NPDES Stormwater Discharges from MS4
Pollutant Reduction Plan
Pennsburg Borough
Montgomery County, Pennsylvania

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MS4 Pollutant Reduction Plan
Pennsburg Borough
Montgomery County, Pennsylvania

Table of Contents

List of Tables

Appendices

Pennsburg Borough, Montgomery County is submitting this Pollution Reduction Plan (PRP) in accordance with the requirements of *General Permit PAG-13 for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems* (MS4); specifically, in accordance with the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017)*. Pennsburg Borough must create a PRP due to discharges from their MS4 to the Green Lane Reservoir via a tributary of the Perkiomen Creek, which has been listed as impaired for Organic Enrichment/Low D.O.; see Appendix A.

The intent of this MS4 PRP is to establish the existing loading of pollutants discharged from the MS4 to Green Lane Reservoir, and to present a plan to reduce these pollutants. This MS4 PRP is organized to follow the *National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions* included as part of the *PAG-13 MS4 General Permit* package. This PRP may be evaluated and updated by Pennsburg Borough on an as-needed basis, based on its effectiveness in reducing pollutant loads in discharges from the regulated small MS4. If this occurs, Pennsburg Borough will work with the Department of Environmental Protection (DEP) for review and approval of any revisions or updates.

Each MS4 PRP must include the following Required PRP Elements:

Section A: Public Participation
Section B: Map
Section C: Pollutants of Concern
Section D: Determine Existing Loading for Pollutants of Concern
Section E: Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading
Section F: Identify Funding Mechanisms
Section G: Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

This PRP is organized to follow the above outline of required elements as shown on the following pages. Relevant verbiage from the PRP Instructions are reiterated herein for each of the above required PRP Elements.

A. Public Participation

As part of the preparation of this MS4 PRP, public participation is required. Pennsburg Borough shall complete the following public participation measures listed below, and report in the PRP that each was completed.

- The Borough shall make a complete copy of the PRP available for public review.

- The Borough shall 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 Borough 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 PRP to DEP. **Include a copy of the public notice with the PRP**.

- The Borough shall accept written comments for a minimum of 30 days from the date of public notice. **Include a copy of all written comments received from the public with the PRP**.

- The Borough shall 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 or municipal authority that is the permittee.

- The Borough shall 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. **Include a copy of the Borough's record of consideration of all timely comments received in the public comment period with the PRP**.

Pennsburg Borough has completed the above-listed Public Participation measures and all required documentation of public participation is included as Appendix B.

- PRP public notice was published in: _____

- Date PRP public notice was published in newspaper: _____
- Date PRP was made available for public review/comment: _____
- End date for receipt of written comments (30 days from the date of public notice): _____
- Date PRP comments were accepted at a public meeting: _____

B. Map

Attach maps that identify **land uses** and the **storm sewershed boundaries** associated with the MS4 that discharge to impaired surface waters, and calculate the storm sewershed area that is subject to Appendix E of PAG-13. In addition, the proposed location(s) of structural BMP(s) that will be implemented to achieve the required pollutant load reductions must be identified on a map.

The map may be the same as that used to satisfy MCM #3 of the PAG-13 General or Individual Permit, with the addition of land use, the storm sewershed boundary, and locations of proposed BMPs, or may be a different map.

The map must be sufficiently detailed to identify the PRP Planning Area relevant to satisfying the requirements of Appendix E, and to demonstrate that BMPs will be located in appropriate storm sewersheds to meet the requirements.

NOTE – Delineation of storm sewersheds associated with individual MS4 outfalls is typically necessary in order to determine the PRP Planning Area. The MS4 may display the storm sewershed for each MS4 outfall or just the PRP Planning Area, at its discretion.

The map may show areas that are to be "parsed" from the PRP Planning Area. In other words, at the MS4's discretion (subject to DEP rules), certain areas may be shown on the map that are within the Planning Area but are not included in the calculation of land area and existing pollutant loading. Guidance on parsing is outlined below. Note that if parsing is done, BMPs implemented within the parsed area will not count toward achieving pollutant reduction objectives.

Parsing Guidelines for MS4s in Pollutant Reduction Plans

DEP has developed these guidelines to assist owners and operators of MS4s that are required to develop Pollutant Reduction Plans (PRPs) in understanding where it is possible to "parse" land area in the course of developing those plans. For the purpose of this document, parsing is

defined as a process in which land area is removed from a Planning Area in order to calculate the actual or target pollutant loads that are applicable to an MS4.

Parsing is not required by NPDES permits and is therefore optional; however, some MS4 permittees may benefit from parsing. When parsing is done, best management practices (BMPs) implemented within the land area that is parsed may not be considered for meeting pollutant loading reductions.

MS4s must identify the target pollutant loadings (i.e., existing pollutant loading minus loading reduced by existing BMPs). In order to estimate existing pollutant loading, MS4s may parse out appropriate land area.

All parsing must be supported by a map and a determination of the area being parsed and/or appropriate calculations demonstrating how the parsing was done.

Parsing for PRPs

Parsing provides an opportunity for an MS4 permittee to eliminate areas within the storm sewershed that do not drain to the MS4 and areas that are already covered by an NPDES permit (i.e., not a waiver or no exposure certification) for the control of stormwater. For example, the land area of an industrial site that is covered by the PAG-03 General Permit for Stormwater Associated with Industrial Activity that discharges stormwater to the MS4 may be parsed out of the assessment of land area within the storm sewershed that is subject to the calculation of existing pollutant loading. If, however, the industrial land area is removed, BMPs implemented on that land may not be used as credit toward meeting the MS4's pollutant loading reduction requirements. Other examples of land area that may be parsed include:

- The land area associated with non-municipal stormwater NPDES permit coverage that exists within the urbanized area of a municipality (in such cases the entities may submit a combined PRP);
- Land area associated with PennDOT roadways and the Pennsylvania Turnpike (roads and right of ways);

- Lands associated with the production area of a Concentrated Animal Feeding Operation that is covered by an NPDES permit;

- Land areas in which stormwater runoff does not enter the MS4. If an accurate storm sewershed map is developed, these lands may be parsed or excluded as part of that process. Potential examples include homeowner's associations and schools which do not contain municipal roads or other municipal infrastructure.

If parsing is initially done for the PRP but the MS4 permittee decides later that it would be in their best interests to include that land in the PRP, the permittee may submit a modified PRP to DEP, following the public participation requirements of Appendix E of the permit.

The MS4 PRP map(s) shall also show the proposed locations of structural BMPs that will be implemented to achieve the required pollutant load reductions.

The Pennsburg Borough MS4 PRP Map identifies the PRP Planning Areas for Green Lane Reservoir, which includes all storm sewershed boundaries, as well as the proposed locations of structural BMPs to be implemented to achieve required pollutant load reductions. The PRP Planning Area for Green Lane Reservoir was calculated to be 308 acres.

For clarity, land uses within the PRP Planning Areas are shown separately on the Pennsburg Borough MS4 PRP Land Uses (MapShed) Map.

The above referenced Maps are included in Appendix C.

C. Pollutants of Concern

Identify the pollutants of concern for each storm sewershed or the overall PRP Planning Area.

The term “nutrients” refers to “Total Nitrogen” (TN) and “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 in these instructions as well as the term “PRP Planning Area” (or “Planning Area”), which refers to all of the storm sewersheds that an MS4 must calculate existing loads and plan load reductions for.

For all PRPs, MS4s shall calculate existing loading of the pollutant(s) of concern in lb/year; calculate the minimum reduction in loading in lb/year; select Best Management Practice(s) (BMP(s)) to reduce loading; and demonstrate that the selected BMPs will achieve the minimum reductions.

For PRPs developed for Appendix E, 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 impaired downstream waters are the Green Lane Reservoir via a tributary of the Perkiomen Creek, which has been listed as impaired for Organic Enrichment/Low D.O.. Pennsburg Borough has elected to use a presumptive approach in which it is assumed that a 10%

sediment reduction will also accomplish a 5% TP reduction for the Green Lane Reservoir. This MS4 PRP presents the minimum reduction in loading for siltation as pounds per year (lb/yr).

D. Determine Existing Loading for Pollutants of Concern

Identify the date associated with the existing loading estimate. Calculate the existing loading, in lbs. per year, for the pollutant(s) of concern in the PRP Planning Area.

There are several possible methods to estimate existing loading, ranging from simplistic to complex. One method to estimate existing loading that is acceptable to DEP is to determine the percent impervious and pervious surface within the urbanized area of the storm sewershed and calculate existing loading by multiplying the developed impervious and developed pervious land areas (acres) by pollutant loading rates (lb/acre/year) ("simplified method"). The MS4 may use loading rates for undeveloped land for areas outside of the urbanized area which flows into the urbanized area. Where structural BMPs are currently in place and are functioning, the existing loading estimate may be reduced to account for pollutant reductions from those BMPs.

Use of DEP's simplified method is not required. Any methodology that calculates existing pollutant loading in terms of lbs. per year, evaluates BMP-based pollutant reductions utilizing the BMP effectiveness values contained in 3800-PM-BCW0100m or Chesapeake Bay Program expert panel reports, uses average annual precipitation conditions, considers both overland flow and stream erosion, and is based on sound science may be considered acceptable.

Whatever tool or approach that is used to estimate existing loading from the PRP Planning Area must also be used to estimate existing loading to planned BMPs. This avoids errors in percent pollutant removal calculations that would result if different methods were used. Later BMP design efforts will usually apply a more sophisticated method than used in planning to calculate load to a BMP. The design loading may not however be used to alter the assumed pollutant reduction by the BMP unless the PRP is revised to apply the more sophisticated method to the load from the storm sewershed as a whole.

MS4s may claim "credit" for structural BMPs implemented prior to development of the PRP to reduce existing loading estimates. In order to claim credit, identify all such structural BMPs in Section D of the PRP along with the following information:

- A detailed description of the BMP;
- Latitude and longitude coordinates for the BMP;
- Location of the BMP on the storm sewershed map;
- The permit number, if any, that authorized installation of the BMP;
- Calculations demonstrating the pollutant reductions achieved by the BMP;
- The date the BMP was installed and a statement that the BMP continues to serve the function(s) it was designed for; and
- The operation and maintenance (O&M) activities and O&M frequencies associated with the BMP.

The MS4 permittee may optionally submit design drawings of the BMP for previously installed or future BMPs with the PRP.

Existing loading 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, and an MS4 may not reduce its obligations for achieving permit term pollutant load reductions through previously installed BMPs. 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.

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.

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 - MapShed, or any other watershed model where channel erosion is explicitly modeled, should be run on a minimum of ~10 mi2 area to properly account for downstream channel impacts and include impaired waters identified in the MS4 Requirements Table. Aggregation of these waters up to approximately the 12-digit HUC scale for modeling purposes is acceptable. Modeling may not be done at the individual storm sewershed or municipal scale where the extent of downstream impact is not included in load calculation.

For PRPs developed for impaired waters (Appendix E), 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.

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 PRPs, except as otherwise approved by DEP. An example of other approaches that may be approved by DEP include the use of 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 BMPs that may provide future cost savings as municipalities move toward implementation of the plan. Such resources must be documented in the PRP, and must reflect both overland flow and in-stream erosion components.

NOTE - Calculation of sediment load reductions for PRP purposes using the *Expert Panel to Define Removal Rates for Individual Stream Restoration Projects* report should be done as follows:

- Where existing sediment loads were calculated using modeling at a local watershed scale, the default rate to be used is 115 lb/ft/yr. This default rate comes from a convergence of MapShed modeled streambank erosion loads from a group of urbanized watersheds, the 248 lb/ft default edge-of-field (EOF) rate in the Expert Panel Report with the 50% efficiency uncertainty factor specified for the Protocols applied, and field data were collected following the BANCS methodology where projects have been implemented and load reductions calculated using the Protocols.

NOTE – Use of default effectiveness values (115 lb/ft/yr) will be accepted for the subsequent permit term. It is recommended that the data required to complete load calculations using the Protocols be collected during the design phase for use in subsequent load reduction calculations.

NOTE – Desktop MapShed users may not use the streambank restoration or street sweeping components included in the MapShed BMP editor for pollutant reduction calculations. Pollutant reductions associated with streambank restoration projects must use the methods described above; whereas, reductions from street sweeping must be calculated in accordance with the *Recommendations of the Expert Panel to Define Removal Rates for Street and Storm Drain Cleaning Practices* or the BMP Effectiveness Values Table.

NOTE – If BMP effectiveness values are updated in DEP's BMP Effectiveness Values document or in Chesapeake Bay Program expert panel reports between the time the PRP is approved and the time the final report is developed to document compliance with the permit, those updated effectiveness values may optionally be used.

MapShed was utilized to compute the existing sediment loading of the Green Lane Reservoir PRP Planning Area. The date the existing loading for each of the PRP Planning Areas was calculated / the date of development of this PRP is _____.

Pennsburg Borough has a total existing sediment loading of 165,866.2 lbs/year in its Green Lane Reservoir storm sewershed.

E. Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

Identify the minimum required reductions in pollutant loading. Applicants must propose the implementation of BMP(s) or land use changes within the PRP Planning Area that will result in meeting the minimum required reductions in pollutant loading within the Planning Area. These BMP(s) must be implemented within 5 years of DEP's approval of coverage under the PAG-13 General Permit or an individual permit, and may be located on either public or private property. If the applicant is aware of BMPs that will be implemented by others (either in cooperation with the applicant or otherwise) within the Planning Area that will result in net pollutant loading reductions, the applicant may include those BMPs within its PRP.

Historic street sweeping practices should not be considered in calculating credit for future practices. All proposed street sweeping practices may be used for credit if the minimum standard is met for credit (see 3800-PM-BCW0100m). In other words, if sweeping was conducted 1/month and will be increased to 25/year in the future, the MS4 does not need to use the "net reduction" resulting from the increased sweeping; it may take credit for the full amount of reductions from 25/year sweeping.

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.

The names and descriptions of BMPs and land uses reported in the PRP should be in accordance with the Chesapeake Bay Program Model. The names and descriptions are available through CAST (log into www.casttool.org, select "Documentation," select "Source Data" and see worksheets named "Land Use Definitions" and "BMP Definitions").

Opportunities for BMP installation vary across a municipality, and for that reason MS4s with multiple PRP obligations need not propose BMPs to address each impairment listed in the Table during the permit term. The existing loading must be calculated for the entire PRP

Planning Area which drains to impaired waters, but pollutant controls to be installed during the subsequent permit term may be located such that they reduce the load in one sub-watershed by less than 10% and by more than 10% in another (as long as the overall amount of lbs. reduced constitutes 10% of the existing loading for the entire PRP Planning Area).

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.

The impairment is siltation for the Green Lane Reservoir PRP, since Pennsburg Borough has elected to use a presumptive approach, which requires a minimum 10% reduction. The required reduction is 16,587 lbs/year for the Green Lane Reservoir PRP. The reductions are calculated as follows:

Pennsburg Borough has a total existing sediment loading of 165,866.2 lbs/year in its Green Lane Reservoir storm sewershed.

The storm sewersheds (the PRP Planning Areas) that drains to the municipal separate storm sewer system within the jurisdiction of the MS4 have been delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours. For Pennsburg Borough, the Green Lane Reservoir PRP Planning Area consists of two storm sewershed areas, totaling 308 acres and the tributary Perkiomen Creek Watershed consists of 7,727 acres.

The drainage area to the proposed BMP location has also been delineated using LiDAR contours. The proposed BMP for the Green Lane Reservoir PRP is a constructed wetland. The BMP watershed was then converted into GIS data for use in the MapShed program, which was utilized in the development of this MS4 PRP to determine the loading of siltation from the Pennsburg Borough MS4 into the Green Lane Reservoir BMP watershed. Please note that per

discussions with Barry Evans, it was determined that the best way to model the MS4 storm sewersheds / PRP Planning Area and the BMP watersheds in the MapShed program was as urban areas. This way, the necessary information (loading, land uses, etc.) could be obtained for the watersheds of interest while still correctly using MapShed to model on a watershed basis.

The first MapShed model run used the PRP Planning Area as an "urban area" to determine the total watershed loading as well as the loading exclusively from the MS4 storm sewershed(s) / PRP Planning Area. The loading from the "urban areas" (PRP Planning Area) was then added from the model run for the Green Land Reservoir basin, 10% of which is the required siltation load reduction.

Pennsburg Borough is proposing a constructed wetland in the Green Lane Reservoir PRP Planning Area.

Another model run was performed using the BMP drainage area as an "urban area" to ascertain the land use information. The land use information from the BMP drainage area is then utilized in the BMP Data function in GWLF-E. This was completed for one (1) BMP drainage area for the Green Lane Reservoir PRP, totaling fifty-five (55) acres.

For the Green Lane Reservoir PRP, a final model was then run applying a constructed wetland BMP type, which utilizes an efficiency rate of 0.60 for TSS. Note that per the BMP Effectiveness Values from DEP (3800-PM-BCW0100m 5/2016), constructed wetlands have a BMP Efficiency Value of 60%.

The first model run of Green Lane Reservoir yielded the existing loading of the entire tributary Perkiomen Creek Watershed basin (7,727 acres) as 2,573,139 lbs. The final model run yielded the entire tributary Perkiomen Creek Watershed basin (7,727 acres) loading with the proposed constructed wetland BMP as 2,551,414 lbs. The difference between the first model run and the final model run number yields the Green Lane Reservoir basin load reduction resulting from the proposed constructed wetland BMP, which is 21,725 lbs; however, the actual reductions will be refined at the time of design of each BMP. Recall the first model run of Green Lane Reservoir

yielded the MS4 loading of 165,866.2 lbs/year, 10% of which must be removed by BMPs (16,587 lbs/year).

TABLE E-1: REQUIRED 10% SILTATION REDUCTION

	Green Lane Reservoir PRP Planning Area
Existing Load (lb/yr)	165,866.2
Percent Reduction	10%
Required Reduction (lb/yr)	16,587
Proposed Reduction (lbs./yr)	21,725

Pennsburg Borough plans to achieve the sediment reduction by designing, constructing, operating and maintaining Best Management Practices (BMPs), namely by installing a constructed wetland from the BMP drainage area for the Green Lane Reservoir PRP Planning Area. Pennsburg Borough is required to implement this plan over the next five (5) years.

The Green Lane Reservoir MS4 Storm Sewersheds / PRP Planning Area require a 10% percent reduction in siltation (sediment). Table E-2 is a summary of the proposed BMPs under consideration, including BMP ID (as indicated on PRP Map), location, type, area treated, and sediment removed:

TABLE E-2: SUMMARY OF PROPOSED BMPS

BMP ID	BMP LOCATION	BMP TYPE	AREA TREATED BY BMP	SEDIMENT REMOVED BY BMP (lbs./yr)
1	Montgomery Avenue Crossing	Constructed Wetland	55 ac.	±21,725

As illustrated in the previous section in Table D-3, the sediment load required to be reduced after proposed BMPs are implemented for the Green Lane Reservoir MS4 Storm Sewersheds / PRP Planning Area should be 16,587 lbs/yr. As demonstrated, the proposed total load

reduction will be 21,725 lbs/yr which meets and/or exceeds the minimum required reduction in pollutant loading. However, note that this proposed load reductions cannot be verified until the time of BMP designs.

The following tables summarize the sediment loads and required and proposed reductions for Pennsburg Borough's Green Lane Reservoir MS4 Storm Sewersheds / PRP Planning Area.

TABLE E-3: MS4 PRP STRATEGY SUMMARY

Green Lane Reservoir MS4 Storm Sewersheds / PRP Planning Area	308	acres
Existing Sediment Load	165,866.2	lb/year
Required Sediment Pollutant Load Reduction Percentage	10%	lb/year
Minimum Required Pollutant Load Reduction	16,587	lb/year
Proposed Sediment Load Reduction from BMPs	21,725	lb/year

Offsets. DEP may authorize the use of offsets toward meeting PRP load reduction requirements, if an individual permit application is submitted. Please refer to DEP's TMDL Plan Instructions (3800-PM-BCW0200d) for additional information.

F. Identify Funding Mechanism(s)

Prior to approving coverage DEP will evaluate the feasibility of implementation of an applicant's PRP. Part of this analysis includes a review of the applicant's proposed method(s) by which BMPs will be funded. Applicants must identify all project sponsors and partners and probable funding sources for each BMP.

Funding sources for the proposed BMP projects outlined in this PRP include the following:

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

Pennsburg Borough will be working in the following five years (i.e., during the permit term) to determine the best funding source for each proposed BMP project, as each project is undertaken.

G. 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 reductions. Applicants must identify the following for each selected BMP:

- The party(ies) responsible for ongoing O&M;
- The activities involved with O&M for each BMP; and
- The frequency at which O&M activities will occur.

MS4 permittees will need to identify actual O&M activities in Annual MS4 Status Reports submitted under the General Permit. Table G-1 lists the required information.

TABLE G-1 OPERATION AND MAINTENANCE OF BMPs

NAME OF BMP	RESPONSIBLE PARTY	O&M ACTIVITY & FREQUENCY
Montgomery Avenue Constructed Wetland	Pennsburg Borough	Per PA BMP Manual (latest revision)

H. GENERAL INFORMATION

Submission of PRP: Attach one copy of the PRP with the NOI or individual permit application that is submitted to the regional office of DEP responsible for reviewing the NOI or application. In addition, one copy of the PRP (not the NOI or application) must be submitted to DEP's Bureau of Clean Water (BCW). BCW prefers electronic copies of PRPs, if possible. Email the electronic version of the PRP, including map(s) (if feasible), to RA-EPPAMS4@pa.gov. If the MS4 determines that submission of an electronic copy is not possible, submit a hard copy to: PA Department of Environmental Protection, Bureau of Clean Water, 400 Market Street, PO Box 8774, Harrisburg, PA 17105-8774.

PRP Implementation and Final Report: Under the PAG-13 General Permit, the permittee must achieve the required pollutant load reductions within 5 years following DEP's approval of coverage under the General 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 completion of the 5th year of General Permit coverage.

For example, if DEP issues written approval of coverage to a permittee on June 1, 2018, the required pollutant load reductions must be implemented by June 1, 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.

Pennsburg Borough will submit the PRP in accordance with the above requirements.

APPENDIX A

MS4 Requirements Table (Municipal)

Anticipated Obligations for Subsequent NPDES Permit Term

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Adams County						
ABBOTTSTOWN BORO		No		Beaver Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
BERWICK TWP		No		Beaver Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
BUTLER TWP		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
CONEWAGO TWP		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Plum Creek	Appendix E-Siltation (5)	
				South Branch Conewago Creek	Appendix E-Siltation (5)	
				Unnamed Tributaries to South Branch Conewago Creek		Other Habitat Alterations, Water/Flow Variability (4c)
CUMBERLAND TWP		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Willoughby Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)	Other Habitat Alterations (4c)
				Rock Creek	Appendix E-Nutrients (5)	
				Unnamed Tributaries to Rock Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
GETTYSBURG BORO		No		Unnamed Tributaries to Rock Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Rock Creek	Appendix E-Nutrients (5)	
				Stevens Run	Appendix E-Nutrients, Siltation (5)	Unknown Toxicity (5), Water/Flow Variability (4c)
HAMILTON TWP		No		Beaver Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
MCSHERRYSTOWN BORO		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				South Branch Conewago Creek	Appendix E-Siltation (5)	
				Plum Creek	Appendix E-Siltation (5)	
MOUNT PLEASANT TWP		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
NEW OXFORD BORO		No		Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Montgomery County						
NARBERTH BORO	PAG130080	No		Indian Creek	Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Gulley Run		Water/Flow Variability (4c)
				East Branch Indian Creek	Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Cobbs Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	
NEW HANOVER TWP	PAG130020	No		Schuylkill River	Appendix C-PCB (4a)	
				Swamp Creek	Appendix E-Siltation (5)	Cause Unknown (5)
NORRISTOWN BORO	PAG130159	No		Schuylkill River	Appendix C-PCB (4a)	
				Stony Creek	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
				Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Sawmill Run	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
				Unnamed Tributaries to Stony Creek		Cause Unknown (5)
NORTH WALES BORO	PAG130005	Yes	TMDL Plan	Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
PENNSBURG BORO	PAG130063	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	
PERKIOMEN TWP	PAG130069	No		Unnamed Tributaries to Perkiomen Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Schoolhouse Run	Appendix E-Siltation (5)	
				Perkiomen Creek	Appendix B-Pathogens (5)	
PLYMOUTH TWP	PAG130008	No		Schuylkill River	Appendix C-PCB (4a)	
				Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Plymouth Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Diamond Run	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Sawmill Run	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
POTTSTOWN BORO	PAG130033	No		Schuylkill River	Appendix C-PCB (4a)	
				Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Unnamed Tributaries to Manatawny Creek	Appendix E-Siltation (5)	Flow Alterations, Other Habitat Alterations (4c)
RED HILL BORO	PAG130164	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	

APPENDIX B

Public Notice & Proof of Publication

Public Comments Received

Public Agenda

And

Meeting Minutes

Record of Consideration

APPENDIX C

EAST GREENVILLE

PENNSBURG

UPPER HANOVER

RED HILL

Green Lane Reservoir PRP Planning Area

Constructed Wetland BMP Drainage Shed

Montgomery Avenue Constructed Wetland BMP

Green Lane Reservoir PRP Planning Area

Macoby Creek

Trib 01430 To Macoby Creek

Trib 01465 To Perkiomen Creek

Trib 01464 To Perkiomen Creek

Perkiomen Creek

Forge Rd
Abbot Rd
Colonial Dr
Blaker Dr
Valley Rd
Hamilton Rd
Water Aly
Jefferson St
School Aly
Bank St
Washington St
Hickory Aly
Cherry St
Green Aly
3rd St
W 4th St
2nd St
State St
Long Aly
W 2nd St
Church Rd
Bull Rd
Front St
Quakertown Rd
John Fries Hwy
Quakertown Ave
Penn St
Macoby St
Berkeley Dr
Morgan Hill Dr
Rosemont Ter
Otts Rd
E Buck Rd
Brooke Rd
Church Rd
Landis Rd
School House Rd
W 2nd St
W 3rd St
W Side Aly
State Rte 29
Seminary St
Shirley Ln
4th St
5th St
3rd St
Silk Aly
Railroad St
Washington St
Silk Aly
Jackson St
Pottstown Ave
W 5th St
W 4th St
Green Aly
Dotts St
W Side Aly
E 6th St
W 6th St
E 7th St
7th St
E 8th St
Runaway Dr
Frye Rd
Hunter Dr
W 8th St
Seminary St
Gravel Pike
Long Aly
W 10th St
Valley Ct
Jodie Ct
11 St
Brookview Dr
Woodbridge Ln
Lakeview Ter
Lake Ln
W 11th St
Tagert Aly
Jefferson St
11th St
Avondale Dr
Vanguard Dr
Newcastle Dr
Carrington Dr
10th St
9th St
9th St
E 8th St
Singer Way
Oak Rd
Layfield Rd
State Rte 663
Mensch-Dam Rd
Walt Rd
Waltgraber Ln
View Rd
Montgomery Ave
Washington St
Bitting Aly
Beyer Aly
6th St E 6th St
Adams St
Main St
Graber Aly
Jefferson St
Cedar Ct
8 St W 8th St
Aspen Cir
W 7th St
Apple St

Legend

- Municipal Boundary
- Inlet
- Pipe Outlet
- Pipe Inlet
- MS4_Pipes
- Streams
- Streets
- Constructed Wetland BMP Drainage Shed
- Green Lane Reservoir PRP Storm Sewershed

N

PENNSBURG BOROUGH

MS4 PRP Map

MONTGOMERY COUNTY, PENNSYLVANIA

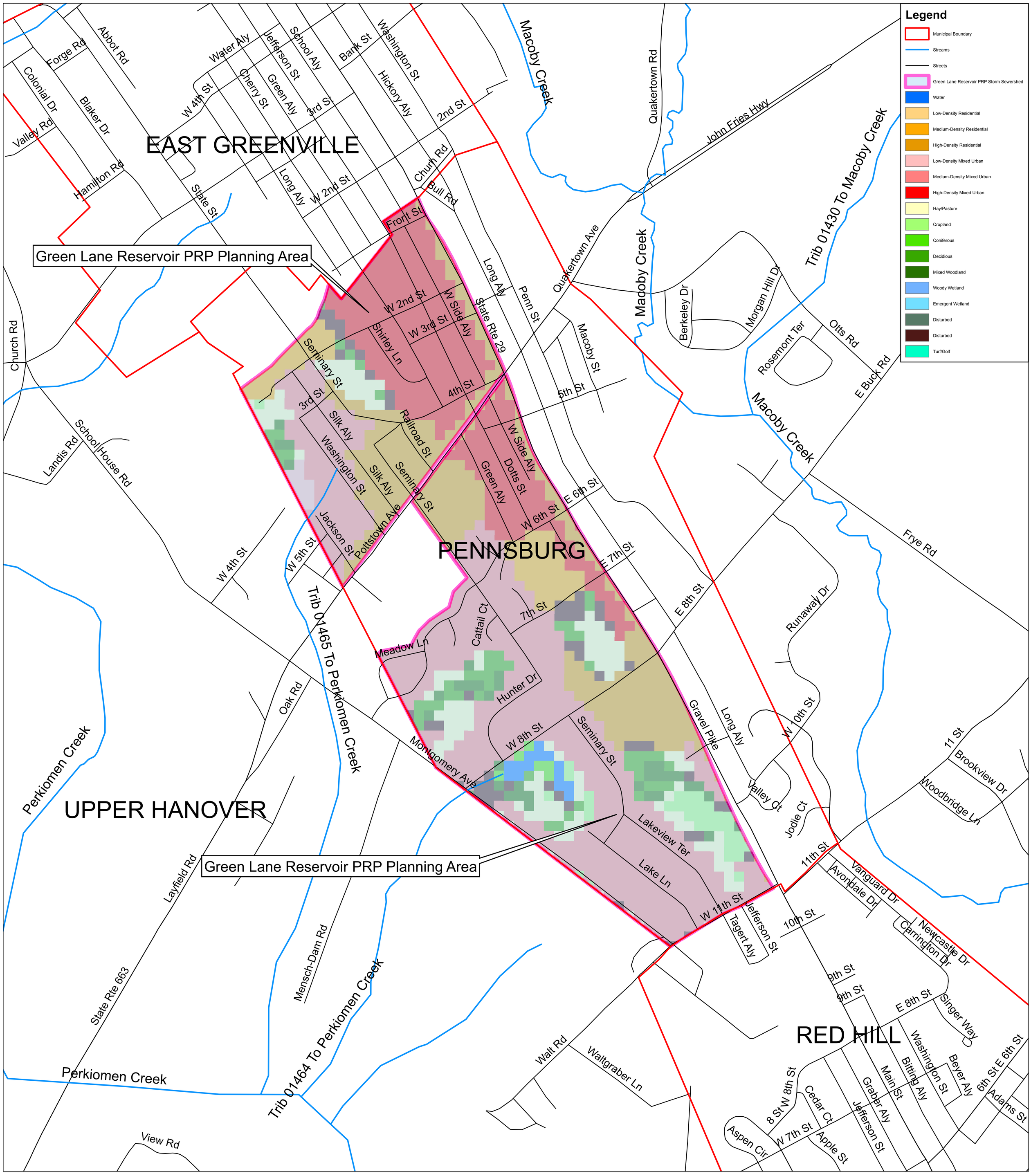
GILMORE & ASSOCIATES, INC.

184 West Main Street, Suite 300 Trappe, PA 19426 (610) 489-4949 - www.gilmore-assoc.com

JOB NO: 16-08033T

DATE: JUNE 30, 2017

0 335 670 1,340 Feet



N

PENNSBURG BOROUGH

MS4 PRP Land Uses (MapShed) Map

MONTGOMERY COUNTY, PENNSYLVANIA

GILMORE & ASSOCIATES, INC.

184 West Main Street, Suite 300 Trappe, PA 19426 (610) 489-4949 - www.gilmore-assoc.com

JOB NO: 16-08033T

DATE: JUNE 30, 2017

0 335 670 1,340 Feet

APPENDIX D

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORMWATER DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS
BMP EFFECTIVENESS VALUES

This table of BMP effectiveness values (i.e., pollutant removal efficiencies) is intended for use by MS4s that are developing and implementing Pollutant Reduction Plans and TMDL Plans to comply with NPDES permit requirements. The values used in this table generally consider pollutant reductions from both overland flow and reduced downstream erosion, and are based primarily on average values within the Chesapeake Assessment Scenario Tool (CAST) (www.casttool.org). Design considerations, operation and maintenance, and construction sequences should be as outlined in the Pennsylvania Stormwater BMP Manual, Chesapeake Bay Program guidance, or other technical sources. The Department of Environmental Protection (DEP) will update the information contained in this table as new information becomes available. Interested parties may submit information to DEP for consideration in updating this table to DEP's MS4 resource account, RA-EPPAMS4@pa.gov. Where an MS4 proposes a BMP not identified in this document or in Chesapeake Bay Program expert panel reports, other technical resources may be consulted for BMP effectiveness values. Note – TN = Total Nitrogen and TP = Total Phosphorus.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Wet Ponds and Wetlands	20%	45%	60%	A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. Until recently, these practices were designed specifically to meet water quantity, not water quality objectives. There is little or no vegetation living within the pooled area nor are outfalls directed through vegetated areas prior to open water release. Nitrogen reduction is minimal.
Dry Detention Basins and Hydrodynamic Structures	5%	10%	10%	Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.
Dry Extended Detention Basins	20%	20%	60%	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Infiltration Practices w/ Sand, Veg.	85%	85%	95%	A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff.
Filtering Practices	40%	60%	80%	Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.
Filter Strip Runoff Reduction	20%	54%	56%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.4 design ratio of filter strip length to impervious flow length is recommended for runoff reduction urban filter strips.
Filter Strip Stormwater Treatment	0%	0%	22%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.2 design ratio of filter strip length to impervious flow length is recommended for stormwater treatment urban filter strips.
Bioretention – Raingarden (C/D soils w/ underdrain)	25%	45%	55%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in C or D soil.
Bioretention / Raingarden (A/B soils w/ underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Bioretention / Raingarden (A/B soils w/o underdrain)	80%	85%	90%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has no underdrain and is in A or B soil.
Vegetated Open Channels (C/D Soils)	10%	10%	50%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in C or D soil.
Vegetated Open Channels (A/B Soils)	45%	45%	70%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in A or B soil.
Bioswale	70%	75%	80%	With a bioswale, the load is reduced because, unlike other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area.
Permeable Pavement w/o Sand or Veg. (C/D Soils w/ underdrain)	10%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in C or D soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/ underdrain)	45%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/o underdrain)	75%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (A/B Soils w/ underdrain)	50%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in A or B soil.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Permeable Pavement w/ Sand or Veg. (A/B Soils w/o underdrain)	80%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, has sand and/or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (C/D Soils w/ underdrain)	20%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in C or D soil.
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.
Forest Buffers	25%	50%	50%	An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. The riparian area is managed to maintain the integrity of stream channels and shorelines, to reduce the impacts of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals. (Note – the values represent pollutant load reductions from stormwater draining through buffers).
Tree Planting	10%	15%	20%	The BMP effectiveness values for tree planting are estimated by DEP. DEP estimates that 100 fully mature trees of mixed species (both deciduous and non-deciduous) provide pollutant load reductions for the equivalent of one acre (i.e., one mature tree = 0.01 acre). The BMP effectiveness values given are based on immature trees (seedlings or saplings); the effectiveness values are expected to increase as the trees mature. To determine the amount of pollutant load reduction that can credited for tree planting efforts: 1) multiply the number of trees planted by 0.01; 2) multiply the acreage determined in step 1 by the pollutant loading rate for the land prior to planting the trees (in lbs/acre/year); and 3) multiply the result of step 2 by the BMP effectiveness values given.
Street Sweeping	3%	3%	9%	Street sweeping must be conducted 25 times annually. Only count those streets that have been swept at least 25 times in a year. The acres associated with all streets that have been swept at least 25 times in a year would be eligible for pollutant reductions consistent with the given BMP effectiveness values.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Storm Sewer System Solids Removal	0.0027 for sediment, 0.0111 for organic matter	0.0006 for sediment, 0.0012 for organic matter	1 – TN and TP concentrations	This BMP (also referred to as "Storm Drain Cleaning") involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards. To determine pollutant reductions for this BMP, these steps must be taken: 1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected. 2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter). 3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations. DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.

APPENDIX E

Entire Tributary Perkiomen Creek Watershed basin Baseline

Select input data file: C:\MapShed\Runfiles\PennsburgStormSewerUA\Output\PennsburgStormSewerUA-1_ua.csv

Watershed Totals | Municipality Loads | Regulated Loads | Unregulated Loads

GWLF-E Average Loads by Source for Watershed 1

Source	Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	746	57628.84	77.30	253.25	0.34	67.90	0.09
Cropland	608	539382.97	887.10	2213.86	3.64	385.35	0.63
Forest	2735	25794.08	9.40	149.80	0.05	20.08	0.01
Wetland	175	705.48	4.00	32.85	0.19	2.05	0.01
Disturbed	22	749.57	34.10	2.12	0.10	0.75	0.03
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	556	77161.79	138.80	460.70	0.83	50.73	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	111	1785.74	16.10	42.24	0.38	4.59	0.04
MD Mixed	368	27116.86	73.70	592.29	1.61	65.96	0.18
HD Mixed	353	26036.59	73.80	568.46	1.61	63.32	0.18
LD Residential	526	8465.75	16.10	199.96	0.38	21.65	0.04
MD Residential	499	36773.11	73.70	802.99	1.61	89.44	0.18
HD Residential	351	25838.18	73.60	564.47	1.61	62.88	0.18
Water	677						
Farm Animals				0.0		0.0	
Tile Drainage		0.0		0.0		0.0	
Stream Bank		1745699.6		873.0		251.3	
Groundwater				18546.6		282.7	
Point Sources				0.0		0.0	
Septic Systems				3680.6		0.0	
Totals	**7727**	**2573139**		**28983**		**1369**	

Print | Export to JPEG | Exit

Entire Tributary Perkiomen Creek Watershed basin with Constructed Wetland BMP

Select input data file: C:\MapShed\Runfiles\PennsburgStormSewerUA\Output\PennsburgStormSewerUA_1_BMPStream-1_ua.csv

Watershed Totals | Municipality Loads | Regulated Loads | Unregulated Loads

GWLF-E Average Loads by Source for Watershed 1

Source	Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	746	57209.96	76.70	252.32	0.34	67.51	0.09
Cropland	608	539382.97	887.10	2213.86	3.64	385.35	0.63
Forest	2735	25794.08	9.40	149.80	0.05	20.08	0.01
Wetland	175	705.48	4.00	32.85	0.19	2.05	0.01
Disturbed	22	749.57	34.10	2.12	0.10	0.75	0.03
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	556	77161.79	138.80	460.70	0.83	50.73	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	111	1763.70	15.90	41.95	0.38	4.52	0.04
MD Mixed	368	26742.07	72.70	588.26	1.60	65.26	0.18
HD Mixed	353	25683.85	72.80	564.58	1.60	62.63	0.18
LD Residential	526	8355.52	15.90	198.59	0.38	21.43	0.04
MD Residential	499	36266.04	72.70	797.52	1.60	88.49	0.18
HD Residential	351	25485.44	72.60	560.64	1.60	62.19	0.18
Water	677						
Farm Animals				0.0		0.0	
Tile Drainage		0.0		0.0		0.0	
Stream Bank		1726113.7		862.0		249.1	
Groundwater				18546.5		282.7	
Point Sources				0.0		0.0	
Septic Systems				3680.6		0.0	
Totals	**7727**	**2551414**		**28952**		**1363**	

Print | Export to JPEG | Exit

Select input data file: C:\MapShed\Runfiles\PennsburgStormSewerUA\Output\PennsburgStormSewerUA-1_ua.csv

Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: Area1 (00001)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	7	541.10	77.30	2.40	0.34	0.60	0.09
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	15	141.00	9.40	0.80	0.05	0.20	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	17	2359.60	138.80	14.10	0.83	1.50	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	10	161.00	16.10	3.80	0.38	0.40	0.04
MD Mixed	10	737.00	73.70	16.10	1.61	1.80	0.18
HD Mixed	30	2214.00	73.80	48.30	1.61	5.40	0.18
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	94	6927.80	73.70	151.30	1.61	16.90	0.18
HD Residential	22	1619.20	73.60	35.40	1.61	4.00	0.18
Water	2						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		88945.42		44.5		12.8	0.087
Groundwater				908.8		13.9	0.049
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	207	103646.1		1225.5		57.5	

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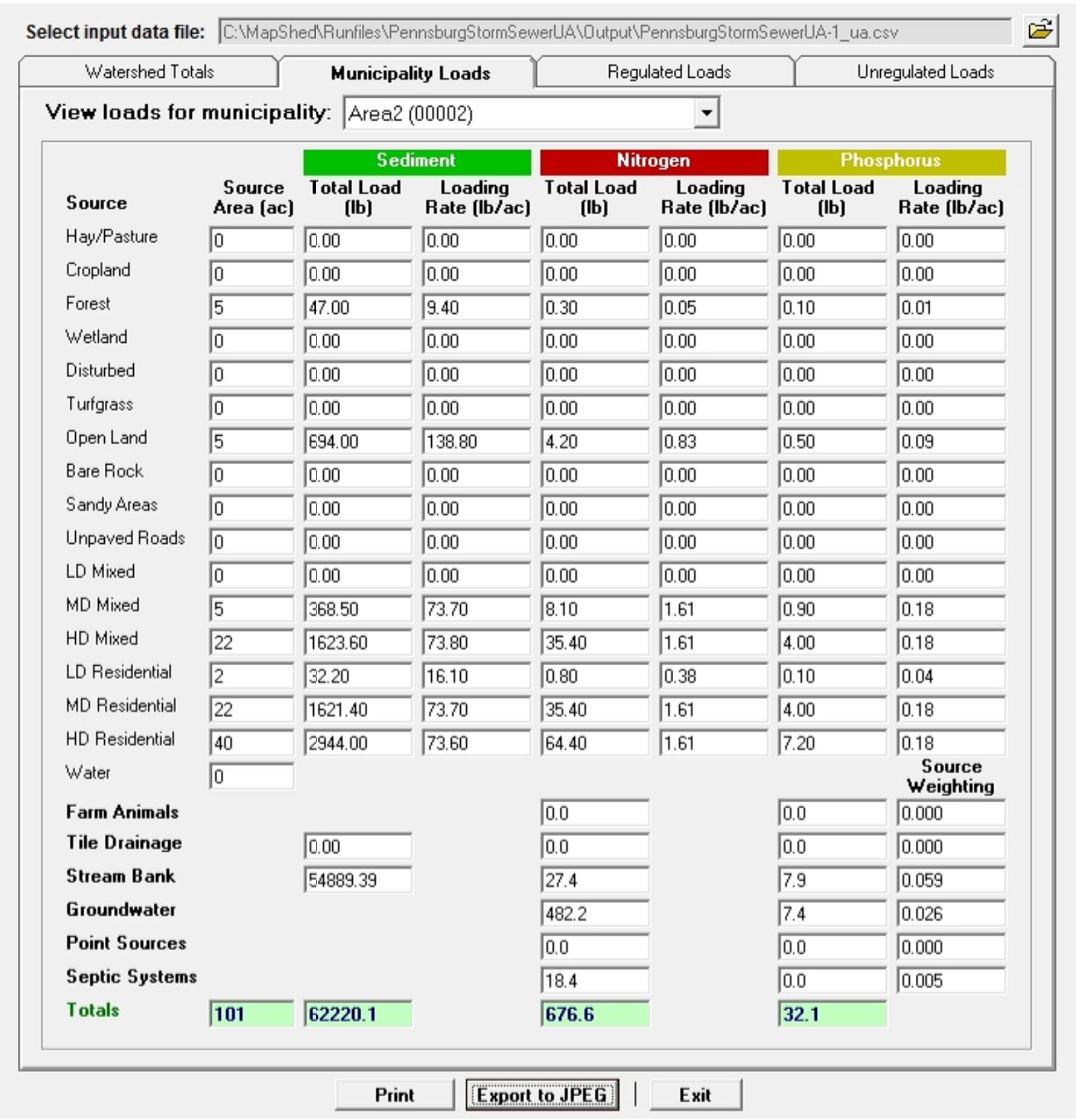

Select input data file: C:\MapShed\Runfiles\PennsburgStormSewerUA\Output\PennsburgStormSewerUA-1_ua.csv

Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: Area2 (00002)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	5	47.00	9.40	0.30	0.05	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	5	694.00	138.80	4.20	0.83	0.50	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Mixed	5	368.50	73.70	8.10	1.61	0.90	0.18
HD Mixed	22	1623.60	73.80	35.40	1.61	4.00	0.18
LD Residential	2	32.20	16.10	0.80	0.38	0.10	0.04
MD Residential	22	1621.40	73.70	35.40	1.61	4.00	0.18
HD Residential	40	2944.00	73.60	64.40	1.61	7.20	0.18
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		54889.39		27.4		7.9	0.059
Groundwater				482.2		7.4	0.026
Point Sources				0.0		0.0	0.000
Septic Systems				18.4		0.0	0.005
Totals	101	62220.1		676.6		32.1	

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Constructed Wetland BMP Drainage Area

Select input data file: C:\MapShed\Runfiles\MontAvStrmBMP\Output\MontAvStrmBMP-0_ua.csv

Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: Area1 (00001)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	7	65.80	9.40	0.40	0.05	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	2	277.60	138.80	1.70	0.83	0.20	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	2	32.20	16.10	0.80	0.38	0.10	0.04
MD Mixed	10	737.00	73.70	16.10	1.61	1.80	0.18
HD Mixed	2	147.60	73.80	3.20	1.61	0.40	0.18
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	25	1842.50	73.70	40.30	1.61	4.50	0.18
HD Residential	7	515.20	73.60	11.30	1.61	1.30	0.18
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		23786.76		11.9		3.4	0.023
Groundwater				241.1		3.7	0.013
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	55	27404.7		326.8		15.5	

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