



NEWTOWN TOWNSHIP

POLLUTANT REDUCTION PLAN

Report Date

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Prepared for:

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ATTACHMENTS

PROOF OF PUBLICATION

PUBLIC COMMENTS

STREAM RESTORATION OPTIONS – FOXES RUN – BROOKSIDE
STREAM RESTORATION OPTIONS – FOXES RUN – GREER PARK
STREAM RESTORATION OPTIONS – PRESTON RUN - DREXEL LODGE
STREAM RESTORATION OPTIONS – REESES RUN - MILL HOLLOW
STREAM RESTORATION OPTIONS – REESES RUN – GOSHEN ROAD TRAIL

NPDES STORM SEWER MAP
PRP DRAINAGE AREA MAP
PRP LAND USE MAP

1.0 INTRODUCTION

The National Pollutant Discharge Elimination System (NPDES) Permit program was established in 1972 by the Federal Clean Water Act (CWA). By 1991, the program administration was authorized in Pennsylvania to the Pennsylvania Department of Environmental Protection (PADEP) through Section 402(b) of the CWA. Initially only communities with a population base of 100,000 or more and Industrial Dischargers were regulated by the program. In 2003, the program expanded to include smaller communities whose population density was 1,000 or more per square mile within an "Urbanized Area". Based on the 2000 Census data there were 11,700 residents resulting in a density of 1,170 people per square mile. This inclusion brought Newtown Township, Delaware County into the program and a new acronym was born, MS4 – Municipal Separate Storm Sewer System. PADEP issues two different types of NPDES MS4 permits, a general permit and an individual permit. Newtown Township contains a portion of a Special Protection watershed in the upper reach of Crum Creek pursuant to PA Code, Title 25, Chapter 93, and therefore is required to be covered under an individual permit.

The MS4 Permit allows a community to discharge a point source of a specified amount of pollution into Waters of the United States under certain conditions. The MS4 includes a system of conveyances that are owned and maintained by the municipal entity designed or used to convey stormwater, including inlets, pipes, ditches, etc. Since its inception the program has been designed to provide for Minimum Control Measures focused on better education on the importance of improving water quality through implementing a variety of Best Management Practices (BMP). The next 5-year permit renewal brings with it a new requirement. As defined by the Individual Permit Authorization, regulated small MS4s discharging to surface waters that are identified as impaired pursuant to PADEP's "Integrated Waste Quality Monitoring and Assessment Report" must prepare and submit a Pollution Reduction Plan (PRP) to PADEP for review and approval. Once approved, the Township has the next 5 years to implement the plan. The PRP is required for each impaired watershed identified in the MS4 Requirements Table (published by PADEP) and must demonstrate a reduction of the named pollutant (siltation and PCB's) by 10% over the permit term. All stormwater improvements, in the form of BMPs contemplated by the Plan must be constructed and commissioned prior to the end of the 5-year permit term.

Newtown Township is located within the Darby Creek and Crum Creek Watersheds. The watershed divide runs north to south through the Township, essentially along Route 252, and splits its area approximately in half. The Township is bordered to the North by Easttown Township, Chester County, to the East by Radnor Township, to the West by Willistown Township, Chester County and Edgmont Township, Delaware County and to the South by Marple Township. The Township consists of both residential and commercial establishments and has a population of 12,216 according to the 2010 US Census. Most of the Township's development occurred prior to 1970 and the implementation of stormwater management. The Township has been a participant in the MS4 program since 2003 and continues to work to implement program requirements.

The Township advertised and held a public meeting on September 24, 2018 to review the Pollution Reduction Plan and solicit public comment. Following the presentation of the plan, this plan was available at the Township office and on their website and public comments were encouraged to be submitted until October 26, 2018. Proof of Publication can be found in attachments. No public comments were received as it pertained to the plan.

On August 27, 2019, PADEP completed their review of the PRP and issued a review letter. A meeting was held with PADEP to review the comments on September 24, 2019. The Township then worked to revise the plan and on February 10, 2020 presented the revised plan to the public and an advertised meeting. Public comments were received from the Newtown Township Environmental Advisory Council. The comments and response to the comments are included at the end of this plan. At a public meeting on April 27, 2020 the comments and revisions to the plan were presented.

2.0 MAPPING

One of the requirements of the current permit was to map all known storm sewer collection systems and their corresponding outfalls to surface waters. The Township has completed mapping of their system with the invaluable assistance of the Public Works Department. Attached to the report is the NPDES Storm Sewer Map. The map has been revised in the latest version to move the outfall locations to where the MS4 runoff physically reaches a stream or waterbody and an observation point where storm sewer endwalls or other physical infrastructure are located and used for the NPDES Outfall monitoring. In addition to mapping the system, the map also depicts the location of the Stormwater Best Management Practices (BMP) installed throughout the Township on private property through enforcement of the stormwater ordinance.

As defined by the PADEP PRP Instructions (3800-PM-BCW0100k), Attachment A “Parsing Guidelines for MS4s in Pollutant Reduction Plans”, parsing is “a process in which land area is removed from a storm sewershed in order to calculate the actual or target pollutant loads that are applicable to an MS4.” Parsed out areas consist of areas that drain overland directly to a stream, private properties with their own stormwater facilities which discharge to a stream and not public storm sewers, and PennDOT right-of-ways. PennDOT rights-of-way within the Township which have been parsed including the rights-of-way for Route 3 (West Chester Pike), Bishop Hollow Road, St. Davids Road, Gradyville Road, Goshen Road and Route 252 (North Newtown Street Road). Parsed areas are not included in the plan for calculation of existing sediment loading and will not be included in the sediment reduction totals. GIS based mapping was utilized to delineate the PRP planning area.

The initial version of the PRP included the removal of several recent large developments that have/had an approved NPDES permit. These developments included the Ashford Land/Liseter, Melmark School, Episcopal Academy, Somerset Property/Muirwood, Dunwoody Village, Marville, Whitehorse and BPG/Ellis Preserve development. This revised version of the PRP includes those developments or portions of those developments which do connect into the Township’s public storm sewer system. This includes portions of the Ashford Land/Liseter along Goshen Road and Route 252, all of Somerset Property/Muirwood, and portions of Dunwoody Village which drain to West Chester Pike. Several of the subareas of the BPG/Ellis Preserve connect to public sewers in the Darby Creek watershed along Route 252. Areas of the BPG/Ellis Preserve which drain directly to Reese’s Run or connect to the headwater of Preston Run have not been included in the PRP. Portions of the Melmark School and Marville properties have been included where MS4 runoff drains across the properties to reach a stream.

Drainage areas for each storm sewer outfall are shown on the PRP Drainage Area Map. The drainage areas were created using 2-foot contour data provided by Delaware Valley Regional Planning Commission (DVRPC) and determined using Autodesk Civil 3D 2017. The drainage areas were then reviewed. A total of 177 outfalls discharge to waters within the Township. The revised PRP drainage areas now account for all dedicated public roads and Township owned property with impervious areas such as the Township Building and library, Greer Park, Brookside Park, and Drexel Lodge Park. These and other impervious areas including function as a conveyance method for stormwater which concentrates the flow prior to reaching a water body. In consultation with PADEP, municipally owned property which satisfy the following three conditions have not been included in the PRP area: there is no impervious surface; does not receive runoff from adjacent properties; and has a stream located on the property allowing for direct discharge of runoff to a waterbody. An example property within the Township is the Newtown Meadow Preserve. These areas are shown on the attached PRP Land Use Map as “Township Owned Open Space –

No Impervious Coverage". Other Township owned property and open space with no improvements which may receive impervious offsite runoff are shown as "Township Owned Property".

3.0 POLLUTANTS OF CONCERN

Runoff from Newtown Township discharges into several streams and tributaries ultimately draining to two separate watersheds, Darby Creek and Crum Creek. Both of these watercourses and tributary streams are listed as impaired according to the Pennsylvania Integrated Water Quality Monitoring Assessment Report. The impairments include siltation from urban runoff/storm sewers, water flow variability from urban runoff/storm sewers and habitat modification impairments.

Impaired Downstream Waters	Requirements	Other Cause(s) of impairment
Lewis Run		Cause Unknown
Thomas Run	PCB	Cause Unknown, Water/flow variability
Saw Mill Run	PCB	Cause Unknown, Water/flow variability
Reeses Run	Siltation	Cause Unknown, Water/flow variability
Little Darby Creek	PCB	Cause Unknown, Water/flow variability
Foxes Run	PCB, Siltation	Cause Unknown, Other Habitat Alterations, Water/flow variability
Darby Creek	PCB, Siltation	Cause Unknown, Other Habitat Alterations, Water/flow variability
Crum Creek	Siltation	Cause Unknown, Other Habitat Alterations, Water/flow variability
Preston Run	Siltation	Cause Unknown, Water/flow variability
Hunter Run	Siltation	Cause Unknown, Water/flow variability

4.0 EXISTING POLLUTANT LOADING

To determine the existing loading for siltation, the PADEP Simplified Method was used. According to PA DEP PRP Instructions attachment B, pollutant loadings for the Township would fall under the “All Other Counties” section. The table below summarizes the loading from the PADEP document.

Table 2 – PRP Pollutant Loading Rates

Category	Total Nitrogen (lbs/acre/yr)	Total Phosphorus (lbs/acre/yr)	Total Suspended Solids (lbs/acre/yr)
Impervious Developed	23.06	2.28	1,839
Pervious Developed	20.72	0.84	264.96
Undeveloped	10	0.33	234.6

For total suspended solids (TSS) / sediment, impervious developed areas have a loading of 1839 pounds per acre per year, and pervious developed areas have a loading of 264.96 pounds per acre per year. Undeveloped land properties have a loading rate of 234.6 pounds per acre per year.

According to the PENNDOT Municipal Boundary, the Township area is 10.103 square miles 281,652,507. This was used as the starting point for the pollutant loading calculations.

The first step was to determine the Townships MS4 Drainage Area within the Darby Creek and Crumb Creek watersheds. This was done as described in Section 3.0 Mapping. The area within each watershed was then broken down by zoning district and analyzed within each, see the PRP Land Use Map. For properties within the PRD overlay district, the area was deducted from the underlying zoning district to prevent double counting of the areas. The areas of state road rights of ways were then parsed and deducted from the total area. Parcels were then individually evaluated including private and Township owned properties to determine if there is any development or improvement. Those without any such improvements were counted as Open Space. Pervious and impervious area for the remaining total was calculated based on the maximum allowable impervious for each zoning district. Township property with improvements such as Greer Park were not counted as Open Spaces with the property's impervious and pervious-developed coverage based on the underlying zoning district. Township owned properties with no improvements but received runoff from upstream impervious surfaces, such as the properties along the Crum Creek near West Chester Pike, were included in the MS4 Drainage Area but considered undeveloped land. The Simplified Method was used to calculate sediment and nutrient loading based on pervious, impervious, and undeveloped areas. Sediment loading reduction was then calculated from installed BMPs within each zoning district and watershed. BMPs installed outside of the MS4 Drainage Area were not used in the sediment loading reduction calculations. The loading reduction was subtracted to determine final sediment and nutrient loading for the Crum and Darby Creek watersheds.

The following pages provides the calculated Sediment Loading for both overall watersheds individually.

5.0 BEST MANAGEMENT PRACTICES TO MEET REQUIRED POLLUTANT REDUCTION

To reduce the sediment loading from the Township by a total in both watersheds of 252,116.21 pounds (120,972.9 pounds in the Crum Creek Watershed and 131,143.31 in the Darby Creek Watershed), some type of best management practices need to be installed. PADEP prepared a document detailing the BMP Effectiveness Values for Stormwater Discharges from Small MS4s (3800-PM-BCW0100m). Several BMPs are proposed to meet the sediment reduction including Stream Restoration, Tree Planting, Rain Gardens/Bioretenion, Permeable Pavement, and Storm Sewer System Solids Removal. Due to the large quantity of the sediment removal needed, the Township has chosen to focus on one BMP type, Stream Restoration to address the needed removal. Stream restoration was selected as the primary BMP due to the readily available Township owned properties located adjacent to streams where it can be implemented, and the cost effectiveness relative to the pound of sediment removed. The other BMPs are proposed to be kept in the Township's toolkit as supplemental BMPs.

Primary BMP - Stream Restoration

According to the BMP effectiveness table, stream restoration would result in a reduction of 44.88 pounds per foot restored per year. To meet the reduction goal, we have calculated 2,700 lineal feet of stream would need to be restored within the Crum Creek Watershed and 2,925 lineal feet would need to be restored in the Darby Creek Watershed.

In determining the potential locations for stream restoration, we looked to public owned or land with previous easements to implement the improvements for the least cost (i.e. no acquisition or new easements). We have selected lengths of Foxes Run that traverses Greer and Brookside Parks to satisfy the requirement for the Darby Creek Watershed. For the Crum Creek Watershed, sections of Preston Run running through Drexel Lodge Park, along Reeses Run by the Goshen Road Trail and the last section of Reeses Run before meeting the Crum Creek were selected. Two of these reaches have Class "C" dam structures also in need of maintenance and can be incorporated into the projects in order to spend public dollars most efficiently. Other options exist on first order streams like Thomas and Saw Mill Run in the Darby Creek Watershed and Lewis Run and Hunters Run in the Crum Creek Watershed but they would require negotiations with private property owners to obtain permission to proceed.

For budget purposes, the estimate of probable construction costs for the combined total of 5,625 feet of stream restoration at a per foot length unit price of \$250 would result in \$1,406,250.

Additional BMPs

For the purposes of meeting the siltation reduction goal, the Township is considering these BMPs to go above and beyond the State required goal for this permit term or supplement the stream restoration. While not as effective relative to stream restoration for the pounds of sediment removed per dollar, these measures provide additional locations upstream of the receiving streams to address sediment removal.

The Tree Planting and the installation of Rain Gardens/Bioretenion have also been selected as potential BMPs to reduce siltation for each watershed, the planting of 1,000 trees and treatment of 2 acres of impervious surfaces with rain gardens has been calculated. The Township is working with the Newtown Township Environmental Advisory

Council (EAC) to determine potential locations for these BMPs. These BMPs will most likely require additional input with private landowners to remove impervious coverage and replace with trees, or potential land acquisition.

Permeable Pavement and Storm Sewer Solids Removal have been selected as potential BMPs to remove sediment from the Township's roads and storm sewers. The Township is currently investigating roadway shoulders with traditional full depth asphalt pavement which can be replaced with bike lanes constructed with permeable pavement and infiltration systems. Sediment removal effectiveness varies between the locations installed. Those located in well-draining soils, Type A/B soils, without an underdrain allows for 85% sediment removal of the upstream drainage area whereas poorly draining soils, Type C/D, with an underdrain allow for a 55% sediment removal.

The Township investigates the storm sewer system to determine areas in need of repair and rehabilitation including the inlets. This is encouraged by PADEP as part of the MS4 permit Minimum Control Measure 6: Pollution Prevention/ Good Housekeeping. The Township is working to identify the inlets in need of extensive repairs which can be replaced with Water Quality Inlets or other structures. Additionally, the Township plans to identify inlets which are good candidates to receive water quality inserts such as inlet filter bags. Sediment removal efficiency for water quality structures, inlets, and filter bags varies for each manufacturer. PADEP has established a maximum efficiency of 80% sediment removal efficiency for planning purposes. After installed, the Township needs to weigh the solids collected (not including refuse, debris and floatables) as part of the operation and maintenance to determine the actual sediment removal.

6.0 FUNDING MECHANISMS

Newtown Township is researching grant programs to assist in funding the costs of the proposed stream restoration projects needed to meet the 10% sediment reduction requirement. The following is a list of options the Township is considering. If grant funding cannot be obtained, the Township will fund the projects.

National Park Service Rivers, Trails and Conservation Assistance Program supports community lead – natural resource conservation and outdoor recreation projects across the nation. This program focuses on projects that contribute to health and wellness, engage youth organizations to promote neighborhood resource conservation, stewardship and outdoor recreation opportunities, improve public access and connections to parks rivers, trails and greenways within urban areas. www.nps.gov/orgs/rtca/apply.htm

Five Star and Urban Waters Restoration Program awards approximately \$2.5 million dollars annually. This program seeks to develop community capacity to sustain local natural resources for future generations by providing modest funding assistance to local communities focused on improving water quality in watersheds and the habitat they support. Priority for funding goes to a variety of BMPs that enhance/restore and conserve natural resources and waterways. www.nfwf.org/fivestar

Clean Water State Revolving Fund administered through PENNVEST these funds can be used for stormwater as well as potable and wastewater projects. www.pennvest.org

For the supplemental BMPs, the Township is working with the EAC to identify grant and private funding sources for the Tree Planting and Bioretention/Rain Gardens. The Permeable Pavement and Storm Sewer Solids Removal BMPs have the potential to be partially funded through allocated Liquid Fuels funding when incorporated as with necessary roadway maintenance projects.

7.0 OPERATION AND MAINTENANCE RESPONSIBLE PARTIES

Primary BMP – Stream Restoration

The Township would be responsible for the operation and maintenance of the stream restoration. Routine maintenance of the vegetation surrounding the stream banks such as weed-whacking grasses in a reestablished riparian forest buffer and inspection of the banks would be performed by the Township on a monthly basis. Additional routine maintenance including weeding and removal of invasive plant species, replacement of lost or damaged bushes and trees, and removal of accumulated debris within the watercourse would be conducted on a quarterly basis. Additional inspections will be conducted following a major flooding event, i.e. greater than a 1-year storm event. In the event of serious issues such as erosion from a catastrophic storm, the Township would look to engage an experienced contractor to perform the work to reestablish the project.

Additional BMPS

For all supplemental BMPs, the Township would be responsible for the operation and maintenance on municipally owned property.

When a BMP is installed on private property, the landowner would be responsible for maintenance. The Township may take on additional maintenance responsibilities but would be determined on a case by case basis. The Township would inspect the BMPs annually for the first ten years after installation to determine proper maintenance by the landowner is taking place as done as part of MCM#5 Post-Construction Stormwater Management in New Development and Redevelopment.

Tree Planting – In areas where the trees are installed as a replacement to impervious areas, the adjacent ground will need to be planted with a proper grass/meadow cover while the trees are establishing. This will require annual mowing in order to control invasive species. Per the PA Stormwater BMP Manual, application of a carefully selected herbicide around the protective tree shelters/tubes may be necessary, reinforced by selective cutting/manual removal as necessary. This initial maintenance routine recommended is necessary for the first 2 to 3 years of growth and may be necessary for up to 5 years until tree growth and tree canopy begins to form, naturally inhibiting weed growth. Once shading is adequate, growth of invasive species and other weeds will be naturally prevented, and the woodland becomes self-maintaining. Review of the new tree plantings would be undertaken annually to determine if replacement trees should be provided.

Bioretention/Rain Gardens – The areas would be inspected at least twice a year (once in the spring and fall). Routine maintenance of the bioretention areas includes weeding and removal of invasive species, placement of mulch in the spring, inspection of the plantings including replacement of damaged plantings, removal of any debris, and cutting of perennial plantings in the fall. If inspections find erosion, additional mulching, extensive replacement of the mulch, or stabilization may be need. Additional inspections shall be conducted following a greater than 1-year storm event to check for erosion or damaged areas.

Permeable Pavement – The permeable pavement surface would be required to be vacuumed a minimum of twice a year. Any pervious areas directly adjacent and draining to the pavement inspected monthly and immediately stabilized. If there are inlet structures located adjacent to the permeable pavement or connected with an underdrain,

these inlets will be inspected and cleaned out twice a year. Damaged pavement would be repaired by an experienced contractor.

Storm Sewer Solids Removal – The operation and maintenance will vary based on the systems implemented and manufacturers recommendations. Water quality structures shall be inspected in the early spring for damage to the structures. The units will be inspected after each significant storm event and at least twice a year for the first year to determine the sediment accumulation rate. The subsequent years sediment inspection will be based on the first year. Sediment will be removed when the sediment exceeds 50% of the storage capacity or manufacturer recommendations. The removed sediment shall be weighed to determine actual removal quantities. Removed sediment material will then be properly disposed of.