

**MS4 Pollutant Reduction Plan
for
Warminster Township
Bucks County, Pennsylvania**

September 2017

Prepared For:

Warminster Township
401 Gibson Avenue
Warminster, PA 18974
(215) 443-5414

Prepared By:

Gilmore & Associates, Inc.
Engineers ♦ Land Surveyors ♦ Planners ♦ GIS Consultants
65 E. Butler Avenue, Suite 100
New Britain, PA 18901
215 345-4330



**MS4 Pollutant Reduction Plan
for
Warminster Township
Bucks County, Pennsylvania**

Table of Contents

A.	Public Participation	2
B.	Map	3
C.	Pollutants of Concern	4
D.	Determine Existing Loads for Pollutants of Concern	5
E.	Wasteload Allocations (WLAs)	8
F.	Analysis of TMDL Objectives	9
G.	Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loads	11
H.	Identify Funding Mechanisms	15
I.	Identify Responsible Parties for Operations and Maintenance (O&M) of BMPs	16
J.	General Information	17

List of Tables

Table D-1:	Area Calculation Summary
Table D-2:	Summary of Existing Loads
Table E-1:	Summary of WLAs
Table F-1:	Summary of Existing Loads & Short-Term TMDL Reductions
Table F-2:	Summary of Long-Term TMDL Reductions
Table G-1:	Summary of Existing Loads & Required Reductions
Table G-2:	Summary of BMPs
Table G-3:	MS4 Pollutant Reduction Plan Summary
Table I-1:	Operation & Maintenance of BMPs

Appendices

Appendix A	<u>MS4 Requirements Table</u>
Appendix A-1:	Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017)
Appendix B	<u>Public Participation</u>
Appendix B-1:	Public Notice & Proof of Advertisement
Appendix B-2:	Public Meeting Agenda & Meeting Minutes
Appendix B-3:	Record of Consideration
Appendix C	<u>Maps</u>
Appendix C-1:	Warminster Township MS4 Planning Area Map
Appendix C-2:	Warminster Township MS4 Land Cover Map
Appendix D	<u>Determine Existing Loads for Pollutants of Concern</u>
Appendix D-1:	EMC Table
Appendix D-2:	Pollutant Loads from Public Streets & Rights-of-Way
Appendix D-3:	Existing Pollutant Loads
Appendix D-4:	Existing Loads Summary & Required Reduction Calculations
Appendix E	<u>Loading Reduction Calculations</u>
Appendix E-1:	Stream Restoration
Appendix E-2:	Barness Park Basin
Appendix E-3:	Munroe Park Vegetated Swale
Appendix E-4:	Szymanek Park Basin
Appendix E-5:	Shenandoah Woods Basin

Warminster Township, Bucks County is submitting this MS4 Pollutant Reduction Plan in accordance with the requirements of the *National Pollutant Discharge Elimination System (NPDES) Individual Permit to Discharge Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s)*; specifically, in accordance with the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017)*. Warminster Township must create a Pollution Reduction Plan (PRP) and Total Maximum Daily Load (TMDL) Plan due to stormwater discharges from their MS4 to the Neshaminy/Little Neshaminy Creek, Pennypack Creek and unnamed tributaries to the Pennypack Creek, and Southampton Creek watersheds, which have been listed as impaired for sediment and nutrients as shown in the Municipal Requirements Table. As permitted by the *NPDES Individual Permit to Discharge Stormwater from Small Municipal Separate Storm Sewer Systems TMDL Plan Instructions* included as part of the NPDES individual permit application for MS4s, Warminster Township has chosen to combine the TMDL Plan with the PRP; this combined document is referred to as the MS4 Pollutant Reduction Plan.

The intent of this MS4 Pollutant Reduction Plan is to establish the Planning Areas that drain to the MS4 from within the jurisdiction of Warminster Township, determine existing pollutant loads discharged from the MS4 to each of these Planning Areas, and to present a plan to reduce the pollutant loads. This MS4 Pollutant Reduction Plan is organized to follow the “Required TMDL Plan Elements” presented in the TMDL Plan Instructions and also addresses the PRP requirements established in the *NPDES Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions*. This MS4 Pollutant Reduction Plan will be evaluated and updated by Warminster Township on an as-needed basis, based on its effectiveness in reducing pollutant loads in discharges from the MS4. If Warminster Township determines that updates are needed, the Township will work with the Department of Environmental Protection (DEP) for review and approval of any revisions or updates.

Per the *TMDL Plan* and *PRP Instructions*, this Plan includes the following elements:

Section A: Public Participation

Section B: Map

Section C: Pollutants of Concern

Section D: Determine Existing Loads for Pollutants of Concern

Section E: Wasteload Allocations (WLAs)

Section F: Analysis of TMDL Objectives

Section G: Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loads

Section H: Identify Funding Mechanisms

Section I: Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

Section J: General Information

A. Public Participation

As part of this MS4 Pollutant Reduction Plan, Warminster Township was required to address the following components related to public participation:

- Make a complete copy of the MS4 Pollutant Reduction Plan available for public review.
- Publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the Plan, where it may be reviewed by the public, and the length of time the Township will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the MS4 Pollutant Reduction Plan to DEP. **A copy of the Public Notice and Proof of Advertisement is included as Appendix B-1.**
- Accept written comments for a minimum of 30 days from the date of public notice. **No written comments were received from the public.**
- Accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly-scheduled meeting of the governing body of the municipality that is the permittee. **A copy of the Board of Supervisors' public meeting agenda and meeting minutes from when the MS4 Pollutant Reduction Plan was discussed is included as Appendix B-2.**
- Consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the Plan, identifying any changes made to the Plan in response to the comment. **A copy of the Township's record of consideration of all timely comments received in the public comment period is included as Appendix B-3.**

The following dates are important to understanding how Warminster Township met the public participation requirements:

- Date the MS4 Pollutant Reduction Plan was made available for public review/comment: July 25, 2017
- Date the MS4 Pollutant Reduction Plan public notice was published in newspaper: July 25, 2017
- End date for the receipt of written comments (30 days from the date of public notice): August 24, 2017
- Date the MS4 Pollutant Reduction Plan listed on the public meeting agenda: August 17, 2017
- Date the MS4 Pollutant Reduction Plan comments were accepted at a public meeting: August 17, 2017

B. Map

Mapping was an integral part of the MS4 Pollutant Reduction Plan and required a level of detail suitable to determine the existing land uses, impervious/pervious surface coverages, topography, and loads for sediment and nutrients. Per the DEP, the most limiting nutrient is total phosphorus (TP) and therefore this is the only nutrient considered in this MS4 Pollutant Reduction Plan.

The MS4 Planning Area Map was developed to identify the PRP and TMDL Planning Areas, including all storm sewershed boundaries, and the proposed locations of structural Best Management Practices (BMPs) to be implemented to achieve the required pollutant load reductions. Parsed areas, which are the areas within the storm sewershed excluded from the Planning Areas and related calculations for land area and existing pollutant loads, were also identified. Examples of land area that were parsed include:

- Land area associated with non-municipal stormwater NPDES permit coverage that exist within the Township;
- Land area associated with PennDOT roadways (roads and rights-of-way);
- Land area in which stormwater runoff does not enter the MS4. Examples include homeowner's associations and schools which do not contain municipal roads or other municipal infrastructure.

All BMPs located within these parsed areas have been excluded from calculations for achieving pollutant load reduction objectives.

The Planning Areas were calculated to be 2,106.4 acres for the Neshaminy/Little Neshaminy Creek; 1,071.9 acres for the Pennypack Creek; and 894.8 acres for the Southampton Creek. Please note that, due to the limited area of Warminster Township located within the main Neshaminy Creek watershed versus the Little Neshaminy Creek sub-watershed, these watersheds were considered together in the calculations and are simply referred to together as "Neshaminy Creek."

The MS4 Land Cover Map identifies the storm sewershed boundaries, existing zoning districts and land uses, and impervious/pervious surface coverages. The storm sewershed boundaries shown on these maps constitute the Planning Areas within the MS4's jurisdiction in the three watersheds. Both the MS4 Planning Area and MS4 Land Cover Maps are included in Appendix C.

C. Pollutants of Concern

The pollutants addressed by this MS4 Pollutant Reduction Plan are based on the Requirement(s) column of the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*, included as Appendix A-1. Impaired downstream waters and pollutants in Warminster Township consist of the following: Little Neshaminy Creek, impaired for nutrients and with a TMDL for sediment; Neshaminy Creek, impaired for nutrients; Pennypack Creek and unnamed tributaries to the Pennypack Creek, impaired for sediment and nutrients; and the Southampton Creek, impaired with a TMDL for sediment and total phosphorous. Per the DEP, the most limiting nutrient is total phosphorus (TP) and therefore this is the only nutrient that this MS4 Pollutant Reduction Plan considers. Please note that, due to the limited area of Warminster Township located within the main Neshaminy Creek watershed versus the Little Neshaminy Creek sub-watershed, these watersheds were considered together in the calculations and are simply referred to together as “Neshaminy Creek.”

Per the PRP Instructions, if the impairment is due to both siltation and nutrients, a 10 percent sediment load and 5 percent TP reduction must be addressed. However, per the PRP and TMDL Instructions, the MS4 may use a presumptive approach in which it is assumed that a 10 percent sediment reduction will also accomplish the required TP reduction.

Furthermore, the TMDL Instructions indicate that MS4s may combine TMDL Plans with PRPs and, if the Plan demonstrates that the sediment and/or TP will be reduced by 10 percent and/or 5 percent during the permit term within the TMDL Planning Area, this satisfies all PRP requirements for any impaired waters within the watershed of the TMDL waters for the subsequent NPDES permit term.

This MS4 Pollutant Reduction Plan combines the TMDL Plans with the PRPs and uses the presumptive approach for the Neshaminy Creek, Pennypack Creek, and Southampton Creek, demonstrating how the Township will achieve the 10 percent sediment load reduction; therefore, TP load reductions are not addressed or calculated separately.

D. Determine Existing Loads for Pollutants of Concern

The existing loading condition was calculated for Warminster Township on July 10, 2017 as follows:

As the first step in determining the existing pollutant loads, Warminster Township determined its PRP and TMDL Planning Areas within each of the three major watersheds: the Neshaminy/Little Neshaminy Creek, Pennypack Creek, and Southampton Creek. The PRP and TMDL Planning Areas are the land areas that drain to the municipal separate storm sewer system from within the jurisdiction of the MS4 permittee, also known as the “storm sewershed.” Lands owned by the Commonwealth or County as well as land areas that drain directly to non-Township roads, streams, or permitted BMPs were parsed since they are outside the Township’s jurisdiction. The drainage areas within each Planning Area were delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours and were then modified as necessary based on field conditions, such as curbing and localized high points. Warminster Township did not claim “credit” for any existing BMPs. The Table below summarizes the division of the total area of Warminster Township.

TABLE D-1: AREA CALCULATION SUMMARY

Area Description	Neshaminy/Little Neshaminy Creek (Acres)	Pennypack Creek (Acres)	Southampton Creek (Acres)
Parsed	1,379.8	587.6	449.2
Township Rights-of-Way	358.0	187.5	123.0
Residential	1,314.4	668.9	574.2
Commercial/Industrial	227.9	153.5	25.6
Open Space	206.1	62.0	172.0
Total Area	3,486.2	1,659.5	1,344.0
Total Planning Area (= Total Area – Parsed)	2,106.4	1,071.9	894.8

For the Pennypack Creek, since no TMDL or WLA exists but portions of the stream are impaired for sediment and nutrients, the PRP requirements apply to this sewershed; this is therefore considered a PRP Planning Area. As permitted per the PRP Instructions, the “simplified method” was used to calculate the existing pollutant loads. To determine the impervious and pervious surfaces, GIS software was used to overlay the existing zoning districts on the PRP Planning Area.

Coverages and areas were then calculated based on the maximum impervious coverage permitted in each zoning district and the remaining areas were considered either planted or lawn. Event Mean Concentrations (EMCs) for sediment and total phosphorous (TP) provided in Table 8.3 of the *Pennsylvania Stormwater Best Management Practices Manual* (PA BMP Manual) and weighted rainfall volumes were applied per the Water Quality Analysis of Pollutant Loading method from Worksheet 12 of the PA BMP Manual. Rainfall volumes were calculated using 4 years (2011 – 2014) of daily rain gauge data from the Ambler Borough Waste Water Treatment Plant (WWTP) and the SCS Runoff Curve Number Method (NRCS, TR-55) accounting for the initial abstraction and land cover classification. Since the Ambler Borough WWTP is within 8.8 miles of Warminster Township, the rainfall data is considered representative of average rainfall in Warminster Township.

Next, loadings for the municipally-owned rights-of-way were calculated using the “simplified method.” Impervious coverages, such as the roadway, sidewalk, and curb, were calculated and separated from the pervious coverage, which was assumed to be grassed. Lastly, an assumed original condition of woods was calculated and removed from the total existing pollutant loads to replicate the most-original condition of the Pennypack Creek watershed; this was done on the assumption that pollutant loads associated with the originally fully-wooded watershed would be considered natural and not a source of pollution.

Since the TMDL Instructions indicate that existing pollutant loads for Planning Areas with a TMDL must be modeled in accordance with the existing loads specified in the TMDL, loads for the Neshaminy Creek and Southampton Creek were calculated differently.

For the Neshaminy Creek, existing sediment loads were calculated using the information provided in the *Total Maximum Daily Load (TMDL) Assessment for the Neshaminy Creek Watershed in Southeast Pennsylvania*, approved by the United States Environmental Protection Agency (USEPA) on December 8, 2003. The TMDL Assessment also established a nutrient TMDL, but this was withdrawn on January 31, 2008; therefore, the “simplified method” discussed above was used to calculate the existing TP loads for the Neshaminy Creek sewershed.

Since the TMDL Assessment did not provide existing sediment load rates, the first step was to calculate these by dividing the area located in each land use category from Table C2.5 "Sediment Load Allocation by Each Land Use/Source" in the “TMDL Development Plan for Little Neshaminy Watershed” chapter by the “2000 Load” rates from the same table.

Land use categories from Table C2.5 were then assigned to the TMDL Planning Area, based on aerial mapping and zoning districts. Each land use area was then multiplied by its respective calculated sediment load rate to provide existing sediment loads. An average stream bank erosion sediment loading rate was also calculated based upon the 3.0 miles of the Little Neshaminy Creek located within Township owned/ maintained lands compared to the total 47.2 mile length of the impaired Little Neshaminy Creek.

For the Southampton Creek, existing sediment and TP loads were calculated using the information provided in the *Nutrient and Sediment TMDLs for the Southampton Creek Watershed, Pennsylvania*, established by the USEPA for the Southampton Creek on June 30, 2008. Since land use related load rates were provided in Table 12 "Existing Sediment Load for Southampton Creek Watershed" in the Southampton Creek TMDL, calculating the existing sediment loads entailed assigning land use categories from the same table to the TMDL Planning Area. The existing load rates were then multiplied by the Planning Areas associated with each land use category.

To calculate the existing TP loads, the land use categories and total loads from Appendix C "Summary of AVGWLF Model Output for Southampton Watershed" in the Southampton Creek TMDL were used. Since it was unclear how the different types of forest were selected, it was assumed that all forest areas were "Mixed Forest." Annual load rates were then calculated for each land use category by dividing the load weight by the area and 23, to account for the 23 year period of analysis. Per Table 18 "Sediment WLAs for MS4 Municipalities in Southampton Watershed" in the Southampton Creek TMDL, Warminster Township was assigned 32.72 percent of the stream bank erosion load and therefore this percentage was used for this calculation as well. Groundwater loading was assigned in an amount proportionate to the area of Warminster Township located within the Southampton Creek watershed. Since Warminster Township has no known septic systems within the Southampton Creek watershed, the existing wasteload was assumed to be zero. In summary, the existing pollutant loads for each Planning Area are as follows:

TABLE D-2: SUMMARY OF EXISTING LOADS

Planning Area	Sediment Load (lbs/year)	TP Load (lbs/year)
Neshaminy/Little Neshaminy Creek - Sewershed 1	450,212	2,596.7
Pennypack Creek - Sewershed 2	342,781	1,442.2
Southampton Creek - Sewershed 3	481,558	209.84
Total Existing Loads	1,274,551	4,248.74

E. Wasteload Allocations (WLAs)

Warminster Township contains two watersheds with TMDLs with specific wasteload allocations (WLAs) – the Little Neshaminy Creek and the Southampton Creek. Though the Pennypack Creek is impaired for sediment and nutrients, there is no TMDL for the watershed.

The *Total Maximum Daily Load (TMDL) Assessment for the Neshaminy Creek Watershed in Southeast Pennsylvania* requires a 17.1 percent reduction in sediment loads in the Little Neshaminy Creek sub-watershed, per Table C2.5 “Sediment Load Allocation by Each Land Use/Source.” No WLA was provided in the TMDL Assessment specific to Warminster Township. The TMDL Assessment had also established a nutrient TMDL, but this was withdrawn on January 31, 2008. The portion of Warminster Township located within the main watershed of the Neshaminy Creek was not assigned a WLA or required reduction. As a conservative approach, all portions of the Township located within the greater Neshaminy Creek watershed were assumed to be within the Little Neshaminy Creek sub-watershed. As indicated in prior sections, the TMDL Planning Area for the Little Neshaminy/Neshaminy Creek is 2,106.4 acres and the existing sediment load was calculated to be 450,212 lbs/year; therefore, a 17.1 percent reduction would result in an allocated sediment wasteload of 373,136 lbs/year.

The *Nutrient and Sediment TMDLs for the Southampton Creek Watershed, Pennsylvania*, established a 367,675 lbs/year sediment WLA and a 2.19 lbs/year total phosphorous WLA for the Southampton Creek, per the tables provided in the TMDL’s Information Sheet.

In summary, the wasteload allocations for each Planning Area are as follows:

TABLE E-1: SUMMARY OF WLAs

Planning Area	Sediment WLA (lbs/year)	TP WLA (lbs/year)
Neshaminy/Little Neshaminy Creek - Sewershed 1	373,136	N/A
Pennypack Creek - Sewershed 2	N/A	N/A
Southampton Creek - Sewershed 3	367,675	2.19

F. Analysis of TMDL Objectives

In the short-term, which is defined as this 5-year permit term beginning upon the DEP's issuance of an individual permit, Warminster Township has decided to pursue reducing the existing sediment load by 10 percent and, presumptively, the TP load by 5 percent as permitted by the TMDL Plan Instructions. Since the proposed pollutant load reductions and BMPs will affect the Planning Areas in each of the 3 watersheds, the table below includes the Pennypack Creek even though there is no TMDL for the watershed. This MS4 Pollutant Reduction Plan is intended to supersede and replace all MS4 TMDL Strategies previously submitted by Warminster Township. The Table below summarizes the existing pollutant loads and short-term TMDL reductions for each Planning Area.

TABLE F-1: SUMMARY OF EXISTING LOADS & SHORT-TERM TMDL REDUCTIONS

Planning Area	Sediment Load (lbs/year)	TP Load (lbs/year)
Neshaminy/Little Neshaminy Creek - Sewershed 1	450,212	2,596.7
Pennypack Creek - Sewershed 2	342,781	1,442.2
Southampton Creek - Sewershed 3	481,558	209.84
Total Existing Loads	1,274,551	4,248.74
Short-Term Reductions	127,455 (10% of total)	212.43 (5% of total)

In the long-term, Warminster Township is required to reduce the sediment load in the Little Neshaminy Creek by 17.1 percent, the sediment load in the Southampton Creek to 367,675 lbs/year and the TP load in the Southampton Creek to 2.19 lbs/year.

The Township plans to systematically achieve the required long-term wasteload allocations through the use of structural and non-structural BMPs intended to remove sediment and TP pollutants from stormwater runoff generated within the TMDL Planning Areas. The Township believes it can achieve both sediment WLAs within 25 years, if not sooner due to future DEP permit requirements; however, due to the extreme TP load reduction requirement for the Southampton Creek watershed, it is unclear how this reduction can be achieved with BMPs - even when employed in combination and/or series, since none currently offer the required reduction - or land use changes - since nearly 60 percent of the TP pollutant load is attributed to groundwater.

This MS4 Pollutant Reduction Plan will be evaluated and updated by Warminster Township on an as-needed basis, based on its effectiveness in reducing pollutant loads in discharges from the Planning Areas. If Warminster Township determines that updates are needed, the Township will work with the DEP for review and approval of any revisions or updates.

This table summarizes the required long-term TMDL reductions for each Planning Area:

TABLE F-2: SUMMARY OF LONG-TERM TMDL REDUCTIONS

Planning Area	Sediment WLA	Existing Sediment Load (lbs/year)	Long-Term Sediment TMDL Reduction (lbs/year)	TP WLA	Existing TP Load (lbs/year)	Long-Term TP TMDL Reduction (lbs/year)
Neshaminy/Little Neshaminy Creek - Sewershed 1	17.1 % reduction	450,212	77,076	N/A	N/A	N/A
Pennypack Creek - Sewershed 2	N/A	N/A	N/A	N/A	N/A	N/A
Southampton Creek– Sewershed 3	367,675 lbs/year	481,558	113,883 (23.6% reduction)	2.19 lbs/year	209.84	207.65 (99.0% reduction)

G. Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loads

As part of this MS4 Pollutant Reduction Plan, Warminster Township is required to implement Best Management Practices (BMPs) within the five-year term of the individual permit coverage that will reduce sediment pollutant loads by 10 percent, and presumptively also reduce TP pollutant loads by 5 percent, within the Planning Areas. As previously stated, the DEP has determined that a 10 percent sediment load reduction will also result in at least a 5 percent TP load reduction; therefore, TP load reductions were not separately examined and calculated as part of this MS4 Pollutant Reduction Plan.

As discussed above, the existing pollutant loads and required reductions are as follows:

TABLE G-1: SUMMARY OF EXISTING LOADS & REQUIRED REDUCTIONS

Planning Area	Sediment Load (lbs/year)	TP Load (lbs/year)
Neshaminy/Little Neshaminy Creek - Sewershed 1	450,212	2,596.7
Pennypack Creek - Sewershed 2	342,781	1,442.2
Southampton Creek - Sewershed 3	481,558	209.84
Existing Total Load	1,274,551	4,248.74
Required Reduction	127,455 (10% of total)	212.43 (5% of total)

Warminster Township plans to achieve the sediment reduction by designing, constructing, operating, and maintaining structural BMPs. The drainage area to each structural BMP was delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours and were then modified as necessary based on field conditions, such as curbing and localized high points. All BMP effectiveness values were obtained from the PADEP’s *BMP Effectiveness Values document (3800-PM-BCW0100m)*.

Table G-2 is a summary of the proposed BMPs under consideration, including location, type, area treated, sediment removed, and sewershed in which the BMP would be located:

TABLE G-2: SUMMARY OF BMPS

BMP Location	BMP Type	Area Treated By BMP (Acres)	Sediment Load Removed by BMP (lbs/year)	Sewershed
Streambank	Stream Restoration	Up to 1,485 LF of stream	Up to 44,431 per sewershed, or 133,293 total	1, 2, & 3
Barness Park, by Log College	Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	15.40	Up to 3,636	1
Munroe Park, by baseball fields	Filter Strip Stormwater Treatment, Filter Strip Runoff Reduction, or Bioswale	21.84	Up to 5,979	1
Szymanek Park, beyond football field	Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	27.94	Up to 7,384	2
Shenandoah Woods, lower parcel	Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	83.67	Up to 22,407	3

As indicated in Table G-1, the minimum required sediment load reduction in Warminster Township's Planning Areas is 127,455 lbs/year. Warminster Township will be using the permitted approach of addressing the sediment load reduction in total, versus reductions in each Planning Area. As demonstrated in Table G-2, Warminster Township may select to implement a combination of several BMPs to meet the address the minimum sediment load reduction. Table G-2 notes the sediment removal values as "up to" since the load reduction cannot be verified until the time of BMP design. For example, infiltration testing has not been completed and therefore it is unknown at this time whether the basins will function in dry extended detention or infiltration conditions. Once the minimum required sediment load reduction has been met, Warminster Township may choose to continue implementing additional BMPs to reduce the sediment load by up to 172,700 lbs/year but does not commit to these additional sediment load reductions within the 5-year term of the individual permit coverage.

The following table summarizes the existing sediment load and required sediment load reduction for each of Warminster Township's Planning Areas and the Township in total. As stated above, Warminster Township will be using the permitted approach of addressing the sediment load reduction in total, versus individual sewersheds.

TABLE G-3: MS4 POLLUTANT REDUCTION PLAN SUMMARY

Planning Area	Area (acres)	Existing Sediment Load (lbs/year)	Sediment Load Reduction per Planning Area (lbs/year)	Potential Proposed Sediment Load Reduction (lbs/year)
Neshaminy/Little Neshaminy Creek – Sewershed 1	2,106.4	450,212	45,021	54,046
Pennypack Creek – Sewershed 2	1,071.9	342,781	34,278	51,816
Southampton Creek – Sewershed 3	894.8	481,558	48,156	66,838
Total	4,073.1	1,274,551	127,455	172,700
Minimum Reduction		127,455 (required 10% of total)	127,455	127,455

The Township plans to systematically achieve the required long-term wasteload allocations through the use of structural and non-structural BMPs intended to remove the sediment and TP pollutant loads from stormwater runoff generated within the TMDL Planning Areas. The Township believes it can achieve the sediment WLAs within 25 years, if not sooner due to requirements of future permits; however, due to the extreme TP reduction requirement for the Southampton Creek watershed, it is unclear how this reduction can be achieved with BMPs - even when employed in combination and/or series, since none currently offer the required reduction - or land use changes - since nearly 60 percent of the pollutant load is attributed to groundwater.

BMPs that would be considered to achieve the long-term wasteload allocations include those included in the Pennsylvania Stormwater Best Management Practices Manual, BMPs recognized by the EPA

Chesapeake Bay Program, or other BMPs where the pollutant reduction efficiency is known or may be determined. These BMPs may be in the form of additional stream restoration, dry extended detention basin or infiltration practices with sand, vegetation, bioswales, etc.

H. Identify Funding Mechanisms

Warminster Township will be working during the five-year term of the individual permit coverage to determine the best funding source for each proposed BMP, as each project is undertaken. Funding sources for the proposed structural BMPs outlined in this MS4 Pollutant Reduction Plan could include the following:

- General Fund
- MS4 Dedicated Fund
- MS4 Stormwater Fee
- Developer Cooperation
- Grant Funding
- PennVest Low-Interest Loan
- Bond

For example, Warminster Township intends to apply for related grants, such as Growing Greener, to implement these BMPs but will utilize general fund monies to cover the design and construction costs for the proposed BMPs should grant money not be awarded.

I. Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

Once implemented, the BMPs must be maintained in order to continue producing the expected pollutant load reductions. Actual Operations and Maintenance (O&M) activities will be identified by Warminster Township in their Annual MS4 Status Reports, submitted under the individual permit. At this time it is anticipated that all BMPs will be owned by the Township and maintained by the more specific Township department identified in the Table. O&M activities and frequency are anticipated to be completed in accordance with the latest version of the PA BMP Manual.

TABLE I-1: OPERATION & MAINTENANCE OF BMPs

Name of BMP	BMP Location	Department Responsible for O&M
Stream Restoration	Streambank	Public Works Department
Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	Barness Park, by Log College and Gorson Drives	Public Works Department
Filter Strip Stormwater Treatment, Filter Strip Runoff Reduction, or Bioswale	Munroe Park, by baseball fields	Public Works Department
Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	Szymanek Park, beyond football field	Public Works Department
Dry Extended Detention Basin or Infiltration Practices w/ Sand, Veg.	Shenandoah Woods, lower parcel	Public Works Department

J. General Information

Terms: The term “nutrients” refers to “Total Phosphorus” (TP) unless specifically stated otherwise in DEP’s latest Integrated Report. The terms “sediment,” “siltation,” and “suspended solids” all refer to inorganic solids and are hereinafter referred to as “sediment.”

The term, “storm sewershed” is defined in the PAG-13 General Permit as the land area that drains to the municipal separate storm sewer from within the jurisdiction of the MS4 permittee. This term is used as well as the term “TMDL Planning Area,” “PRP Planning Area,” as appropriate, or more generally as “Planning Area” which refers to all the storm sewersheds that an MS4 must calculate existing loads and plan load reductions for.

The term “baseline load” is used to refer to the pollutant load discharged by an MS4 as reported in a TMDL. A baseline load can be revised by 1) conducting a new modeling effort that utilizes the land use/land cover information from the original TMDL and 2) by considering the reductions achieved through structural BMPs installed prior to approval of a TMDL that were not considered during development of the TMDL.

The term “existing load” refers to the pollutant load that the MS4 estimates is draining to impaired waters from the Planning Area at the time of TMDL Plan submission. The existing load will be the same as the baseline load (regardless of whether or not the baseline load is revised) unless the MS4 accounts for reductions from structural BMPs installed between the date of TMDL approval and TMDL Plan submission.

Pollutants of Concern and Required Reductions: For all PRPs, MS4s shall calculate existing loading of the pollutant(s) of concern, in lbs/year; calculate the minimum reduction in loading, in lbs/year; select BMP(s) to reduce loading; and demonstrate that the selected BMP(s) will achieve the minimum reductions.

For PRPs developed for impaired waters, the pollutant(s) are based on the impairment listing, as provided in the MS4 Requirements Table. If the impairment is based on siltation only, a minimum 10% sediment reduction is required. If the impairment is based on nutrients only or other surrogates for nutrients (e.g., “Excessive Algal Growth” and “Organic Enrichment/Low D.O.”), a minimum 5% TP reduction is required. If the impairment is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed. PRPs may use a presumptive approach in which it is assumed that a 10% sediment reduction will also accomplish a 5% TP reduction. However, MS4s may not presume that a reduction in nutrients will accomplish a commensurate reduction in sediment.

The pollutants of concern for TMDL Plans will be based on the following:

If a WLA has been established in a TMDL for sediment, the MS4 is expected to develop the TMDL Plan based on the reduction of sediment.

If WLAs have been established in a TMDL for sediment and nutrients, the MS4 is expected to develop the TMDL Plan based on the reduction of sediment and TP, unless the MS4 chooses to utilize a presumptive approach for TP. DEP will allow MS4s to calculate loads and pollutant reductions based on sediment, under the assumption that the achievement of TMDL Plan objectives for sediment will also achieve the objectives for TP. MS4s must identify use of the presumptive approach in its TMDL Plan if chose.

TMDL Plan Objectives: There are two objectives for a TMDL Plan:

1. **Long-Term Reduction** – plan for the reduction of pollutant load(s) to achieve the WLA(s) in the TMDL.

The TMDL Plan must describe a general plan as to how WLA(s) will ultimately be achieved.

2. **Short-Term Reduction** – plan for the short-term reduction of pollutant load(s) that will be achieved within the subsequent NPDES permit term (i.e., the 5-year permit term resulting from DEP's issuance of a permit in response to the receipt of the MS4's next submission of an individual permit application).

MS4s must achieve at least one of the following objectives within the 5-year permit term: 1) the WLA(s) in the TMDL, or 2) if the WLA(s) cannot be achieved, a load reduction of at least 10% for sediment and/or 5% for TP, compared to the existing load for these pollutants at the time of TMDL Plan submission. A load reduction of at least 10% for sediment may be used as the objective in lieu of a 5% reduction in TP under the presumptive approach.

Existing Pollutant Loads: The estimation or determination of existing loads for TMDL Plans is different than the estimation of existing loads for PRPs. MS4s have two options in establishing the existing pollutant loads for pollutants of concern for TMDL Plans:

1. MS4s may report the existing loads specified in the TMDL (i.e., the TMDL "baseline load"). The baseline loads may be represented in the TMDL as either:
 - Loads that are specific to the MS4
 - Loads that are not specific to the MS4, in which the MS4 will need to delineate its individual loads
2. MS4s may choose to calculate its existing loads for a TMDL Plan through a new modeling effort using the MapShed model developed by the Pennsylvania State University (www.mapshed.psu.edu) or a comparable, or more robust, continuous simulation model. Any new modeling effort must focus on the TMDL Planning Area and account for overland flow as well as downstream channel and bank erosion; therefore, modeling must be done at a scale that allows for the quantification of both impacts. **New modeling must utilize the same land use/land cover information that was used to develop the TMDL or other quality assured land use/land cover data from the time of TMDL approval.**

If a combined PRP and TMDL Plan is developed, in which the PRP and TMDL Planning Areas are combined into one Planning Area, the existing loads for the Planning Area may only be derived using a new modeling effort.

Existing loading for PRP Planning Areas must be calculated and reported for the portion of the Planning Area which drains to impaired waters as of the date of the development of the PRP. MS4s may not claim credit for street sweeping and other non-structural BMPs implemented in the past. If structural BMPs were implemented prior to development of the PRP and continue to be operated and maintained, the MS4 may claim pollutant reduction credit in the form of reduced existing loading.

Each impairment identified on the MS4 Requirements Table ("Table") must be addressed in a PRP document. The Table listings for each MS4 are different because they reflect local conditions, which is why an MS4 must carefully interpret the information on the Table.

NOTE – An MS4 may not reduce its obligations for achieving permit term pollutant load reductions through previously installed BMPs. An MS4 may use all BMPs installed prior to the date of the load calculation to reduce its estimate of existing pollutant loading. For example, if a rain garden was installed ten years ago and is expected to remove 100 lbs of sediment annually, and the overall

annual loading of sediment in the storm sewershed is estimated to be 1,000 lbs without specifically addressing the rain garden, an MS4 may not claim that the rain garden satisfies its obligations to reduce sediment loading by 10%. The MS4 may, however, use the rain garden to demonstrate that the existing load is 900 lbs instead of 1,000 lbs, and that 90 lbs rather than 100 lbs needs to be reduced during the term of permit coverage.

BMP Effectiveness: All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in TMDL Plans and PRPs, except as otherwise approved by DEP. For BMPs not listed in 3800-PM-BCW0100m or expert panel reports, MS4s may use effectiveness values from other technical resources; such resources must be documented in the TMDL plan and PRP, and must reflect both overland flow and stream erosion components. For example, PRPs/TMDL Plans may also apply thoroughly vetted mechanistic models with self-contained BMP modules (e.g. Storm Water Management Model (SWMM), WinSLAMM) to demonstrate achievement of reduction targets. Application of these data intensive models could allow for a streamlining of the planning and design phases of the stormwater control process that may provide future cost savings as municipalities move toward implementation of the plan. Such resources must be documented in the Plan, and must reflect both overland flow and in-stream erosion components.

Combining Planning Obligations: MS4s with multiple TMDL Plan development obligations may develop one TMDL Plan for submission to DEP, if desired. If this is done, MS4s may elect to address each TMDL water separately or in combination. If done in combination, unless specifically restricted in the TMDL, the MS4 has flexibility when locating BMPs between the TMDL Planning Areas. If the MS4 elects to meet the percent reduction requirements (10% sediment or 5% TP) in lieu of meeting the WLA(s) within the first permit term, it may elect to reduce pollutants by a greater percentage in one TMDL Planning Area over another, as long as the overall reduction for the planning effort achieves the percent reduction requirements.

MS4s may also combine TMDL Plans with PRPs, and the same flexibility is provided as discussed above. In addition, where TMDL Plans demonstrate: 1) WLA(s) have been achieved, or 2) WLA(s) will be achieved during the permit term, or 3) sediment and/or TP will be reduced by 10% and/or 5% during the permit term within the TMDL Planning Area, this satisfies all PRP requirements for any impaired waters within the watershed of the TMDL waters for the subsequent NPDES permit term. Where TMDL and PRP Planning Areas are combined, existing loads must be determined based on a new modeling effort.

BMP Selection: MS4s may select BMPs from the Pennsylvania Stormwater Best Management Practices Manual (363-0300-002), BMPs recognized by the EPA Chesapeake Bay Program, or other BMPs where the pollutant reduction efficiency is known or may be determined. Land use changes are not BMPs but may be used to demonstrate pollutant load reductions. For land use changes and BMPs implemented within a Planning Area as part of an NPDES permit requirement (e.g., post-construction stormwater management BMPs for Chapter 102 NPDES permits), pollutant load reduction credit may be claimed based on an analysis of pre- and post-construction or land use conditions, where the credit is a demonstrated net decrease in pollutant load.

MS4s may propose and take credit for only those BMPs that are not required to meet regulatory requirements or otherwise go above and beyond regulatory requirements. For example, a BMP that was installed to meet Chapter 102 NPDES permit requirements for stormwater associated with construction activities may not be used to meet permit term minimum pollutant reductions unless the MS4 can demonstrate that the BMP exceeded regulatory requirements; if this is done, the MS4 may take credit for only those reductions that will occur as a result of exceeding regulatory requirements.

NOTE – Street sweeping may be proposed as a BMP for pollutant loading reductions if 1) street sweeping is not the only method identified for reducing pollutant loading, and 2) the BMP effectiveness values contained in 3800-PM-BCW0100m or Chesapeake Bay Program expert panel reports are utilized.

Combining PRPs: If the MS4 discharges into multiple local surface waters impaired for nutrients and/or sediment, one PRP may be submitted to satisfy Appendix E but calculations and BMP selections must be completed independently for the storm sewershed of each impaired water. If, for example, an MS4 permittee must complete three PRPs according to the MS4 Requirements Table for three separate surface waters, storm sewershed maps must be developed, existing loads must be calculated, and BMPs must be implemented for pollutant reductions independently within those storm sewersheds. In other words, BMPs cannot be implemented in one storm sewershed to count toward pollutant reductions in an entirely separate storm sewershed for a different impaired water.

Where local surface waters are impaired for nutrients and/or sediment, and those waters are tributary to a larger body of water that is also impaired, MS4s can propose BMPs within the upstream impaired waters to meet the pollutant reduction requirements of both the upstream and downstream waters. For example, if Stream A flows through a municipality that is tributary to Stream B, both are impaired and the MS4 has discharges to both streams, the MS4 can implement BMPs in the storm sewershed of Stream A to satisfy pollutant reduction requirements for both Streams A and B. In general, the MS4 permittee would not be able to satisfy pollutant reduction requirements for both streams if BMPs were only implemented in the storm sewershed of Stream B; however, on a case by case basis DEP will consider such proposals where it can be demonstrated that implementing BMPs in the upstream storm sewershed is infeasible.

If, however, Stream A does not flow into Stream B, both are impaired and the MS4 has discharges to both streams, in general DEP would expect that BMPs be implemented in the storm sewershed of both streams to meet pollutant reduction requirements.

MS4s participating in collaborative efforts are encouraged to contact DEP's Bureau of Clean Water during the PRP development phase for feedback on proposed approaches.

PRP and TMDL Plan Implementation and Final Report: Under the individual permit, the permittee must achieve the required pollutant load reductions within 5 years following DEP's issuance of the permit, and must submit a report demonstrating compliance with the minimum pollutant load reductions as an attachment to the first Annual MS4 Status Report that is due following expiration of the permit.

For example, if DEP issues a permit to a permittee on June 1, 2018, the required pollutant load reductions must be implemented by June 30, 2023 and the final report documenting the BMPs that were implemented (with appropriate calculations) must be attached to the annual report that is due September 30, 2023.

Appendix A

MS4 Requirements Table

Appendix A-1: Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017)

Appendix A-1: Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Bucks County						
WARMINSTER TWP	PAG130049	Yes	TMDL Plan	Southampton Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Mill Creek		Other Habitat Alterations, Water/Flow Variability (4c)
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Pennypack Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Southampton Creek TMDL	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation (4a)	
				Unnamed Tributaries to Pennypack Creek	Appendix C-Priority Organics (5)	
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
WARRINGTON TWP	PAG130055	Yes	TMDL Plan	Mill Creek	Appendix E-Nutrients (5)	
				Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Unnamed Tributaries to Mill Creek		Flow Alterations (4c)
				Unnamed Tributaries to Neshaminy Creek		Water/Flow Variability (4c)
				Warrington Lake	Appendix E-Nutrients (5)	Exotic Species (5)
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
WARWICK TWP	PAG130074	Yes	TMDL Plan	Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Unnamed Tributaries to Neshaminy Creek		Water/Flow Variability (4c)
WEST ROCKHILL TWP	PAG130046	Yes	SP	Lake Nockamixon	Appendix E-Nutrients, Suspended Solids (4a)	
				Mill Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Threemile Run	Appendix E-Nutrients (5)	Flow Alterations (4c)
				Tohickon Creek	Appendix E-Nutrients, Siltation (5)	
				Unnamed Tributaries to East Branch Perkiomen Creek	Appendix E-Siltation (5)	Flow Alterations, Water/Flow Variability (4c)
				Delmont Lake		Exotic Species (5)
WRIGHTSTOWN TWP	PAG130043	No		Neshaminy Creek	Appendix E-Siltation (4a), Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Jericho Creek	Appendix E-Siltation (5)	
				Delaware River		Mercury (5)

Appendix B

Public Participation

Appendix B-1:	Public Notice & Proof of Advertisement
Appendix B-2:	Public Meeting Agenda & Meeting Minutes
Appendix B-3:	Record of Consideration

Bucks County, SS.



WARMINSTER TWP
401 GIBSON AVE.
WARMINSTER, PA 18974

**NOTICE
WARMINSTER TOWNSHIP
MS4 POLLUTANT
REDUCTION PLAN:**

The Warminster Township Board of Supervisors will accept comments from the public, beginning on July 25, 2017 and extending through August 24, 2017, associated with the Township's MS4 Pollutant Reduction Plan, which addresses the Pollutant Reduction and Total Maximum Daily Load (TMDL) Plan requirements from the Pennsylvania Department of Environmental Protection as a component of the Township's National Pollutant Discharge Elimination System (NPDES) Individual Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The MS4 Pollutant Reduction Plan outlines in general terms the Township's 5-year plan between 2018 and 2023 to reduce sediment and total phosphorous loadings from the MS4 stormwater discharges to the Neshaminy/Little Neshaminy Creek, Pennypack Creek, and Southampton Creek. During the comment period, the MS4 Pollutant Reduction Plan will be available for public review weekdays between the hours of 9 AM and 4 PM at the Township Administration Building (401 Gibson Avenue, Warminster, PA 18974) and will also be available for public review on the Township's website at www.warminstertownship.org/. Comments must be submitted in writing to the attention of Katherine McGovern, Executive Assistant, at the Township Administration Building (401 Gibson Avenue, Warminster, PA 18974) or by email (kmcgovern@warminsterpa.org). The Township will also accept written and verbal comments from the public at the Board of Supervisors' public meeting scheduled at 7PM on August 17, 2017. Comments, including comments submitted by email, must include the originator's name and address.

1t Jy 25 7144811

3-061270005
0007144811-01

Ann Clark being duly affirmed according to law, deposes and says that he/she is the Legal Billing Co-ordinator of the CALKINS NEWSPAPER INCORPORATED, Publisher of The Intelligencer, a newspaper of general circulation, published and having its place of business at Doylestown, Bucks County, Pa. and Horsham, Montgomery County, Pa.; that said newspaper was established in 1886; that securely attached hereto is a facsimile of the printed notice which is exactly as printed and published in said newspaper on

.....
July 25, 2017
.....

and is a true copy thereof; and that this affiant is not interested in said subject matter of advertising; and all of the allegations in this statement as to the time, place and character of publication are true.

LEGAL BILLING CO-ORDINATOR

Affirmed and subscribed to me before me this 25th day of July 2017 A.D.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Karen McGovern, Notary Public
Tullytown Boro, Bucks County
My Commission Expires Feb. 19, 2021
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES



[\[/public-information/about-warminster/\]](http://public-information/about-warminster/)

Welcome

News & Announcements

PENN COMMUNITY
BANK HELPS KIDS
SHED LIGHT ON THE
ECLIPSE



On August 1, Penn Community Bank and the Warminster Parks & Recreation Department will be hosting the children from the Warminster YMCA camp programs at the Centennial School District Planetarium.

Read [more](http://warminstertownship.org/penn-community-bank-helps-kids-shed-light-eclipse/) →
[<http://warminstertownship.org/penn-community-bank-helps-kids-shed-light-eclipse/>]

POLLUTANT

REDUCTION PLAN

Warminster Township is required to develop and implement a Pollutant Reduction Plan (PRP) for Municipal Separate Storm Sewer System (MS4) discharges to the Neshaminy/Little Neshaminy, Pennypack Creek, and Southampton Creek as part of the 2018 National Pollutant Discharge Elimination System (NPDES) MS4 Individual Permit application to the Pennsylvania Department of Environmental Protection (PADEP).

Read [more](http://warminstertownship.org/pollutant-reduction-plan/) →
[<http://warminstertownship.org/pollutant-reduction-plan/>]



STORMWATER MANAGEMENT

What is Storm Water?

Storm water is water from precipitation that flows across the ground and pavement when it rains or when snow and ice melt. The water seeps into the ground or drains into what we call storm sewers. These are the drains you see at street corners or at low points on the sides of streets. Collectively, the draining water is called storm water runoff.

Why is Storm Water “Good Rain Gone Wrong?”

Storm water becomes a problem when it picks up debris, chemicals, dirt, and other pollutants as it flows or when it causes flooding and erosion of stream banks. Storm water travels through a system of pipes and roadside ditches that make up storm sewer systems. It eventually flows directly to a lake, river, stream, wetland, or coastal water. All of the pollutants storm water carries along the way empty into our waters, too, because storm water does not get treated!

Pet wastes left on the ground get carried away by storm water, contributing harmful bacteria, parasites and viruses to our water.

Vehicles drip fluids (oil, grease, gasoline, antifreeze, brake fluids, etc.) onto paved areas where storm water runoff carries them through our storm drains and into our water.

Chemicals used to grow and maintain beautiful lawns and gardens, if not used properly, can run off into the storm drains when it rains or when we water our lawns and gardens.

Waste from chemicals and materials used in construction can wash into the storm sewer system when it rains. Soil that erodes from construction sites causes environmental degradation, including harming fish and shellfish populations that are important for recreation and our economy.

Restoring Rain's Reputation: What Everyone Can Do To Help:

Rain by nature is important for replenishing drinking water supplies, recreation, and healthy wildlife habitats. It only becomes a problem when pollutants from our activities like car maintenance, lawn care, and dog walking are left on the ground for rain to wash away. Here are some of the most important ways to prevent storm water pollution:

- Properly dispose of hazardous substances such as used oil, cleaning supplies and paint—never pour them down any part of the storm sewer system—report anyone who does.
- Use pesticides, fertilizers, and herbicides properly and efficiently to prevent excess runoff.
- Look for signs of soil and other pollutants, such as debris and chemicals, leaving construction sites in storm water runoff or tracked into roads by construction vehicles. Report poorly managed construction sites that could impact storm water runoff to your community.
- Install innovative storm water practices on residential property, such as rain barrels or rain gardens, that capture storm water and keep it on site instead of letting it drain away into the storm sewer system.
- Report any discharges from storm water outfalls during times of dry weather—a sign that there could be a problem with the storm sewer system.
- Pick up after pets and dispose of their waste properly. No matter where pets make a mess—in the backyard or at the park—storm water runoff can carry pet waste from the land to the storm sewer system to a stream.
- Store materials that could pollute storm water indoors and use containers for outdoor storage that do not rust or leak to eliminate exposure of materials to storm water.

Stormwater Information provided by Pennsylvania Department of Environmental Protection, "When it Rains, it Drains" brochure.

Stormwater Links:

[DEP Stormwater Management Program](#)

[\http://www.portal.state.pa.us/portal/server.pt/community/st
[DEP Homepage](#)

[\[http://www.depweb.state.pa.us/\]](http://www.depweb.state.pa.us/) EPA Stormwater Program
[\[http://cfpub.epa.gov/npdes/home.cfm?program_id=6\]](http://cfpub.epa.gov/npdes/home.cfm?program_id=6) EAP
[Homepage](#)

[\[http://www.epa.gov/\]](http://www.epa.gov/) PA Environmental Quality Board
[\http://www.portal.state.pa.us/portal/server.pt/community/er
[Warminster Township MS4 Southampton Creek TMDL](#)
[Strategy](#)

[\[/warminstertownship.org/download/warminster-township-tmdl-strategy/?wpdmdl=4546"](http://warminstertownship.org/download/warminster-township-tmdl-strategy/?wpdmdl=4546) > <div class="media"> <div class="pull-left"></div> <div class="media-body"><strong class="ptitle">Warminster Township MS4 Southampton Creek TMDL Strategy 1.33 MB <div>Download</div> </div> </div></div> <div style="clear: both;"></div> </div>] **(NEW)**

[MS4 Pollutant Reduction Plan](#)

[\[/warminstertownship.org/download/ms4-pollutant-reduction-plan/?wpdmdl=7843"](http://warminstertownship.org/download/ms4-pollutant-reduction-plan/?wpdmdl=7843) > <div class="media"> <div class="pull-left"></div> <div class="media-body">
<strong class="ptitle">MS4 Pollutant Reduction Plan 8.51
MB <div><a class='wprm-
download-link wprm-download-locked [btnclass]'
rel='nofollow' href='#'
onclick="location.href='http://warminstertownship.org/downlo
ad-link/pollutant-reduction-plan/?wprmdl=7843';return
false;">Download</div> </div> </div>
</div> <div style="clear: both"></div> </div>]

```

## EPA Websites:

[EPA Water Homepage \[http://water.epa.gov/\]](http://water.epa.gov/)

[EPA Water Pollution Prevention and Control \[http://water.epa.gov/polwaste/\]](http://water.epa.gov/polwaste/)

[EPA Stormwater Homepage \[http://water.epa.gov/polwaste/npdes/stormwater/index.cfm\]](http://water.epa.gov/polwaste/)

[EPA MS4 Main Page \[http://water.epa.gov/polwaste/npdes/stormwater/Municipal-Separate-Storm-Sewer-System-MS4-Main-Page.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/index.cfm)

[National Menu of Stormwater Best Management Practices \[http://water.epa.gov/polwaste/npdes/swbmp/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Municipal-Separate-Storm-Sewer-System-MS4-Main-Page.cfm)

[Stormwater Outreach Materials and Reference Documents \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Outreach-Materials-and-Reference-Documents.cfm\]](http://water.epa.gov/polwaste/npdes/swbmp/index.cfm)

[MS4 Fact Sheet \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Outreach-Materials-and-Reference-Documents.cfm)

[Polluted Runoff: Nonpoint Source Pollution \[http://water.epa.gov/polwaste/nps/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm)

[EPA Watersheds \[http://water.epa.gov/type/watersheds/index.cfm\]](http://water.epa.gov/polwaste/nps/index.cfm)

[MS4 Fact Sheet \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm\]](http://water.epa.gov/type/watersheds/index.cfm)

[Polluted Runoff: Nonpoint Source Pollution \[http://water.epa.gov/polwaste/nps/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm)

[EPA Watersheds \[http://water.epa.gov/type/watersheds/index.cfm\]](http://water.epa.gov/polwaste/nps/index.cfm)

[MS4 Fact Sheet \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm\]](http://water.epa.gov/type/watersheds/index.cfm)

[Polluted Runoff: Nonpoint Source Pollution \[http://water.epa.gov/polwaste/nps/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm)

[EPA Watersheds \[http://water.epa.gov/type/watersheds/index.cfm\]](http://water.epa.gov/polwaste/nps/index.cfm)

[MS4 Fact Sheet \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm\]](http://water.epa.gov/type/watersheds/index.cfm)

[Polluted Runoff: Nonpoint Source Pollution \[http://water.epa.gov/polwaste/nps/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm)

[EPA Watersheds \[http://water.epa.gov/type/watersheds/index.cfm\]](http://water.epa.gov/polwaste/nps/index.cfm)

[MS4 Fact Sheet \[http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm\]](http://water.epa.gov/type/watersheds/index.cfm)

[Polluted Runoff: Nonpoint Source Pollution \[http://water.epa.gov/polwaste/nps/index.cfm\]](http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Phase-II-Final-Rule-Fact-Sheet-Series.cfm)



## POLLUTANT REDUCTION PLAN

Warminster Township is required to develop and implement a Pollutant Reduction Plan (PRP) for Municipal Separate Storm Sewer System (MS4) discharges to the Neshaminy/Little Neshaminy, Pennypack Creek, and Southampton Creek as part of the 2018 National Pollutant Discharge Elimination System (NPDES) MS4 Individual Permit application to the Pennsylvania Department of Environmental Protection (PADEP).

The Plan must indicate how the Township will reduce sediment pollution from MS4 discharges to streams impaired by sediment by ten (10) percent and total phosphorous pollution from MS4 discharges to streams impaired by nutrients by five (5) percent over the five (5) year permit term (March 16, 2018 to March 15, 2023).

This Plan has been prepared and Warminster Township is now accepting written public comment on the PRP, beginning on July 25, 2017 and extending through August 24, 2017, and written and verbal comments from the public at the Board of Supervisors' public meeting scheduled at 7PM on August 17, 2017. In addition to the link ([click here](#)

<http://warminstertownship.org/download/ms4-pollutant-reduction-plan/?wpdmdl=7843> > <div class="media"> <div class="pull-left"></div> <div class="media-body"> <strong class="ptitle">MS4 Pollutant Reduction Plan <span

8.51 MB
[Download](#)

), the PRP is available for public review weekdays between the hours of 9 AM and 4 PM at the Township Administration Building (401 Gibson Avenue, Warminster, PA 18974). All written comments must be sent to the attention of Katherine McGovern, Executive Assistant, at the Township Administration Building (401 Gibson Avenue, Warminster, PA 18974) or by email ([kmcgovern@warminsterpa.org](mailto:kmcgovern@warminsterpa.org) [mailto:kmcgovern@warminsterpa.org]). Comments, including comments submitted by email, must include the originator's name and address.



# Township of Warminster

## A G E N D A

### BOARD OF SUPERVISORS

Thursday, August 17, 2017 7:00 PM

#### Call to Order

#### Pledge of Allegiance

#### Moment of Silence

#### 1. Announcements

- a. August Business of the Month-Centennial Education Foundation

#### 2. Presentations

- a. Karen MacNair- MS4 PRP and TMDL plans
  - i. Approve Township's MS4 PRP and TMDL plans

#### 3. Public Comment

Township Residents have the opportunity at this time to comment on any non-agenda items, subject to the 5-minute guideline as recognized by the chair. Residents will also have the opportunity to discuss agenda items at the time they are presented before the Board of Supervisors casts a vote.

#### 4. Consent Agenda

- a. Consider approval of Board of Supervisors minutes dated July 20, 2017
- b. Authorization to Advertise RFP for Mowing and Turf Services 2018-2020
- c. Authorization to Advertise RFP for Cleaning Services 2018-2020
- d. Authorization to Advertise RFP for Court Resurfacing at Munro Park
- e. Consider approval of TRAIRS software purchase contract
- f. Consider approval of the removal of the Central Bucks Family YMCA as a Sub-Grantee of RACP Contract #ME 300-1499 - Improvements to Warminster Community Park
- g. Consider release from Prestige Property Partners-216 Maple Street- Legal and Engineering Escrow in the amount of \$12,398.92 plus any accrued interest.
- h. Consider release from I3 Pharmaceuticals from the Legal and Engineering Escrow in the amount of \$1,000.80 plus any accrued interest.
- i. Consider Warminster Commerce, LLC, 450 York Road - Release #4 - Final from the Escrow Account in the amount of \$438,457.62.
- j. Consider Warminster Commerce, LLC, 450 York Road - Release #1 - Final from the Escrow Account in the amount of \$15,095.30 associated with the required off-site drainage improvements.
- k. Consider Hart School Redevelopment - Release #8 from the Escrow Account in the amount of \$88,063.20
- l. (LD 2003-16) 545 Sixth Avenue Amended Final Land Development Approval-Resolution 2017-28
- m. Consider Resolution 2017-29 expanding membership on the Pension Investment Advisory Committee to include one member of the police union and one member from each of the non-uniform unions
- n. Consider appointments to the Pension Investment Advisory Committee

**5. Treasurer’s Report**

- a. Approval of July transfers and Bill List for period ending August 17, 2017
  - i. July transfers
  - ii. Supplemental Bill List dated July 28, 2017 in the amount of \$540,429.31
  - iii. Bill List dated August 17, 2017 in the amount of \$1,340,925.13
- b. July Financial Statement
- c. Budget Amendment 2017 No. 2 Resolution 2017-27

**6. Unfinished Business**

**7. New Business**

- a. Review and consider Adoption of Ordinance 740-Noise Ordinance Amendment
- b. Approval of Cooperation Agreement and Straw Party Agreement with the Bucks County Redevelopment Authority with regards to Shenandoah Woods
- c. Consider approval of PFM agreements
- d. Consider approval of Agreement with US Bank
- e. Investment Policy Statement

**8. Professional’s Reports**

- a. Township Manager’s Report
- b. Solicitor’s Report
- c. Engineer’s Report

**9. Township Manager announcement of upcoming agenda items**

**10. Public Comment-** Residents have another opportunity to comment on any items (maximum 5 minutes)

**11. Supervisor’s Comments**

**12. Adjournment**

Next Ordinance Number: 741  
Next Resolution Number: 2017-30

**Upcoming Meetings:**

|                                              |                  |                                  |                |                  |
|----------------------------------------------|------------------|----------------------------------|----------------|------------------|
| <b>Board of Supervisors</b>                  | <b>Thursday</b>  | <b>September 7<sup>th</sup></b>  | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Municipal Authority</b>                   | <b>Monday</b>    | <b>September 25<sup>th</sup></b> | <b>4:00 PM</b> | <b>WMA</b>       |
| <b>Library Board</b>                         | <b>Wednesday</b> | <b>September 13<sup>th</sup></b> | <b>6:00 PM</b> | <b>Library</b>   |
| <b>Zoning Hearing Board</b>                  | <b>Wednesday</b> | <b>August 23<sup>rd</sup></b>    | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| Z17-24 320 W Street Road (BB&T)              | <b>Wednesday</b> | <b>August 23<sup>rd</sup></b>    | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| Z17-25 211 Kirk Road                         | <b>Wednesday</b> | <b>August 23<sup>rd</sup></b>    | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Environmental Advisory Committee</b>      | <b>Monday</b>    | <b>August 28<sup>th</sup></b>    | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Planning Commission</b>                   | <b>Tuesday</b>   | <b>September 12<sup>th</sup></b> | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Parks &amp; Rec Advisory Committee</b>    | <b>Wednesday</b> | <b>September 6<sup>th</sup></b>  | <b>6:30 PM</b> | <b>WREC</b>      |
| <b>Pension Investment Advisory Committee</b> | <b>Thursday</b>  | <b>October 26<sup>th</sup></b>   | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Economic Development Committee</b>        | <b>Monday</b>    | <b>September 11<sup>th</sup></b> | <b>7:00 PM</b> | <b>Twp. Bldg</b> |
| <b>Comprehensive Plan Sub Committee</b>      | <b>Thursday</b>  | <b>August 24<sup>th</sup></b>    | <b>7:00 PM</b> | <b>Twp. Bldg</b> |

The above dates are subject to change. Amended days / dates will be advertised on Ch 22 & 45

WARMINSTER TOWNSHIP BOARD OF SUPERVISORS  
MINUTES OF THE AUGUST 17, 2017

PUBLIC MEETING

MEMBERS PRESENT: Mark McKee, Chairman  
Jason Croley, Vice Chairman  
Daniel McPhillips, Secretary  
Brian Munroe, Treasurer  
Katherine Frescatore, Asst. Treasurer

STAFF PRESENT: Gregg Schuster, Township Manager  
Michael Savona, Esq., Township Solicitor  
Karen MacNair, P.E., Township Engineer  
Amanda Zimmerman, Assistant Manager

**CALL TO ORDER**

The Public Meeting of the Warminster Township Board of Supervisors, duly advertised, was held at the Performing Arts Center at Ann's Choice Retirement Community, 30000 Ann's Choice Way, Warminster, PA 18974. Mr. McKee, Chairman, called the meeting to order at 7:02 PM.

**PLEDGE OF ALLEGIANCE**

Mr. McPhillips led the pledge, which was followed by a moment of silence for our men and women serving our country both home and abroad.

**ANNOUNCEMENTS**

Ms. Frescatore thanked everyone for coming this evening. Ms. Frescatore made an announcement about Jackson's Heros' 2<sup>nd</sup> Annual 5k and Family Fun Run. This race will be held on Sunday, October 15, 2017 at the Warminster Community Park. This is a superhero themed run/walk and all proceeds will be donated in Jackson Silas Cole's name to the YMCA 2<sup>nd</sup> Grade Swim Program. Ms. Frescatore also made announcements on behalf of the Parks and Recreation department. **PARKS & REC HAS A VARIETY OF DISCOUNT TICKETS AVAILABLE** Discount Amusement Park and area attraction tickets are available for sale in the office. The price list is posted online. Discount Premiere Movie Tickets to Regal/Edwards/United Artist theaters are sold for \$9.50 each. All tickets are sold Monday thru Friday from 9 AM-4 PM. For more info and prices, check the website: [www.warminstertownship.org](http://www.warminstertownship.org). **Parks & Rec is taking registration for our FALL COMMUNITY YARD SALE** Saturday, August 26, 2017 @ WCP, Time: 8:00 AM to 1:00 PM (Weather permitting), Vendor Fees: \$25 per 20'x20' space, Registration Deadline: Wednesday, August 19 @ Noon (All Vendors **MUST PRE-REGISTER!** - No "Day-of" vendor registration will be accepted). Register on line or call the Parks & Rec office. **2017 Dog licenses** may be purchased at the Parks & Rec office in WCP during business hours or online at [www.padoglicense.com](http://www.padoglicense.com). The Parks Department continues to take **new applications and renewals for the Bark Park**. The next Bark Park safety education class will be held on Tuesday, August 29 at 6:30 PM. Call to register. The **Heaviest Tomato Contest** is being held from August 1-September 15. Bring your tomato to the Park & Rec offices in WCP during regular business hours. Heaviest tomato wins a prize! The Parks & Recreation Department has teamed up with Hatboro Federal Savings to host our annual **Fall Golf Scramble** on Monday, Oct 9 at Five Ponds. Golfer fee if \$125/person or \$450/foursome. Sponsorships are available. Call the parks & rec department for more info or go on line: [www.warminstertownship.org/specialevents](http://www.warminstertownship.org/specialevents) The Annual **Touch A Truck** event will be held on Saturday, October 28<sup>th</sup> from 10am-1pm at Warminster Community Park. Families are invited to visit the park to see the trucks, equipment and emergency service vehicles up close. Park & Rec is hosting the annual trip to the **RADIO CITY CHRISTMAS SPECTACULAR** on *Saturday, November 18, 2017* from 7:45 AM-6:30 PM. Fees are \$110/resident or \$115/Non-resident Join us to celebrate this annual tradition. Trip includes motor coach transportation and 2nd mezzanine ticket. Free time in NYC after the show for lunch, shopping or sightseeing. Trip fills fast, call to reserve your seats! For more info, contact the Parks & Recreation office at 215-443-5428 or visit the township website at [www.warminstertownship.org/specialevents](http://www.warminstertownship.org/specialevents)

Mr. Munroe did not have any announcements this evening but thanked all the residents who came out to this evening's meeting.

Mr. McPhillips stated that he is happy and excited to be at Ann's Choice this evening and he has had several opportunities to come to Ann's Choice to update residents on Township business and to hear resident concerns. He thanked Ella and Sally for their assistance in hosting those events. Mr. McPhillips also discussed Warminster's Prescription Drug Take Back program at the Police Department and stated that anyone with unused medication can drop it off safely to be destroyed. Bucks County is one of the leaders in prescription drug take back programs. Additionally, Mr. McPhillips commented on reforming the Sterling Act and the loss of earned income from Township residents who live in the Township but work in Philadelphia. Annually, the Township loses approximately \$400,000 from 1,600 residents. Mr. McPhillips asked that residents communicate with their State and Federal representatives to support reforming this act.

Mr. Croley thanked Ann's Choice for having the Township back after hosting the Comprehensive Plan Subcommittee in April. The April meeting was very interactive and a lot of residents spoke and he invited everyone to do the same this evening. Mr. Croley also announced the new businesses in town. On July 25, 2017, Yuck Truck opened at 385 Nina Way and on July 26, E2 Accuracy, LLC. On August 1, Child and Family Focus Inc opened at 755 York Road, Suite 204. On August 7, Abra Auto Body and Glass LP opened at 555 W. Street Road. And on August 16, C. A Briggs Company opened at 622 Mary Street, Suites 1001 and 101.

Mr. McKee thanked Ann's Choice and Chris Donati for hosting the Township this evening. This is the first time the Board of Supervisors has held a meeting outside of the township building. Mr. McKee stated that it's such an honor to be here tonight with the greatest generation.

## PRESENTATIONS

### **A. August Business of the Month-Centennial Education Foundation**

Mr. Croley and Mr. McPhillips explained the Business of the Month program. The Economic Development Committee started in late 2015 to serve as an advisory board to support the Township on their business development. One way they wanted to help businesses was to recognize a business each month at the Board of Supervisors meeting. For the month of August, Centennial Education Foundation (CEF) was selected. Mr. McPhillips offered his congratulations to CEF. Honorees are members of the Chamber of Commerce and are seasonally appropriate. Mr. Croley asked Mr. Wayne McCulloch, former Township Supervisor and CEF member, to introduce those on stage. Carolyn Fisher, Executive Director of CEF, spoke about the foundations goals and accomplishments. Celebrating their 20th anniversary, Centennial Education Foundation was founded as an independent non-profit in 1997 to provide enriching educational opportunities, programs, and projects for students in the Centennial School District. The Foundation solely relies on donations to support its programs. CEF's work has impacted the educational needs of thousands of District students. Ms. Fisher stated that they estimate CEF has given Centennial School District nearly a million dollars to help support programs for its students through 400 grants, impacting over 200,000 students.

Mr. Croley presented CEF with a Certificate of Appreciation.

### **B. MS4-PRP and TMDL Plans Overview and Presentation**

Karen MacNair, Township Engineer, presented the Township's MS4 (storm water) PRP and TMDL plans as mandated by the Township's MS4 permit. The Township's current permit expires in March 2018 and as part of this permit, the PRP and TMDL plans must be publically presented to the Board and the residents. The permit application is due September 16, 2017. The TMDL for sediment in the Little Neshaminy Creek was established by the EPA in December 2003. The TMDL for sediment and total phosphorous was established in June 2008 by the EPA for the Southampton Creek watershed. The PRP is required for any identified impaired streams, the Little Neshaminy/ Neshaminy Creek and Pennypack Creek within the Township. The Pennypack Creek impairments are sediments and nutrients. DEP has required that the Township reduce sediment loads by ten percent and phosphorus loads by five percent over the next five year permit term. Gilmore and Associates created planning areas to show what areas the Township is responsible for. The Best Management Practices that

are proposed are: (1) about 500 feet of streambank restoration in each of the watersheds; (2) a basin in Barnes Park; (3) a filter strip/swale in Munroe Park; (4) a basin in Syzmanek Park; and (5) a basin in Shenandoah Woods. The BMPs proposed in the parks are intended not inhibit the daily function and use of the parks. Once the BMPs are installed, Public Works will maintain them. Part of the requirement of the plans is public comment tonight. The Township is also accepting written comment on the plans, which are available on the Township's website and at the Township Administration Building, where the plans are available for review and comment through August 24, 2017.

Mr. McKee commented that this plan is an unfunded mandate that the Township must complete in the next five years.

Bob Trotter, Warminster, asked how many basins are proposed to be installed. Ms. MacNair responded that three basins are proposed to address the impairments. Mr. Trotter asked how large the basins are going to be. Ms. MacNair stated that the designs are not completed.

Donna Elms, Warminster, asked why basins were chosen instead of vegetative infiltration systems. Ms. MacNair explained that the basins were a better option because of the drainage area required to be addressed and the basin would have the largest impact on the sediment and nutrient loads. Ms. Elms asked if the Township would consider putting native vegetation in the basins. Ms. MacNair responded that they would be considered. Ms. Elms asked where the basin in Syzmanek Park will be going. The location is not decided yet but will be reviewed during the design process. Mr. McKee asked that Ms. MacNair present the designs to the Board as we go through the process. Ms. Elms asked that the basin not interrupt the community garden in the park. Ms. Elms also asked why there were no numbers on Table F-2 for the Pennypack Creek Watershed. Ms. MacNair responded that there is no information because there is not a TMDL plan. The impairments were determined by the US EPA and US DEP. They provided the impairments to all municipalities and all the table information came from them.

Ms. Frescatore asked if the Township can post each portion of the design plan as it moves forward. Mr. Schuster responded that it can be.

Mr. McKee stated that the Township will have to budget as the plan moves forward.

Mr. Munroe made a motion to approve the PRP and TMDL plans as presented; Seconded by Mr. Croley; Mr. McKee asked if there was any discussion from the Board or Comment from the Public; Hearing none.  
5-0 Motion Carried.

### PUBLIC COMMENT

Bob Trotter, Warminster, commented on his concerns with the Majestic Oaks Basin that is being built along Centennial Road. The homes along the creek on Centennial Road have had flooding issues for years because of overflow from the old basin. The current pipe placement of the new basin is not correct, nor is the height of the spillway and the basin will not solve the problem. The creek is not maintained and there is debris throughout the creek that needs to be cleaned up as well. Ms. Frescatore commented that she had concerns about this basin from the beginning and its ability to fix the flooding. Ms. MacNair responded that Gilmore has done site visits and from appearance it is built as it was approved by DEP. However, until the as-built plans are submitted it is hard to say if there is a problem. Ms. MacNair also reminded everyone that there will be an 18 month maintenance bond that will ensure that the basin is working and if it is not, then Pulte will be required to fix the issues.

### CONSENT AGENDA

- A. Consider approval of Board of Supervisors minutes dated July 20, 2017
- B. Authorization to Advertise RFP for Mowing and Turf Services 2018-2020
- C. Authorization to Advertise RFP for Cleaning Services 2018-2020
- D. Authorization to Advertise RFP for Court Resurfacing at Munro Park
- E. Consider approval of TRAISR software purchase contract

- F. Consider approval of the removal of the Central Bucks Family YMCA as a Sub-Grantee of RACP Contract #ME 300-1499 – Improvements to Warminster Community Park
- G. Consider release from Prestige Property Partners-216 Maple Street- Legal and Engineering Escrow in the amount of \$12,398.92 plus any accrued interest.
- H. Consider release from I3 Pharmaceuticals from the Legal and Engineering Escrow in the amount of \$1,000.80 plus any accrued interest.
- I. Consider Warminster Commerce, LLC, 450 York Road – Release #4 – Final from the Escrow Account in the amount of \$438,457.62.
- J. Consider Warminster Commerce, LLC, 450 York Road – Release #1 – Final from the Escrow Account in the amount of \$15,095.30 associated with the required off-site drainage improvements.
- K. Consider Hart School Redevelopment – Release #8 from the Escrow Account in the amount of \$88,063.20
- L. Consider (LD 2003-16) 545 Sixth Avenue Amended Final Land Development Approval-Resolution 2017-28
- M. Consider Resolution 2017-29 expanding membership on the Pension Investment Advisory Committee to include one member of the police union and one member from each of the non-uniform unions
- N. Consider appointments to the Pension Investment Advisory Committee

Mr. Schuster briefly read and described the consent agenda items.

**Mr. Munroe made a motion to approve the consent agenda; Seconded by Ms. Frescatore; Mr. McKee asked if there was any discussion from the Board or Comment from the Public; Hearing none.  
5-0 Motion Carried.**

Mr. Croley asked who was appointed to the Pension Investment Advisory Board. Mr. Schuster provided the names.

#### **TREASURER’S REPORT**

- A. Approval of July transfers and Bill List for period ending August 17, 2017
  - i. July transfers
  - ii. Supplemental Bill List dated July 28, 2017 in the amount of \$540,429.31
  - iii. Bill List dated August 17, 2017 in the amount of \$1,340,925.13

**Mr. Munroe made the motion to approve transfers and Bill List for the period ending August 17, 2017 as read; Seconded by Ms. Frescatore. Mr. McKee asked if there was any discussion from the Board or Comment from the Public; Hearing none.  
5-0 Motion Carried**

#### **B. July Financial Statement**

Mr. Schuster provided a brief overview, highlighting the fact that the finances continue to look positive and the revenue is above average for the building permits and real estate transfer taxes.

#### **C. Budget Amendment 2017 No. 2 Resolution 2017-27**

Mr. Schuster provided an overview on the budget transfers.

**Mr. McPhillips made the motion to approve Resolution 2017-27; Seconded by Mr. Croley. Mr. McKee asked if there was any discussion from the Board or Comment from the Public; Hearing none.  
5-0 Motion Carried**

#### **UNFINISHED BUSINESS**

There is no unfinished business for this meeting.

## NEW BUSINESS

### **A. Review and Consider Adoption of Ordinance 740-Noise Ordinance Amendment**

Mr. Savona provided a brief overview of the changes to the Noise Ordinance, highlighting the change from the use of a sound decibel meter to determine if a sound level is unlawful. This is challenging when the proper equipment is not available to measure the sound level. The new standards do not rely solely on decibels levels, sets time limits on certain activities that would disturb residents. Generally, Monday to Friday, most activity is prohibited between 7:00 pm and 7:00 am. On Saturdays, most outside activity, especially construction activity has been shifted back an hour to the new starting time of 8:00 am.

**Ms. Frescatore made a motion to approve Ordinance 740; Seconded by Mr. Munroe.** Mr. McKee asked if there was any discussion from the Board or Comment from the Public;

Mr. Munroe thanked the Board for indulging him on this ordinance change and for pushing the start time back on Saturdays. He also thanked the citizens for their involvement with the noise ordinance and the need for change. Mr. Munroe stated that while we can't improve the quality of life in one move, this is a good step forward.

Ms. Frescatore thanked Mr. Munroe for advocating for this change to the ordinance. Ms. Frescatore asked what residents should do if they hear loud cars or other noises at night. Mr. Savona instructed residents to call the Police Department and provide as much information to them as possible so they can investigate and address the problem.

**5-0 Motion Carried.**

### **B. Approval of Cooperation Agreement and Straw Party Agreement with the Bucks County Redevelopment Authority with regards to Shenandoah Woods**

Mr. Savona provided an overview of the two agreements. This is the culmination of a years long process to acquire the 55 acres for a reasonable cost. These agreements will allow the Township to acquire Shenandoah Woods from the Navy through the Bucks County Redevelopment Authority (RDA). The Navy has agreed to sell the property to the Township for \$1 million and the Township will permanently preserve the property as open space by deed restriction. The RDA will perform all the demolition and remediation of the property and then hand it over to the Township as open space. The RDA will also work with the Parks Department on what roads and features will remain and what new features need to be installed. The Township will cover all the expenses of the acquisition and clean up. Mr. Savona strongly recommends the Board to approve both documents this evening. The RDA is anticipated to approve both documents tomorrow. The agreements will then go to Congress for review and approval before the RDA officially can take title.

**Mr. McPhillips made a motion to approve the Cooperation and Straw Party Agreements with the Bucks County Redevelopment Authority; Seconded by Ms. Frescatore.** Mr. McKee asked if there was any discussion from the Board or Comment from the Public;

Mr. Munroe commented that this is not just a financial decision or real estate decision but an ethical decision to preserve the land as open space and not allow anyone to live on contaminated land had it been redeveloped as housing. The Township is absolutely making the right decision.

Mr. McKee stated that he and Mr. McPhillips got on the on the Board at roughly the same time and this issue was very much in flux and it is nice to finally get to this point. Development on the property was not something anyone wanted to see and the open space solution is the best path.

Ms. Frescatore commented that as a new member of the Board, open space has been a pet peeve and she is very happy to see the Township acquire the land for open space and at such a reasonable price. Thank you to Mr. Savona and Mr. Schuster for their negotiating skills and charm to get the price to the current level.

Mr. Croley commented on looking back to January 2013 when he was running for this position and he met with Mr. McPhillips and Mr. McKee to learn about the biggest issues facing the Township. They were storm water and Shenandoah Woods. It is definitely a win to be acquiring the land for \$1 million finally and it's a testament to everyone who has worked so hard over the years to get to this point.

Mr. Schuster reminded the Board that the \$1 million purchase price is not the only expense for the project. The Township will also be funding the remediation and demolition costs to getting the land to open space. The Township is working out the financing and applying for grants. The financing options will be presented to the Board at a later meeting.

**5-0 Motion Carried.**

**C. Consider approval of the PFM Agreements**

Mr. Schuster explained that tonight's agreements with PFM are a result of a process undertaken by the Pension Advisory Committee who through an RFP process vetted eleven candidates, interviewing six and ultimately decided that PFM was the best option to provide pension advisory and management services. The agreement has been reviewed and approved by Mr. Savona.

**Mr. McPhillips made a motion to approve the PFM Agreement; Mr. Munroe seconded the motion; Mr. McKee asking there was any discussion from the Board or comment from the public;**

Mr. Croley asked what the length of the agreement is. Mr. Schuster stated that there is no term and can be terminated with a 60 day notice.

Mr. Munroe commented that the search was a very thorough process and he was very happy with how the process went. Additionally, he is happy that there will be a representative from each of the three unions on the Pension Investment Advisory Committee moving forward.

**5-0 Motion Carried**

**D. Consider approval of Agreement with US Bank**

Mr. Schuster explained that under our previous agreement, the advisors and custodian of funds were the same entity. It is strongly advised to separate the two so there is no chance of impropriety. This agreement will make US Bank, who PFM has a working relationship with, serve as the custodian of the funds. The agreement has been reviewed by Mr. Savona.

**Mr. Croley made a motion to approve the agreement with US Bank. Mr. McPhillips seconded the motion; Mr. McKee asking there was any discussion from the Board or comment from the public;**

Ms. Frescatore asked if we are able to change who the custodian of funds is and Mr. Schuster responded that we are able to do so.

Mr. Croley asked what the vote in the committee was. Mr. Schuster explained that there were actually two votes. The first one was 5-0 but to hold in abeyance until the police union concern was resolved, after that is was a 4-1 vote. Mr. Croley stated that he puts a lot of faith in the committee and have knowledge about pensions.

**5-0 Motion Carried**

**E. Investment Policy Statement**

Mr. Schuster explained that it is important to have an Investment Policy Statement and PFM was kind enough to speak to the Pension Committee about this. This policy statement details what the rules are for investment of the funds. The rules include what your target allocation is, what funds can or cannot be invested in, and lays out the parameters for the investments. Input was provided from the Pension Advisory

Committee. The target allocation is 65 percent equity and 35 fixed income. This is a longer horizon investment in areas that will provide long term growth. Finally, the Township is going to a discretionary management style where the advisors are able to move funds around to different investments without waiting for the Township's approval. This will allow the Township to take advantage of positive movement in the market.

Mr. McKee commented that he and Mr. Munroe both agreed with this change in the committee. PFM was far and above everyone else and their resources are phenomenal.

Mr. McPhillips made a motion to approve the Pension Investment Policy Statement. Mr. Munroe seconded the motion; Mr. McKee asking there was any discussion from the Board or comment from the public; Hearing none.

5-0 Motion Carried

## PROFESSIONAL'S REPORTS

### A. Township Manager's Report

Mr. Schuster thanked Penn Community Bank for sponsoring several shows at the William Tennent High School Planetarium on stars and the eclipse. Additionally, he reminded everyone to wear the special glasses when viewing the solar eclipse. Additionally, Mr. Schuster announced that the Board's September 21 meeting was cancelled due to Rosh Hashanah but the September 7, 2017 will occur. Mr. Schuster updated the Board on the status of the Firefight Tax Relief program. Currently the final details on qualifiers are being worked out with the two companies and hopefully this will come before the Board soon. Finally, Mr. Schuster reminded everyone that there are open resident positions on the Golf Committee and the Municipal Complex Committee.

### B. Solicitor's Report

Mr. Savona discussed House Bill 1620 regarding wireless infrastructure that is currently being considered. Currently, the Township has codes and provisions outlining how a wireless communication facility can be installed. This bill would strip municipalities of the right to have any regulations and open the municipalities up to lawsuits if they try to enforce regulations. Additionally, the bill strips municipalities of the right to collect revenue off of the wire communications infrastructure. Mr. Savona asked that everyone contact their representative and tell them to oppose House Bill 1620. Mr. McKee would like the Board to pass a resolution opposing the bill.

### C. Engineer's Report

Ms. MacNair announced one update to the Engineer's Report, a submission for land development was received for the property at 1020 W. Bristol Road to demo the existing home and build a medical/office building. This project and the Victory Gardens project are both anticipated to present at the September 12, 2017 Planning Commission meeting. Mr. McKee asked about the status of Steak and Shake, Ms. MacNair responded that they are reviewing resubmission plans. Mr. Croley asked what the status of Lidl and Weis are and Ms. MacNair stated that they are coming but there is no timeline. Mr. Croley also asked about Rosemore Donuts. Mr. Savona responded yes.

## TOWNSHIP MANAGER ANNOUNCEMENT OF UPCOMING AGENDA ITEMS

Mr. Schuster announced that at the September 7 meeting it is anticipated to see an update to the housing ordinance, a representative from Brad Fox, and the HVAC bid. There will be no land development.

### PUBLIC COMMENT

Al Bradley, Warminster, commented that he faithfully watches the Township meetings and that everyone does a great job. Great job on the acquisition of the Navy property and investment pension plan tonight. Mr. Bradley commented that he is concerned about the closing of Warminster Ambulance Company and the Board's quick action allowed for instant coverage. Mr. Bradley is concerned that the ambulance may not be able to provide enough coverage to serve the community and Ann's Choice. Mr. Schuster responded that there should be no lack of coverage.

Jim Kibblesmith, Warminster, commented on the Sterling Act and asked if there is a coordinated effort between the municipalities. Mr. McPhillips responded that there is a coordinated effort. Mr. Kibblesmith also asked if the Board had advertised it to the public and Mr. McPhillips informed him that the Board passed a resolution in favor of the Sterling at a meeting earlier this year.

### SUPERVISORS COMMENT

Ms. Frescatore thanked everyone for their comments and for coming tonight. Ms. Frescatore also commented on the flooding issues on Centennial Road and the surrounding area and she voted against Tall Oaks because she doubted that the basin would solve the flooding issue. Ms. Frescatore also thanked Mr. Schuster for steering the Township in the right direction and thanked Gilmore for all their hard work. Ms. Frescatore also thanked Mr. Savona for all his work on the acquisition of Shenandoah Woods.

Mr. Munroe commented that the Board should make having a meeting at Ann's Choice an annual event.

Mr. McPhillips commented that this was a great meeting at a great location and thank you to everyone for attending.

Mr. Croley thanked everyone for welcoming the Board tonight and he is looking forward to coming back again. It is fantastic to have over forty people attend a meeting and stay for the entire meeting. Mr. Croley wished his son Jacob a happy birthday and his wife Ann a Happy Anniversary.

Mr. McKee thanked Ann's Choice for having the Board tonight and commented on how easy to work with Chris and the Board has been. Mr. McKee thanked Ms. Zimmerman and Mr. Der Hagopian for their work on setting up this meeting.

### ADJOURNMENT

Mr. McPhillips made a motion to adjourn at 8:46 pm.

Respectfully Submitted,



Dan McPhillips,  
Secretary

### Appendix B-3: Record of Consideration

No written comments were received by the Township during the 30 day public comment period.

The following comments were received at the Board of Supervisor's public meeting held on August 17, 2017. The questions and responses below are reworded for clarity but are substantively similar to those provided during the meeting.

1. Is this [MS4 Pollutant Reduction Plan] an unfunded mandate by the federal government that the municipality is going to have to absorb [the cost of] and we [, the Township,] have to complete within the next 5 years?

Yes

2. How many basins are you building?

3 basins

3. How big are these basins - 1 acre, 2 acre, or more?

The size of the basins is not known at this time since they have not been designed yet.

4. Why did you decide on basins instead of a vegetative infiltration system?

We proposed basins because they could capture drainage from larger drainage areas and therefore have a greater load reduction. For this reason we proposed several basins rather a multitude of smaller BMPs.

5. Would you consider putting native plantings in the basins?

Yes, if we can support landscaping in the basins, native plantings would be incorporated into the designs.

6. In the Szymanek Park specifically, am I to understand that at this time you do not know exactly where you would put the basin?

Yes, though we have looked at putting it by stream, behind football field. This location would need to be confirmed during the design process.

7. How long would the design process be?

The design and construction of the BMPs must be completed within the 5 year permit term.

8. So you don't have a timeline at this point?

We do not have an exact timeline at this point.

9. As the design process takes place, will you come back and review [the designs] publically for public input?

Yes, we can do that.

10. Would you consider that there is a community garden back there [in Szymanek Park] and maybe not disrupt it?

Yes, we can definitely take that into consideration.

11. In the Pennypack Watershed, I saw that there were actually no numbers. Is that because someone else is responsible for that information?

No one else is responsible for that information. There are calculations related to the Pennypack Creek Watershed in Sections D, F, and G related to the PRP requirements, but there are not Pennypack Creek Watershed related calculations in Section E because there is no TMDL Plan/WLA for the Pennypack Creek.

12. How was it determined that there were phosphorous and sediment loads if there are no numbers to back that up?

Impairments were determined by the USEPA and PADEP. The PADEP provided the "MS4 Requirement Table (Municipal) Anticipated Obligations for Subsequent NPDES Perm Term," included in the plan as Appendix A-1, to all municipalities in Pennsylvania. The identified impairments in the plan are based on that Table, which indicates the impairments, requirements, and other causes of impairments.

13. So they did not provide a TMDL requirement for the Pennypack Creek?

Correct, there is no TMDL Plan, and therefore no TMDL requirements, for the Pennypack Creek. Since the only impairment identified in the Table for the Pennypack Creek was siltation, the Pennypack Creek load calculations and reductions were only calculated in accordance with Pollution Reduction Plan requirements.

14. Is this [MS4 Pollutant Reduction Plan] something that could be posted on the website for the public to see as we go along?

The current Plan was posted on the website on July 25, 2017. The Township can post updates during design and implementation to solicit feedback and public comment.

15. We [, the Board of Supervisors,] have to budget for this moving forward because the Township has to absorb these costs?

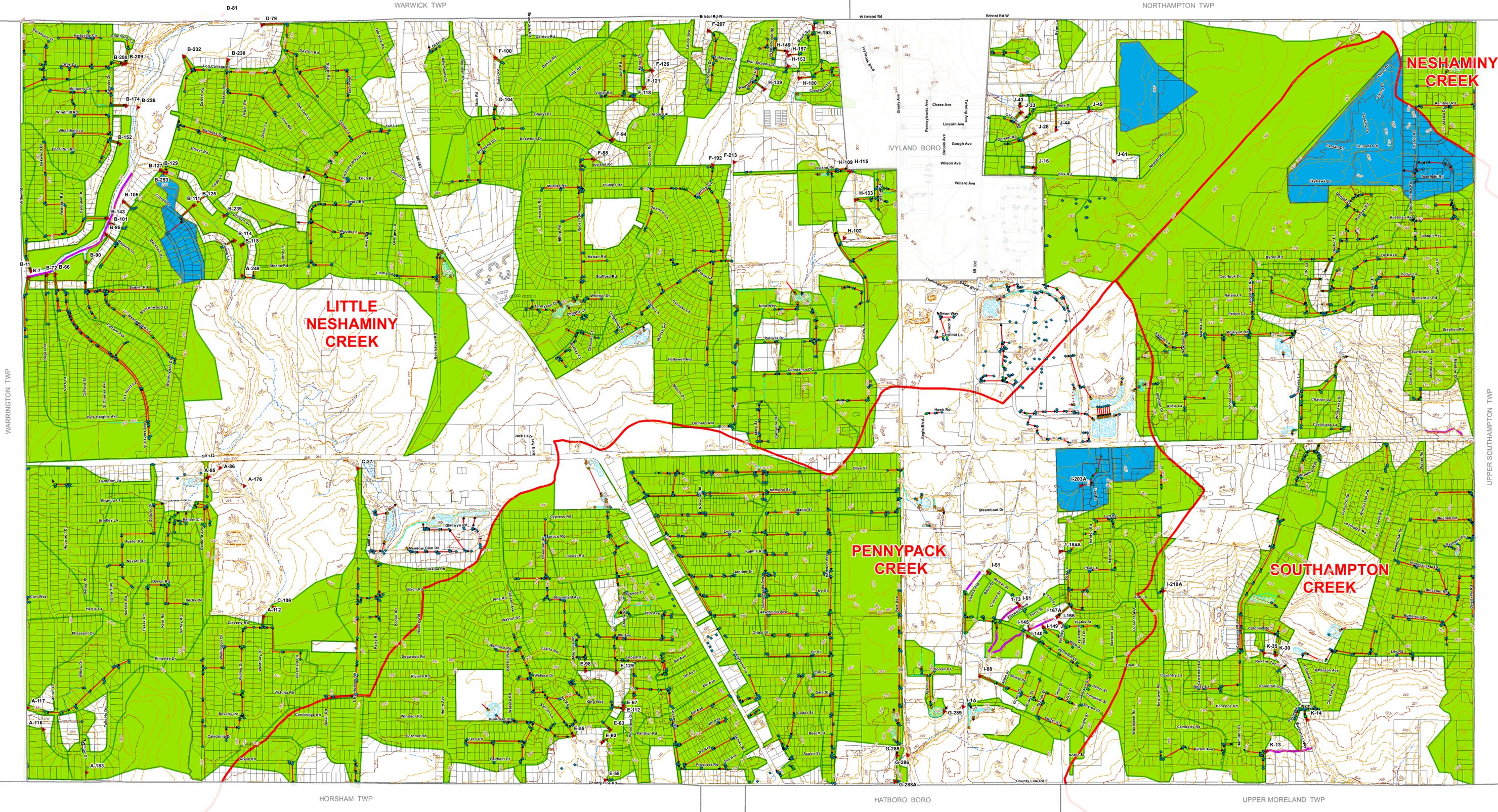
Correct.

No changes were made to the plan to in response to the comments, except the prior Appendix B-2 was removed since the Township did not receive any written comments.

## Appendix C

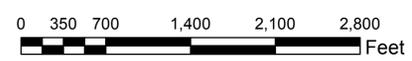
### Maps

- Appendix C-1: Warminster Township MS4 Planning Area Map
- Appendix C-2: Warminster Township MS4 Land Cover Map



**Legend**

- Municipal Boundary
- Existing Basin
- Watershed Boundary
- Endwall
- Proposed BMP Drainage
- Storm Manhole
- Planning Areas/ Drainage Areas
- ▲ MS4 Outfall
- Parsed Areas
- Inlet
- Swale
- Storm Pipe
- unknown-pipe
- INDEX
- INTER



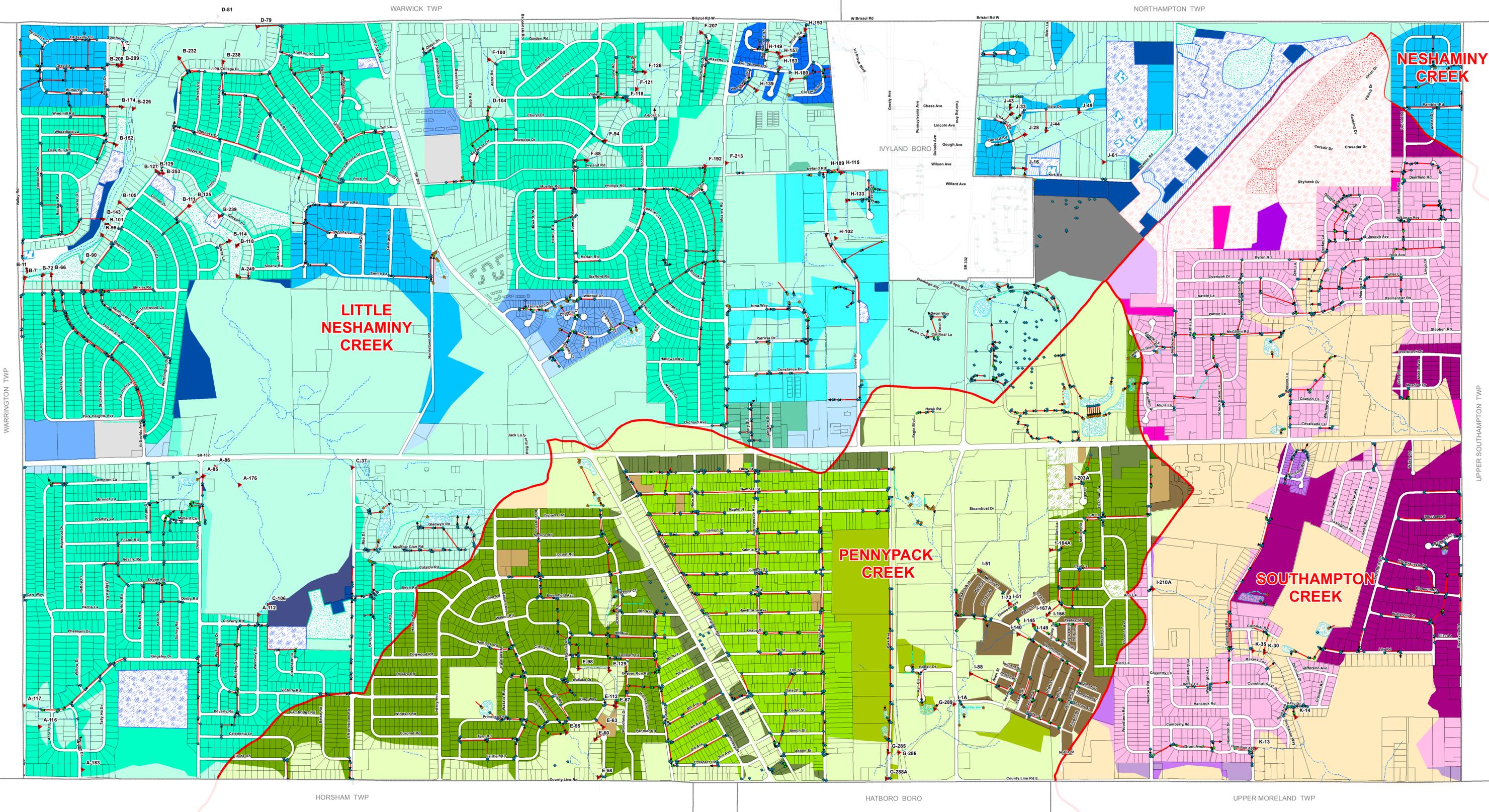
**Warminster Township  
MS4 Planning Map**

WARMINSTER TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

**GILMORE & ASSOCIATES, INC.**  
ENGINEERING & CONSULTING SERVICES

65 E BUTLER AVENUE, SUITE 100  
NEW BRITAIN, PA 18901

|                  |                 |                  |
|------------------|-----------------|------------------|
| JOB NO: 12-08078 | DATE: JULY 2017 | SCALE: 1" = 700' |
|------------------|-----------------|------------------|



**Legend**

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |



**Warminster Township**  
**MS4 Land Cover Map**  
 WARMINSTER TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

**GILMORE & ASSOCIATES, INC.**  
 ENGINEERING & CONSULTING SERVICES  
 65 E BUTLER AVENUE, SUITE 100  
 NEW BRITAIN, PA 18901

|                  |                 |                  |
|------------------|-----------------|------------------|
| JOB NO: 12-08078 | DATE: JULY 2017 | SCALE: 1" = 700' |
|------------------|-----------------|------------------|

## Appendix D

### Determine Existing Loads for Pollutants of Concern

|               |                                                          |
|---------------|----------------------------------------------------------|
| Appendix D-1: | EMC Table                                                |
| Appendix D-2: | Pollutant Loads from Public Streets & Rights-of-Way      |
| Appendix D-3: | Existing Pollutant Loads                                 |
| Appendix D-4: | Existing Loads Summary & Required Reduction Calculations |

## Appendix D-1: EMC Table

|                     | Land Cover Classification               | TSS (mg/l) | TP (mg/l) | Average Annual Runoff (in/year) |
|---------------------|-----------------------------------------|------------|-----------|---------------------------------|
| Pervious Surfaces   | Forest                                  | 39         | 0.15      | 4.63                            |
|                     | Meadow                                  | 47         | 0.19      | 4.10                            |
|                     | Fertilized Planting Area                | 55         | 1.34      | 5.53                            |
|                     | Native Planting Area                    | 55         | 0.40      | 3.62                            |
|                     | Lawn, Low-Input                         | 180        | 0.40      | 6.59                            |
|                     | Lawn, High-Input                        | 180        | 2.22      | 5.53                            |
|                     | Golf Course Fairway/Green               | 305        | 1.07      | 6.59                            |
|                     | Grassed Athletic Field                  | 200        | 1.07      | 7.39                            |
| Impervious Surfaces | Rooftop                                 | 21         | 0.13      | 43.51                           |
|                     | High Traffic Street/Highway             | 261        | 0.40      | 39.80                           |
|                     | Medium Traffic Street                   | 113        | 0.33      | 23.96                           |
|                     | Low Traffic/Residential Street          | 86         | 0.36      | 22.47                           |
|                     | Residential Driveway, Play Courts, etc. | 60         | 0.46      | 43.51                           |
|                     | High Traffic Parking Lot                | 120        | 0.39      | 43.51                           |
|                     | Low Traffic Parking Lot                 | 58         | 0.15      | 43.51                           |

For the purposes of this PRP, the Average Annual Runoff depth was calculated using 4 years (2011 – 2014) of daily rain gauge data from the Ambler Borough Waste Water Treatment Plant (WWTP) and the SCS Runoff Curve Number Method (NRCS, TR-55) accounting for the initial abstraction and land cover classification. Since the Ambler Borough WWTP is within 8.8 miles of Warminster Township, the rainfall data is considered representative of average rainfall in the Township.

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Neshaminy Creek Watershed**

| Street Name      | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Acorn Dr         | Low Int Dev    | YES      | YES  | 4,541       | 18         | 60       | 124,100                            | 148,348                         | 2,147                    |                                 | 7.2                |
| Ajas Way         | Low Int Dev    | YES      | YES  | 581         | 30         | 50       | 22,843                             | 6,197                           | 266                      |                                 | 1.0                |
| Anthony Wayne Dr | Low Int Dev    | YES      | YES  | 1,584       | 18         | 50       | 43,291                             | 35,909                          | 652                      |                                 | 2.3                |
| Arbor La         | Low Int Dev    | YES      | YES  | 1,003       | 25         | 50       | 34,440                             | 15,720                          | 440                      |                                 | 1.7                |
| Aster Rd         | Low Int Dev    | YES      | YES  | 1,162       | 26         | 50       | 41,039                             | 17,041                          | 514                      |                                 | 1.9                |
| Azalea Dr        | Low Int Dev    | NO       | NO   | 634         | 18         | 50       | 11,405                             | 20,275                          | 238                      |                                 | 0.8                |
| Barness Dr       | Low Int Dev    | YES      | YES  | 2,323       | 28         | 50       | 86,725                             | 29,435                          | 1,046                    |                                 | 4.0                |
| Belair Rd        | Low Int Dev    | YES      | YES  | 1,690       | 24         | 50       | 56,314                             | 28,166                          | 735                      |                                 | 2.7                |
| Bellemead Drive  | Low Int Dev    | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 413                      |                                 | 1.5                |
| Benn La          | Low Int Dev    | NO       | NO   | 792         | 18         | 50       | 14,256                             | 25,344                          | 298                      |                                 | 0.9                |
| Beverly Rd       | Low Int Dev    | YES      | YES  | 1,267       | 24         | 50       | 42,236                             | 21,124                          | 551                      |                                 | 2.1                |
| Birch Rd         | Low Int Dev    | YES      | YES  | 1,320       | 32         | 50       | 54,556                             | 11,444                          | 615                      |                                 | 2.4                |
| Boxwood Cir      | Low Int Dev    | YES      | YES  | 528         | 22         | 50       | 16,542                             | 9,858                           | 225                      |                                 | 0.8                |
| Boxwood Dr       | Low Int Dev    | YES      | YES  | 211         | 28         | 50       | 7,884                              | 2,676                           | 95                       |                                 | 0.4                |
| Bradley La       | Low Int Dev    | YES      | YES  | 1,373       | 22         | 50       | 43,010                             | 25,630                          | 586                      |                                 | 2.1                |
| Brennan Dr       | Low Int Dev    | YES      | YES  | 2,957       | 32         | 50       | 122,205                            | 25,635                          | 1,377                    |                                 | 5.5                |
| Brookdale Rd     | Low Int Dev    | YES      | YES  | 898         | 22         | 50       | 28,122                             | 16,758                          | 383                      |                                 | 1.4                |
| Brook Ln         | Low Int Dev    | YES      | YES  | 1,584       | 24         | 50       | 52,795                             | 26,405                          | 689                      |                                 | 2.6                |
| Buttonwood Ln    | Low Int Dev    | NO       | YES  | 845         | 22         | 50       | 19,709                             | 22,531                          | 335                      |                                 | 1.1                |
| Caldonia Dr      | Low Int Dev    | NO       | NO   | 528         | 18         | 50       | 9,504                              | 16,896                          | 198                      |                                 | 0.6                |
| Cambridge Rd     | Low Int Dev    | YES      | YES  | 1,003       | 22         | 50       | 31,430                             | 18,730                          | 428                      |                                 | 1.6                |
| Canterberry Cir  | Low Int Dev    | YES      | YES  | 317         | 24         | 50       | 10,559                             | 5,281                           | 138                      |                                 | 0.5                |
| Carr Way         | Low Int Dev    | YES      | YES  | 264         | 24         | 60       | 8,799                              | 7,041                           | 131                      |                                 | 0.5                |
| Carroll Ci       | Low Int Dev    | YES      | YES  | 211         | 24         | 50       | 7,039                              | 3,521                           | 92                       |                                 | 0.3                |
| Carousel Dr      | Low Int Dev    | YES      | YES  | 2,270       | 25         | 50       | 77,943                             | 35,577                          | 996                      |                                 | 3.7                |
| Catalpa Rd       | Low Int Dev    | YES      | YES  | 1,637       | 22         | 50       | 51,281                             | 30,559                          | 699                      |                                 | 2.6                |
| Cathe La         | Low Int Dev    | YES      | YES  | 2,534       | 24         | 50       | 84,472                             | 42,248                          | 1,102                    |                                 | 4.1                |
| Chater Rd        | Low Int Dev    | YES      | YES  | 1,320       | 24         | 50       | 43,996                             | 22,004                          | 574                      |                                 | 2.1                |
| Cheryl La        | Low Int Dev    | YES      | YES  | 2,746       | 28         | 50       | 102,493                            | 34,787                          | 1,236                    |                                 | 4.8                |
| Clearfield Cir   | Low Int Dev    | YES      | YES  | 317         | 24         | 50       | 10,559                             | 5,281                           | 138                      |                                 | 0.5                |
| Clifford St      | Low Int Dev    | NO       | NO   | 1,373       | 24         | 50       | 32,947                             | 35,693                          | 547                      |                                 | 1.9                |
| Cloverly Rd      | Low Int Dev    | YES      | YES  | 1,109       | 28         | 50       | 41,392                             | 14,048                          | 499                      |                                 | 1.9                |
| Clyde Rd         | Low Int Dev    | NO       | NO   | 528         | 15         | 50       | 7,920                              | 18,480                          | 192                      |                                 | 0.6                |
| Cooper Dr        | Low Int Dev    | YES      | YES  | 1,584       | 22         | 60       | 49,627                             | 45,413                          | 774                      |                                 | 2.7                |
| Cornell Dr       | Low Int Dev    | YES      | YES  | 1,795       | 24         | 50       | 59,834                             | 29,926                          | 781                      |                                 | 2.9                |
| Dager Rd         | Low Int Dev    | YES      | YES  | 792         | 24         | 50       | 26,397                             | 13,203                          | 344                      |                                 | 1.3                |
| Dahlia Rd        | Low Int Dev    | YES      | YES  | 2,218       | 22         | 50       | 69,477                             | 41,403                          | 947                      |                                 | 3.5                |
| Darrah Rd        | Low Int Dev    | YES      | YES  | 1,003       | 24         | 50       | 33,437                             | 16,723                          | 436                      |                                 | 1.6                |
| Davisville Rd    | Low Int Dev    | NO       | YES  | 1,795       | 24         | 80       | 45,472                             | 98,144                          | 1,055                    |                                 | 3.2                |
| Dayton Dr        | Low Int Dev    | YES      | YES  | 845         | 22         | 50       | 26,468                             | 15,772                          | 361                      |                                 | 1.3                |
| Deer Run Rd      | Low Int Dev    | YES      | YES  | 898         | 24         | 50       | 29,917                             | 14,963                          | 390                      |                                 | 1.5                |
| Delmont Ave      | Low Int Dev    | YES      | YES  | 5,174       | 40         | 60       | 255,253                            | 55,211                          | 2,886                    |                                 | 11.4               |
| Derby Rd         | Low Int Dev    | YES      | YES  | 317         | 24         | 50       | 10,559                             | 5,281                           | 138                      |                                 | 0.5                |
| Devon Rd         | Low Int Dev    | YES      | YES  | 1,795       | 25         | 50       | 61,629                             | 28,131                          | 787                      |                                 | 3.0                |
| Dixon Rd         | Low Int Dev    | YES      | YES  | 634         | 24         | 50       | 21,118                             | 10,562                          | 275                      |                                 | 1.0                |
| Dogwood Rd       | Low Int Dev    | YES      | YES  | 528         | 24         | 50       | 17,598                             | 8,802                           | 230                      |                                 | 0.9                |
| Dorsett Cir      | Low Int Dev    | YES      | YES  | 422         | 24         | 50       | 14,079                             | 7,041                           | 184                      |                                 | 0.7                |
| Duffy La         | Low Int Dev    | YES      | YES  | 158         | 20         | 50       | 4,646                              | 3,274                           | 66                       |                                 | 0.2                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Neshaminy Creek Watershed**

| Street Name    | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|----------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Emma Ln        | Low Int Dev    | YES      | YES  | 2,112       | 24         | 50       | 70,393                             | 35,207                          | 918                      |                                 | 3.4                |
| Essex Rd       | Low Int Dev    | YES      | YES  | 1,162       | 20         | 50       | 34,070                             | 24,010                          | 487                      |                                 | 1.8                |
| Fisher Ln      | Low Int Dev    | YES      | YES  | 2,112       | 24         | 50       | 70,393                             | 35,207                          | 918                      |                                 | 3.4                |
| Fitch Pl       | Low Int Dev    | YES      | YES  | 1,320       | 24         | 50       | 43,996                             | 22,004                          | 574                      |                                 | 2.1                |
| Foster Rd      | Low Int Dev    | YES      | YES  | 2,165       | 22         | 50       | 67,823                             | 40,417                          | 925                      |                                 | 3.4                |
| Fox Hunt La    | Low Int Dev    | NO       | YES  | 634         | 22         | 50       | 14,782                             | 16,898                          | 251                      |                                 | 0.8                |
| Garden Rd      | Low Int Dev    | YES      | YES  | 739         | 22         | 50       | 23,159                             | 13,801                          | 316                      |                                 | 1.2                |
| Georges Ln     | Low Int Dev    | NO       | NO   | 1,109       | 16         | 50       | 17,741                             | 37,699                          | 408                      |                                 | 1.3                |
| Gladwyn Rd     | Low Int Dev    | YES      | YES  | 2,006       | 24         | 50       | 66,873                             | 33,447                          | 872                      |                                 | 3.2                |
| Glazar Rd      | Low Int Dev    | YES      | YES  | 1,003       | 22         | 50       | 31,430                             | 18,730                          | 428                      |                                 | 1.6                |
| Gorson Dr      | Low Int Dev    | YES      | YES  | 845         | 24         | 50       | 28,157                             | 14,083                          | 367                      |                                 | 1.4                |
| Grey La        | Low Int Dev    | YES      | YES  | 1,426       | 24         | 50       | 47,515                             | 23,765                          | 620                      |                                 | 2.3                |
| Hallowell Ave  | Low Int Dev    | NO       | YES  | 792         | 22         | 50       | 18,477                             | 21,123                          | 314                      |                                 | 1.1                |
| Hampton La     | Low Int Dev    | NO       | YES  | 1,373       | 22         | 50       | 32,027                             | 36,613                          | 544                      |                                 | 1.8                |
| Harris La      | Low Int Dev    | YES      | YES  | 1,109       | 24         | 50       | 36,956                             | 18,484                          | 482                      |                                 | 1.8                |
| Harting Cir    | Low Int Dev    | YES      | YES  | 317         | 28         | 50       | 11,826                             | 4,014                           | 143                      |                                 | 0.5                |
| Hartsville Cir | Low Int Dev    | YES      | YES  | 1,478       | 24         | 50       | 49,275                             | 24,645                          | 643                      |                                 | 2.4                |
| Hickory Rd     | Low Int Dev    | YES      | YES  | 1,109       | 22         | 50       | 34,739                             | 20,701                          | 474                      |                                 | 1.7                |
| Hilltop Rd     | Low Int Dev    | YES      | YES  | 1,373       | 22         | 50       | 43,010                             | 25,630                          | 586                      |                                 | 2.1                |
| Hopwood Dr     | Low Int Dev    | YES      | YES  | 2,376       | 24         | 50       | 79,192                             | 39,608                          | 1,033                    |                                 | 3.8                |
| Howard Rd      | Low Int Dev    | YES      | YES  | 1,267       | 18         | 50       | 34,633                             | 28,727                          | 522                      |                                 | 1.8                |
| Irma Rd        | Low Int Dev    | YES      | YES  | 1,848       | 24         | 50       | 61,594                             | 30,806                          | 804                      |                                 | 3.0                |
| Ivers La       | Low Int Dev    | NO       | YES  | 1,531       | 24         | 50       | 38,785                             | 37,775                          | 619                      |                                 | 2.1                |
| Ivylnd Rd      | Low Int Dev    | YES      | YES  | 9,293       | 30         | 80       | 365,486                            | 377,938                         | 5,963                    |                                 | 20.4               |
| June Rd        | Low Int Dev    | YES      | YES  | 1,214       | 24         | 50       | 40,476                             | 20,244                          | 528                      |                                 | 2.0                |
| Kemper Dr      | Low Int Dev    | YES      | YES  | 2,376       | 24         | 50       | 79,192                             | 39,608                          | 1,033                    |                                 | 3.8                |
| Kent Rd        | Low Int Dev    | YES      | YES  | 1,162       | 24         | 50       | 38,716                             | 19,364                          | 505                      |                                 | 1.9                |
| Kingsley Dr    | Low Int Dev    | NO       | NO   | 3,115       | 22         | 50       | 68,534                             | 87,226                          | 1,218                    |                                 | 4.1                |
| Kipling Dr     | Low Int Dev    | YES      | YES  | 1,426       | 26         | 50       | 50,366                             | 20,914                          | 631                      |                                 | 2.4                |
| Kirk Rd        | Low Int Dev    | NO       | NO   | 5,174       | 16         | 50       | 82,790                             | 175,930                         | 1,904                    |                                 | 5.9                |
| Laurel Av      | Low Int Dev    | NO       | NO   | 1,426       | 16         | 50       | 22,810                             | 48,470                          | 525                      |                                 | 1.6                |
| Lavera Rd      | Low Int Dev    | YES      | YES  | 1,954       | 32         | 50       | 80,742                             | 16,938                          | 910                      |                                 | 3.6                |
| Little La      | Low Int Dev    | YES      | YES  | 1,003       | 24         | 50       | 33,437                             | 16,723                          | 436                      |                                 | 1.6                |
| Log College Dr | Low Int Dev    | YES      | YES  | 5,914       | 36         | 60       | 268,063                            | 86,753                          | 3,207                    |                                 | 12.4               |
| Lynda La       | Low Int Dev    | YES      | YES  | 1,742       | 24         | 60       | 58,074                             | 46,470                          | 864                      |                                 | 3.1                |
| Mae Dr         | Low Int Dev    | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 413                      |                                 | 1.5                |
| Maguire La     | Low Int Dev    | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 459                      |                                 | 1.7                |
| Mallard Ci     | Low Int Dev    | YES      | YES  | 634         | 38         | 50       | 29,988                             | 1,692                           | 310                      |                                 | 1.3                |
| Manor Dr       | Low Int Dev    | YES      | YES  | 1,214       | 24         | 50       | 40,476                             | 20,244                          | 528                      |                                 | 2.0                |
| Marian Rd      | Low Int Dev    | YES      | YES  | 1,795       | 34         | 50       | 77,786                             | 11,974                          | 850                      |                                 | 3.4                |
| Marshall Dr    | Low Int Dev    | YES      | YES  | 1,320       | 24         | 50       | 43,996                             | 22,004                          | 574                      |                                 | 2.1                |
| Mason Dr       | Low Int Dev    | NO       | NO   | 1,109       | 15         | 50       | 16,632                             | 38,808                          | 404                      |                                 | 1.2                |
| Meadow Glen Dr | Low Int Dev    | YES      | YES  | 2,059       | 24         | 50       | 68,633                             | 34,327                          | 895                      |                                 | 3.3                |
| Meadowood Ln   | Low Int Dev    | NO       | YES  | 1,690       | 25         | 50       | 44,487                             | 39,993                          | 689                      |                                 | 2.4                |
| Miranda La     | Low Int Dev    | YES      | YES  | 1,373       | 22         | 50       | 43,010                             | 25,630                          | 586                      |                                 | 2.1                |
| Mueller Rd     | Low Int Dev    | YES      | YES  | 3,379       | 30         | 60       | 132,904                            | 69,848                          | 1,754                    |                                 | 6.5                |
| Mulberry Ci    | Low Int Dev    | YES      | YES  | 1,426       | 25         | 50       | 48,941                             | 22,339                          | 625                      |                                 | 2.3                |
| Murray Cir     | Low Int Dev    | YES      | YES  | 211         | 24         | 50       | 7,039                              | 3,521                           | 92                       |                                 | 0.3                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Neshaminy Creek Watershed**

| Street Name      | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Nassau Rd        | Low Int Dev    | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 459                      |                                 | 1.7                |
| Nevarc Rd        | Low Int Dev    | YES      | YES  | 2,165       | 24         | 50       | 72,153                             | 36,087                          | 941                      |                                 | 3.5                |
| Norfolk Rd       | Low Int Dev    | YES      | YES  | 1,003       | 24         | 50       | 33,437                             | 16,723                          | 436                      |                                 | 1.6                |
| Norristown Rd    | Low Int Dev    | YES      | YES  | 3,854       | 28         | 80       | 143,885                            | 164,467                         | 2,444                    |                                 | 8.3                |
| Northfield Cir   | Low Int Dev    | YES      | YES  | 422         | 24         | 50       | 14,079                             | 7,041                           | 184                      |                                 | 0.7                |
| Oak Leaf La      | Low Int Dev    | YES      | YES  | 1,690       | 24         | 50       | 56,314                             | 28,166                          | 735                      |                                 | 2.7                |
| Oakwood Dr       | Low Int Dev    | YES      | YES  | 2,006       | 24         | 50       | 66,873                             | 33,447                          | 872                      |                                 | 3.2                |
| Old York Rd      | Low Int Dev    | YES      | YES  | 1,162       | 18         | 50       | 31,747                             | 26,333                          | 478                      |                                 | 1.7                |
| Olden Dr         | Low Int Dev    | YES      | YES  | 317         | 24         | 50       | 10,559                             | 5,281                           | 138                      |                                 | 0.5                |
| Orchard Ave      | Low Int Dev    | NO       | NO   | 950         | 18         | 50       | 17,107                             | 30,413                          | 357                      |                                 | 1.1                |
| Orchid Rd        | Low Int Dev    | YES      | YES  | 2,165       | 16         | 50       | 54,834                             | 53,406                          | 874                      |                                 | 3.0                |
| Park Heights Ave | Low Int Dev    | YES      | YES  | 1,531       | 28         | 50       | 57,160                             | 19,400                          | 689                      |                                 | 2.7                |
| Parry Rd         | Low Int Dev    | YES      | YES  | 2,218       | 24         | 50       | 73,913                             | 36,967                          | 964                      |                                 | 3.6                |
| Pelham Ave       | Low Int Dev    | NO       | YES  | 2,323       | 24         | 50       | 58,847                             | 57,313                          | 938                      |                                 | 3.2                |
| Penrose La       | Low Int Dev    | YES      | YES  | 2,006       | 24         | 60       | 66,873                             | 53,511                          | 995                      |                                 | 3.5                |
| Pheasant Dr      | Low Int Dev    | NO       | NO   | 739         | 14         | 50       | 10,349                             | 26,611                          | 266                      |                                 | 0.8                |
| Phillips Rd      | Low Int Dev    | YES      | YES  | 4,013       | 28         | 60       | 149,798                            | 90,970                          | 2,052                    |                                 | 7.5                |
| Poplar Rd        | Low Int Dev    | YES      | YES  | 1,109       | 24         | 50       | 36,956                             | 18,484                          | 482                      |                                 | 1.8                |
| Rambler Rd       | Low Int Dev    | NO       | NO   | 845         | 20         | 50       | 16,896                             | 25,344                          | 324                      |                                 | 1.1                |
| Red Barn Rd      | Low Int Dev    | YES      | YES  | 1,003       | 24         | 50       | 33,437                             | 16,723                          | 436                      |                                 | 1.6                |
| Redwood Rd       | Low Int Dev    | YES      | YES  | 317         | 24         | 50       | 10,559                             | 5,281                           | 138                      |                                 | 0.5                |
| Rettop Pl        | Low Int Dev    | YES      | YES  | 792         | 18         | 50       | 21,645                             | 17,955                          | 326                      |                                 | 1.1                |
| Ridge La         | Low Int Dev    | YES      | YES  | 898         | 24         | 50       | 29,917                             | 14,963                          | 390                      |                                 | 1.5                |
| Riviera Rd       | Low Int Dev    | YES      | YES  | 528         | 24         | 50       | 17,598                             | 8,802                           | 230                      |                                 | 0.9                |
| Roberts Rd       | Low Int Dev    | YES      | YES  | 3,854       | 30         | 60       | 151,594                            | 79,670                          | 2,001                    |                                 | 7.4                |
| Rogers Rd        | Low Int Dev    | NO       | YES  | 2,006       | 28         | 50       | 58,848                             | 41,472                          | 841                      |                                 | 3.0                |
| St Charles Ave   | Low Int Dev    | NO       | YES  | 1,320       | 24         | 50       | 33,436                             | 32,564                          | 533                      |                                 | 1.8                |
| Sandy La         | Low Int Dev    | YES      | YES  | 1,109       | 24         | 50       | 36,956                             | 18,484                          | 482                      |                                 | 1.8                |
| Sinkler Rd       | Low Int Dev    | YES      | YES  | 2,693       | 28         | 60       | 100,522                            | 61,046                          | 1,377                    |                                 | 5.0                |
| Slight Rd        | Low Int Dev    | YES      | YES  | 634         | 24         | 50       | 21,118                             | 10,562                          | 275                      |                                 | 1.0                |
| Sloane Rd        | Low Int Dev    | YES      | YES  | 1,003       | 24         | 50       | 33,437                             | 16,723                          | 436                      |                                 | 1.6                |
| Southern Ct      | Low Int Dev    | YES      | YES  | 370         | 38         | 50       | 17,493                             | 987                             | 181                      |                                 | 0.7                |
| Sparks Ave       | Low Int Dev    | NO       | NO   | 158         | 24         | 50       | 3,802                              | 4,118                           | 63                       |                                 | 0.2                |
| Spencer La       | Low Int Dev    | YES      | YES  | 1,901       | 24         | 50       | 63,354                             | 31,686                          | 826                      |                                 | 3.1                |
| Spieß La         | Low Int Dev    | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 459                      |                                 | 1.7                |
| St Davids Ave    | Low Int Dev    | NO       | NO   | 2,587       | 24         | 60       | 62,093                             | 93,139                          | 1,190                    |                                 | 3.9                |
| Strafford Rd     | Low Int Dev    | YES      | YES  | 1,109       | 28         | 50       | 41,392                             | 14,048                          | 499                      |                                 | 1.9                |
| Surrey Rd        | Low Int Dev    | YES      | YES  | 1,109       | 24         | 50       | 36,956                             | 18,484                          | 482                      |                                 | 1.8                |
| Sycamore Ct      | Low Int Dev    | YES      | YES  | 317         | 38         | 50       | 14,994                             | 846                             | 155                      |                                 | 0.6                |
| Tally Ho Dr      | Low Int Dev    | NO       | NO   | 792         | 24         | 50       | 19,008                             | 20,592                          | 316                      |                                 | 1.1                |
| Toll House La    | Low Int Dev    | YES      | YES  | 2,112       | 34         | 50       | 91,513                             | 14,087                          | 1,000                    |                                 | 4.0                |
| Tulip Rd         | Low Int Dev    | YES      | YES  | 1,901       | 32         | 50       | 78,560                             | 16,480                          | 885                      |                                 | 3.5                |
| Valley Rd        | Low Int Dev    | YES      | YES  | 21,806      | 32         | 80       | 901,259                            | 843,253                         | 14,161                   |                                 | 49.1               |
| Victoria Rd      | Low Int Dev    | YES      | YES  | 2,376       | 24         | 60       | 79,192                             | 63,368                          | 1,179                    |                                 | 4.2                |
| Violet Rd        | Low Int Dev    | YES      | YES  | 1,531       | 24         | 50       | 51,035                             | 25,525                          | 666                      |                                 | 2.5                |
| Vista Dr         | Low Int Dev    | YES      | YES  | 1,320       | 24         | 50       | 43,996                             | 22,004                          | 574                      |                                 | 2.1                |
| Weber Rd         | Low Int Dev    | YES      | YES  | 950         | 26         | 50       | 33,578                             | 13,942                          | 421                      |                                 | 1.6                |
| Wellington Dr    | Low Int Dev    | YES      | YES  | 1,531       | 28         | 50       | 57,160                             | 19,400                          | 689                      |                                 | 2.7                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Neshaminy Creek Watershed**

| Street Name                       | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-----------------------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Westbury Dr                       | Low Int Dev    | YES      | YES  | 1,478       | 24         | 50       | 49,275                             | 24,645                          | 643                      |                                 | 2.4                |
| Wheatfield Ln                     | Low Int Dev    | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 459                      |                                 | 1.7                |
| Whittier Dr                       | Low Int Dev    | YES      | YES  | 1,901       | 24         | 50       | 63,354                             | 31,686                          | 826                      |                                 | 3.1                |
| Willow Dr                         | Low Int Dev    | NO       | NO   | 2,112       | 20         | 50       | 42,240                             | 63,360                          | 810                      |                                 | 2.6                |
| Windmill Rd                       | Low Int Dev    | YES      | YES  | 1,478       | 24         | 50       | 49,275                             | 24,645                          | 643                      |                                 | 2.4                |
| Woodbrook La                      | Low Int Dev    | YES      | YES  | 581         | 24         | 50       | 19,358                             | 9,682                           | 253                      |                                 | 0.9                |
| Woods La                          | Low Int Dev    | YES      | YES  | 634         | 60         | 70       | 43,927                             | 425                             | 441                      |                                 | 1.8                |
| Worthington Dr                    | Low Int Dev    | YES      | YES  | 4,171       | 26         | 60       | 147,368                            | 102,904                         | 2,101                    |                                 | 7.6                |
| <b>LOW INT DEV ROW TOTALS</b>     |                |          |      |             |            |          | <b>8,501,907</b>                   | <b>5,638,461</b>                | <b>119,395</b>           | <b>367.80</b>                   | <b>431.3</b>       |
| Boyd Rd                           | High Int Dev   | YES      | YES  | 739         | 24         | 50       | 24,638                             | 12,322                          | 1,386                    |                                 | 2.8                |
| Catherine St                      | High Int Dev   | NO       | NO   | 739         | 15         | 50       | 11,088                             | 25,872                          | 728                      |                                 | 2.6                |
| Christie Ct                       | High Int Dev   | YES      | YES  | 158         | 24         | 50       | 5,279                              | 2,641                           | 297                      |                                 | 0.6                |
| Constance Dr                      | High Int Dev   | NO       | YES  | 2,112       | 28         | 50       | 61,945                             | 43,655                          | 3,549                    |                                 | 7.9                |
| Creekwood Dr                      | High Int Dev   | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 1,979                    |                                 | 4.0                |
| Freedom Way                       | High Int Dev   | YES      | YES  | 528         | 24         | 50       | 17,598                             | 8,802                           | 990                      |                                 | 2.0                |
| Homestead Ct                      | High Int Dev   | YES      | YES  | 845         | 40         | 50       | 41,674                             | 566                             | 2,239                    |                                 | 3.5                |
| Johnsville Blvd                   | High Int Dev   | NO       | YES  | 1,866       | 50         | 80       | 95,761                             | 53,487                          | 5,414                    |                                 | 11.3               |
| Lafayette Ln                      | High Int Dev   | YES      | YES  | 370         | 24         | 50       | 12,319                             | 6,161                           | 693                      |                                 | 1.4                |
| Longfellow Ct                     | High Int Dev   | YES      | YES  | 264         | 40         | 50       | 13,023                             | 177                             | 700                      |                                 | 1.1                |
| Louis Dr                          | High Int Dev   | NO       | NO   | 4,752       | 34         | 60       | 161,568                            | 123,552                         | 9,306                    |                                 | 21.1               |
| Madison Ave                       | High Int Dev   | YES      | YES  | 264         | 24         | 50       | 8,799                              | 4,401                           | 495                      |                                 | 1.0                |
| Mary St                           | High Int Dev   | YES      | YES  | 739         | 28         | 50       | 27,594                             | 9,366                           | 1,529                    |                                 | 2.9                |
| Michener Ct                       | High Int Dev   | YES      | YES  | 317         | 40         | 50       | 15,628                             | 212                             | 840                      |                                 | 1.3                |
| Nina Wy                           | High Int Dev   | NO       | NO   | 1,742       | 28         | 50       | 48,787                             | 38,333                          | 2,815                    |                                 | 6.4                |
| Patricia Dr                       | High Int Dev   | NO       | NO   | 1,320       | 28         | 50       | 36,960                             | 29,040                          | 2,133                    |                                 | 4.9                |
| Pebblebrook Rd                    | High Int Dev   | YES      | YES  | 686         | 26         | 50       | 24,251                             | 10,069                          | 1,353                    |                                 | 2.6                |
| Shelley Ct                        | High Int Dev   | YES      | YES  | 251         | 38         | 50       | 11,889                             | 671                             | 641                      |                                 | 1.0                |
| Spring St                         | High Int Dev   | YES      | YES  | 370         | 24         | 50       | 12,319                             | 6,161                           | 693                      |                                 | 1.4                |
| Stub Rd                           | High Int Dev   | NO       | NO   | 1,612       | 18         | 50       | 29,016                             | 51,584                          | 1,822                    |                                 | 5.7                |
| Sturbridge Dr                     | High Int Dev   | YES      | YES  | 1,162       | 24         | 50       | 38,716                             | 19,364                          | 2,177                    |                                 | 4.4                |
| Summit Ct                         | High Int Dev   | YES      | YES  | 422         | 40         | 50       | 20,837                             | 283                             | 1,120                    |                                 | 1.7                |
| Tennyson Dr                       | High Int Dev   | NO       | YES  | 1,214       | 24         | 50       | 30,761                             | 29,959                          | 1,805                    |                                 | 4.4                |
| Thomas Dr                         | High Int Dev   | NO       | YES  | 792         | 40         | 50       | 32,733                             | 6,867                           | 1,792                    |                                 | 3.1                |
| Thoreau ct                        | High Int Dev   | YES      | YES  | 158         | 34         | 50       | 6,863                              | 1,057                           | 374                      |                                 | 0.6                |
| Twin Streams Dr                   | High Int Dev   | YES      | YES  | 422         | 30         | 50       | 16,613                             | 4,507                           | 915                      |                                 | 1.7                |
| Veterans Cir                      | High Int Dev   | NO       | YES  | 581         | 40         | 50       | 24,004                             | 5,036                           | 1,314                    |                                 | 2.3                |
| Veterans Way                      | High Int Dev   | NO       | NO   | 933         | 20         | 50       | 18,656                             | 27,984                          | 1,145                    |                                 | 3.3                |
| Wedgewood Dr                      | High Int Dev   | YES      | YES  | 634         | 22         | 50       | 19,851                             | 11,829                          | 1,126                    |                                 | 2.4                |
| <b>HIGH INT DEV ROW TOTALS</b>    |                |          |      |             |            |          | <b>904,368</b>                     | <b>551,560</b>                  | <b>51,370</b>            | <b>1,536.94</b>                 | <b>109.4</b>       |
| <b>NESHAMINY CREEK ROW TOTALS</b> |                |          |      |             |            |          | <b>9,406,274</b>                   | <b>6,190,022</b>                | <b>170,765</b>           |                                 | <b>540.7</b>       |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Pennypack Creek Watershed**

| Street Name     | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-----------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Allen Ln        | Low Int Dev    | YES      | YES  | 396         | 24         | 50       | 13,199                             | 6,601                           | 172                      |                                 | 0.6                |
| Ann Ln          | Low Int Dev    | YES      | YES  | 739         | 24         | 50       | 24,638                             | 12,322                          | 321                      |                                 | 1.2                |
| Barbara Ln      | Low Int Dev    | YES      | YES  | 950         | 26         | 50       | 33,578                             | 13,942                          | 421                      |                                 | 1.6                |
| Beaver Run Rd   | Low Int Dev    | NO       | YES  | 264         | 24         | 50       | 6,687                              | 6,513                           | 107                      |                                 | 0.4                |
| Belair Rd       | Low Int Dev    | YES      | YES  | 1,478       | 24         | 50       | 49,275                             | 24,645                          | 643                      |                                 | 2.4                |
| Birch Rd        | Low Int Dev    | YES      | YES  | 317         | 32         | 50       | 13,093                             | 2,747                           | 148                      |                                 | 0.6                |
| Bloomfield Rd   | Low Int Dev    | YES      | YES  | 1,373       | 24         | 50       | 45,755                             | 22,885                          | 597                      |                                 | 2.2                |
| Brown Rd        | Low Int Dev    | YES      | YES  | 370         | 24         | 50       | 12,319                             | 6,161                           | 161                      |                                 | 0.6                |
| Caledonia Dr    | Low Int Dev    | NO       | NO   | 1,320       | 14         | 50       | 18,480                             | 47,520                          | 476                      |                                 | 1.4                |
| Chestnut Rd     | Low Int Dev    | YES      | YES  | 1,426       | 26         | 50       | 50,366                             | 20,914                          | 631                      |                                 | 2.4                |
| Claire Rd       | Low Int Dev    | YES      | YES  | 845         | 24         | 50       | 28,157                             | 14,083                          | 367                      |                                 | 1.4                |
| Clyde Rd        | Low Int Dev    | NO       | NO   | 898         | 16         | 50       | 14,362                             | 30,518                          | 330                      |                                 | 1.0                |
| Coronet Rd      | Low Int Dev    | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 413                      |                                 | 1.5                |
| Cypress Rd      | Low Int Dev    | YES      | YES  | 1,954       | 26         | 50       | 69,021                             | 28,659                          | 864                      |                                 | 3.3                |
| Deb Ln          | Low Int Dev    | YES      | YES  | 1,320       | 24         | 50       | 43,996                             | 22,004                          | 574                      |                                 | 2.1                |
| Dogwood Rd      | Low Int Dev    | YES      | YES  | 528         | 24         | 50       | 17,598                             | 8,802                           | 230                      |                                 | 0.9                |
| Fairfield Dr    | Low Int Dev    | YES      | YES  | 898         | 22         | 50       | 28,122                             | 16,758                          | 383                      |                                 | 1.4                |
| Fern Rd         | Low Int Dev    | YES      | YES  | 898         | 20         | 50       | 26,327                             | 18,553                          | 376                      |                                 | 1.4                |
| Florence Ave    | Low Int Dev    | YES      | YES  | 1,109       | 18         | 50       | 30,304                             | 25,136                          | 456                      |                                 | 1.6                |
| Gibson Ave      | Low Int Dev    | YES      | YES  | 4,382       | 26         | 50       | 154,830                            | 64,290                          | 1,939                    |                                 | 7.3                |
| Gilbert St      | Low Int Dev    | NO       | NO   | 370         | 15         | 50       | 5,544                              | 12,936                          | 364                      |                                 | 1.3                |
| Greene Rd       | Low Int Dev    | NO       | YES  | 2,693       | 28         | 50       | 78,980                             | 55,660                          | 1,129                    |                                 | 4.1                |
| Grenne Ct       | Low Int Dev    | NO       | YES  | 264         | 24         | 50       | 6,687                              | 6,513                           | 107                      |                                 | 0.4                |
| Hardman Ln      | Low Int Dev    | YES      | YES  | 2,218       | 25         | 50       | 76,130                             | 34,750                          | 973                      |                                 | 3.7                |
| Harvey Rd       | Low Int Dev    | NO       | YES  | 1,109       | 25         | 50       | 29,195                             | 26,245                          | 452                      |                                 | 1.6                |
| Hemlock Rd      | Low Int Dev    | YES      | YES  | 1,214       | 24         | 50       | 40,476                             | 20,244                          | 528                      |                                 | 2.0                |
| Henry Ave       | Low Int Dev    | YES      | NO   | 6,283       | 32         | 60       | 251,328                            | 125,664                         | 3,278                    |                                 | 12.2               |
| Hickory Rd      | Low Int Dev    | YES      | YES  | 1,109       | 24         | 50       | 36,956                             | 18,484                          | 482                      |                                 | 1.8                |
| Hidden Woods La | Low Int Dev    | YES      | YES  | 739         | 38         | 50       | 34,986                             | 1,974                           | 361                      |                                 | 1.5                |
| Horseshoe La    | Low Int Dev    | NO       | YES  | 792         | 24         | 50       | 20,061                             | 19,539                          | 320                      |                                 | 1.1                |
| Iris Rd         | Low Int Dev    | YES      | YES  | 845         | 22         | 50       | 26,468                             | 15,772                          | 361                      |                                 | 1.3                |
| King Way        | Low Int Dev    | YES      | YES  | 792         | 24         | 50       | 26,397                             | 13,203                          | 344                      |                                 | 1.3                |
| Lea La          | Low Int Dev    | YES      | YES  | 792         | 24         | 50       | 26,397                             | 13,203                          | 344                      |                                 | 1.3                |
| Leopard La      | Low Int Dev    | YES      | YES  | 2,218       | 24         | 50       | 73,913                             | 36,967                          | 964                      |                                 | 3.6                |
| Lion Rd         | Low Int Dev    | NO       | NO   | 158         | 22         | 50       | 3,485                              | 4,435                           | 62                       |                                 | 0.2                |
| Locust Rd       | Low Int Dev    | YES      | YES  | 1,214       | 25         | 50       | 41,690                             | 19,030                          | 533                      |                                 | 2.0                |
| Luff Ln         | Low Int Dev    | YES      | YES  | 1,426       | 24         | 50       | 47,515                             | 23,765                          | 620                      |                                 | 2.3                |
| Magnolia Rd     | Low Int Dev    | YES      | YES  | 1,267       | 24         | 50       | 42,236                             | 21,124                          | 551                      |                                 | 2.1                |
| Marilyn Rd      | Low Int Dev    | YES      | YES  | 845         | 22         | 50       | 26,468                             | 15,772                          | 361                      |                                 | 1.3                |
| Ninth Ave       | Low Int Dev    | NO       | YES  | 1,795       | 20         | 50       | 38,292                             | 51,468                          | 697                      |                                 | 2.3                |
| Panther Rd      | Low Int Dev    | NO       | YES  | 634         | 24         | 50       | 16,049                             | 15,631                          | 256                      |                                 | 0.9                |
| Parry Rd        | Low Int Dev    | YES      | YES  | 581         | 24         | 50       | 19,358                             | 9,682                           | 253                      |                                 | 0.9                |
| Paul Ln         | Low Int Dev    | YES      | YES  | 634         | 24         | 50       | 21,118                             | 10,562                          | 275                      |                                 | 1.0                |
| Pine Rd         | Low Int Dev    | YES      | YES  | 686         | 24         | 50       | 22,878                             | 11,442                          | 298                      |                                 | 1.1                |
| Primrose Dr     | Low Int Dev    | YES      | YES  | 1,584       | 24         | 50       | 52,795                             | 26,405                          | 689                      |                                 | 2.6                |
| Riviera Rd      | Low Int Dev    | YES      | YES  | 581         | 22         | 50       | 18,196                             | 10,844                          | 248                      |                                 | 0.9                |
| Spruce Rd       | Low Int Dev    | YES      | YES  | 1,690       | 22         | 50       | 52,935                             | 31,545                          | 722                      |                                 | 2.6                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Pennypack Creek Watershed**

| Street Name                   | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-------------------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Sylvan Dr                     | Low Int Dev    | YES      | YES  | 475         | 24         | 50       | 15,838                             | 7,922                           | 207                      |                                 | 0.8                |
| Victoria Rd                   | Low Int Dev    | YES      | YES  | 1,214       | 22         | 60       | 38,047                             | 34,817                          | 593                      |                                 | 2.1                |
| Wallace Dr                    | Low Int Dev    | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 413                      |                                 | 1.5                |
| Walnut Rd                     | Low Int Dev    | YES      | YES  | 1,373       | 24         | 50       | 45,755                             | 22,885                          | 597                      |                                 | 2.2                |
| Windsor Rd                    | Low Int Dev    | YES      | YES  | 1,109       | 22         | 50       | 34,739                             | 20,701                          | 474                      |                                 | 1.7                |
| Wisteria Rd                   | Low Int Dev    | YES      | YES  | 370         | 24         | 50       | 12,319                             | 6,161                           | 161                      |                                 | 0.6                |
| Woodland Dr                   | Low Int Dev    | NO       | YES  | 2,059       | 24         | 50       | 52,160                             | 50,800                          | 832                      |                                 | 2.9                |
| <b>LOW INT DEV ROW TOTALS</b> |                |          |      |             |            |          | <b>2,078,850</b>                   | <b>1,220,886</b>                | <b>28,458</b>            | <b>375.68</b>                   | <b>104.5</b>       |
| Adams Av                      | High Int Dev   | NO       | NO   | 739         | 20         | 50       | 14,784                             | 22,176                          | 907                      |                                 | 2.6                |
| Allen St                      | High Int Dev   | NO       | YES  | 317         | 15         | 50       | 5,173                              | 10,667                          | 332                      |                                 | 1.1                |
| Ash Cir                       | High Int Dev   | YES      | YES  | 1,162       | 35         | 50       | 51,494                             | 6,586                           | 2,797                    |                                 | 4.7                |
| Aspen St                      | High Int Dev   | NO       | YES  | 634         | 35         | 50       | 23,019                             | 8,661                           | 1,280                    |                                 | 2.4                |
| Baird Av                      | High Int Dev   | NO       | NO   | 581         | 15         | 50       | 8,712                              | 20,328                          | 572                      |                                 | 2.0                |
| Beech St                      | High Int Dev   | NO       | YES  | 1,109       | 26         | 50       | 30,304                             | 25,136                          | 1,755                    |                                 | 4.1                |
| Bonair Dr                     | High Int Dev   | NO       | YES  | 792         | 44         | 50       | 35,901                             | 3,699                           | 1,946                    |                                 | 3.2                |
| Cedar St                      | High Int Dev   | NO       | NO   | 1,003       | 30         | 50       | 30,096                             | 20,064                          | 1,718                    |                                 | 3.7                |
| Craven Av                     | High Int Dev   | NO       | NO   | 528         | 18         | 50       | 9,504                              | 16,896                          | 597                      |                                 | 1.9                |
| Date St                       | High Int Dev   | NO       | YES  | 1,478       | 28         | 50       | 43,361                             | 30,559                          | 2,484                    |                                 | 5.5                |
| Dean St                       | High Int Dev   | NO       | NO   | 106         | 20         | 50       | 2,112                              | 3,168                           | 130                      |                                 | 0.4                |
| Downey Dr                     | High Int Dev   | NO       | YES  | 1,162       | 24         | 50       | 29,423                             | 28,657                          | 1,726                    |                                 | 4.2                |
| Eighth Ave                    | High Int Dev   | NO       | YES  | 686         | 24         | 50       | 17,387                             | 16,933                          | 1,020                    |                                 | 2.5                |
| Elm St                        | High Int Dev   | NO       | NO   | 1,373       | 28         | 50       | 38,438                             | 30,202                          | 2,218                    |                                 | 5.1                |
| Elmwood Av                    | High Int Dev   | NO       | YES  | 739         | 18         | 50       | 14,289                             | 22,671                          | 883                      |                                 | 2.6                |
| Evans St                      | High Int Dev   | NO       | YES  | 1,109       | 18         | 50       | 21,433                             | 34,007                          | 1,325                    |                                 | 3.9                |
| Evergreen Ave                 | High Int Dev   | NO       | YES  | 5,914       | 24         | 60       | 149,791                            | 205,025                         | 9,093                    |                                 | 25.3               |
| Fenton St                     | High Int Dev   | NO       | YES  | 1,109       | 15         | 50       | 18,107                             | 37,333                          | 1,164                    |                                 | 3.9                |
| Ferry St                      | High Int Dev   | NO       | NO   | 634         | 16         | 50       | 10,138                             | 21,542                          | 655                      |                                 | 2.2                |
| Fifth Av                      | High Int Dev   | NO       | YES  | 1,056       | 24         | 50       | 26,748                             | 26,052                          | 1,569                    |                                 | 3.9                |
| Findley Ter                   | High Int Dev   | NO       | YES  | 211         | 15         | 50       | 3,449                              | 7,111                           | 222                      |                                 | 0.7                |
| Fir St                        | High Int Dev   | NO       | YES  | 1,795       | 26         | 50       | 49,063                             | 40,697                          | 2,842                    |                                 | 6.6                |
| Fourth Av                     | High Int Dev   | NO       | YES  | 2,059       | 24         | 50       | 52,160                             | 50,800                          | 3,060                    |                                 | 7.5                |
| Grape St                      | High Int Dev   | NO       | NO   | 1,690       | 28         | 50       | 47,309                             | 37,171                          | 2,730                    |                                 | 6.2                |
| Grier St                      | High Int Dev   | YES      | YES  | 1,056       | 18         | 50       | 28,860                             | 23,940                          | 1,672                    |                                 | 3.9                |
| Hart St                       | High Int Dev   | NO       | NO   | 1,003       | 22         | 50       | 22,070                             | 28,090                          | 1,329                    |                                 | 3.6                |
| Hawthorne St                  | High Int Dev   | NO       | YES  | 1,848       | 24         | 50       | 46,810                             | 45,590                          | 2,747                    |                                 | 6.7                |
| Holt Ter                      | High Int Dev   | NO       | YES  | 475         | 16         | 50       | 8,235                              | 15,525                          | 522                      |                                 | 1.7                |
| Ivy St                        | High Int Dev   | NO       | NO   | 2,059       | 26         | 50       | 53,539                             | 49,421                          | 3,127                    |                                 | 7.5                |
| Jamison St                    | High Int Dev   | YES      | YES  | 2,640       | 18         | 50       | 72,151                             | 59,849                          | 4,180                    |                                 | 9.7                |
| Johnsville Blvd               | High Int Dev   | NO       | YES  | 1,408       | 50         | 80       | 72,273                             | 40,367                          | 4,086                    |                                 | 8.5                |
| Juniper St                    | High Int Dev   | NO       | YES  | 2,218       | 26         | 50       | 60,607                             | 50,273                          | 3,511                    |                                 | 8.2                |
| Kalmia St                     | High Int Dev   | NO       | NO   | 2,376       | 24         | 50       | 57,024                             | 61,776                          | 3,378                    |                                 | 8.6                |
| Knight St                     | High Int Dev   | NO       | NO   | 422         | 15         | 50       | 6,336                              | 14,784                          | 416                      |                                 | 1.5                |
| Lemon St                      | High Int Dev   | NO       | YES  | 2,587       | 24         | 50       | 65,534                             | 63,826                          | 3,845                    |                                 | 9.4                |
| Luther St                     | High Int Dev   | NO       | YES  | 317         | 16         | 50       | 5,490                              | 10,350                          | 348                      |                                 | 1.1                |
| Madison Ave                   | High Int Dev   | YES      | YES  | 7,709       | 34         | 50       | 334,022                            | 51,418                          | 18,189                   |                                 | 30.7               |
| Maple St                      | High Int Dev   | YES      | NO   | 3,907       | 26         | 50       | 132,845                            | 62,515                          | 7,450                    |                                 | 14.9               |
| Mercer St                     | High Int Dev   | YES      | YES  | 528         | 18         | 50       | 14,430                             | 11,970                          | 836                      |                                 | 1.9                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Pennypack Creek Watershed**

| Street Name                       | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-----------------------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Nemoral St                        | High Int Dev   | NO       | YES  | 4,118       | 30         | 50       | 129,029                            | 76,891                          | 7,320                    |                                 | 15.5               |
| Noble St                          | High Int Dev   | NO       | YES  | 158         | 15         | 50       | 2,587                              | 5,333                           | 166                      |                                 | 0.6                |
| Norristown Rd                     | High Int Dev   | YES      | YES  | 1,373       | 26         | 80       | 48,501                             | 61,323                          | 2,918                    |                                 | 7.9                |
| Norwood Av                        | High Int Dev   | NO       | YES  | 1,214       | 26         | 50       | 33,190                             | 27,530                          | 1,923                    |                                 | 4.5                |
| Olive St                          | High Int Dev   | NO       | YES  | 4,224       | 25         | 50       | 111,218                            | 99,982                          | 6,483                    |                                 | 15.5               |
| Park Ave                          | High Int Dev   | NO       | YES  | 5,280       | 30         | 60       | 165,422                            | 151,378                         | 9,656                    |                                 | 23.2               |
| Potter St                         | High Int Dev   | YES      | YES  | 2,059       | 18         | 50       | 56,278                             | 46,682                          | 3,260                    |                                 | 7.6                |
| Prospect Rd                       | High Int Dev   | NO       | YES  | 1,373       | 24         | 50       | 34,773                             | 33,867                          | 2,040                    |                                 | 5.0                |
| Ross St                           | High Int Dev   | NO       | YES  | 158         | 30         | 50       | 4,963                              | 2,957                           | 282                      |                                 | 0.6                |
| Rush St                           | High Int Dev   | NO       | YES  | 264         | 18         | 50       | 5,103                              | 8,097                           | 316                      |                                 | 0.9                |
| Second Av                         | High Int Dev   | YES      | YES  | 686         | 24         | 50       | 22,878                             | 11,442                          | 1,287                    |                                 | 2.6                |
| Seventh Av                        | High Int Dev   | NO       | YES  | 792         | 24         | 50       | 20,061                             | 19,539                          | 1,177                    |                                 | 2.9                |
| Sharon St                         | High Int Dev   | NO       | YES  | 422         | 16         | 50       | 7,320                              | 13,800                          | 464                      |                                 | 1.5                |
| Shield St                         | High Int Dev   | NO       | YES  | 264         | 14         | 50       | 4,047                              | 9,153                           | 264                      |                                 | 0.9                |
| Sixth Av                          | High Int Dev   | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 1,781                    |                                 | 3.6                |
| Sunnemead Av                      | High Int Dev   | YES      | YES  | 3,115       | 25         | 60       | 106,945                            | 79,967                          | 6,150                    |                                 | 13.9               |
| Tennant St                        | High Int Dev   | NO       | NO   | 264         | 15         | 50       | 3,960                              | 9,240                           | 260                      |                                 | 0.9                |
| Tenth Ave                         | High Int Dev   | NO       | YES  | 898         | 24         | 50       | 22,736                             | 22,144                          | 1,334                    |                                 | 3.3                |
| Third Av                          | High Int Dev   | NO       | YES  | 1,003       | 24         | 50       | 25,411                             | 24,749                          | 1,491                    |                                 | 3.7                |
| Tompkins St                       | High Int Dev   | NO       | YES  | 422         | 18         | 50       | 8,165                              | 12,955                          | 505                      |                                 | 1.5                |
| Ulmar St                          | High Int Dev   | NO       | YES  | 422         | 18         | 50       | 8,165                              | 12,955                          | 505                      |                                 | 1.5                |
| Van Horn Dr                       | High Int Dev   | NO       | YES  | 2,376       | 24         | 50       | 60,184                             | 58,616                          | 3,531                    |                                 | 8.7                |
| Veterans Way                      | High Int Dev   | NO       | NO   | 933         | 20         | 50       | 18,656                             | 27,984                          | 1,145                    |                                 | 3.3                |
| Walk St                           | High Int Dev   | YES      | YES  | 1,003       | 18         | 50       | 27,417                             | 22,743                          | 1,588                    |                                 | 3.7                |
| Yeats St                          | High Int Dev   | NO       | YES  | 528         | 20         | 50       | 11,262                             | 15,138                          | 682                      |                                 | 1.9                |
| <b>HIGH INT DEV ROW TOTALS</b>    |                |          |      |             |            |          | <b>2,682,371</b>                   | <b>2,186,141</b>                | <b>155,189</b>           | <b>1,388.52</b>                 | <b>359.3</b>       |
| <b>PENNYPACK CREEK ROW TOTALS</b> |                |          |      |             |            |          | <b>4,761,221</b>                   | <b>3,407,027</b>                | <b>183,647</b>           |                                 | <b>463.8</b>       |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Southampton Creek Watershed**

| Street Name       | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Alicia La         | Low Int Dev    | YES      | YES  | 581         | 24         | 50       | 19,358                             | 9,682                           | 253                      |                                 | 0.9                |
| Allen Ln          | Low Int Dev    | YES      | YES  | 396         | 24         | 50       | 13,199                             | 6,601                           | 172                      |                                 | 0.6                |
| Azalea Dr         | Low Int Dev    | NO       | NO   | 317         | 18         | 50       | 5,702                              | 10,138                          | 119                      |                                 | 0.4                |
| Bethany Cir       | Low Int Dev    | NO       | YES  | 634         | 38         | 50       | 24,919                             | 6,761                           | 290                      |                                 | 1.1                |
| Betsy La          | Low Int Dev    | YES      | YES  | 528         | 24         | 50       | 17,598                             | 8,802                           | 230                      |                                 | 0.9                |
| Blossom Rd        | Low Int Dev    | NO       | YES  | 1,373       | 26         | 50       | 37,519                             | 31,121                          | 565                      |                                 | 2.0                |
| Bluebell Rd       | Low Int Dev    | NO       | YES  | 1,056       | 24         | 50       | 26,748                             | 26,052                          | 427                      |                                 | 1.5                |
| Buchanan Way      | Low Int Dev    | NO       | YES  | 422         | 24         | 50       | 10,699                             | 10,421                          | 171                      |                                 | 0.6                |
| Buttercup Dr      | Low Int Dev    | NO       | YES  | 422         | 25         | 50       | 11,122                             | 9,998                           | 172                      |                                 | 0.6                |
| Byron Rd          | Low Int Dev    | YES      | YES  | 2,534       | 20         | 50       | 74,334                             | 52,386                          | 1,063                    |                                 | 3.8                |
| Camberly Rd       | Low Int Dev    | YES      | YES  | 1,162       | 24         | 50       | 38,716                             | 19,364                          | 505                      |                                 | 1.9                |
| Cavalcade Rd      | Low Int Dev    | NO       | NO   | 739         | 32         | 50       | 23,654                             | 13,306                          | 318                      |                                 | 1.2                |
| Centenary Ln      | Low Int Dev    | YES      | YES  | 422         | 24         | 50       | 14,079                             | 7,041                           | 184                      |                                 | 0.7                |
| Centennial Rd     | Low Int Dev    | YES      | YES  | 5,914       | 35         | 60       | 262,150                            | 92,666                          | 3,184                    |                                 | 12.2               |
| Citation La       | Low Int Dev    | NO       | NO   | 634         | 18         | 50       | 11,405                             | 20,275                          | 238                      |                                 | 0.8                |
| Colonial Dr       | Low Int Dev    | NO       | NO   | 1,531       | 24         | 50       | 36,749                             | 39,811                          | 611                      |                                 | 2.1                |
| Concord Rd        | Low Int Dev    | YES      | YES  | 1,373       | 30         | 50       | 53,992                             | 14,648                          | 629                      |                                 | 2.5                |
| Constitutional Dr | Low Int Dev    | NO       | YES  | 2,957       | 18         | 50       | 57,155                             | 90,685                          | 1,126                    |                                 | 3.6                |
| Cotlar Dr         | Low Int Dev    | YES      | YES  | 1,056       | 24         | 50       | 35,196                             | 17,604                          | 459                      |                                 | 1.7                |
| Coventry La       | Low Int Dev    | YES      | YES  | 264         | 24         | 50       | 8,799                              | 4,401                           | 115                      |                                 | 0.4                |
| Crockett Rd       | Low Int Dev    | NO       | YES  | 422         | 24         | 50       | 10,699                             | 10,421                          | 171                      |                                 | 0.6                |
| Davisville Rd     | Low Int Dev    | NO       | YES  | 7,603       | 30         | 100      | 238,208                            | 522,112                         | 5,576                    |                                 | 17.1               |
| Decker La         | Low Int Dev    | YES      | YES  | 3,168       | 22         | 50       | 99,253                             | 59,147                          | 1,353                    |                                 | 5.0                |
| Deerfield Dr      | Low Int Dev    | YES      | YES  | 581         | 24         | 50       | 19,358                             | 9,682                           | 253                      |                                 | 0.9                |
| Dick Av           | Low Int Dev    | YES      | YES  | 3,696       | 24         | 50       | 123,174                            | 61,606                          | 1,607                    |                                 | 6.0                |
| Donald Dr         | Low Int Dev    | YES      | YES  | 211         | 22         | 50       | 6,617                              | 3,943                           | 90                       |                                 | 0.3                |
| Estelle La        | Low Int Dev    | YES      | YES  | 792         | 24         | 50       | 26,397                             | 13,203                          | 344                      |                                 | 1.3                |
| Glen Rd           | Low Int Dev    | NO       | YES  | 2,112       | 26         | 50       | 57,721                             | 47,879                          | 869                      |                                 | 3.1                |
| Grant Ave         | Low Int Dev    | YES      | YES  | 1,373       | 22         | 50       | 43,010                             | 25,630                          | 586                      |                                 | 2.1                |
| Hamilton Dr       | Low Int Dev    | NO       | YES  | 264         | 30         | 50       | 8,271                              | 4,929                           | 113                      |                                 | 0.4                |
| Hancock Rd        | Low Int Dev    | YES      | YES  | 1,478       | 24         | 50       | 49,275                             | 24,645                          | 643                      |                                 | 2.4                |
| Honeysuckle Dr    | Low Int Dev    | NO       | YES  | 1,162       | 24         | 50       | 29,423                             | 28,657                          | 469                      |                                 | 1.6                |
| Hostman Dr        | Low Int Dev    | YES      | YES  | 950         | 26         | 50       | 33,578                             | 13,942                          | 421                      |                                 | 1.6                |
| Hostman Av        | Low Int Dev    | YES      | YES  | 1,267       | 30         | 50       | 49,839                             | 13,521                          | 580                      |                                 | 2.3                |
| Independence Rd   | Low Int Dev    | YES      | YES  | 950         | 24         | 50       | 31,677                             | 15,843                          | 413                      |                                 | 1.5                |
| Jefferson Ave     | Low Int Dev    | NO       | YES  | 528         | 22         | 50       | 12,318                             | 14,082                          | 209                      |                                 | 0.7                |
| Joseph Av         | Low Int Dev    | YES      | YES  | 1,795       | 20         | 50       | 52,653                             | 37,107                          | 753                      |                                 | 2.7                |
| Lexington Rd      | Low Int Dev    | YES      | YES  | 634         | 24         | 50       | 21,118                             | 10,562                          | 275                      |                                 | 1.0                |
| Lilac Ln          | Low Int Dev    | NO       | YES  | 422         | 24         | 50       | 10,699                             | 10,421                          | 171                      |                                 | 0.6                |
| Lillian La        | Low Int Dev    | YES      | YES  | 317         | 22         | 50       | 9,925                              | 5,915                           | 135                      |                                 | 0.5                |
| Lily Rd           | Low Int Dev    | NO       | YES  | 1,742       | 24         | 50       | 44,135                             | 42,985                          | 704                      |                                 | 2.4                |
| Lingo Dr          | Low Int Dev    | YES      | YES  | 1,109       | 26         | 50       | 39,174                             | 16,266                          | 491                      |                                 | 1.9                |
| Longstreth Rd     | Low Int Dev    | YES      | YES  | 2,112       | 22         | 50       | 66,169                             | 39,431                          | 902                      |                                 | 3.3                |
| Lowell Rd         | Low Int Dev    | YES      | YES  | 1,795       | 30         | 50       | 70,605                             | 19,155                          | 822                      |                                 | 3.2                |
| Martha La         | Low Int Dev    | YES      | YES  | 1,267       | 22         | 50       | 39,701                             | 23,659                          | 541                      |                                 | 2.0                |
| McGlynn Rd        | Low Int Dev    | YES      | YES  | 1,214       | 24         | 50       | 40,476                             | 20,244                          | 528                      |                                 | 2.0                |
| Meadow Dr         | Low Int Dev    | NO       | YES  | 1,109       | 24         | 50       | 28,086                             | 27,354                          | 448                      |                                 | 1.5                |

**Appendix D-2: Pollutant Loads from Public Streets & Rights-of-Way - Southampton Creek Watershed**

| Street Name                         | Classification | Sidewalk | Curb | Length (ft) | Width (ft) | ROW (ft) | Impervious Area (ft <sup>2</sup> ) | Grassed Area (ft <sup>2</sup> ) | Sediment Load (lbs/year) | Avg Sediment Load (lbs/ac/year) | TP Load (lbs/year) |
|-------------------------------------|----------------|----------|------|-------------|------------|----------|------------------------------------|---------------------------------|--------------------------|---------------------------------|--------------------|
| Middle Ave                          | Low Int Dev    | NO       | YES  | 528         | 24         | 50       | 13,374                             | 13,026                          | 213                      |                                 | 0.7                |
| Natale La                           | Low Int Dev    | YES      | YES  | 1,056       | 20         | 50       | 30,972                             | 21,828                          | 443                      |                                 | 1.6                |
| S Newtown Rd                        | Low Int Dev    | YES      | YES  | 5,386       | 35         | 50       | 238,744                            | 30,536                          | 2,570                    |                                 | 10.4               |
| N Newtown Rd                        | Low Int Dev    | NO       | YES  | 2,904       | 20         | 50       | 61,942                             | 83,258                          | 1,128                    |                                 | 3.7                |
| Orchid Rd                           | Low Int Dev    | YES      | YES  | 898         | 16         | 50       | 22,736                             | 22,144                          | 363                      |                                 | 1.3                |
| Otto Ln                             | Low Int Dev    | YES      | YES  | 475         | 24         | 50       | 15,838                             | 7,922                           | 207                      |                                 | 0.8                |
| Overlook Dr                         | Low Int Dev    | YES      | YES  | 2,323       | 28         | 50       | 86,725                             | 29,435                          | 1,046                    |                                 | 4.0                |
| Parmentier Rd                       | Low Int Dev    | YES      | YES  | 2,165       | 24         | 50       | 72,153                             | 36,087                          | 941                      |                                 | 3.5                |
| Patton Dr                           | Low Int Dev    | YES      | YES  | 739         | 20         | 50       | 21,681                             | 15,279                          | 310                      |                                 | 1.1                |
| Ramsey Rd                           | Low Int Dev    | YES      | YES  | 792         | 25         | 50       | 27,189                             | 12,411                          | 347                      |                                 | 1.3                |
| Reeves Ln                           | Low Int Dev    | NO       | NO   | 792         | 24         | 50       | 19,008                             | 20,592                          | 316                      |                                 | 1.1                |
| Revere Ter                          | Low Int Dev    | NO       | YES  | 898         | 24         | 50       | 22,736                             | 22,144                          | 363                      |                                 | 1.3                |
| Revolutionary Wy                    | Low Int Dev    | NO       | YES  | 634         | 22         | 50       | 14,782                             | 16,898                          | 251                      |                                 | 0.8                |
| Rilling Rd                          | Low Int Dev    | YES      | YES  | 264         | 18         | 50       | 7,215                              | 5,985                           | 109                      |                                 | 0.4                |
| Schoolhouse La                      | Low Int Dev    | YES      | YES  | 1,690       | 26         | 50       | 59,694                             | 24,786                          | 748                      |                                 | 2.8                |
| Sheldon Dr                          | Low Int Dev    | YES      | YES  | 264         | 24         | 50       | 8,799                              | 4,401                           | 115                      |                                 | 0.4                |
| Stephen Rd                          | Low Int Dev    | YES      | YES  | 686         | 24         | 50       | 22,878                             | 11,442                          | 298                      |                                 | 1.1                |
| Sweetbriar Rd                       | Low Int Dev    | NO       | YES  | 3,643       | 24         | 60       | 92,282                             | 126,310                         | 1,695                    |                                 | 5.6                |
| Walter Rd                           | Low Int Dev    | NO       | NO   | 581         | 20         | 50       | 11,616                             | 17,424                          | 223                      |                                 | 0.7                |
| Washington Dr                       | Low Int Dev    | YES      | YES  | 739         | 28         | 50       | 27,594                             | 9,366                           | 333                      |                                 | 1.3                |
| Watson Glen Dr                      | Low Int Dev    | YES      | YES  | 422         | 25         | 50       | 14,501                             | 6,619                           | 185                      |                                 | 0.7                |
| Webster Way                         | Low Int Dev    | YES      | YES  | 528         | 25         | 50       | 18,126                             | 8,274                           | 232                      |                                 | 0.9                |
| Whirlaway Dr                        | Low Int Dev    | NO       | NO   | 581         | 24         | 50       | 13,939                             | 15,101                          | 232                      |                                 | 0.8                |
| Winchester Rd                       | Low Int Dev    | YES      | YES  | 1,056       | 22         | 50       | 33,084                             | 19,716                          | 451                      |                                 | 1.7                |
| Winding Way                         | Low Int Dev    | YES      | YES  | 1,426       | 24         | 50       | 47,515                             | 23,765                          | 620                      |                                 | 2.3                |
| Woodlawn Rd                         | Low Int Dev    | YES      | YES  | 1,795       | 24         | 50       | 59,834                             | 29,926                          | 781                      |                                 | 2.9                |
| <b>LOW INT DEV ROW TOTALS</b>       |                |          |      |             |            |          | <b>3,109,616</b>                   | <b>2,248,772</b>                | <b>44,818</b>            | <b>364.34</b>                   | <b>160.7</b>       |
| <b>SOUTHAMPTON CREEK ROW TOTALS</b> |                |          |      |             |            |          | <b>3,109,616</b>                   | <b>2,248,772</b>                | <b>44,818</b>            |                                 | <b>160.7</b>       |

**Appendix D-3: Existing Pollutant Loads - Neshaminy Creek Watershed**

TMDL Planning Area - Sediment Load Calculation

| Sediment Load Calculation  |                                                                |                                   |                                    |                               |                              |                                          |                                                                 |                                    |                                          |
|----------------------------|----------------------------------------------------------------|-----------------------------------|------------------------------------|-------------------------------|------------------------------|------------------------------------------|-----------------------------------------------------------------|------------------------------------|------------------------------------------|
| Land Use Source            | Area of Little Neshaminy Creek Watershed (acres; stream miles) | 2000 Existing Wasteload (lb/year) | Existing Loading Rate (lb/ac/year) | Allocated Wasteload (lb/year) | Target Sediment Loading Rate | Final TMDL % Sediment Reduction Required | Area of Warminster TMDL Area in Watershed (acres; stream miles) | Warminster Existing Load (lb/year) | Warminster Allocated Wasteload (lb/year) |
| Hay/Pasture                | 2,726                                                          | 43,465                            | 15.94                              | 36,032                        | 13.22                        | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Cropland                   | 7,989                                                          | 1,053,201                         | 131.83                             | 873,004                       | 109.28                       | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Coniferous Forest          | 296                                                            | 243                               | 0.82                               | 201                           | 0.68                         | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Mixed Forest               | 1,911                                                          | 2,252                             | 1.18                               | 1,867                         | 0.98                         | 17.1%                                    | 53.0                                                            | 62                                 | 52                                       |
| Deciduous Forest           | 6,918                                                          | 10,110                            | 1.46                               | 8,381                         | 1.21                         | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Unpaved Roads              | 7                                                              | 3,289                             | 469.86                             | 2,727                         | 389.57                       | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Transitional Land          | 17                                                             | 826,324                           | 48,607.29                          | 685,023                       | 40,295.47                    | 17.1%                                    | 0.0                                                             | 0                                  | 0                                        |
| Low Intensity Development  | 5,640                                                          | 136,071                           | 24.13                              | 112,603                       | 19.97                        | 17.1%                                    | 1,826.3                                                         | 44,062                             | 36,463                                   |
| High Intensity Development | 1,758                                                          | 30,949                            | 17.60                              | 25,657                        | 14.59                        | 17.1%                                    | 227.1                                                           | 3,998                              | 3,315                                    |
| Streambank Erosion         | 47.2                                                           | 6,263,576                         | 132,703                            | 5,192,105                     | 110,002                      | 17.1%                                    | 3.0                                                             | 402,090                            | 333,307                                  |
| <b>TOTAL</b>               |                                                                |                                   |                                    |                               |                              |                                          | <b>2,106.4 acres</b>                                            | <b>450,212</b>                     | <b>373,136</b>                           |

All information in the first 7 columns are from Table C2.5. "Sediment Load Allocation by Each Land Use/Source" of Neshaminy Creek TMDL.  
 Warminster Existing Load (lb/year) = Warminster Acres (Ac) \* Existing Loading Rate (lb/ac/year)  
 Warminster Allocated Wasteload (lb/year) = Warminster Acres (Ac) \* Target Loading Rate (lb/ac/year)  
 Streambank Erosion Loading Rates = Warminster Area (stream miles) \* Target Loading Rate (lb/mi/year)

**Appendix D-3: Existing Pollutant Loads - Neshaminy Creek Watershed**

PRP Planning Area - TP Load Calculation

| Public Streets & Rights-of-Way |                            |  |  |                    |  |  |  |  |  |                                                            |                                                                      |                          |
|--------------------------------|----------------------------|--|--|--------------------|--|--|--|--|--|------------------------------------------------------------|----------------------------------------------------------------------|--------------------------|
| Land Cover                     | Land Use                   |  |  | Total Area (acres) |  |  |  |  |  | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) | Total TP Load (lbs/year) |
| Various                        | Low Intensity Development  |  |  | 324.6              |  |  |  |  |  | 119,395                                                    | 367.80                                                               | 431.3                    |
| Various                        | High Intensity Development |  |  | 33.4               |  |  |  |  |  | 51,370                                                     | 1,536.94                                                             | 109.4                    |
| <b>TOTAL</b>                   |                            |  |  | <b>358.0</b>       |  |  |  |  |  | <b>170,765</b>                                             |                                                                      | <b>540.7</b>             |

| Residential Analysis |                            |                           |                                 |                    |                 |                  |                        |                    |                                                            |                                                                      |                          |                 |
|----------------------|----------------------------|---------------------------|---------------------------------|--------------------|-----------------|------------------|------------------------|--------------------|------------------------------------------------------------|----------------------------------------------------------------------|--------------------------|-----------------|
| Zone                 | Land Use                   | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Driveway (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) | Total TP Load (lbs/year) |                 |
| R1                   | Low Intensity Development  | 20                        | 35                              | 191.3              | 38.26           | 28.7             | 57.4                   | 67.0               | 46,513                                                     | 243.14                                                               | 313.36                   |                 |
| R2                   | Low Intensity Development  | 25                        | 35                              | 978.8              | 244.675         | 97.9             | 293.6                  | 342.5              | 219,281                                                    | 224.05                                                               | 1,445.08                 |                 |
| R3                   | Low Intensity Development  | 30                        | 35                              | 18.8               | 5.64            | 0.9              | 5.6                    | 6.6                | 3,853                                                      | 204.96                                                               | 24.72                    |                 |
| R4                   | High Intensity Development | 25                        | 35                              | 57.5               | 14.375          | 5.8              | 17.3                   | 20.1               | 12,883                                                     | 224.05                                                               | 84.90                    |                 |
| AQC                  | Low Intensity Development  | 40                        | 50                              | 8.2                | 3.28            | 0.8              | 2.5                    | 2.9                | 2,090                                                      | 254.89                                                               | 13.67                    |                 |
| CCRC                 | Low Intensity Development  | 35                        | 45                              | 44.8               | 15.68           | 4.5              | 13.4                   | 15.7               | 10,959                                                     | 244.61                                                               | 71.85                    |                 |
| CCRC-2               | High Intensity Development | 17                        | 60                              | 15.0               | 2.55            | 6.5              | 4.5                    | 5.3                | 6,022                                                      | 401.44                                                               | 42.91                    |                 |
| <b>TOTAL</b>         |                            |                           |                                 | <b>1314.4</b>      |                 |                  |                        |                    |                                                            |                                                                      |                          | <b>1,996.50</b> |

| Commercial Analysis |                            |                           |                                 |                    |                 |                             |                              |                        |                    |                                                            |                                                                      |                          |
|---------------------|----------------------------|---------------------------|---------------------------------|--------------------|-----------------|-----------------------------|------------------------------|------------------------|--------------------|------------------------------------------------------------|----------------------------------------------------------------------|--------------------------|
| Zone                | Land Use                   | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Low Traffic Parking (acres) | High Traffic Parking (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) | Total TP Load (lbs/year) |
| C-1                 | High Intensity Development | 25                        | 50                              | 38.7               | 38.26           | 9.675                       | 0                            | 5.805                  | 13.545             | 11,494                                                     | 296.99                                                               | 44.24                    |
| C-2                 | High Intensity Development | 25                        | 50                              | 22.2               | 244.675         | 5.55                        | 0                            | 3.33                   | 7.77               | 6,593                                                      | 296.99                                                               | 25.38                    |
| IO                  | High Intensity Development | 35                        | 65                              | 18.8               | 5.64            | 0                           | 1.974                        | 2.82                   | 6.58               | 4,422                                                      | 235.22                                                               | 16.98                    |
| I                   | High Intensity Development | 25                        | 50                              | 99                 | 14.375          | 0                           | 6.1875                       | 14.85                  | 34.65              | 18,863                                                     | 190.53                                                               | 76.82                    |
| G                   | Low Intensity Development  | 25                        | 50                              | 49.2               | 3.28            | 12.3                        | 0                            | 7.38                   | 17.22              | 14,612                                                     | 296.99                                                               | 56.24                    |
| <b>TOTAL</b>        |                            |                           |                                 | <b>227.9</b>       |                 |                             |                              |                        |                    |                                                            |                                                                      | <b>219.65</b>            |

| Open Space Analysis |                           |  |  |                    |  |  |  |  |  |                                                            |                                                                      |                          |
|---------------------|---------------------------|--|--|--------------------|--|--|--|--|--|------------------------------------------------------------|----------------------------------------------------------------------|--------------------------|
| Land Cover          | Land Use                  |  |  | Total Area (acres) |  |  |  |  |  | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) | Total TP Load (lbs/year) |
| Impervious          | Low Intensity Development |  |  | 17.0               |  |  |  |  |  |                                                            |                                                                      |                          |
| Wooded              | Forest                    |  |  | 53.0               |  |  |  |  |  |                                                            |                                                                      |                          |
| Meadow              | Hay/Pasture               |  |  | 0.0                |  |  |  |  |  |                                                            |                                                                      |                          |
| Ball Field          | Low Intensity Development |  |  | 3.0                |  |  |  |  |  |                                                            |                                                                      |                          |
| Lawn                | Low Intensity Development |  |  | 133.1              |  |  |  |  |  |                                                            |                                                                      |                          |
| <b>TOTAL</b>        |                           |  |  | <b>206.1</b>       |  |  |  |  |  | <b>48,646</b>                                              | <b>236.03</b>                                                        | <b>169.09</b>            |

**Appendix D-3: Existing Pollutant Loads - Pennypack Creek Watershed**

PRP Planning Area - Sediment and TP Load Calculations

| Public Streets & Rights-of-Way |                            |                    |  |  |  |  |  |                                |                                          |                          |
|--------------------------------|----------------------------|--------------------|--|--|--|--|--|--------------------------------|------------------------------------------|--------------------------|
| Land Cover                     | Land Use                   | Total Area (acres) |  |  |  |  |  | Total Sediment Load (lbs/year) | Zone/Land Cover EMC for TSS (lb/yr/acre) | Total TP Load (lbs/year) |
| Various                        | Low Intensity Development  | 75.8               |  |  |  |  |  | 28,458                         | 375.68                                   | 104.5                    |
| Various                        | High Intensity Development | 53.7               |  |  |  |  |  | 155,189                        | 1388.52                                  | 359.3                    |
| <b>TOTALS</b>                  |                            | <b>129.5</b>       |  |  |  |  |  | <b>183,647</b>                 |                                          | <b>463.8</b>             |

| Residential Analysis |                           |                                 |                    |                 |                  |                        |                    |                                |                                          |                          |
|----------------------|---------------------------|---------------------------------|--------------------|-----------------|------------------|------------------------|--------------------|--------------------------------|------------------------------------------|--------------------------|
| Zone                 | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Driveway (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (lbs/year) | Zone/Land Cover EMC for TSS (lb/yr/acre) | Total TP Load (lbs/year) |
| R1                   | 20                        | 35                              | 0.3                | 0.1             | 0.0              | 0.1                    | 0.1                | 70                             | 243.14                                   | 0.5                      |
| R2                   | 25                        | 35                              | 364.0              | 91.0            | 36.4             | 109.2                  | 127.4              | 81,555                         | 224.05                                   | 537.5                    |
| R3                   | 30                        | 35                              | 242.0              | 72.6            | 12.1             | 72.6                   | 84.7               | 49,601                         | 204.96                                   | 318.2                    |
| R4                   | 25                        | 35                              | 63.0               | 15.8            | 6.3              | 18.9                   | 22.1               | 14,115                         | 224.05                                   | 93.0                     |
| AQC                  | 40                        | 50                              | 0.0                | 0.0             | 0.0              | 0.0                    | 0.0                | 0                              | 0.00                                     | 0.0                      |
| CCRC                 | 35                        | 45                              | 0.0                | 0.0             | 0.0              | 0.0                    | 0.0                | 0                              | 0.00                                     | 0.0                      |
| CCRC-2               | 17                        | 60                              | 0.0                | 0.0             | 0.0              | 0.0                    | 0.0                | 0                              | 0.00                                     | 0.0                      |
| <b>TOTALS</b>        |                           |                                 | <b>669.3</b>       |                 |                  |                        |                    | <b>145,342</b>                 |                                          | <b>949.2</b>             |

| Commercial Analysis |                           |                                 |                    |                 |                             |                              |                        |                    |                              |                                          |                          |
|---------------------|---------------------------|---------------------------------|--------------------|-----------------|-----------------------------|------------------------------|------------------------|--------------------|------------------------------|------------------------------------------|--------------------------|
| Zone                | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Low Traffic Parking (acres) | High Traffic Parking (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (lbs/yr) | Zone/Land Cover EMC for TSS (lb/yr/acre) | Total TP Load (lbs/year) |
| C-1                 | 25                        | 50                              | 53                 | 13.3            | 13.3                        | 0.0                          | 8.0                    | 18.6               | 15,741                       | 296.99                                   | 60.6                     |
| C-2                 | 25                        | 50                              | 7                  | 1.8             | 1.8                         | 0.0                          | 1.1                    | 2.5                | 2,079                        | 296.99                                   | 8.0                      |
| IO                  | 35                        | 65                              | 76                 | 26.6            | 0.0                         | 8.0                          | 11.4                   | 26.6               | 17,877                       | 235.22                                   | 68.6                     |
| I                   | 25                        | 50                              | 0                  | 0.0             | 0.0                         | 0.0                          | 0.0                    | 0.0                | 0                            | 0.00                                     | 0.0                      |
| G                   | 25                        | 50                              | 17                 | 4.3             | 4.3                         | 0.0                          | 2.6                    | 6.0                | 5,049                        | 296.99                                   | 19.4                     |
| <b>TOTALS</b>       |                           |                                 | <b>153.0</b>       |                 |                             |                              |                        |                    | <b>40,745</b>                |                                          | <b>156.7</b>             |

| Open Space Analysis |                    |                         |                     |                |                    |                    |                              |                                          |                          |  |
|---------------------|--------------------|-------------------------|---------------------|----------------|--------------------|--------------------|------------------------------|------------------------------------------|--------------------------|--|
| Zone                | Total Area (acres) | Impervious Area (acres) | Wooded Area (acres) | Meadow (acres) | Ball Field (acres) | Lawn Areas (acres) | Total Sediment Load (lbs/yr) | Zone/Land Cover EMC for TSS (lb/yr/acre) | Total TP Load (lbs/year) |  |
| Open Space          | <b>62.0</b>        | 1.00                    | 0.00                | 0.00           | 0.95               | 60.05              | <b>16,608</b>                | 267.87                                   | <b>40.1</b>              |  |

**Appendix D-3: Existing Pollutant Loads - Southampton Creek Watershed**

TMDL Planning Area - Sediment and TP Load Calculations

| Sediment Load Calculation  |                                         |                                                |                                 |                                              |                                  |                                          |                                         |                                                                 |
|----------------------------|-----------------------------------------|------------------------------------------------|---------------------------------|----------------------------------------------|----------------------------------|------------------------------------------|-----------------------------------------|-----------------------------------------------------------------|
| Land Use Source            | Area of Warminster in Watershed<br>(ac) | Existing Sediment Loading Rate<br>(lb/ac/year) | Existing Wasteload<br>(lb/year) | Target Sediment Loading Rate<br>(lb/ac/year) | Allocated Wasteload<br>(lb/year) | Final TMDL % Sediment Reduction Required | TMDL Planning Area in Watershed<br>(ac) | Existing Sediment Wasteload for TMDL Planning Area<br>(lb/year) |
| Hay/Pasture                | 56                                      | 93                                             | 5,208                           | 42                                           | 2,342                            | 55.03%                                   | 0                                       | 0                                                               |
| Cropland                   | 51                                      | 758                                            | 38,658                          | 623                                          | 31,890                           | 17.51%                                   | 0                                       | 0                                                               |
| Forest                     | 196                                     | 7                                              | 1,372                           | 4                                            | 786                              | 42.71%                                   | 33.0                                    | 231                                                             |
| Transitional Land          | 4                                       | 2,708                                          | 10,832                          | 1,229                                        | 4,918                            | 54.60%                                   | 0                                       | 0                                                               |
| Low Intensity Development  | 928                                     | 98                                             | 90,944                          | 50                                           | 46,517                           | 48.85%                                   | 833.2                                   | 81,655                                                          |
| High Intensity Development | 110                                     | 56                                             | 6,160                           | 45                                           | 4,927                            | 20.02%                                   | 28.6                                    | 1,604                                                           |
| Streambank Erosion         | 32.72%                                  | 1,216,589                                      | 398,068                         | 844,428                                      | 276,297                          | 30.59%                                   |                                         | 398,068                                                         |
| <b>TOTAL</b>               | <b>1344</b>                             |                                                | <b>551,242</b>                  |                                              | <b>367,675</b>                   | <b>33.30%</b>                            | <b>894.8</b>                            | <b>481,558</b>                                                  |

Area of Warminster in Watershed from Table 18 "Sediment WLAs for MS4 Municipalities in Southampton Watershed" of Southampton Creek TMDL.  
 Existing Sediment Loading Rate (lb/ac/year) from Table 12 "Existing Sediment Load for Southampton Creek Watershed" of Southampton Creek TMDL.  
 Existing Waste Load (lb/year) = Acres \* Existing Loading Rates  
 Target Sediment Loading Rate (lb/ac/year) from Table 19 "Land Use Loading Rates for MS4 WLAs" of Southampton Creek TMDL  
 Allocated Waste Load (lb/year) = Acres \* Allocated Loading from Table 18 "Sediment WLAs for MS4 Municipalities in Southampton Watershed" of Southampton Creek TMDL.  
 Final TMDL % Reduction Required = (Existing Waste Load - Allocated Waste Load)/Existing Waste Load  
 TMDL Planning Area in Watershed from TMDL Planning Area tables  
 Existing Sediment Waste Load for TMDL Planning Area (lb/ac/year) = TMDL Planning Area \* Existing Loading Rates

| Total Phosphorous (TP) Load Calculation |                    |                    |                                            |                                              |                                          |                                         |                                 |                                  |                                         |                                                           |
|-----------------------------------------|--------------------|--------------------|--------------------------------------------|----------------------------------------------|------------------------------------------|-----------------------------------------|---------------------------------|----------------------------------|-----------------------------------------|-----------------------------------------------------------|
| Land Use Source                         | Total Area<br>(Ha) | Total Area<br>(ac) | 23 Year Existing Wasteload TP Mass<br>(kg) | 23 Year Existing Wasteload TP Weight<br>(lb) | Existing TP Loading Rate<br>(lb/ac/year) | Area of Warminster in Watershed<br>(ac) | Existing Wasteload<br>(lb/year) | Allocated Wasteload<br>(lb/year) | TMDL Planning Area in Watershed<br>(ac) | Existing TP Wasteload for TMDL Planning Area<br>(lb/year) |
| Hay/Pasture                             | 19                 | 46.95              | 3.26                                       | 231.42                                       | 0.2143                                   | 56                                      | 12.00                           | 0.10                             | 0                                       | 0.00                                                      |
| Cropland                                | 78                 | 192.74             | 32.70                                      | 2,321.33                                     | 0.5236                                   | 51                                      | 26.71                           | 0.22                             | 0                                       | 0.00                                                      |
| Coniferous Forest                       | 25                 | 61.78              | 0.12                                       | 8.52                                         | 0.0060                                   | 0                                       | 0.00                            | 0.00                             | 0                                       | 0.00                                                      |
| Mixed Forest                            | 28                 | 69.19              | 0.13                                       | 9.23                                         | 0.0058                                   | 196                                     | 1.14                            | 0.01                             | 33.0                                    | 0.19                                                      |
| Deciduous Forest                        | 109                | 269.34             | 0.51                                       | 36.20                                        | 0.0058                                   | 0                                       | 0.00                            | 0.00                             | 0.0                                     | 0.00                                                      |
| Transition                              | 15                 | 37.07              | 15.23                                      | 1,081.16                                     | 1.2682                                   | 4                                       | 5.07                            | 0.00                             | 0.0                                     | 0.00                                                      |
| Low Intensity Development               | 973                | 2,404.33           | 56.56                                      | 4,015.12                                     | 0.0726                                   | 928                                     | 67.38                           | 0.55                             | 833.2                                   | 60.50                                                     |
| High Intensity Development              | 329                | 812.98             | 46.51                                      | 3,301.69                                     | 0.1766                                   | 110                                     | 19.42                           | 0.16                             | 28.6                                    | 5.06                                                      |
| Streambank                              |                    |                    | 19.40                                      | 1,377.18                                     | 59.8775                                  | 32.72%                                  | 19.59                           | 0.16                             |                                         | 19.59                                                     |
| Groundwater                             |                    |                    | 116.88                                     | 8,297.17                                     | 360.7464                                 | 34.51%                                  | 124.50                          | 1.01                             |                                         | 124.50                                                    |
| Septic System                           |                    |                    | 3.41                                       | 242.07                                       |                                          | 0                                       | 0.00                            | 0.00                             |                                         | 0.00                                                      |
| <b>TOTAL:</b>                           |                    | <b>3,894.37</b>    | <b>294.71</b>                              | <b>20,921.10</b>                             |                                          | <b>1344</b>                             | <b>275.81</b>                   | <b>2.19</b>                      | <b>894.9</b>                            | <b>209.84</b>                                             |

Total Area (Ha) and 23 Year Existing TP (kg) from Appendix C "Summary of AVGWLF Model Output for Southampton Watershed" of Southampton Creek TMDL  
 Total Area (ac) and 23 Year Existing TP (lb) are based on standard conversion factors: 1 Ha = 2.47105 ac; 1 kg = 2.20462 lbm; Weight (lb) = mass (lbm) \* 32.2 ft/sec/sec  
 Existing TP Loading Rates (lb/ac/year) = 23 Year Existing Waste Load TP (lb)/Total Area (ac)/23 years  
 Area of Warminster in Watershed (Ac) from Table 18 "Sediment WLAs for MS4 Municipalities in Southampton Watershed" of Southampton Creek TMDL. All Forest assumed to be Mixed Forest, since no Forest type breakdown is available and all 3 forest types have existing loading rate TP of approximately 0.0002lb/ac/yr. Groundwater percentage based on area of Warminster in Watershed (ac)/Total Area in Southampton Creek Watershed  
 Existing Waste Load (lb/year) = Warminster Acres (Ac) \* Existing Loading TP (lb/ac/yr)  
 Allocated Waste Load (lb/year) from Table 24 "TP WLAs for MS4 Municipalities in Southampton Watershed" of Southampton Creek TMDL  
 TMDL Planning Area in Watershed from TMDL Planning Area tables  
 Existing TP Waste Load for TMDL Planning Area (lb/ac/year) = TMDL Planning Area \* Existing Loading Rates

**Appendix D-3: Existing Pollutant Loads - Southampton Creek Watershed**

**Public Streets & Rights-of-Way**

| Land Cover | Land Use                  |  |  | Total Area (acres) |  |  |  |  | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) |
|------------|---------------------------|--|--|--------------------|--|--|--|--|------------------------------------------------------------|----------------------------------------------------------------------|
| Various    | Low Intensity Development |  |  | 123.0              |  |  |  |  | 44,818                                                     | 364.34                                                               |

**Residential Analysis**

| Zone         | Land Use                   | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Driveway (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) |
|--------------|----------------------------|---------------------------|---------------------------------|--------------------|-----------------|------------------|------------------------|--------------------|------------------------------------------------------------|----------------------------------------------------------------------|
| R1           | Low Intensity Development  | 20                        | 35                              | 171.0              | 34.2            | 25.7             | 51.3                   | 59.9               | 41,577                                                     | 243.14                                                               |
| R2           | Low Intensity Development  | 25                        | 35                              | 379.0              | 94.75           | 37.9             | 113.7                  | 132.7              | 84,916                                                     | 224.05                                                               |
| R3           | Low Intensity Development  | 30                        | 35                              | 0.0                | 0               | 0.0              | 0.0                    | 0.0                | 0                                                          | 0.00                                                                 |
| R4           | High Intensity Development | 25                        | 35                              | 11.0               | 2.75            | 1.1              | 3.3                    | 3.9                | 2,465                                                      | 224.05                                                               |
| AQC          | Low Intensity Development  | 40                        | 50                              | 0.0                | 0               | 0.0              | 0.0                    | 0.0                | 0                                                          | 0.00                                                                 |
| CCRC         | Low Intensity Development  | 35                        | 45                              | 13.2               | 4.2             | 1.2              | 3.6                    | 4.2                | 2,935                                                      | 244.61                                                               |
| CCRC-2       | High Intensity Development | 17                        | 60                              | 0.0                | 0               | 0.0              | 0.0                    | 0.0                | 0                                                          | 0.00                                                                 |
| <b>TOTAL</b> |                            |                           |                                 | <b>574.2</b>       |                 |                  |                        |                    |                                                            |                                                                      |

**Commercial Analysis**

| Zone         | Land Use                   | Maximum Building Area (%) | Maximum Impervious Coverage (%) | Total Area (acres) | Rooftop (acres) | Low Traffic Parking (acres) | High Traffic Parking (acres) | Planting Areas (acres) | Lawn Areas (acres) | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) |
|--------------|----------------------------|---------------------------|---------------------------------|--------------------|-----------------|-----------------------------|------------------------------|------------------------|--------------------|------------------------------------------------------------|----------------------------------------------------------------------|
| C-1          | High Intensity Development | 25                        | 50                              | 7.0                | 1.8             | 1.8                         | 0.0                          | 1.1                    | 2.5                | 2,079                                                      | 296.99                                                               |
| C-2          | High Intensity Development | 25                        | 50                              | 3.0                | 0.8             | 0.8                         | 0.0                          | 0.5                    | 1.1                | 891                                                        | 296.99                                                               |
| IO           | High Intensity Development | 35                        | 65                              | 7.6                | 2.8             | 0.0                         | 0.8                          | 1.2                    | 2.8                | 1,882                                                      | 235.22                                                               |
| I            | High Intensity Development | 25                        | 50                              | 0.0                | 0.0             | 0.0                         | 0.0                          | 0.0                    | 0.0                | 0                                                          | 0.00                                                                 |
| G            | Low Intensity Development  | 25                        | 50                              | 8.0                | 2.0             | 2.0                         | 0.0                          | 1.2                    | 2.8                | 2,376                                                      | 296.99                                                               |
| <b>TOTAL</b> |                            |                           |                                 | <b>25.6</b>        |                 |                             |                              |                        |                    |                                                            |                                                                      |

**Open Space Analysis**

| Land Cover   | Land Use                  |  |  | Total Area (acres) |  |  |  |  | Total Sediment Load (for BMP calculations only) (lbs/year) | Zone/Land Cover EMC for TSS (for BMP calculations only) (lb/yr/acre) |
|--------------|---------------------------|--|--|--------------------|--|--|--|--|------------------------------------------------------------|----------------------------------------------------------------------|
| Impervious   | Low Intensity Development |  |  | 9                  |  |  |  |  |                                                            |                                                                      |
| Wooded       | Forest                    |  |  | 33                 |  |  |  |  |                                                            |                                                                      |
| Meadow       | Hay/Pasture               |  |  | 0                  |  |  |  |  |                                                            |                                                                      |
| Ball Field   | Low Intensity Development |  |  | 0                  |  |  |  |  |                                                            |                                                                      |
| Lawn         | Low Intensity Development |  |  | 130                |  |  |  |  |                                                            |                                                                      |
| <b>TOTAL</b> |                           |  |  | <b>172.0</b>       |  |  |  |  | 41,310                                                     | 240.17                                                               |

Appendix D-4: Existing Loads Summary & Required Reduction Calculations

**Area Calculation Summary**

|                    | Total Township Area (Acres) | Parsed Areas (Acres) | PRP/ TMDL Planning Area (Acres) | Township ROW (Acres) | Residential (Acres) | Commercial (Acres) | Open Space (Acres) |
|--------------------|-----------------------------|----------------------|---------------------------------|----------------------|---------------------|--------------------|--------------------|
| <b>NESHAMINY</b>   | 3,486.2                     | 1,379.8              | 2,106.4                         | 358.0                | 1,314.4             | 227.9              | 206.1              |
| <b>PENNPACK</b>    | 1,659.5                     | 587.6                | 1,071.9                         | 187.5                | 668.9               | 153.5              | 62.0               |
| <b>SOUTHAMPTON</b> | 1,344.0                     | 449.2                | 894.8                           | 123.0                | 574.2               | 25.6               | 172.0              |

**Sediment Loading Summary**

|                                                | Existing Township Load (lbs/year) | Existing Forest Load (lbs/year)                                           | Existing Low Density Development Load (lbs/year) | Existing High Density Development Load (lbs/year) | Existing Streambank Erosion Load (lbs/year) |
|------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|---------------------------------------------|
| <b>NESHAMINY</b>                               | 450,212                           | 62                                                                        | 44,062                                           | 3,998                                             | 402,090                                     |
| <b>10% Reduction Required (lbs/year)</b>       | 45,021                            | 5-year Permit Reduction Required                                          |                                                  |                                                   |                                             |
| <b>PENNPACK</b>                                | 386,342                           | 183,647                                                                   | 145,342                                          | 40,745                                            | 16,608                                      |
| If PRP Planning Area was all wooded (lbs/year) | 43,562                            | Municipality Not Able to Reduce Coverage Beyond Original Wooded Landscape |                                                  |                                                   |                                             |
| <b>Modified Township Load (lbs/year)</b>       | 342,781                           | Township Load Less Wooded Landscape Load                                  |                                                  |                                                   |                                             |
| <b>10% Reduction Required (lbs/year)</b>       | 34,278                            | 5-year Permit Reduction Required                                          |                                                  |                                                   |                                             |
| <b>SOUTHAMPTON</b>                             | 481,558                           | 231                                                                       | 81,655                                           | 1,604                                             | 398,068                                     |
| <b>10% Reduction Required (lbs/year)</b>       | 48,156                            | 5-year Permit Reduction Required                                          |                                                  |                                                   |                                             |

Appendix D-4: Existing Loads Summary & Required Reduction Calculations

**Total Phosphorous (TP) Loading Summary**

| MUNICIPALITY       | Existing Township Load (lbs/year)              | Existing ROW Load (lbs/year)                                              | Existing Residential Load (lbs/year)             | Existing Commercial Load (lbs/year)               | Existing Open Space Load (lbs/year)         |                                      |
|--------------------|------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|---------------------------------------------|--------------------------------------|
|                    | <b>NESHAMINY</b>                               | 2,925.9                                                                   | 540.7                                            | 1,996.5                                           | 219.6                                       | 169.1                                |
|                    | If PRP Planning Area was all wooded (lbs/year) | Municipality Not Able to Reduce Coverage Beyond Original Wooded Landscape |                                                  |                                                   |                                             |                                      |
|                    | 329.2                                          |                                                                           |                                                  |                                                   |                                             |                                      |
|                    | <b>Modified Township Load (lbs/year)</b>       | Township Load Less Wooded Landscape Load                                  |                                                  |                                                   |                                             |                                      |
|                    | <b>2,596.7</b>                                 |                                                                           |                                                  |                                                   |                                             |                                      |
|                    | <b>5% Reduction Assumed (lbs/year)</b>         | 5-year Permit Reduction Assumption                                        |                                                  |                                                   |                                             |                                      |
|                    | <b>129.83</b>                                  |                                                                           |                                                  |                                                   |                                             |                                      |
| <b>PENNYPACK</b>   | Existing Township Load (lbs/year)              | Existing ROW Load (lbs/year)                                              | Existing Residential Load (lbs/year)             | Existing Commercial Load (lbs/year)               | Existing Open Space Load (lbs/year)         |                                      |
|                    | 1,609.7                                        | 463.8                                                                     | 949.2                                            | 156.7                                             | 40.1                                        |                                      |
|                    | If PRP Planning Area was all wooded (lbs/year) | Municipality Not Able to Reduce Coverage Beyond Original Wooded Landscape |                                                  |                                                   |                                             |                                      |
|                    | 167.5                                          |                                                                           |                                                  |                                                   |                                             |                                      |
|                    | <b>Modified Township Load (lbs/year)</b>       | Township Load Less Wooded Landscape Load                                  |                                                  |                                                   |                                             |                                      |
|                    | <b>1,442.2</b>                                 |                                                                           |                                                  |                                                   |                                             |                                      |
|                    | <b>5% Reduction Assumed (lbs/year)</b>         | 5-year Permit Reduction Assumption                                        |                                                  |                                                   |                                             |                                      |
|                    | <b>72.11</b>                                   |                                                                           |                                                  |                                                   |                                             |                                      |
| <b>SOUTHAMPTON</b> | Existing Township Load (lbs/year)              | Existing Forest Load (lbs/year)                                           | Existing Low Density Development Load (lbs/year) | Existing High Density Development Load (lbs/year) | Existing Streambank Erosion Load (lbs/year) | Existing Groundwater Load (lbs/year) |
|                    | <b>209.84</b>                                  | 0.19                                                                      | 60.50                                            | 5.06                                              | 19.59                                       | 124.50                               |
|                    | <b>5% Reduction Assumed (lbs/year)</b>         | 5-year Permit Reduction Assumption                                        |                                                  |                                                   |                                             |                                      |
|                    | <b>10.49</b>                                   |                                                                           |                                                  |                                                   |                                             |                                      |

## Appendix E

### Loading Calculations

|               |                             |
|---------------|-----------------------------|
| Appendix E-1: | Stream Restoration          |
| Appendix E-2: | Barness Park Basin          |
| Appendix E-3: | Munroe Park Vegetated Swale |
| Appendix E-4: | Szymanek Park Basin         |
| Appendix E-5: | Shenandoah Woods Basin      |

## Appendix E-1: Stream Restoration

|                                                     |               |              |
|-----------------------------------------------------|---------------|--------------|
| Stream Restoration BMP Sediment Effectiveness Value | 44.88         | lb/ft/yr     |
| Length of stream bank restored (one side)           | 495           | ft           |
| Length of stream bank restored (both sides)         | 990           | ft           |
| <b>Sediment Load Reduction (both sides)</b>         | <b>44,431</b> | <b>lb/yr</b> |

BMP Name and BMP Sediment Effectiveness Values from the PADEP's BMP Effectiveness Values document (3800-PM-BCW0100m)

## Appendix E-2: Barnes Park Basin

| Zone/Land Cover | Area (SF)      | Area (Acres) | Zone/Land Cover EMC for TSS<br>(lb/year/acre) | Sediment Loading<br>(lbs/year) |
|-----------------|----------------|--------------|-----------------------------------------------|--------------------------------|
| R2              | 556,318        | 12.77        | 224.05                                        | 2,861                          |
| ROW             | 114,391        | 2.63         | 367.80                                        | 966                            |
| <b>Total</b>    | <b>670,709</b> | <b>15.40</b> |                                               | <b>3,827</b>                   |

Sediment Loading = [EMC, lb/year/acre] X [Area of Zone/Land Cover, acres]

| BMP Name                             | BMP Sediment Effectiveness<br>Value | Sediment Load<br>Reduction (lbs/year) |
|--------------------------------------|-------------------------------------|---------------------------------------|
| Dry Extended Detention Basin         | 0.60                                | <b>2,296</b>                          |
| Infiltration Practices w/ Sand, Veg. | 0.95                                | <b>3,636</b>                          |

BMP Name and BMP Sediment Effectiveness Values from the PADEP's BMP Effectiveness Values document (3800-PM-BCW0100m)

### Appendix E-3: Munroe Park Vegetated Swale

| Zone/Land Cover          | Area (SF)      | Area (Acres) | EMC for TSS (mg/l) | Average Annual Runoff (in/year) | Sediment Loading (lbs/year) |
|--------------------------|----------------|--------------|--------------------|---------------------------------|-----------------------------|
| G Grassed Athletic Field | 915,385        | 21.01        | 200                | 7.39                            | 6,987                       |
| G Various Impervious     | 36,117         | 0.83         | 60                 | 43.51                           | 487                         |
| <b>Total</b>             | <b>951,502</b> | <b>21.84</b> |                    |                                 | <b>7,474</b>                |

Sediment Loading = [EMC, mg/l] X [Area of Zone/Land Cover, acres] X [Average Annual Runoff, in/yr] X [1 ft/12 in conversion] X [2.7, Unit Conversion]

| BMP Name                          | BMP Sediment Effectiveness Value | Sediment Load Reduction (lbs/year) |
|-----------------------------------|----------------------------------|------------------------------------|
| Filter Strip Stormwater Treatment | 0.22                             | <b>1,644</b>                       |
| Filter Strip Runoff Reduction     | 0.56                             | <b>4,185</b>                       |
| Bioswale                          | 0.80                             | <b>5,979</b>                       |

BMP Name and BMP Sediment Effectiveness Values from the PADEP's BMP Effectiveness Values document (3800-PM-BCW0100m)

## Appendix E-4: Szymanek Park Basin

| Zone/Land Cover | Area (SF)        | Area (Acres) | Zone/Land Cover EMC for TSS<br>(lb/year/acre) | Sediment Loading<br>(lbs/year) |
|-----------------|------------------|--------------|-----------------------------------------------|--------------------------------|
| C1              | 278,457          | 6.39         | 296.99                                        | 1,898                          |
| G               | 474,509          | 10.89        | 296.99                                        | 3,234                          |
| R2              | 390,826          | 8.97         | 224.05                                        | 2,010                          |
| ROW             | 73,186           | 1.68         | 375.68                                        | 631                            |
| <b>Total</b>    | <b>1,216,979</b> | <b>27.94</b> |                                               | <b>7,773</b>                   |

Sediment Loading = [EMC, lb/year/acre] X [Area of Zone/Land Cover, acres]

| BMP Name                             | BMP Sediment Effectiveness<br>Value | Sediment Load<br>Reduction (lbs/year) |
|--------------------------------------|-------------------------------------|---------------------------------------|
| Dry Extended Detention Basin         | 0.60                                | <b>4,664</b>                          |
| Infiltration Practices w/ Sand, Veg. | 0.95                                | <b>7,384</b>                          |

BMP Name and BMP Sediment Effectiveness Values from the PADEP's BMP Effectiveness Values document (3800-PM-BCW0100m)

## Appendix E-5: Shenandoah Woods Basin

| Zone/Land Cover | Area (SF)        | Area (Acres) | Zone/Land Cover EMC for TSS<br>(lb/year/acre) | Sediment Loading<br>(lbs/year) |
|-----------------|------------------|--------------|-----------------------------------------------|--------------------------------|
| R1              | 446,259          | 10.24        | 243.14                                        | 2,490                          |
| R2              | 569,733          | 13.08        | 224.05                                        | 2,931                          |
| G               | 2,471,670        | 56.74        | 296.99                                        | 16,851                         |
| ROW             | 157,186          | 3.61         | 364.34                                        | 1,315                          |
| <b>Total</b>    | <b>3,644,848</b> | <b>83.67</b> |                                               | <b>23,586</b>                  |

Sediment Loading = [EMC, lb/year/acre] X [Area of Zone/Land Cover, acres]

| BMP Name                             | BMP Sediment Effectiveness<br>Value | Sediment Load<br>Reduction (lbs/year) |
|--------------------------------------|-------------------------------------|---------------------------------------|
| Dry Extended Detention Basin         | 0.60                                | <b>14,152</b>                         |
| Infiltration Practices w/ Sand, Veg. | 0.95                                | <b>22,407</b>                         |

BMP Name and BMP Sediment Effectiveness Values from the PADEP's BMP Effectiveness Values document (3800-PM-BCW0100m)