

West Earl Township Pollutant Reduction Plan

Brownstown, PA
July 24, 2017



Prepared for:
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A. Introduction

This pollutant reduction plan (PRP) was developed for West Earl Township as a requirement of Permit PAG#133535 for their municipal separate storm sewer system (MS4). The PRP outlines the actions the Township will take to address pollutant loads to waterbodies within the MS4 that drain to the Chesapeake Bay and Impaired waters within the MS4. These actions include public participation, mapping of outfalls and other discharges, pollutant load calculations, best management practices (BMPs) selection, identification of potential funding sources and partners, and operations and maintenance (O&M) activities.

B. Public Participation

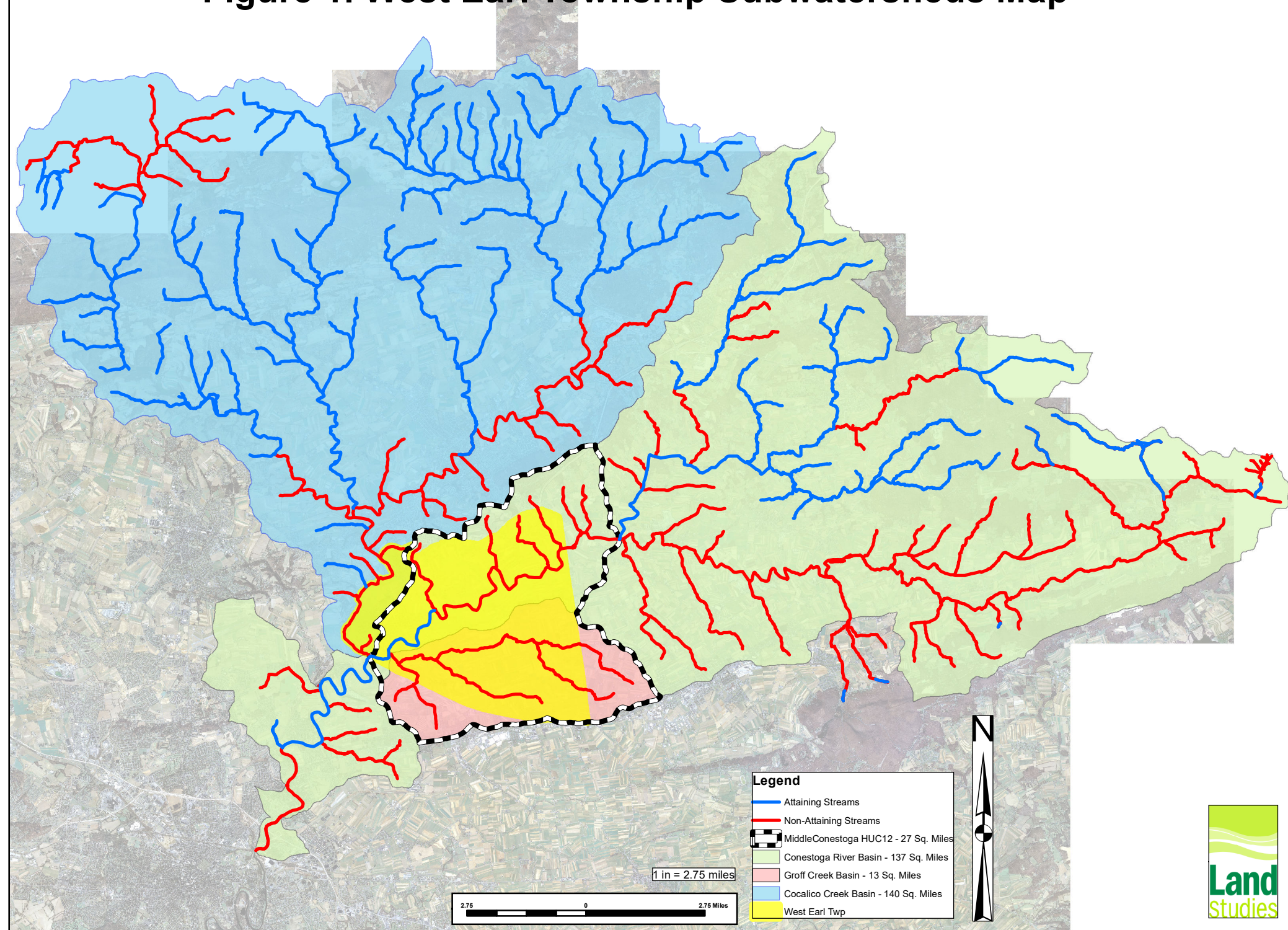
Public participation is an essential part of the PRP because it enhances buy-in from landowners that may have an impact on pollutant discharges, can uncover missing elements or errors in calculations, and builds cooperative partnerships among the municipality and other entities.

A copy of the draft PRP was released via public notice on June 19th, 2017 to the following media outlets: LNP newspaper. The notice ran for one day. A copy of the public notice is included as Item A-1. The public was given 30 days to provide commentary on the contents of the PRP. No written comments were received regarding the PRP. West Earl Township held a public meeting on July 10, 2017 to receive verbal commentary on the contents of the PRP. No comments were received at the July 10 meeting. No details were changed from the draft PRP to the final PRP due to the fact that no public comments were received on the draft plan.

C. Map

Figure 1 below identifies the subwatersheds of the Cocalico Creek, Conestoga River and Groff Creek, including headwaters upstream from West Earl Township. Map B1 in Appendix B identifies the land use types throughout the Township, the MS4 outfall locations, and the storm sewershed boundaries grouped into Planning Areas. An additional map, Map B2 in Appendix B, identifies the Planning Areas for the Cocalico Creek, Conestoga River, and Groff Creek, respectively. It also includes the existing structural best management practice (BMP) that is considered in the calculation of the existing pollutant loads and the proposed location(s) of structural BMPs that will be implemented to achieve the required pollutant load reductions per watershed during the current permit cycle.

Figure 1. West Earl Township Subwatersheds Map



West Earl Township is approximately 77 percent non-urban lands, mostly used for agricultural activity. West Earl's Urbanized Area (UA) covers only 2,634.50 acres based on the 2010 U.S. Census data. The total impervious cover within the UA totals 764.01 acres or 29 percent based on DEP's Statewide MS4 Land Cover Estimates for West Earl Township. The remaining 71 percent of the UA is composed of 1,870.50 acres of pervious cover.

Since West Earl's urban storm sewersheds drain to the Cocalico Creek, Conestoga River, or Groff Creek, it was determined that these sub-watersheds would be grouped into the Cocalico Creek Planning Area, Conestoga River Planning Area, and the Groff Creek Planning Area. Note that Groff Creek and West Earl's reach of the Conestoga River are part of the same Middle Conestoga River HUC 12 watershed basin. So, even though they are separate planning areas, proposed BMPs to meet the pollutant load reductions will be aggregated for the larger Middle Conestoga River HUC 12 basin.

Within the UAs between these three drainage basins, there were over 650 acres of cropland / hay / pasture that did not contain any MS4 infrastructure. These agricultural lands that did not drain to the MS4 system were parsed out of the planning areas. Additionally, there were pockets of medium-density residential land that do not drain to any type of MS4 infrastructure, but drain as incidental dispersion into surrounding lands; thus, these areas were parsed out of the planning areas. West Earl Township's UAs are split by several major PENNDOT roadways, including Routes 222 and 272, which are parsed out of the planning areas. There were several large tracts of land in relatively flat areas in between PENNDOT roadways that were also parsed out of the planning areas because stormwater drainage from these parcels are assumed to drain to PENNDOT's system and not the municipality's MS4. In total, 1,085.8 acres of UA were excluded from the planning areas based on the aforementioned rationale (see Excluded Areas in Map B2).

D. Pollutants of Concern

Since the waterways of West Earl Township ultimately drain to the Chesapeake Bay, the following are pollutants of concern: sediment, total nitrogen (TN), and total phosphorus (TP). Because of this drainage to the Chesapeake Bay, the Township must prepare a CBPRP in accordance with Appendix D in the PAG-13 General Permit. West Earl Township also discharges stormwater to local impaired waters, including the Cocalico Creek, Groff Creek and the Conestoga River and unnamed tributaries. Therefore, it must reduce pollutant loads associated with those impairments and prepare an impaired waters PRP in accordance with Appendix E in the PAG-13 General Permit. West Earl Township will select BMPs to reduce the sediment pollutant load by 10 percent, which is assumed to then reduce the TN and TP by 3 percent and 5 percent respectively according to DEP's PRP Instructions (3800-PM-BCW0100k).

Table 1 shows the affected subwatersheds within West Earl Township and the pollutant(s) that are of concern to the municipality as shown on the DEP MS4 requirements table revised

4/7/2017. The Township must reduce sediment loading by 10 percent, reduce phosphorus by 5 percent and nitrogen by 3 percent. In accordance with DEP's PRP instructions, West Earl Township will assume that a 10 percent sediment reduction will also accomplish the required nutrient reduction. Therefore, only sediment load reductions within the MS4 planning areas are reported in this PRP.

Table 1. Pollutants of Concern

Planning Area	Pollutant(s) of Concern
Cocalico Creek (including tributary)	Appendix E – Nutrients, Siltation (5)
Conestoga River (including tributaries) ^{1,2}	Appendix B – Pathogens, Appendix E – Nutrients, Organic Enrichment/Low D.O., Siltation (5)
Groff Creek (including tributaries)	Appendix E – Nutrients, Siltation (5)

NOTE1: The section of the mainstem of the Conestoga River that flows through West Earl Township's UA is not identified as impaired; however, both upstream and downstream of the UA are identified as impaired for nutrients and siltation.

NOTE2: The MS4 Requirements Table identifies "Organic Enrichment / Low D.O." as Appendix E Pollutants of Concern for the Conestoga River. Organic Enrichment and Low D.O. are surrogates for nutrient impairment.

In accordance with DEP's PRP Instructions document (3800-PM-BCW0100K), this report is required specifically for stormwater discharges of nutrients and sediment to surface waters for the Chesapeake Bay (Appendix D) and impaired waters (Appendix E). Separate from the PRP, Pollutant Control Measures (PCMs) described in DEP's General Permit (3800-PM-BCW0100d) are to be implemented for Appendix A, B, and/or C pollutants of concern identified in the MS4 Requirements Table.

Because West Earl Township is subject to both a CBPRP and an impaired waters PRP, it will select BMPs that target the impaired waters discharges first, as action toward the local impaired waters will have a beneficial impact on the Chesapeake Bay.

E. Existing Load for Pollutants of Concern

West Earl Township has a total of 761 acres in the Cocalico Creek Planning Area of which 221 acres are impervious and 540 acres are pervious. The Conestoga River Planning Area is 572 acres, of which 166 acres are impervious and 406 acres are pervious. The Groff Creek Planning Area covers 194 acres of which 56 acres are impervious and 138 are pervious.

The existing loading rates for West Earl Township's planning areas are shown in Table 2 below. These loading rates were calculated by using DEP's "Simplified Method" based on developed land loading rates for Pennsylvania counties from Attachment B of the PRP Instructions, 3800-PM-BCW0100K (See Appendix C for details).

Table 2. Existing Loading Rates

Planning Area	Sediment Loading (lbs)	N Loading (lbs)	P Loading (lbs)
Cocalico Creek Planning Area	403,169.23	20,059.87	515.61
Conestoga River Planning Area	306,343.57	14,983.92	385.73
Groff Creek Planning Area	109,497.31	5,226.7	136.7
TOTAL:	819,010.11	40,270.52	1,038.02

The existing loading estimate was adjusted to account for pollutant reductions from an existing stormwater basin BMP within the Cocalico Creek Watershed. BMP load reduction values were calculated based on the Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects (hereafter referred to as the Expert Panel) in conjunction with loading rates from Attachment B of the PRP instructions referenced above (Schueler and Lane, 2015). DEP's BMP Effectiveness Values Table (3800-PM-BCW0100m) was also utilized to calculate BMP load reductions.

Existing Structural BMPs

West Earl Township is claiming credit for the following structural BMP that was implemented prior to development of this PRP to reduce existing load estimates:

Table 3. Existing BMP

BMP ID:	Cloverbrook Detention Basin
Coordinates:	40.1387, -76.2211
Map Location:	See Existing BMP in Item B3.
Permit #:	PAG2003604034
Load Reduction:	17,873.49 lbs; See Appendix C for BMP Load Reduction Calculation Details.
Details:	This 71,194 ft ³ dry extended detention basin was constructed in April 2004 as part of the development off of Cocalico Creek Road.
O&M Activities:	Basin mowed and otherwise maintained, as needed to functionally manage stormwater as this basin was designed.

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

Based on the 10% sediment reduction targets established above, West Earl Township has identified a strategy to meet the minimum load reductions within 5 years following DEP's approval of permit coverage. The nutrient reduction requirements for the impaired waters are assumed to be addressed by the 10 percent sediment reductions.

Within West Earl Township, the following minimum 10 percent sediment load reductions per watershed planning area must be met:

- Cocalico Creek Planning Area = 40,317 lbs
 - Conestoga River Planning Area = 30,634 lbs
 - Groff Creek Planning Area = 10,950 lbs
 - *Total for Middle Conestoga River Basin (Conestoga River and Groff Creek) = 41,584 lbs*
-
- **Total Reduction Requirements for West Earl Township= 81,901 lbs**

Summary of Alternatives and Selection of BMPs

West Earl Township evaluated and ranked each of the BMP alternatives listed in the tables below using the following criteria:

- Sediment reductions
- Cost per pound of pollutant reduction
- Ownership (public versus private land)
- Funding and Workforce availability
- Community benefit (site accessibility, visibility to the public, ability of public to experience benefits)
- Connectivity to other completed or proposed stormwater BMPs
- Timeframe to implement

The purpose of the evaluation was to determine the BMPs that would reduce the most pollutants for the least amount of money while getting closer to the goal of removing streams from the impaired waters list and protecting the Chesapeake Bay. The highest priority BMPs evaluated by West Earl Township are summarized in Tables 4 and 5 as potential BMPs that could be implemented to satisfy the load reduction requirements. West Earl Township is not committing to implementing all of the projects listed in this report as that would exceed their required deduction. The final selection of BMPs to be implemented will be based on detailed design criteria and cost. These BMPs will be implemented by the end of the 5 year permit cycle.

As identified previously, the Groff Creek Planning Area and Conestoga River Planning Area are aggregated as part of the Middle Conestoga River Basin. To meet the pollutant load reduction requirements for the Middle Conestoga River Basin, West Earl Township proposes the implementation of the following BMPs summarized in Table 4:

Table 4. Summary of Proposed BMPs for the Middle Conestoga River Subwatershed

BMP ID	BMP Project	Sediment Load Reduction (lbs)
PRP1	Eagleview Estates Detention Basin Retrofit	15,727
PRP2	Anglesea Detention Basin Retrofit	13,670
PRP4	Main Street Bioswale	2,208
PRP5	School Lane Farms Detention Basin	7,631
PRP7A/7B	West Earl Community Park Riparian Buffer / Extended Riparian Buffer	318 / 953
PRP8	West Metzler Road Channel Stabilization	44,880

BMP PRP1: Eagleview Estates Detention Basin Retrofit Project

Eagleview Estates is an existing detention basin, built in 2003, that receives drainage from 59.9 acres of pervious area and 12 acres of impervious area. This privately-owned basin is proposed to be retrofitted to increase the capacity of stormwater detained in the basin. The total area of the basin retrofit is 1.06 acres. This BMP will serve as a Stormwater Treatment practice (as defined by the Expert Panel) for the Conestoga River Planning Area (part of the Middle Conestoga River Basin). Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

BMP PRP2: Anglesea Detention Basin Retrofit Project

The Anglesea housing development has an existing detention basin, built in 2004, that receives drainage from 36.6 acres of pervious area and 18.3 acres of impervious area. This privately-owned basin is proposed to be retrofitted to increase the capacity of stormwater detained in the basin. The total area of the basin retrofit is 1.01 acres. This BMP will serve as a Stormwater Treatment practice for the Groff Creek Planning Area (part of the Middle Conestoga River Basin). Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

BMP PRP4: Main Street Bioswale / Channel Stabilization

There is an eroded channel on the south side of Main Street that receives drainage from 3.55 acres of pervious area and 1.45 acres of impervious area. This channel conveys stormwater to the Conestoga River during storm events. West Earl Township proposes stabilizing this channel by creating an approximately 700 ft x 30 ft bioswale to reduce sediment erosion discharging to the river during storm events. This BMP will serve as a Stormwater Treatment practice for the Conestoga River Planning Area (part of the Middle

Conestoga River Basin). Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

BMP PRP5: School Lane Farms Detention Basin Retrofit Project

The School Lane Farms housing development has an existing detention basin that receives drainage from 22.01 acres of pervious area and 8.99 acres of impervious area. This privately-owned basin is proposed to be retrofitted to increase the capacity of stormwater detained in the basin. The total area of the basin retrofit is 0.558 acres. This BMP will serve as a Stormwater Treatment practice for the Conestoga River Planning Area (part of the Middle Conestoga River Basin). Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

BMP PRP7A/7B: West Earl Community Park Riparian Buffer Project

West Earl Township proposes to create a riparian buffer along a drainage channel / unnamed stream that runs through the West Earl Community Park (publicly owned) and ultimately connects to the Conestoga River. The proposed buffer is 350 in length and 35 feet wide on both sides of the stream. The buffer will treat a drainage area that is 0.8 pervious acres and 0.33 impervious acres within the Conestoga River Planning Area (part of the Middle Conestoga River Basin). As an additive alternative (BMP ID# PRP7B), the riparian buffer could be extended onto the other side of Route 772 for an additional 700 linear feet to the confluence with the Conestoga River. This alternative buffer would treat a drainage area that is 2.40 acres of pervious area and 0.98 acres impervious area. The additional length of buffer would require coordination with a private landowner. Load reductions were calculated using the BMP effectiveness values for Forest Buffers (see BMP Effectiveness Values). Calculation details are included in Appendix D.

BMP PRP8: West Metzler Road Channel Stabilization Project

West Earl Township proposes to create a channel stabilization project along an unnamed tributary to the Conestoga River off of West Metzler Road. The proposed project is intended to stabilize 1,000 linear feet of stream running through a privately owned agricultural field within the UA. The channel stabilization will treat the drainage area within the Conestoga River Planning Area (part of the Middle Conestoga River Basin). The length of channel stabilization could be reduced depending on site specifics and the amount of load reduction achieved from the implementation of other BMPs. Sediment load reductions for a channel stabilization project are calculated at 44.88 lbs/ft/yr based on the BMP effectiveness values for Stream Restoration (see BMP Effectiveness Values). Calculation details are included in Appendix D.

If all of the above BMPs are implemented, the sediment load reduction in the Middle Conestoga River Basin would be 85,069 lbs/yr which is above the minimum 10% sediment reduction requirement.

To meet the pollutant load reduction requirements for the Cocalico Creek Planning Area, West Earl Township proposes the implementation of the following BMPs summarized in Table 5:

Table 5. Proposed BMPs for the Cocalico Creek Subwatershed

BMP ID	BMP Project	Sediment Load Reduction (lbs)
PRP3	Millway Acres Detention Basin Retrofit	5,706
PRP6	Industrial Road Detention Basin Retrofit	10,337

BMP PRP3: Millway Acres Detention Basin Retrofit Project

Millway Acres is an existing detention basin, built in 2004, that receives drainage from 8.28 acres of pervious area and 4.99 acres of impervious area. This privately-owned basin is proposed to be retrofitted to increase the capacity of stormwater detained in the basin. The total area of the basin retrofit is 0.63 acres. This BMP will serve as a Stormwater Treatment practice for the Cocalico Creek Planning Area. Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

BMP PRP6: Industrial Road Detention Basin Retrofit Project

Industrial Road is the location of an existing detention basin that receives drainage from 20.66 acres of pervious area and 8.44 acres of impervious area. This privately-owned basin is proposed to be retrofitted to increase the capacity of stormwater detained in the basin. The total area of the basin retrofit is 1.03 acres. This BMP will serve as a Stormwater Treatment practice for the Cocalico Creek Planning Area. Load reductions for this BMP were calculated based on procedures from the Expert Panel. Calculation details are included in Appendix D.

If the above BMPs are implemented, the sediment load reduction in the Cocalico Creek subwatershed would be 16,042 lbs/yr, which is less than the minimum 10% sediment reduction requirement for this particular area. This portion of the subwatershed within West Earl Township boundaries has limited opportunities for stormwater BMP implementation.

Based on guidance from DEP, West Earl Township plans to utilize additional load reductions from proposed BMPs implemented within the Middle Conestoga River subwatershed to satisfy the overall 10% load reduction requirements for the municipality.

G. Funding Mechanism Identification

In order to install and maintain the BMPs listed in Section E, West Earl Township proposes the following sponsors/partners and funding sources:

Table 6. Funding Sources per Proposed BMP

BMP #	Sponsor/Partner/Funding Sources
PRP1	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources for installation;
PRP2	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources;
PRP3	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources for installation;
PRP4	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources;
PRP5	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources for installation;
PRP6	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources;
PRP7A	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources for installation;
PRP7B	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources;
PRP8	West Earl budget funds, local business tax; DCNR, DEP, NFWF are potential grant sources for installation;

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

All stormwater BMPs installed under this PRP are subject to West Earl's stormwater management ordinance.

The Operation and Maintenance (O&M) activities for each BMP are included in the table below. If the BMP is located on private land, the landowner must convey an easement to the Township to allow for access for periodic inspections and maintenance, as needed. Actual O&M activities will be listed in the Annual MS4 Status Report sent to the PADEP under the General Permit.

Table 7. O&M Activities per Proposed BMP

BMP #	Parties Responsible for O&M	O&M Activities	Frequency for O&M Activities
PRP1	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement, inlet and outlet cleaning;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;

PRP2	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement, inlet and outlet cleaning;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP3	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement, inlet and outlet cleaning;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP4	Township Public Works Department, maintenance staff;	Inspection, mowing (if applicable depending on design) and weeding, plant replacement;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP5	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement, inlet and outlet cleaning;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP6	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection, mowing and weeding, plant replacement, inlet and outlet cleaning;	Monthly inspection and mowing (during the growing season); at least annual plant replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP7A	Township Public Works Department and maintenance staff;	Inspection and plant and plant protection replacement;	Monthly inspection; at least annual plant and plant protection replacement (if needed)

			Additional O&M activities will be detailed in the final design;
PRP7B	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection and plant and plant protection replacement;	Monthly inspection and mowing; annual plant and plant protection replacement (if needed); Additional O&M activities will be detailed in the final design;
PRP8	Township Public Works Department and maintenance staff, as coordinated with the landowner;	Inspection in accordance with channel stabilization design details;	Biannual inspections for first three years and annual inspections for 2 additional years. Additional inspections following large storm events; Additional O&M activities will be detailed in the final design;

I. Works Cited

Integrated Water Quality Report 2014 – 2014 Integrated List of All Waters (formerly 303(d) Report). Retrieved February 8, 2017, from <http://www.dep.pa.gov/Business/Water/CleanWater/WaterQuality/Pages/Integrated-Water-Quality-Report-2014.aspx>. Office of Water Management, Bureau of Water Supply & Wastewater Management, Water Quality Assessment and Standards Division.

Schueler, T. and C. Lane. January 20, 2015. Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit. Chesapeake Bay Program Urban Stormwater Workgroup.

Pennsylvania Department of Environmental Protection (PADEP). 2016. PRP / TMDL Plans MS4 Workshop. Harrisburg, PA.

Pennsylvania Department of Environmental Protection (PADEP) Bureau of Clean Water. 2016. National Pollutant Discharge Elimination System(NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values (3800-PM-BCW0100m). Harrisburg, PA.

Appendix A
Public Participation: Item A1. Public Notice;

PROOF OF PUBLICATION NOTICE IN

State of Pennsylvania}
 } ss:
 County of Lancaster}

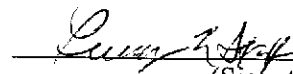
Penny L. Stauffer of the County and State aforesaid, being duly sworn, deposes and says that the LNP, a daily newspaper of general circulation published at Lancaster, County and State aforesaid, was established 1794-1877 since which date said daily newspaper has been regularly issued in said county, and that a copy of the printed notice or publication is attached hereto exactly the same as was printed and published in the regular editions and issues of said daily newspaper on the following dates:

16TH DAY OF JUNE 2017

Affiant further deposes that she is the Clerk duly authorized by the LNP Media Group, Inc., a corporation, publisher of said LNP, a newspaper of general circulation, to verify the foregoing statement under oath, and also declares that affiant is not interested in the subject matter of the aforesaid notice or advertisement and that all allegations in the foregoing statement as to time, place and character of publication are true.

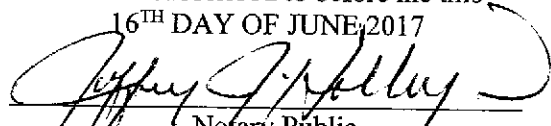
Notice is hereby given that West Earl Township, Lancaster County, Pennsylvania, shall conduct a public review period of the West Earl Township Pollutant Reduction Plan commencing on Monday, June 19, 2017. The Pollutant Reduction Plan proposes a minimum reduction of 81,901 pounds of sediment resulting from storm water flows through the Township's Municipal Separate Storm Sewer System within the Cocalico Creek, Conestoga River, and Groff Creek planning areas. These reductions in sediment loading to local waterways are planned to be achieved through the construction of best management practices during the 2018 National Pollutant Discharge Elimination System permit cycle. The Pollutant Reduction Plan is available for public inspection at the West Earl Township Municipal Building, 157 West Metzler Road, Brown-

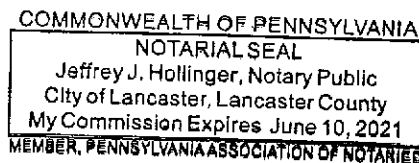
stown, Pennsylvania, Mondays through Fridays from 8:00 a.m. until 4:00 p.m. The public review period will conclude on July 19, 2017, during which period comments may be submitted in person at the West Earl Township Municipal Building, by United States mail to the Township at P.O. Box 787, Brownstown, Pennsylvania, or by e-mail to Township Manager Candie Johnson at cjohnson@westearitwp.org. Comments may also be made during the public comment period at the Board of Supervisors meeting on July 10, 2017, at the West Earl Township Municipal Building at 7:00 p.m. All comments will be considered by the Township Board of Supervisors at a public meeting to be held on Monday, July 24, 2017, at the Township Municipal Building at 7:00 p.m. Candie L. Johnson, Township Manager


 (Signature)

COPY OF NOTICE OF PUBLICATION

Sworn and subscribed to before me this
 16TH DAY OF JUNE 2017


 Notary Public



Appendix B

Map B1. West Earl Township Land Use Types and Planning Areas; Map B2. West Earl Township MS4 PRP Map

Map B1. West Earl Township Land Use Types and Planning Areas

Legend

- ★ MS4 Outfalls
- ▨ MS4 Planning Areas
- MUNICIPAL RD
- PRIVATE RD
- STATE RD
- Stream
- ▬ West Earl Township Boundary
- 2011 Mapshed Southcentral Land Use Data
 - Water
 - Low-Density Mixed Urban
 - High-Density Mixed Urban
 - Hay / Pasture
 - Cropland
 - Forest
 - Forest
 - Forest
 - Wetland
 - Wetland
 - Disturbed
 - Turf
 - Low-Density Residential
 - Medium-Density Residential
 - High-Density Residential
 - Medium-Density Mixed Urban
 - Open Land



1 in = 0.25 miles

0.25 0 0.25 0.5 0.75 1 1.25 Miles

Map B2. West Earl Township MS4 PRP Map

Legend

- Proposed BMPs
- Existing BMP
- ▨ Excluded Area
- Groff Creek Planning Area
- Conestoga River Planning Area
- Cocalico Creek Planning Area
- HUC12 Subwatershed
- Attaining Stream
- Non Attaining Stream
- Road**
 - MUNICIPAL
 - PRIVATE
 - STATE
- West Earl Twp Boundary



1 in = 0.25 miles

0.25 0 0.25 0.5 0.75 1 1.25 1.5 1.75 Miles

Appendix C

Baseline Load Calculations and Existing BMP Load Reductions

EXISTING LOAD DEP SIMPLIFIED METHOD SUMMARY TABLE

Statewide MS4 Land Cover Estimates for West Earl Township

UA % Impervious	29%
UA % Pervious	71%
Non-UA %Impervious	11%
Non-UA % Pervious	89%

PRP Instructions (05/2016) Attachment B - Developed Land Use Loading Rates for PA Counties - Lancaster County

	Sediment (lb/ac/yr)	N (lb/ac/yr)	P (lb/ac/yr)
UA Impervious Loading	1480.43	38.53	1.55
UA Pervious Loading	190.93	22.24	0.36
Undeveloped (Non UA) Loading	234.6	10	0.33

			Urban Area		Non-UA		Existing Baseline Load			Reductions ¹			Reductions - Existing BMPs			Final Existing Load		
Planning Area Name	UA Acreage ¹	non-UA aceage ²	Acres Impervious	Acres Pervious	Acres Impervio us	Acres Pervious	Sediment Load (lbs)	N Load (lbs)	P Load (lbs)	Sediment Load (lbs)	N Load (lbs)	P Load (lbs)	Sediment Reductions (lbs)	N Reductions (lbs)	P Reductions (lbs)	Sediment Load (lbs)	N Load (lbs)	P Load (lbs)
Cocalico Creek Planning Area	760.95		220.68	540.28			429,850.37	20,518.39	536.55	4,403.82	114.61	4.61	17,873.49	343.90	16.33	403,169.23	20,059.87	515.61
Conestoga River Planning Area	571.75		165.81	405.94			322,973.00	15,416.72	403.14	16,629.43	432.80	17.41				306,343.57	14,983.92	385.73
Groff Creek Planning Area	193.84		56.21	137.63			109,497.31	5,226.72	136.68							109,497.31	5,226.72	136.68
Planning Areas Total Acreage:	1,526.54												Planning Areas Total:			819,010.11	40,270.52	1,038.02

¹ Reductions shown here are for 14.2 acres of PENNDOT roads that could not otherwise be extracted from the Planning Area acreage; All other Excluded Area acreage has already been extracted from the Planning Area acreage

Site	RR or ST	Runoff Storage (RS) (ac ft)	Impervio us Area (IA) (ac)	(RS)(12)/IA (Min=0, Max=2.5)	Pervious Area (ac)	Sediment Removal %**	Sediment Load (lb)	Sediment Removal (lb)	Sediment Removal (T)
Cloverbrook Detention Basin	ST	1.63	13.81	1.42	17.10	0.75	23709.64	17,873.49	8.94
Cocalico Creek Planning Area Existing BMP									

Loading Rates from DEP PRP Instructions, Attachement B "Developed Land Loading Rates for PA Counties" May, 2016;			
	N	P	TSS
Pervious Surface Loading (lb/ac/yr) =	22.24	0.36	190.93
Impervious Surface Loading (lb/ac/yr)=	38.53	1.55	1,480.43

* Based on Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects. Chesapeake Stormwater Network. January 20, 2015

** From Retrofit Adjustor Curves, p 14, 15 - Forumulas form Peft Standards and Retrofits_FAQ Document_090913

Appendix D

Proposed BMP Load Reduction Calculations

West Earl Township Proposed Urban BMPs - Sediment and Nutrient Reduction Calculations*

Site	BMP ID	RR or ST	BMP Acreage	Runoff Storage (RS) (ac ft)	Impervio us Area (IA) (ac)	(RS)(12)/IA (Min=0, Max=2.5)	Pervious Area (ac)	Sediment Removal %**	Sediment Load (lb)	Sediment Removal (lb)	Sediment Removal (T)
Eagleview Estates Detention Basin Retrofit	PRP1	ST	1.06	0.53	12.00	0.53	59.87	0.54	29196.14	15,726.72	7.86
Anglesea Detention Basin Retrofit	PRP2	ST	1.01	0.50	18.27	0.33	36.59	0.40	34033.20	13,669.89	6.83
Millway Acres Detention Basin Retrofit	PRP3	ST	0.63	0.31	4.99	0.75	8.28	0.64	8968.25	5,705.65	2.85
Main Street Bioswale	PRP4	ST	0.48	0.24	1.45	1.99	3.55	0.78	2824.43	2,207.61	1.10
School Lane Farms Detention Basin	PRP5	ST	0.56	0.28	8.99	0.37	22.01	0.44	17511.44	7,631.35	3.82
Industrial Road Detention Basin	PRP6	ST	1.03	0.51	8.44	0.73	20.66	0.63	16438.15	10,336.62	5.17
										Proposed BMP Load Reductions***:	10% Requirement:
Conestoga River Planning Area Proposed BMPs										71,398.83	30,634.36
Cocalico Creek Planning Area Proposed BMPs										16,042.27	40,316.92
Groff Creek Planning Area Proposed BMPs										13,669.89	10,949.73
						Total Proposed BMP Reductions for West Earl Twp:				101,110.99	81,901.01

Loading Rates from DEP PRP Instructions, Attachment B "Developed Land Loading Rates for PA Counties" May, 2016; Lancaster County values used			
	N	P	TSS
Pervious Surface Loading (lb/ac/yr) =	22.24	0.36	190.93
Impervious Surface Loading (lb/ac/yr)=	38.53	1.55	1,480.43

* Based on Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects. Chesapeake Stormwater Network. January 20, 2015

** From Retrofit Adjustor Curves, p 14, 15

***Includes Load Reductions from Stream BMPs identified on other page

West Earl Township Proposed Stream BMPs - Sediment and Nutrient Reduction Calculations*

Site	BMP ID	Length (ft)	BMP Area (ac)	Area Treated (ac)	Imp. Area (ac)	Perv. Area (ac)	Imp. Area TSS Loading (lbs/ac/yr)**	Perv. Area TSS Loading (lbs/ac/yr)**	Sediment Removal (lbs)
West Earl Community Park Riparian Buffer	PRP7A	350	0.28	1.12	0.33	0.80	482.94	152.49	317.72
West Earl Community Park Extended Riparian Buffer	PRP7B	1050	0.84	3.37	0.98	2.40	1448.82	457.47	953.15
West Metzler Road Channel Stabilization	PRP8	1000							44,880.00

* Based on PADEP's BMP Effectiveness Values (3800-PM-BCW0100m), 5/2016

**Loading Rates from DEP PRP Instructions, Attachement B "Developed Land Loading Rates for PA Counties" May, 2016; Lancaster County values used			
	N	P	TSS
Pervious Surface Loading (lb/ac/yr) =	22.24	0.36	190.93
Impervious Surface Loading (lb/ac/yr)=	38.53	1.55	1,480.43
Undeveloped (Non UA) Surface Loading (lb/ac/yr)=	10	0.33	234.60