, 2018, at 7:30 p.m. at the address listed above.
Edward Carter
Township Manager
Sept. 5



Appendix B

MapShed 2011 Land Use and MS4 Planning Area



AGGREGATED HUC12 WATERSHEDS - LITTLE LEHIGH CREEK & LITTLE LEHIGH CREEK - LIEBERT CREEK

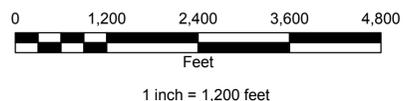
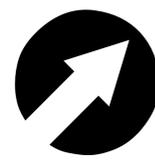
2011 Land Use*

Coniferous Forest	Forested Wetland	Low-Density Residential	Turf/Golf
Cropland	Hay/Pasture	Medium-Density Mixed Urban	Water
Deciduous Forest	High-Density Mixed Urban	Medium-Density Residential	
Disturbed	High-Density Residential	Mixed Forest	
Emergent Wetland	Low-Density Mixed Urban	Open Land	

* 2011 Land Use data was provided by The Stroud Water Research Center and is available to download at: <https://www.waterwatch.org/landuse/>

LEGEND

- REGULATED MS4 OUTFALL
- MUNICIPAL BOUNDARY
- STATE ROAD
- LOCAL ROAD
- HYDROLOGY
- 10FT LIDAR CONTOUR
- PARK LAND
- URBANIZED AREA - 2010 CENSUS



1. THIS DOCUMENT IS PROPERTY OF HANOVER ENGINEERING ASSOCIATES, INC. ANY USE OF A COPY OF THIS DOCUMENT THAT DOES NOT CONTAIN AN ORIGINAL SEAL AND SIGNATURE IS STRICTLY PROHIBITED. THIS DOCUMENT IS NOT PUBLISHED AND ALL RIGHTS ARE RESERVED BY HANOVER ENGINEERING ASSOCIATES, INC. THIS PLAN HAS BEEN SEALED WITH EITHER A RED INK SEAL OR A CRIMP SEAL. IF NEITHER APPEARS ON THIS PLAN, POSSIBLE REPRODUCTIONS OR ALTERATIONS MAY HAVE BEEN MADE WITHOUT THE APPROVAL OR KNOWLEDGE OF THE SIGNATORY

2011 LAND USE MAP			MS4 PROGRAM - 2018	
NO.	REVISIONS	DATE	UPPER MILFORD TOWNSHIP	
			LEHIGH COUNTY	
			PENNSYLVANIA	
			PROJECT NO. UMIL18-12	
			DRAWN BY: MJA	CHECKED BY: JES
			DATE: 9-17-2018	SHEET NO. 1 of 1
			SCALE: 1:14,400	
			252 Brodhead Road, Suite 100 Bethlehem, PA 18017 610.961.5644 Fax 610.961.6968	



SEAL

Path: X:\Projects\Municipal\MS4\Upper Milford\Map\Map.mxd

Appendix C

Calculations for Proposed BMP Sediment Load Reductions

BMP ID	Area (acres)	Land Use Code	Land Use Description	Coeff (lbs/ac/yr)	Existing Sediment Load - Landuse (lbs/yr)	Existing Total Sediment Load (lbs/yr)	BMP Type	Sediment Load Reduction Coeff (percent)	Sediment Load Reduction (lbs/yr)
SAUCON CREEK HUC12									
067	0.26243618	3	High-Density Mixed Urban	167.5	44.0	771.0	Bioretention Basin A/B soil w/Underdrain	0.8	616.8
	0.99906947	4	Hay/Pasture	129.6	129.5				
	0.00223665	5	Cropland	1536.3	3.4				
	0.02815558	8	Mixed Forest	16.2	0.5				
	15.7858621	13	Low-Density Residential	35.5	559.8				
	0.15991425	17	Open Land	212.3	33.9				
PERKIOMEN CREEK HUC12									
033	1.82275551	3	High-Density Mixed Urban	154.9	282.3	6309.6	Bioretention Swale	0.8	5047.7
	5.38046133	5	Cropland	1044.6	5620.4				
	16.9135636	8	Mixed Forest	10.0	169.1				
	1.78063734	13	Low-Density Residential	33.0	58.8				
	1.43849655	17	Open Land	124.4	178.9				
036	14.2845305	8	Mixed Forest	10.0	142.8	309.2	Bioretention Swale	0.8	247.3
	3.56295154	13	Low-Density Residential	33.0	117.6				
	0.39190669	17	Open Land	124.4	48.8				
AGGREGATED HUC 12 WATERSHEDS*									
001	0.1446871	3	High-Density Mixed Urban	163.9	23.7	4627.4	Bioretention Basin A/B soil w/Underdrain	0.8	3701.9
	0.00062369	12	Turf/Golf	23.7	0.0				
	24.4766453	14	Medium-Density Residential	163.9	4012.1				
	3.60911362	16	Medium-Density Mixed Urban	163.9	591.6				
002	1.16423635	2	Low-Density Mixed Urban	36.0	41.9	4534.1	Bioswale	0.8	3627.3
	18.3676242	14	Medium-Density Residential	163.9	3010.7				
	0.24398681	16	Medium-Density Mixed Urban	163.9	40.0				
	9.07293415	17	Open Land	158.9	1441.4				
016	3.48417367	2	Low-Density Mixed Urban	36.0	125.5	9023.7	Bioretention Basin A/B soil w/Underdrain	0.8	7219.0
	0.03227965	3	High-Density Mixed Urban	163.9	5.3				
	5.4668026	5	Cropland	1235.0	6751.6				
	0.66738823	8	Mixed Forest	13.8	9.2				
	1.06371492	13	Low-Density Residential	36.0	38.3				
	0.91962626	14	Medium-Density Residential	163.9	150.7				
	7.51993401	16	Medium-Density Mixed Urban	163.9	1232.6				
4.47221345	17	Open Land	158.9	710.5					
018	0.72081393	2	Low-Density Mixed Urban	36.0	26.0	2417.4	Bioretention Basin A/B soil w/Underdrain	0.8	1933.9
	1.27806017	5	Cropland	1235.0	1578.4				
	0.09264288	8	Mixed Forest	13.8	1.3				

	4.1555304	14 Medium-Density Residential	163.9	681.1			
	0.82190306	17 Open Land	158.9	130.6			
019	0.22237702	4 Hay/Pasture	101.3	22.5	402.4 Bioretention Basin	0.8	321.9
	2.93487712	13 Low-Density Residential	36.0	105.7	A/B soil w/Underdrain		
	0.66151091	14 Medium-Density Residential	163.9	108.4			
	1.04323808	17 Open Land	158.9	165.7			
020	1.02852678	2 Low-Density Mixed Urban	36.0	37.0	1369.9 Bioretention Basin	0.8	1095.9
	0.12768879	4 Hay/Pasture	101.3	12.9	A/B soil w/Underdrain		
	0.62023229	5 Cropland	1235.0	766.0			
	0.52661312	8 Mixed Forest	13.8	7.3			
	1.42841189	13 Low-Density Residential	36.0	51.5			
	2.41693106	14 Medium-Density Residential	163.9	396.2			
	0.62333385	17 Open Land	158.9	99.0			
022	0.32454968	8 Mixed Forest	13.8	4.5	436.7 Bioretention Basin	0.8	349.4
	10.6174476	13 Low-Density Residential	36.0	382.4	A/B soil w/Underdrain		
	0.07268147	16 Medium-Density Mixed Urban	163.9	11.9			
	0.23852337	17 Open Land	158.9	37.9			
031	2.75696574	3 High-Density Mixed Urban	163.9	451.9	1453.9 Bioretention Basin	0.8	1163.1
	0.33268978	8 Mixed Forest	13.8	4.6	A/B soil w/Underdrain		
	25.1858123	13 Low-Density Residential	36.0	907.2			
	0.56779968	17 Open Land	158.9	90.2			

* Little Lehigh Creek-Lehigh River and Liebert Cree-Little Lehigh Creek

Appendix D

Proposed BMP Locations and Watersheds

Appendix E

Project Designs

(to be updated as prepared)