

MS4 NPDES Permit Pollution Reduction Plan (PRP)

FOR

Fleetwood Borough



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List of Acronyms

BMP	Best Management Practices
CBW	Chesapeake Bay Watershed
CWA	Clean Water Act
DEP	Department of Environmental Protection
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	Minimum Control Measure
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
SOP	Standard Operating Procedure
TMDL	Total Maximum Daily Load
UA	Urbanized Area

Common Terms related to Stormwater Management

(As defined by PA Code 25, Chapter 92a. and Chapter 96 *)

Best Management Practice (BMP) – schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce pollutant loading to surface waters of the Commonwealth.

Buffer (Vegetated) – A permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for purposes that include slowing water runoff, enhancing water infiltration and minimizing risk of any potential pollutants from leaving the field and reaching surface waters.

Intermittent Stream – A body of water flowing in a channel or bed composed primarily of substrates associated with flowing water, which, during period of the year, is below the local water table and obtains its flow from both surface runoff and groundwater discharges.

Loading Capacity * - the greatest amount of loading that a surface water can receive without violating a water quality standard

MS4 – Municipal Separate Storm Sewer System – A separate storm sewer (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels or storm drains) which is all of the following:

- (i) Owned or operated by a State, City, town, Borough, County District association or other public body (created by or under State Law) having jurisdiction over disposal of sewage, industrial wastes, stormwater or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under section 208 of the Federal Act (33 U.S.C.A. 1288) that discharges surface waters of this Commonwealth.
- (ii) Designed or used for collecting or conveying stormwater
- (iii) Not a combined sewer
- (iv) Not part of a POTW (Publicly Owned Treatment Works)

Perennial Stream – A body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters and capable, in the absence of pollution or other manmade stream disturbances, of supporting benthic macroinvertebrate community which is composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye and can be retained by a United States Standard No. 30 sieve and live at least part of their life cycles within or upon available substrates in a body of water or water transport system.

Separate Storm Sewer – A conveyance or system of conveyances including pipes, conduits, ditches and channels, primarily used for collecting and conveying stormwater runoff.

Storm Sewershed – The land area which drains to the municipal separate storm sewer system from within the jurisdiction of the MS4 permittee.

Stormwater – runoff from precipitation, snow melt runoff and surface runoff and drainage.

Surface Waters – Perennial and intermittent streams, rivers, lakes, reservoirs, ponds, wetlands, springs, natural seeps and estuaries, excluding water at facilities approved for wastewater treatment such as wastewater treatment impoundments, cooling water ponds and constructed wetlands used as part of a wastewater treatment process.

Purpose

The submission of this Pollution Reduction Plan (PRP) is in accordance with the requirements as defined in the *General Permit PAG-13 Authorization to Discharge Under the National Pollutant Discharge Elimination System (NPDES)*. This general permit, issued by the PA Department of Environmental Protection (DEP), grants municipalities the authority to discharge its stormwater into Waters of the Commonwealth under a *Stormwater Discharges from Small Municipal Storm Sewer Systems (MS4)* permit.

Fleetwood Borough discharges stormwater into a tributary stream of Willow Creek, and Willow Creek which have been listed by DEP as being impaired for sediment. In accordance with Fleetwood Borough's MS4 permit, this PRP has been developed to address water quality initiatives within the drainage areas of these impaired streams.

This Pollution Reduction Plan (PRP) may be evaluated by Fleetwood Borough at any time for its effectiveness in reducing pollutant loads from its stormwater discharges. If the Borough believes the PRP should be revised or best management practices (BMP) updated, Fleetwood Borough shall work with the Regional Office of DEP for review and approval of any revisions and/or updates.

Pollution Prevention

By developing guidelines to help Fleetwood Borough manage its stormwater objectives, the 'front end' planning and design process becomes an important tool to assist in the thoughtful prevention of additional pollutants discharging into the Borough's impaired streams. Controls and management solutions shall be reviewed to limit cases of removing pollutants from one location and medium, only to transfer them and their possible liabilities to another location. Addressing water quality and pollution concerns at the beginning of a project can decrease the cost, risks and environmental concerns in managing a problem after its been created.

Implementation of Fleetwood Borough's PRP plan shall be a multimedia approach, in that program requirements shall integrate educational materials, opportunities for the public to participate, include operation and maintenance measures, and training events, whenever possible.

POLLUTION REDUCTION PLAN ELEMENTS**A. 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, it can uncover missing elements or errors in the calculations, and builds cooperative partnerships among the municipality and other local entities.

The Borough held an initial informational public meeting to review the Borough's NPDES MS4 permit and beginning stages of the Pollution Reduction Plan (PRP) process. A public notice was issued in the February 3rd, 2017 publication of the Reading Eagle newspaper. The public meeting was held on Monday, February 12th at Borough Hall. A copy of the public notice is included as Appendix A.

The Borough released a second public notice to review components of the draft PRP report, including evaluation of proposed stormwater best management practices (BMPs). A public notice was released on Monday, June 12th, 2017 to the Reading Eagle. The public meeting was held on Monday, June 26th at Borough Hall. A copy of the public notice is included as Appendix B.

The public was given 30 days to provide commentary on the contents of the PRP. A copy of all written public comments is included in **Appendix C. TO BE ADDED AT END OF REVIEW PERIOD**

The Borough of Fleetwood held a public meeting on June 26th, 2017 to receive a verbal commentary on the contents of the PRP. A copy of the comments and the record of consideration is included as **Appendix D. TO BE ADDED AT END OF REVIEW PERIOD**

The MUNICIPALITY used the public comments to update the draft PRP in the following ways:
TO BE ADDED AT END OF REVIEW PERIOD.

B. MAPPING

In order to determine how much existing sediment was being contributed by the municipality to its receiving streams, the Borough needed to first examine how stormwater runoff was entering its boundaries, how the stormwater runoff was being impacted once inside its boundaries, and how the stormwater was then collected and discharged from the municipality. The Borough had an existing storm sewer map for its MS4 permit, showing the locations of storm outfalls, inlets, manholes, pipes, swales and pipe discharge locations. This map was used as a base to identify land uses and/or impervious/pervious surfaces and the storm sewershed boundary associated with each MS4 outfall.

Use of this base map was permitted as described in the NPDES PRP Instructions, *'The map may be the same as that used to satisfy MCM #3 of the PAG-13 General Permit, with the addition of land use and/or impervious/pervious surfaces, the storm sewershed boundary, and locations of proposed BMPs, or may be a different map'*. The map needed to be sufficiently detailed to identify the "planning area" relevant to satisfying the requirements of Appendix D and/or Appendix E in the *Municipal Requirements MS4*

Table published by PA DEP and last updated on February 8, 2017 (See Table 2). The map shall also be able to demonstrate the proposed BMPs are located in appropriate storm sewersheds to meet the requirements.

The following GIS platform maps were utilized for analysis and development of the Borough's PRP.

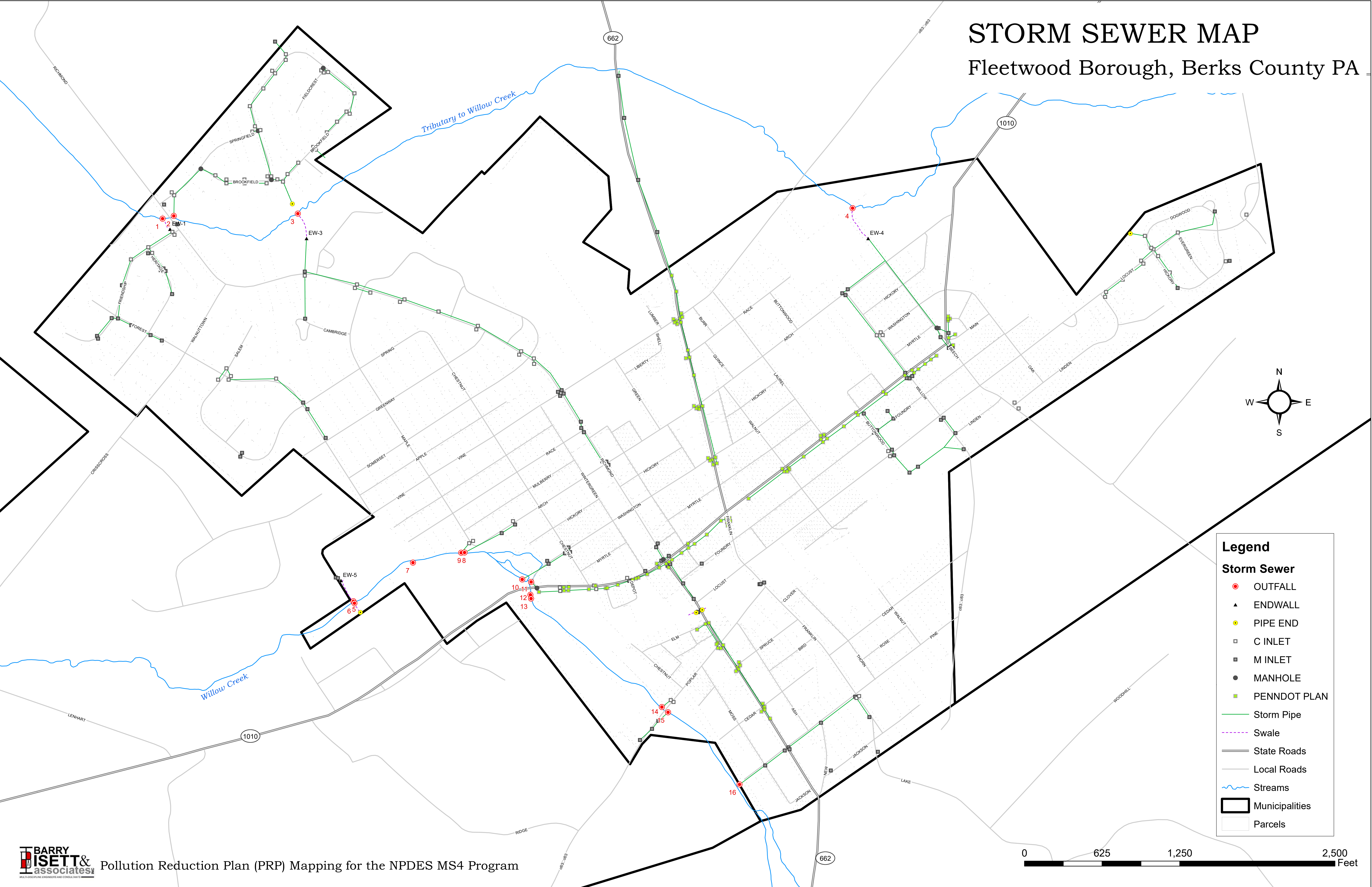
1. Storm Sewer & Street Map – existing basemap showing the municipal storm sewer system with outfall locations, streams and drainage channels.
2. Topo & Impaired Stream Map – contour information was provided by LIDAR shapefile information downloaded from Pennsylvania Spatial Data Access (PASDA) website. The contours provide information on the general grading and how stormwater is directed through the Borough. The impaired stream information was provided by PA DEP online GIS mapping service eMAP. The DEP site provides information on the reach extent and location of impaired streams.
3. Storm Drainage Areas Map – drainage areas to each MS4 outfall were evaluated by the Borough Engineer's office using the topographic information and assessing how the stormwater runoff entered and traveled through the storm sewer system by street inlets and pipes. The drainage areas also include 'dispersed discharges' where runoff is not piped and does not have single point source, but is allowed to flow across a surface into a stream or receiving body of water, such as ponds, wetlands, tributary streams.
4. Impairment Area Map – after the drainage areas were outlined, a storm sewershed boundary was delineated. This boundary shows which areas of the Borough drain to and impact each stream, specifically Willow Creek. Any land use areas draining to non-impaired streams were not included in the PRP calculations.
5. Land Use Map – land uses were evaluated for two different sewersheds: Willow Creek and the tributary of Willow Creek. Determining the land use for a property is essential for calculating the pervious and impervious areas within each drainage area since different types of land uses will have different levels of impervious coverage.
6. Parsing – the map may show areas that are to be "parsed" from the planning area. At the MS4's discretion, certain areas may be shown on the map that are within the storm sewershed but are not included in the calculation of land area or the existing pollution loading. These areas are already covered by an NPDES permit for the control of stormwater. If, however, the land is removed from the planning area, BMPs implemented on that land may not be used as credit toward meeting the MS4's pollutant loading reduction requirements.

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.

Fleetwood Borough did not parse out any properties as part of this PRP.

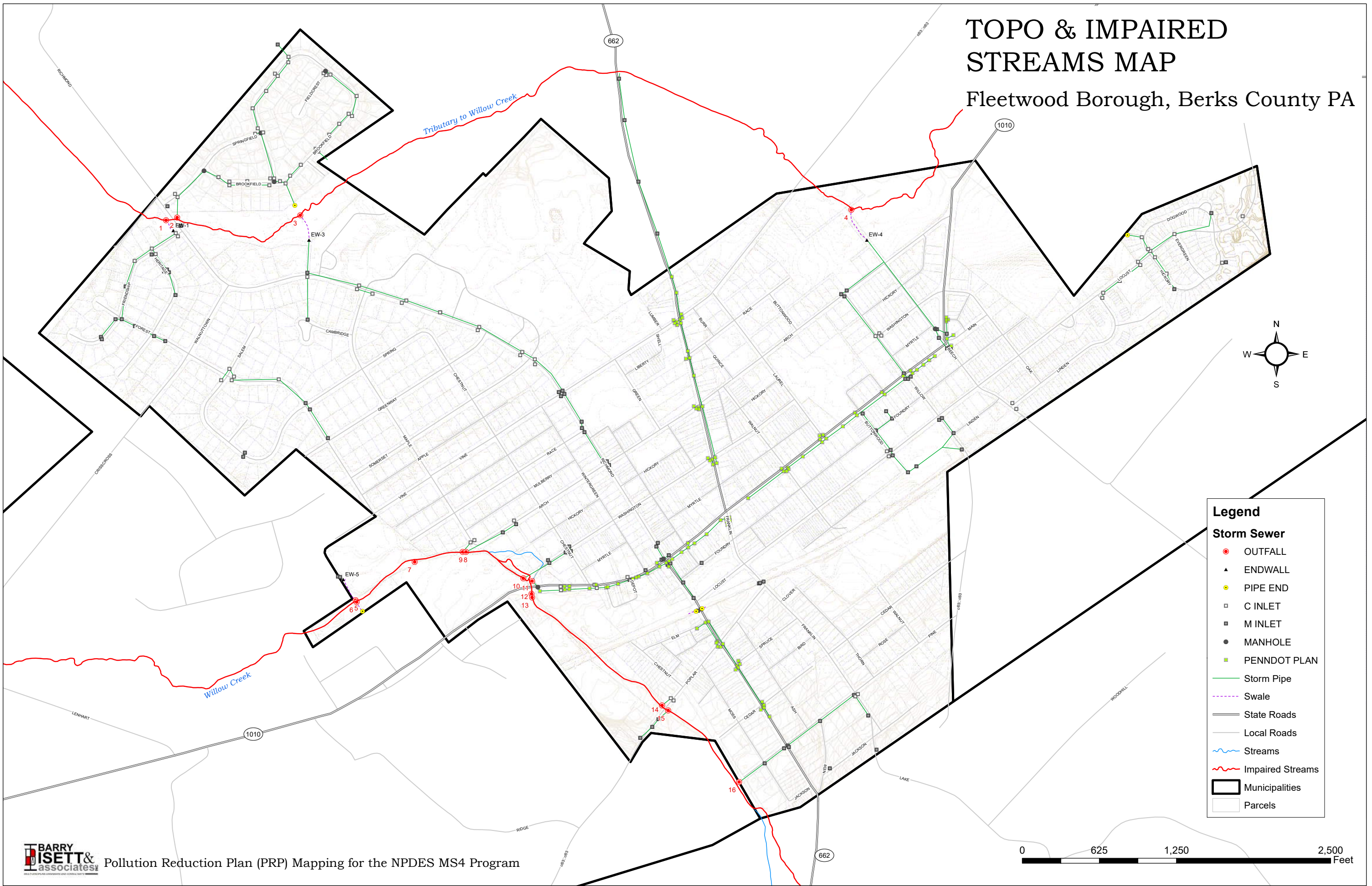
STORM SEWER MAP

Fleetwood Borough, Berks County PA



TOPO & IMPAIRED STREAMS MAP

Fleetwood Borough, Berks County PA



Legend

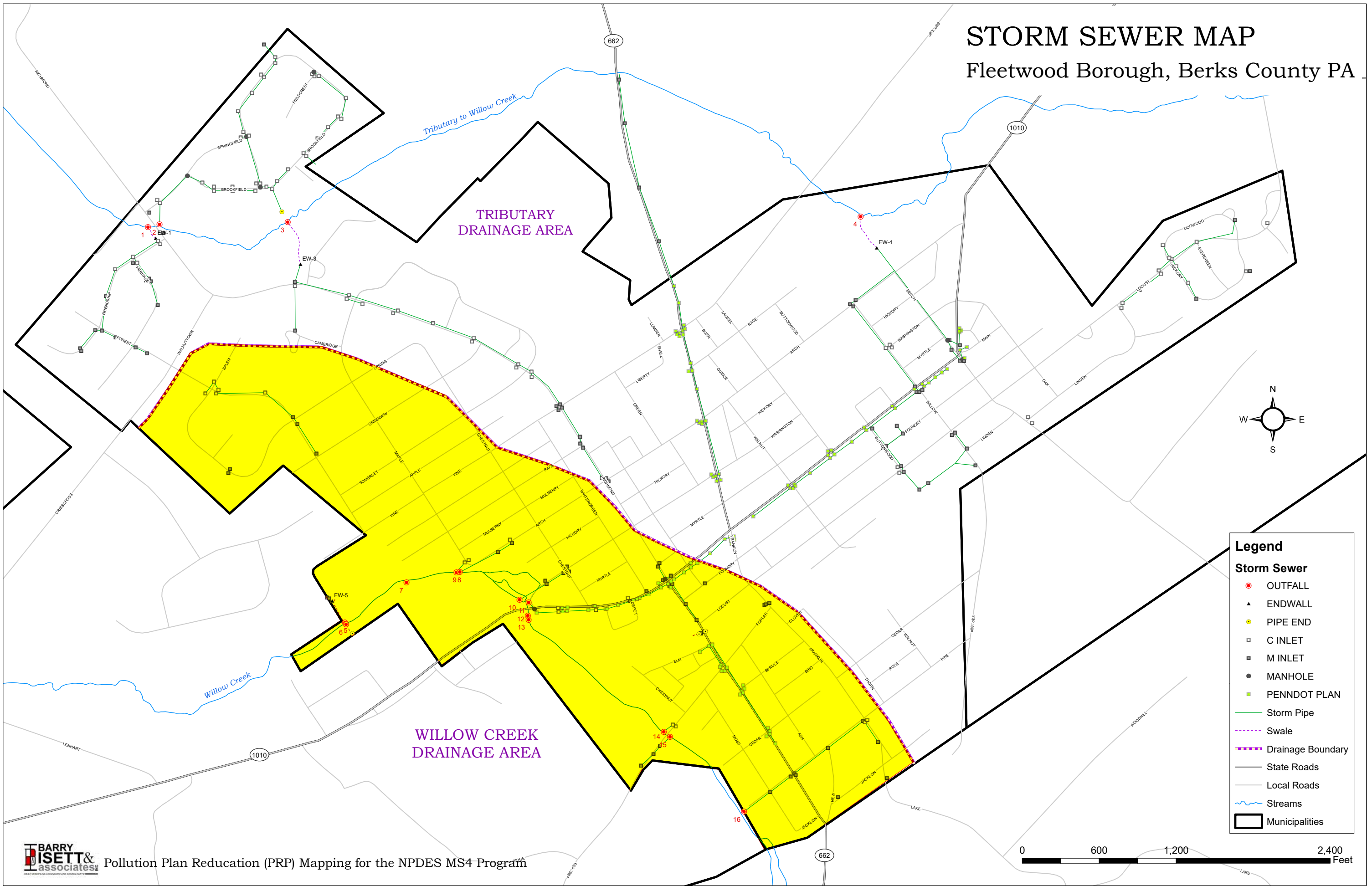
Storm Sewer

- OUTFALL
- ▲ ENDWALL
- PIPE END
- C INLET
- M INLET
- MANHOLE
- PENNDOT PLAN
- Storm Pipe
- - - Swale
- State Roads
- Local Roads
- Streams
- Impaired Streams
- ▭ Municipalities
- ▭ Parcels



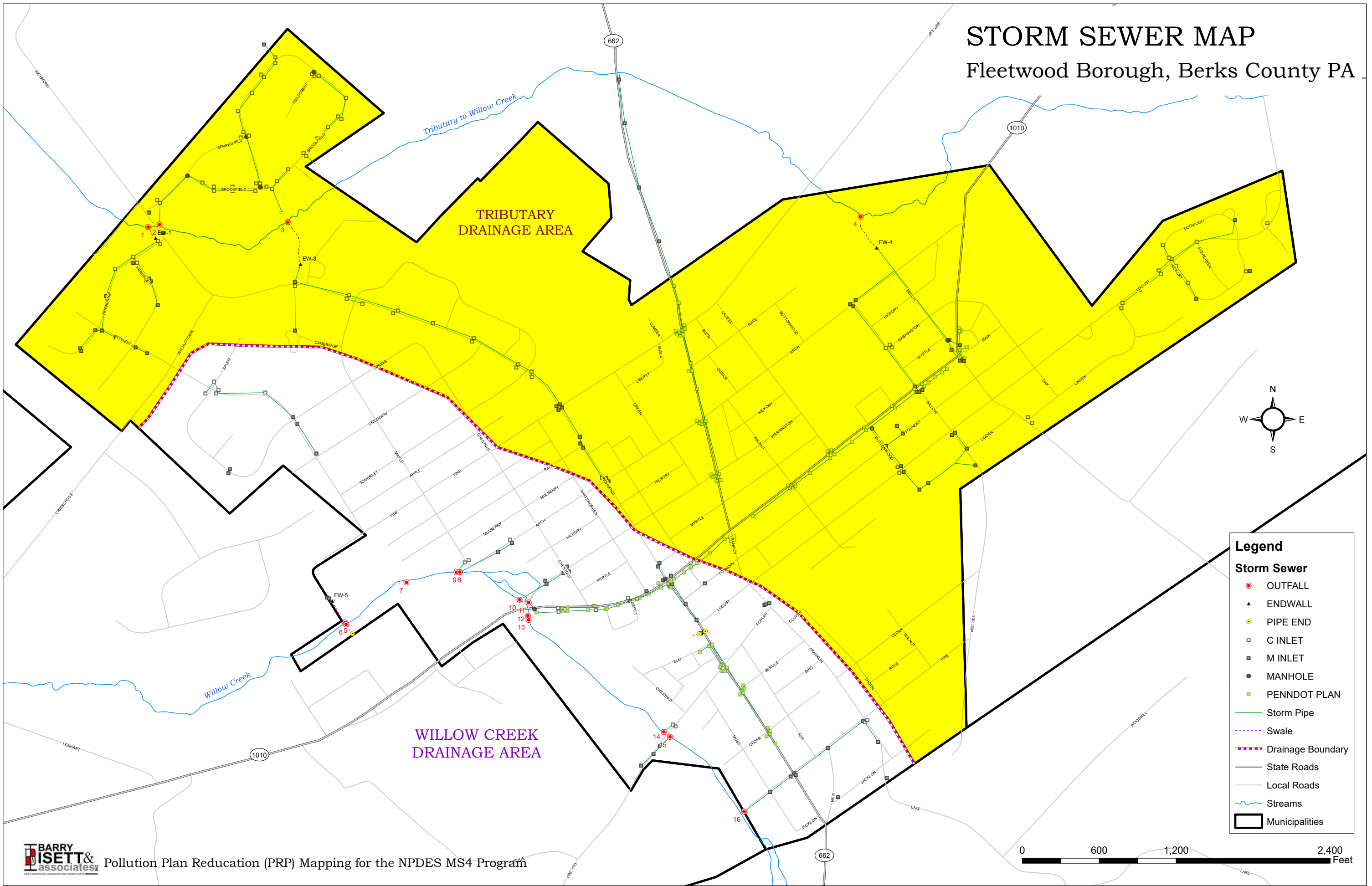
STORM SEWER MAP

Fleetwood Borough, Berks County PA



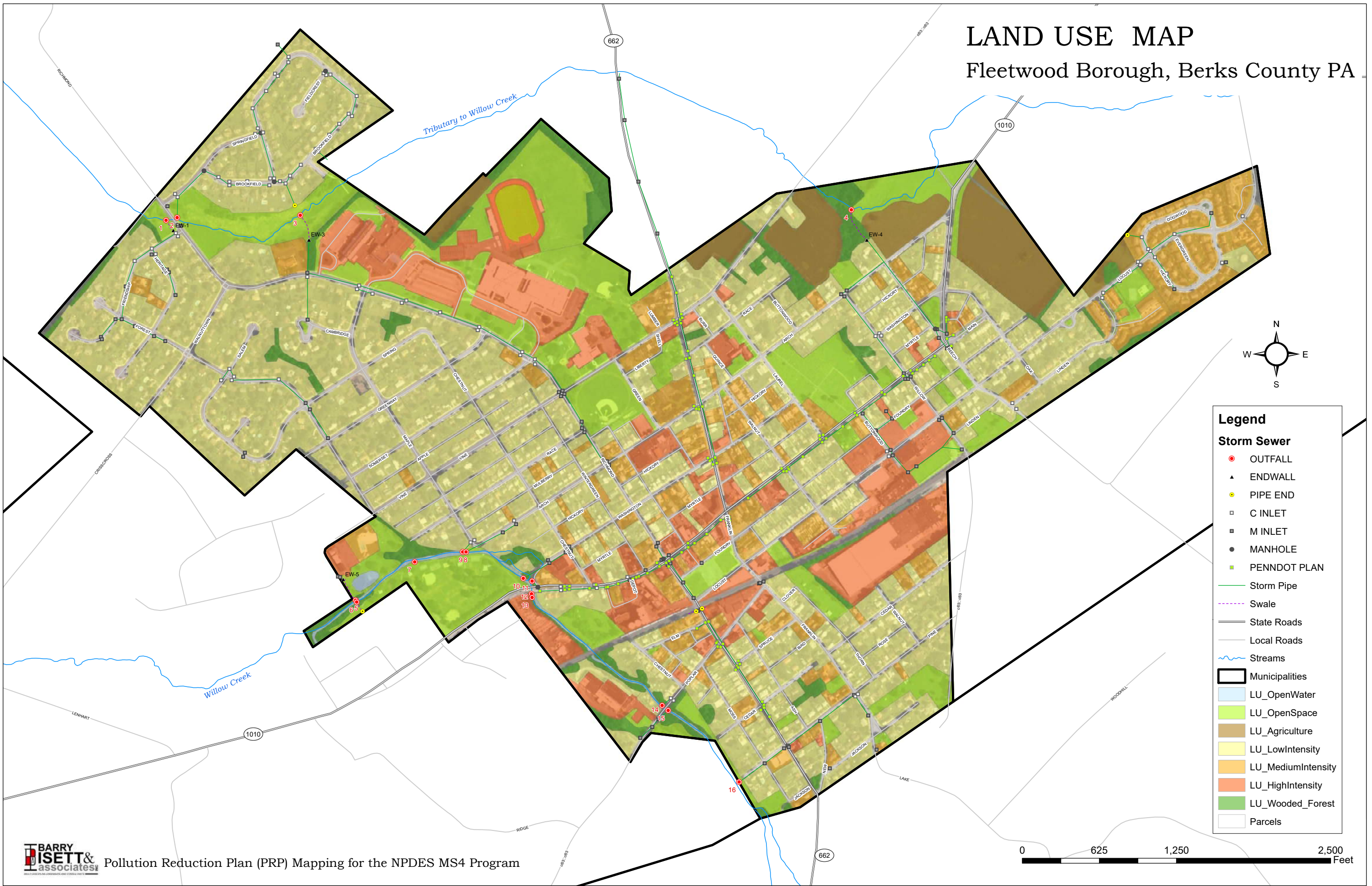
STORM SEWER MAP

Fleetwood Borough, Berks County PA



LAND USE MAP

Fleetwood Borough, Berks County PA



Legend

Storm Sewer

- OUTFALL
- ENDWALL
- PIPE END
- C INLET
- M INLET
- MANHOLE
- PENNDOT PLAN

- Storm Pipe
- Swale
- State Roads
- Local Roads
- Streams
- Municipalities

- LU_OpenWater
- LU_OpenSpace
- LU_Agriculture
- LU_LowIntensity
- LU_MediumIntensity
- LU_HighIntensity
- LU_Wooded_Forest
- Parcels



Table 1: Total PRP Planning Areas

Mapped	Area	Acres
Willow Creek		
PRP Planning Area	8,947,471 SF	205.40 AC
Tributary of Willow Creek		
PRP Planning Area	19,832,990 SF	455.30 AC

C. POLLUTANTS OF CONCERN

The Borough shall identify the pollutants of concern for each storm sewershed or the overall PRP planning area. DEP's MS4 Requirements Table identified Fleetwood Borough as having impaired stream waters for Willow Creek. The stream is impaired due to sediment and nutrients. The terms "sediment", "siltation" and "suspended solids" all refer to inorganic solids.

The table below shows the impaired waters receiving discharges from the Borough, and the pollutant(s) that are of concern to that stream.

Table 2: DEP MS4 Requirements Table (last revised 2/8/17)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Fleetwood Borough	PAG 133517	No		Willow Creek	Appendix E – Nutrients, Siltation (5)	Flow Alterations, Water Flow Variability (4c)

The EPA defines sediment as *'the loose sand, clay, silt and other soil particles that settle at the bottom of a body of water. Sediment can come from soil erosion or from the decomposition of plant and animals. Wind, water and ice help carry these particles to rivers, lakes and streams.'* Sediment is a pollution of concern due to its degradation of water quality, which impacts sources of drinking water; increases water turbidity (cloudiness) causing impacts to aquatic habitat and fish health; and alters the depth and direction of drainage areas which can result in flooding issues.

The EPA notes that nitrogen pollution is *'one of America's most widespread, costly and challenging environmental problems, and is caused by excess nitrogen and phosphorous in the air and water.'* Although Nitrogen and Phosphorous are natural elements and support both animal and plant life, too much of either can impact our air quality, alter plant growth, decrease aquatic habitat and impact our food and drinking resources.

For all PRPs, the MS4 shall calculate the existing loading of the pollutant(s) of concern in pounds per year (lbs/yr). Fleetwood Borough utilized the mapping information to determine its existing contribution of sediment being discharged into Willow Creek and its tributary.

Fleetwood Borough is required to reduce the amount of sediment discharge by 10%, and Phosphorous by 5%. The MS4 shall select the Best Management Practices (BMPs) suited to reduce this pollution loading. The PRP shall demonstrate that the selected BMPs will achieve the minimum reductions required by DEP.

If the impairment is based on nutrients only or other surrogates for nutrients, then a minimum 5% reduction of Phosphorous is required. If the impairment is due to both sediment and nutrients, then both 10% reduction in sediment and 5% reduction in total Phosphorous must be addressed. PRP's may use a presumptive approach in which it is assumed that a 10% sediment reduction will also accomplish a 5% Phosphorous reduction. However, MS4s may not presume that a reduction in nutrients will accomplish a commensurate reduction in sediment.

D. DETERMINE EXISTING LOADING FOR POLLUTANTS OF CONCERN

There are several possible methods to estimating the existing load, ranging from the simplistic to the complex. One method to estimate existing loading is the Simplified Method. This method determines the percent of impervious and pervious surface within the urbanized area of the storm sewershed and calculates the existing loading by multiplying those land areas (acres) by pollutant loading rates (lbs/acre/yr). This method does not take into consideration the different types of land uses within the storm sewershed.

Use of the simplified method is not required. Any methodology that uses the following factors based on sound science may be considered acceptable:

- calculates existing pollutant loading in terms of pounds per year, and
- evaluates BMP-based pollution reductions utilizing DEP's BMP Effectiveness Values contained in 3800-PM-BCW0100m, or
- evaluates BMP -based pollution reduction utilizing Chesapeake Bay Program expert panel reports, and
- uses average annual precipitation conditions, and
- considers both overland flow and stream erosion

The Borough Engineer's office utilized the WikiWatershed online tool from the Stroud Water Research Center. Use of the GIS platform and WikiWatershed was an approved method noted by PA DEP. Since different land uses have different impacts on impervious coverage, the WikiWatershed model was determined to give the Borough more accurate pollution loading calculations.

Aerial photography was utilized through a GIS platform to outline the various land use boundaries within each of the drainage areas for the planning area. The square footage of each

land use was calculated by the GIS program and then compiled into a spreadsheet to get the total square footage of each land use.

The existing loading estimates were calculated on September 15, 2017 (date of NOI submission) using Attachment B of the PRP Instructions - DEP's BMP Effectiveness Values. Tables 3a and 3b show the calculation method and breakdown of land uses for determining the existing loading rates within each of the impaired sewersheds: Willow Creek and the Tributary to Willow Creek. Table 4a and 4b show what the total contribution of sediment Fleetwood is estimated to contributing to these two streams.

Table 3a: Land Uses, Impervious Coverage and Loading Rates - Willow Creek

WILLOW CREEK PLANNING AREA					SEDIMENT		PHOSPHOROUS	
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	LOADING RATE (LB/AC) ²	EXISTING LOAD (LBS)	LOADING RATE (LB/AC) ³	EXISTING LOAD
FOREST/ WOODED	400,723.49	9.20	0.00	0.00	12.71	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	950,187.01	21.81	0.19	4.14	12.71	52.68	0.04	0.17
DEVELOPED, LOW INTENSITY	4,473,922.33	102.71	0.49	50.33	46.23	2326.59	0.31	15.60
DEVELOPED, MEDIUM INTENSITY	672,363.22	15.44	0.79	12.19	46.23	563.72	0.31	3.78
DEVELOPED, HIGH INTENSITY	814,211.19	18.69	1.00	18.69	46.23	864.12	0.31	5.79
REMAINING STREETS/ROADS	1,523,804.51	34.98	1.00	34.98	46.23	1617.21	0.31	10.84
TOTAL:					5424.32		36.19	

1 - Wiki Watershed, Model My Watershed Online Tool, Site Storm Model Scenario

2 - Wiki Watershed, Stream Reach Assessment Tool, Local Catchment Stats for Willow Creek (Sediment: Urban Areas 46.23 lb/acre, Natural 12.71 lb/acre, Agricultural 337.67 lb/ac, streambank erosion 285,973.10 lbs)

3 - Wiki Watershed, Stream Reach Assessment Tool, Local Catchment Stats for Willow Creek (Phosphorous: Urban Areas 0.31 lb/acre, Natural 0.04 lb/acre, Agricultural 1.95 lb/ac)

Table 3b: Land Uses, Impervious Coverage and Loading Rates – Tributary to Willow Creek

TRIBUTARY TO WILLOW CREEK PLANNING AREA					SEDIMENT		PHOSPHOROUS	
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	LOADING RATE (LB/AC) ²	EXISTING LOAD (LBS)	LOADING RATE (LB/AC) ³	EXISTING LOAD (LBS)
FOREST/ WOODED	679,052.65	15.59	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	3,422,168.05	78.56	0.19	14.93	12.47	186.14	0.04	0.60
DEVELOPED, LOW INTENSITY	7,110,922.42	163.24	0.49	79.99	44.48	3557.94	0.33	26.40
DEVELOPED, MEDIUM INTENSITY	1,983,873.45	45.54	0.79	35.98	44.48	1600.36	0.33	11.87
DEVELOPED, HIGH INTENSITY	2,603,049.33	59.76	1.00	59.76	44.48	2658.03	0.33	19.72
DEVELOPED, AGRICULTURAL	1,248,672.65	28.67	0.19	5.45	521.96	2842.83	2.16	11.76
REMAINING STREETS/ROADS	8,785,251.44	63.94	1.00	63.94	44.48	2844.08	0.33	21.10
TOTAL:					13689.38		91.45	

1 - Wiki Watershed, Model My Watershed Online Tool, Site Storm Model Scenario

2 - Wiki Watershed, Stream Reach Assessment Tool, Local Catchment Stats for Willow Creek
(Sediment: Urban Areas 44.48 lb/acre, Natural 12.47 lb/acre, Agricultural 521.96 lb/ac, streambank erosion 586,041.91 lbs)

3 - Wiki Watershed, Stream Reach Assessment Tool, Local Catchment Stats for Willow Creek
(Phosphorous: Urban Areas 0.33 lb/acre, Natural 0.04 lb/acre, Agricultural 2.16 lb/ac)

Table 4a: Existing Pollution Load and Required Reduction to Willow Creek

MAIDEN CREEK WATERSHED – WILLOW CREEK			
Fleetwood Borough	Existing Load	Required Reduction	Minimum Load Reduction Required
Total Sediment	5,424.32 lb/yr	10%	542.43 lb/yr
Total Phosphorous	36.19 lb/yr	5%	1.80 lb/yr

Table 4b: Existing Pollution Load and Required Reduction to Tributary to Willow Creek

MAIDEN CREEK WATERSHED – TRIBUTARY TO WILLOW CREEK			
Fleetwood Borough	Existing Load	Required Reduction	Minimum Load Reduction Required
Total Sediment	13,689.38 lb/yr	10%	1,368.94 lb/yr
Total Phosphorous	91.45 lb/yr	5%	4.57 lb/yr

Whatever tool or approach that is used to estimate existing loading from the PRP planning area must also be used to estimate loading to planned BMPs. This avoids errors in percent pollutant removal calculations that would result if different methods were used. Later BMP efforts will usually apply a more sophisticated method than used in the planning process to calculate loads 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 sewer watershed as a whole.

MS4's may claim "credit" for structural BMPs implemented prior to development of the PRP to reduce existing loading estimates. In order to claim credit, the Borough shall 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 of 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 Borough may optionally submit design drawings of the BMP for previously installed or future BMPs with the PRP. Fleetwood Borough did not claim credit for non-structural BMPs installed and implemented prior to this report.

MS4s may not claim credit for street sweeping or other non-structural BMPs implemented in the past in order to meet its reduction requirement. Instead, the MS4 may claim pollutant reduction credit in the form of reducing the existing loading being discharged by the MS4 into the stream. In order for the structural BMPs to be credited, the stormwater BMP must have been continually operated and maintained.

E. SELECT BMPs TO ACHIEVE THE MINIMUM REQUIRED REDUCTIONS IN POLLUTANT LOADING

Once the Borough identified the amount of pollution load required to be reduced, the Borough could then identify areas within the municipality to be studied for BMP improvements. The proposed implementation of BMPs or land use changes must be within the storm sewershed that will result in meeting the minimum required reductions. This means the municipality can not install a BMP outside the planning area of one sewershed and use its pollution reduction amounts toward a different impaired stream's sewershed.

These BMPs shall be implemented within five (5) years of DEP's approval date for coverage under the PAG-13 General Permit. The BMPs may be located on public or private property. If the applicant is aware of BMPs that will be installed by others, either in cooperation with the applicant or otherwise, and it will be located within the sewershed that will result in net pollutant loading reductions, then the applicant may propose those BMPs in this PRP.

As part of the Borough's annual cleaning and maintenance practices for streets, sweeping has been used to remove sediment, debris and other potential sources of pollution affecting the streams. This practice is well suited for urban environments with little land available for the installation of structural controls. However, historic street sweeping practices have been a seasonal task and should not be considered in calculating credit for future BMP practices. The method and frequency of street sweeping has changed in order to be used as credit. If street sweeping is conducted at least 25 times a year, the municipality can only count the streets that have been swept 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.

In calculating future pollutant loading, the Borough must be cognizant of planned changes to land uses or BMPs. For example, if a tract of land (<1 acre) currently in pasture will be converted within the next few years to residential land use, and there are no ordinances in place to control the rate, volume or quality of stormwater draining from the tract, the potential net increase in pollutant loading must be factored into the future loading estimates. This means that BMPs must be implemented on the tract or elsewhere within the storm sewershed to compensate for this change.

During the five (5) year permit, the MS4 can take credit for BMPs that are under 1 acre and are not being used to meet regulatory requirements, such as a Chapter 102 NPDES permit for construction activities. However, in cases where there is a Chapter 102 NPDES permit, the MS4 may take credit for stormwater BMPs that go above and beyond the minimum requirements. For example, a land development project was required to install a stormwater BMP as part of its Chapter 102 NPDES permit requirement. The BMP was designed and installed to exceed the minimum requirements of the permit. The MS4 may elect to take credit for the additional pollution reduction provided by that BMP. It is the responsibility of the MS4 to demonstrate that the BMP exceeds its regulatory requirements. The MS4 may take credit for only those additional reductions that result from exceeding the regulatory requirements.

STUDY AREAS

Fleetwood Borough reviewed a variety of site locations and selections for BMPs to achieve its minimum required reduction of sediment and phosphorous. Borough staff and the Borough Engineer's office developed a list of priority areas for initial evaluation. These areas were either property owned by the Municipality, areas in need of improvements, or areas of existing drainage concerns. The goal was to assess a BMP's potential for addressing multiple concerns and opportunities. The PRP will review the proposed BMPs by each impaired stream's planning area.

WILLOW CREEK PLANNING AREA

Fleetwood Borough began the process of developing a Park Master Plan for its 12.9 acre Community Park, located on Main Street. This property is the center of many community events throughout the year. In the planning process for the Fleetwood Borough Community Park Master Plan, the Borough conducted community meetings and public surveys which included park users who live outside the Borough limits. On the list of areas to improve within the park, stream restoration of Willow Creek and access to the water for educational purposes were commonly listed. Having Willow Creek travel through the largest and most used park in the Borough provides Fleetwood with an opportunity to engage, educate and mobilize multiple target audiences.

BMP OPTION – STREAM RESTORATION

Willow Creek enters the property at the park's eastern corner on West Main Street and travels northwest between residential property and the park for approximately 460 feet. This section of the creek is moderately vegetated along the residential embankment, however the sloped embankments have been eroded on both sides. Borough staff members noted the loss of lawn areas along the creek through the years, resulting in less lawn setbacks between the park trail and creek edge.

At Arch Street, the creek turns west and travels approximately 140 feet to a pedestrian footbridge between the park and W Arch Street. This section of stream has concrete sidewalls which has prevented further loss of turf areas in the creek's bend, however the concrete walls are cracked and some sections are 'pushed out', tilting towards the creek bed.

The creek continues another 350 feet where it reaches a second pedestrian footbridge that connects to W Vine and Forest Streets. This section of stream has a mix of both concrete side walls and sloped embankments. Topography in this area is more gently sloping, which has permitted the creek to encroach up into the park property during heavy storms and flooding. There is evidence of soil wash out and erosion from the water receding back to the streambed. The washouts have contributed to the development of small island areas within the streambed from the sediment accumulation. This section is the most open and publicly accessible area of the Willow Creek in the park.

Continuing west for 350 feet, a third pedestrian footbridge connects the park to the community pool. Perennial grasses and volunteer plants are along the creek edges making visual inspection difficult to assess where the stream edge is located. After the third bridge, Willow Creek continues traveling west for approximately 700 feet where it leaves the Borough and enters Richmond Township. This section is located in a passive recreational area of the park with more dense vegetation along Willow Creek, including mature trees for shading.

The park is owned and maintained by Fleetwood Borough. Additional maintenance and fundraising events are provided by a variety of clubs and organizations from the area who hold annual events and fundraisers



Photo 1: Area of embankment collapsing due to erosion factors from fluctuating water levels of the creek



Photo 2: Loss of wall support and backfill from creek washout



Photo 3: View of Willow Creek. Mowing permitted up to edge of creek. Topography allows for creek to expand beyond its edge during flood events.



Photo 4: View of Willow Creek towards Main Street. Width of lawn area between creek and pathway has been reduced due to loss of embankment soils from erosion

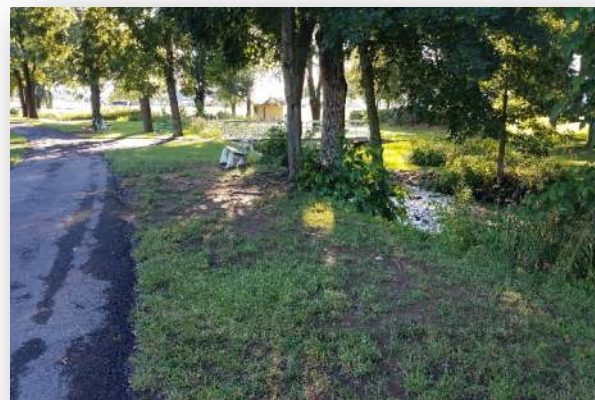


Photo 5: View of exposed soil along top of streambank. Soils wash out into the creek during flood events. Difficulty in maintaining established lawn area.



Photo 6: Mowed lawn areas up to edge of creek. Lawn clippings and fertilizers can enter creek. Area void of buffer zone plantings to filter organics.

Proposed Stream Restoration

Size: 600 LF (first segment from Main St bridge to first pedestrian footbridge)

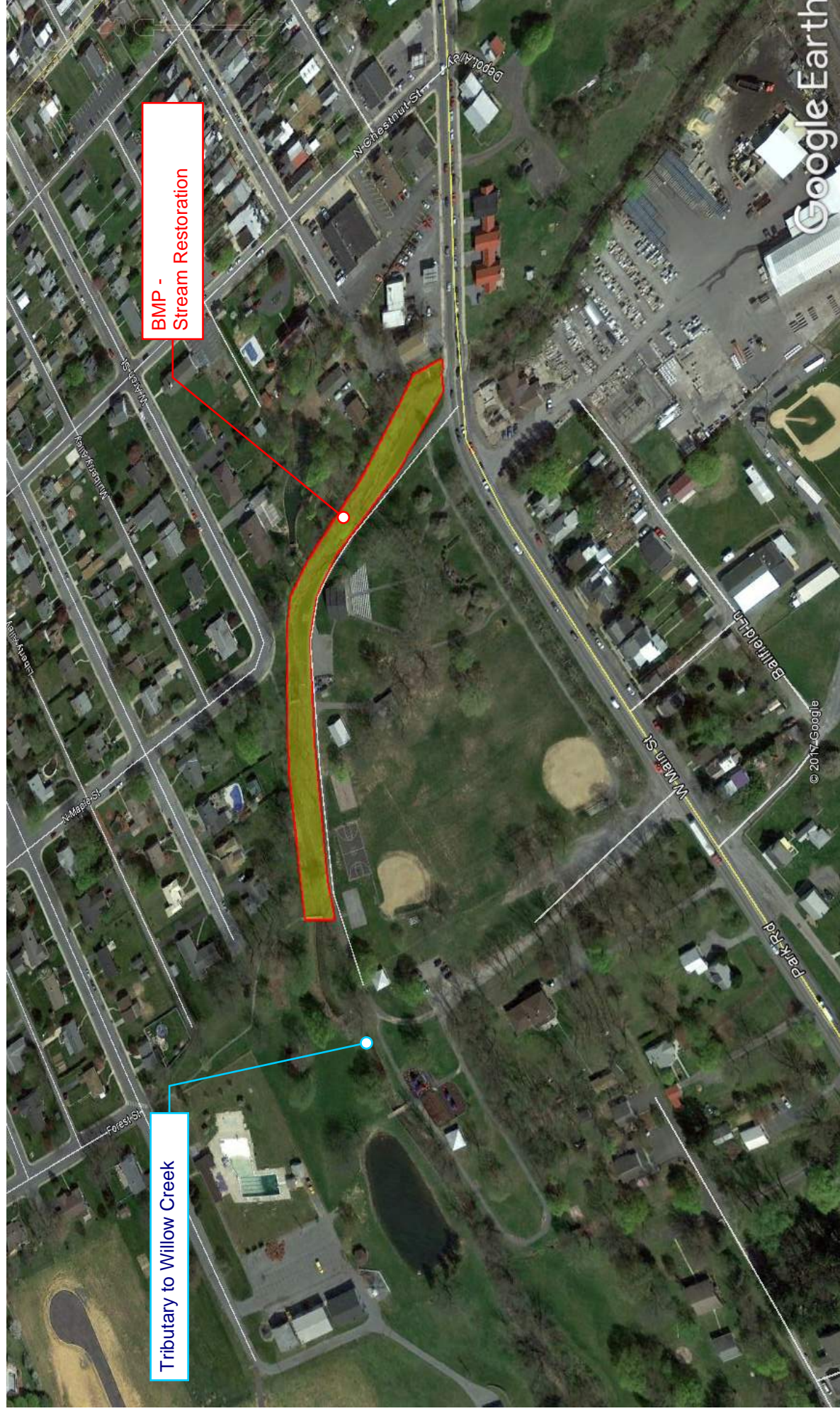
Soils: A/B - as noted from Web Soil Survey Information

Table 5: BMP Option – Stream Restoration Sediment Reduction Calculations

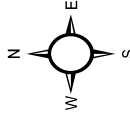
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, OPEN SPACE	337,210.36	7.74	0.19	1.47	12.71	18.69
DEVELOPED, LOW INTENSITY	2,306,514.00	52.95	0.49	25.95	46.23	1199.47
DEVELOPED, MEDIUM INTENSITY	55,570.78	1.28	0.79	1.01	46.23	46.59
DEVELOPED, HIGH INTENSITY	53,320.85	1.22	1.00	1.22	46.23	56.59
DEVELOPED, WOODED	147,217.28	3.38	0.00	0.00	12.71	0.00
REMAINING STREETS/ROADWAYS	567,216.93	13.02	1.00	13.02	46.23	601.98
TOTAL:						1923.33
BMP Effectiveness Value: (lbs/ft/yr)						44.88

Table 5 shows calculations for stormwater runoff entering the stream for a length of 900 linear feet (half of the Willow Creek within Fleetwood Community Park), which is depositing an estimated 1923.33 lbs of sediment per year. This is more than the required 10% reduction sediment of 542.43 lbs of sediment. The Borough is demonstrating that restoration of at least 43 linear feet of stream will not only exceed the required 10% reduction, but is the needed length of restoration in order to process what is currently reaching half of Willow Creek from the current surrounding land uses.

With the selection of this BMP, the sediment loading reduction and phosphorous reduction requirements will be met.



Willow Creek Drainage Area
Aerial showing location restoration area



TRIBUTARY TO WILLOW CREEK PLANNING AREA

The planning area for the tributary stream to Willow Creek included agricultural land uses, which has a significantly higher sediment loading ratio than urban development, 521.46 lb/yr to 44.88 lb/yr respectively. The addition of the agricultural use areas contributed to the higher pollutant load reduction required for the tributary drainage area.

The Borough initially reviewed two target properties for proposed BMPs:

- 1) Borough owned property at the corner of Richmond Road and Friendship Drive, and
- 2) A drainage easement at the north end of N Beech Street.

Both locations included pipe discharges that conveyed moderately sized drainage areas from residential developments. Through further investigations, both locations were also found to be in the Floodplain, as designated by FEMA flood maps. Construction work within a Floodway is feasible with proper permitting and plan development, however the municipality needs to weigh the cost of any improvements on the overall BMP benefits that would be obtained, therefore, other locations were assessed for proposed BMPs.

BMP OPTION 1 – REMOVAL OF PIPE FOR OPEN VEGETATED CHANNEL

Between the Medical office property and Fleetwood High School is a drainage easement for storm pipe discharging to the Floodplain. The pipe is used to convey stormwater from North Richmond Avenue, which is not a PennDOT owned road. The proposed solution would be for the removal of approximately 200 feet of pipe and install an open stormwater channel to permit 200 feet to filter settlement of inorganic solids, increase evapotranspiration rates, reduce maintenance of mowed lawn areas, and provide educational resource for an outdoor classroom opportunity for adjacent Fleetwood Area School District.

There is potential for widening of the channel if Fleetwood Borough enters into a grading easement agreement with Fleetwood High School. The open vegetated channel would be located at the edge of High School property and has an added opportunity to become an outdoor educational resource for both high school and middle school students.

Proposed Open Vegetated Channel

Size: min. 5' bottom channel width x 200' length

Soils: B – as noted from Web Soil Survey

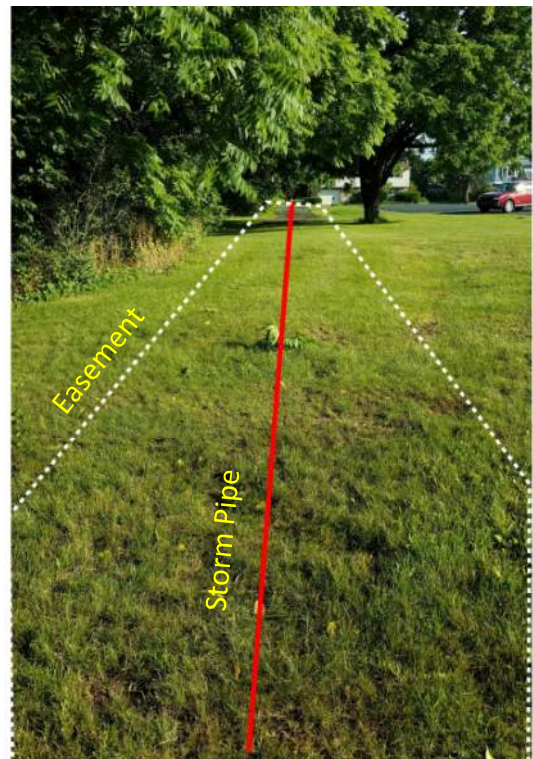
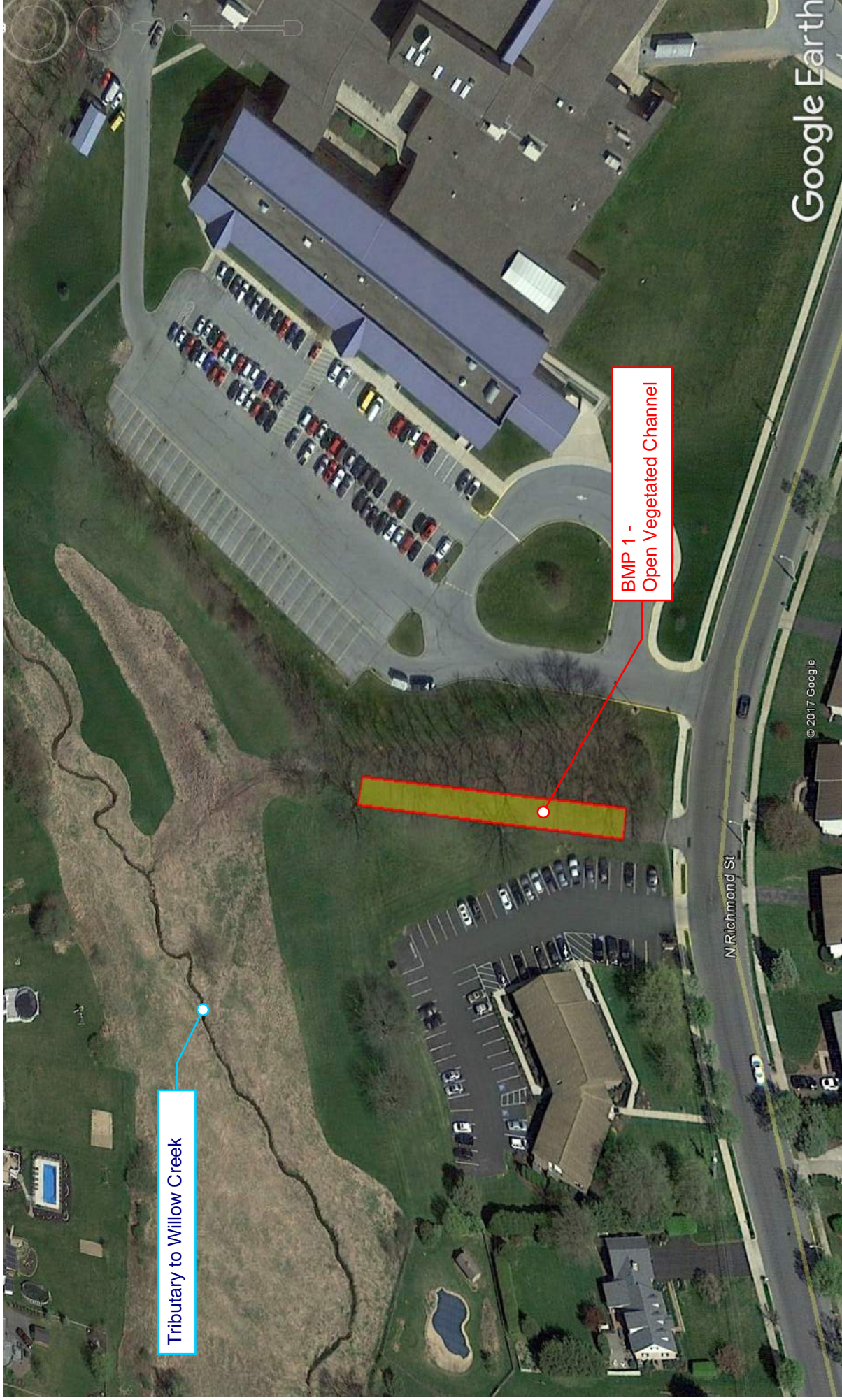


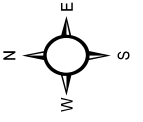
Table 6: BMP Option 1 – Open Vegetated Channel Reduction Calculations

SEDIMENT							PHOSPHOROUS	
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, WOODED	47,856.00	1.10	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	432,711.00	9.93	0.19	1.89	12.47	23.54	0.04	0.08
DEVELOPED, LOW INTENSITY	1,082,291.00	24.85	0.49	12.17	44.48	541.52	0.33	4.02
DEVELOPED, MEDIUM INTENSITY	159,110.00	3.65	0.79	2.89	44.48	128.35	0.33	0.95
DEVELOPED, HIGH INTENSITY	354,802.00	8.15	1.00	8.15	44.48	362.30	0.33	2.69
REMAINING STREETS/ROADS	666,394.00	15.3	1.00	15.30	44.48	680.47	0.33	5.05
TOTAL:						1736.17		12.78
BMP Effectiveness Value:					80%		40%	
Total Sediment Removed by Open Vegetated Channel:					(lb/yr)	1388.94		5.11

With the selection of this BMP, the sediment loading reduction and phosphorous reduction requirements will be met.



Tributary to Willow Creek Drainage Area
Aerial showing location and size of proposed BMP



BMP OPTION 2 – COLLECTION OF SMALL BMPS ON FLEETWOOD AREA SCHOOL DISTRICT PROPERTY

If the Borough is unable to secure the required agreements for proposed BMP option 1, a secondary option of BMPs was prepared in order to meet the required minimum reductions. In order for the requirement to be met with option #2, all BMPs listed here would require installment as each project area provides a portion of the overall reduction. This option contains a total of five (5) proposed BMPs, three (3) of which are located on school property, and one (1) on private property requiring a legal agreement with the owner.

- 1) Rain Garden – Located east of the Fleetwood Middle School parking lot, a dry detention area is currently being maintained as mowed lawn. The basin collects run off from paved surface parking areas from the Berks Encore Fleetwood Center, and run off from Green Street. Overflow discharge areas would remain in place as the area drains to the outfield of a nearby ballfield.
 - Size: 4,500 SF
 - Soils: B – as noted from Web Soil Survey

Table 7: BMP Option 2a – Elementary School Rain Garden

LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	SEDIMENT		PHOSPHOROUS	
					LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, WOODED	0.00	0.00	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	44,136.00	1.01	0.19	0.19	12.47	2.40	0.04	0.01
DEVELOPED, LOW INTENSITY	0.00	0.00	0.00	0.00	44.48	0.00	0.33	0.00
DEVELOPED, MEDIUM INTENSITY	0.00	0.00	0.00	0.00	44.48	0.00	0.33	0.00
DEVELOPED, HIGH INTENSITY	83,705.00	1.92	1.00	1.92	44.48	85.47	0.33	0.63
REMAINING STREETS/ROADS	0.00	0.00	1.00	0.00	44.48	0.00	0.33	0.00
TOTAL:						87.87		0.64
BMP Effectiveness Value:					90%		85%	
Total Sediment Removed by Open Vegetated Channel:					(lb/yr)	79.09		0.55

- 2) Permeable Pavement Parking Area – Located 100 feet east of the proposed rain garden near a ballfield is an existing grass area being used as overflow parking. The area is accessed through the maintenance area on Lumber Street. Evidence of soil compaction, bare soil areas where turf does not grow, and displacement of sediment from vehicle tires onto the adjoining paved surfaces make this area a candidate for permeable pavement. There are many types of pervious pavement, such as interlocking concrete pavers with turf, or material that appears as asphalt and concrete but allow water to filter through to the soil below.

- Size: 5,000 SF
- Soils: B – as noted from Web Soil Survey

Table 8: BMP Option 2b – Elementary School Permeable Parking Area

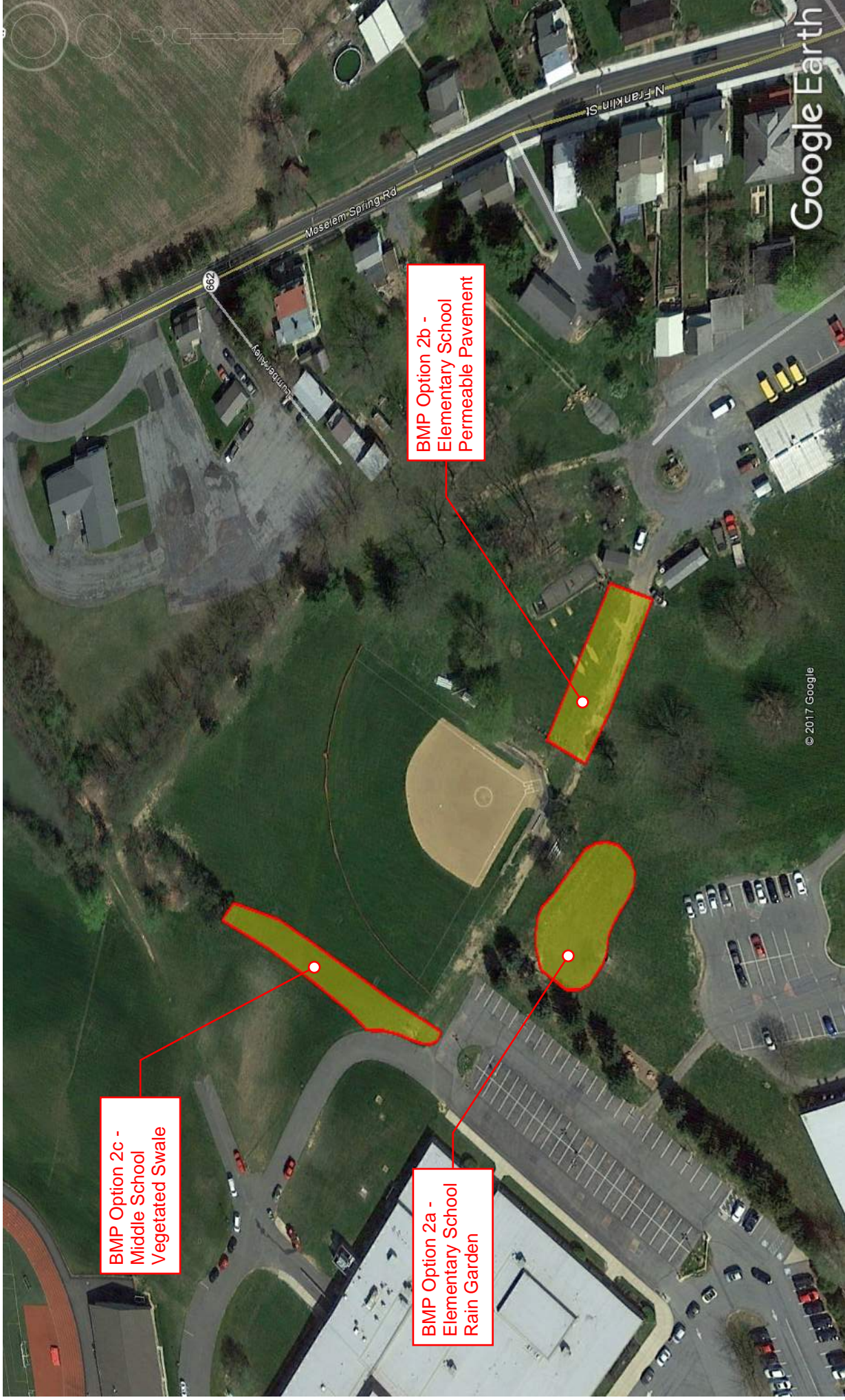
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIO US (%) ¹	IMPERVIOUS AREA (AC)	SEDIMENT		PHOSPHOROUS	
					LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, WOODED	0.00	0.00	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	6,897.00	0.16	0.19	0.03	12.47	0.38	0.04	0.0012
DEVELOPED, LOW INTENSITY	0.00	0.00	0.49	0.00	44.48	0.00	0.33	0.00
DEVELOPED, MEDIUM INTENSITY	23,733.00	0.54	0.79	0.43	44.48	19.15	0.33	0.14
DEVELOPED, HIGH INTENSITY	0.00	0.00	1.00	0.00	44.48	0.00	0.33	0.63
REMAINING STREETS/ROADS	0.00	0.00	1.00	0.00	44.48	0.00	0.33	0.00
TOTAL:						19.52		0.14
BMP Effectiveness Value:					70%		50%	
Total Sediment Removed by Open Vegetated Channel:					(lb/yr)	13.66		0.07

- 3) Vegetated Channel behind Middle School Building – Located 200 feet northwest of the proposed rain garden is a depressed area that carries run off from the parking lot and school driveway into a grass area. The run off travels for approximately 200 feet through grass lawn before it reaches a yard inlet where it gets collected and discharged into a nearby pond. The drainage area is being maintained as mowed lawn and also carries the overflow from the rain garden and nearby softball field. Various lawn fertilizers and clippings are concentrated in this stormwater runoff. Changing the drainage area to a vegetated swale with amended soils, native plants with deep root systems and grading changes will assist in reducing the nutrient load reaching the pond and tributary stream.

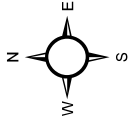
- Size: 7,000 SF
- Soils: B – as noted from Web Soil Survey

Table 9: BMP Option 2c – Middle School Vegetated Swale

LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIO US (%) ¹	IMPERVIOUS AREA (AC)	SEDIMENT		PHOSPHOROUS	
					LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, WOODED	0.00	0.00	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	121,794.00	2.80	0.19	0.53	12.47	6.62	0.04	0.02
DEVELOPED, LOW INTENSITY	0.00	0.00	0.49	0.00	44.48	0.00	0.33	0.00
DEVELOPED, MEDIUM INTENSITY	0.00	0.00	0.79	0.00	44.48	0.00	0.33	0.00
DEVELOPED, HIGH INTENSITY	83,351.00	1.91	1.00	1.91	44.48	85.11	0.33	0.63
REMAINING STREETS/ROADS	0.00	0.00	1.00	0.00	44.48	0.00	0.33	0.00
TOTAL:						91.73		0.65
BMP Effectiveness Value:					70%		45%	
Total Sediment Removed by Open Vegetated Channel:					(lb/yr)	64.21		0.29



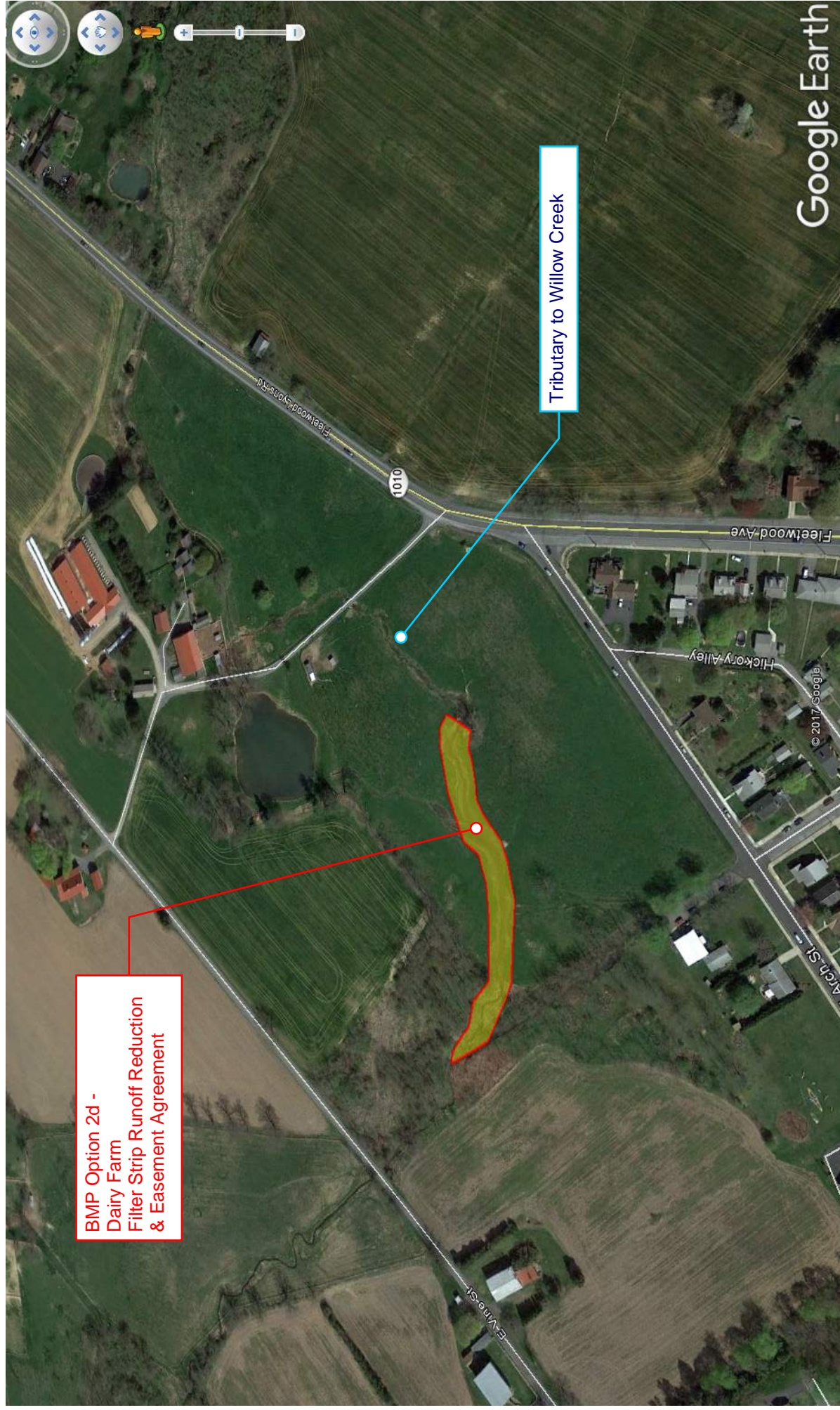
Tributary to Willow Creek Drainage Area
Aerial showing location and size of proposed BMPs



- 4) Dairy Farm Filter Strip/ Conservation Easement Agreement with Fleetwood Borough – There is a dairy property on Fleetwood Avenue at the boundary line of Fleetwood Borough and Richmond Township, which the tributary stream for Willow Creek passes through. Currently the property uses the open field within Fleetwood Borough for grazing. The cows have access up to and across the tributary stream. The issue with sediment pollution can be intensified when agricultural manure is permitted to enter the stream when it rains. There are a number of management practices to reduce the impacts livestock have on the water quality of streams. One approach is with the use of vegetated buffers, or vegetated filter to prevent animals from entering the channel, and allows vegetation to filter and collect the sediment and other organics before it has a chance to enter the stream.

Table 10: BMP Option 2d – Filter Strip Runoff Reduction

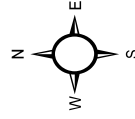
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIO US (%) ¹	IMPERVIOUS AREA (AC)	SEDIMENT		PHOSPHOROUS	
					LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
DEVELOPED, WOODED	14,927.00	34.26	0.00	0.00	12.47	0.00	0.04	0.00
DEVELOPED, OPEN SPACE	23,6378.08	5.42	0.19	1.03	12.47	12.86	0.04	0.04
DEVELOPED, LOW INTENSITY	130,144.49	2.98	0.49	1.46	44.48	65.12	0.33	0.48
DEVELOPED, MEDIUM INTENSITY	8,513.18	0.00	0.79	0.00	44.48	0.00	0.33	0.00
DEVELOPED, AGRICULTURAL	570,461.09	13.09	0.19	2.49	521.96	1298.76	2.16	5.37
REMAINING STREETS/ROADS	98,300.33	2.25	1.00	2.25	44.48	100.37	0.33	.74
TOTAL:						1477.11		6.63
BMP Effectiveness Value:					56%		54%	
Total Sediment Removed by Filter Strip Runoff Reduction:					(lb/yr)	827.18		3.58



BMP Option 2d -
Dairy Farm
Filter Strip Runoff Reduction
& Easement Agreement

Tributary to Willow Creek

Tributary to Willow Creek Drainage Area
Aerial showing approximate location and size of proposed BMP



- 5) Inlet Filter Bags – The Borough has nearly 200 inlets in its roadways and proposes to purchase and maintain 30 filter bags that receive drainage from 15 acres of impervious developed land as each inlet has a maximum drainage area of 0.5 acre. The manufacturer of the Flex Storm filter bags claim up to 85% removal of sediment when properly maintained; for planning purposes an 80% efficiency shall be used. According to the manufacturer, the filter bags will need to be inspected and solids removed at least monthly and following rain events of 0.5 inch or more.

The Borough of Fleetwood may not use inlet filter bags to satisfy more than 50% of its pollution reduction requirement, which means inlets may not exceed a reduction load of 684.50 lbs/yr.

Table 11: BMP Option 2e – Filter Inlet Bags

SEDIMENT							PHOSPHOROUS	
LAND USE CATEGORY ¹	AREA (SF)	ACRES (AC)	STROUD TOOL IMPERVIOUS (%) ¹	IMPERVIOUS AREA (AC)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)	LOADING RATE (LB/AC) ²	PROPOSED LOAD (LBS)
REMAINING STREETS/ROADS		15.0	1.00	15.0	44.48	667.20	0.33	4.95
TOTAL:						667.20		4.95
BMP Effectiveness Value:					80%		.0006%	
Total Sediment Removed by Filter Strip Runoff Reduction:					(lb/yr)	533.76		0.00

If the Borough of Fleetwood chose option 2 of BMPs to satisfy their load reduction requirement, all 5 proposed BMPs would need to be installed and implemented. See the following summary of load reductions.

Table 12: BMP Option 2 Summary

BMP OPTION 2 – TRIBUTARY TO WILLOW CREEK			
BMP TYPE	LOCATION	SEDIMENT REDUCTION	PHOSPHOROUS REDUCTION
Rain Garden	Fleetwood Area School District – Elementary School	79.09	0.55
Permeable Pavement	Fleetwood Area School District – Elementary School	13.66	0.07
Open Vegetated Channel	Fleetwood Area School District – Middle School	64.21	0.29
Filter Strip Runoff Reduction	Dairy Farm – Private Property	827.18	3.58
Filter Inlet Bags (30)	Fleetwood Borough Roadways	533.76	0.00
TOTALS		1517.90	4.49

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 MECHANISMS

Once the Borough has identified the types of BMPs being proposed, then the municipality shall identify the types of funding needed to install these projects during the five (5) year permit. DEP shall review the feasibility and implementation of the Borough's PRP prior to DEP approving PAG-13 NPDES permit coverage. DEP will analyze the applicant's proposed method(s) by which these BMPs shall be funded. DEP does not expect that guaranteed sources are identified in the PRP, but does expect that applicants propose their preferred funding options with alternatives in the event the preferred options do not materialize.

In identifying funding sources and potential partnerships for the proposed BMP projects, the Borough reviewed its list of target audiences in their MS4 Stormwater Management Program. Groups that the MS4 has been working with during its previous permit who have a general understanding and interest in protection of watershed resources.

Fleetwood Borough shall use the following five years of the PAG-13 General Permit to determine the best funding source for each proposed BMP project, and to review new opportunities as other partnerships and funding sources become available.

The following tables are a summary of potential funding sources.

Table 13: Summary of Funding Sources for Willow Creek BMP

Source/ Group	Type
WILLOW CREEK BMP OPTION – Stream Restoration	
DEP – Growing Greener Grant	Funding Source - Conservation & Environmental Projects focused on water quality for planning and installation, requires 15% match
DCED/ Commonwealth Financing Authority Act 13	(Alternative funding source to DEP Grant) Very competitive and popular choice for municipalities; needs support from local legislator; applicable because of the community park and trails and beautification work; requires 15% match
Berks County Conservation District	(Alternative funding source to DEP Grant) ; plus resource for
Maiden Creek Watershed Association	(Alternative funding source to DEP Grant)
PSU Cooperative Extension Berks Campus	Assist with stream classification work; Assist with the identification of invasive and volunteer plantings for staff training on removal; recommendations for embankment restoration; recommendations for the property owner on improvements to buffer streambank property
Schuylkill River Greenway Heritage Area	Funding source
East Penn Manufacturing	Corporate Sponsor; Funding source
Boy Scout and Girl Scout Troops	Installation of planting materials (limited areas)
Esbenshade's Garden Centers & Greenhouse	Donated/ Discounted plant material
Valley View Greenhouse and Nursery	Donated/ Discounted plant material
Borough of Fleetwood	Budget funds
Willow Creek Fundraiser (community sponsorship)	Fundraising program – local businesses or individual residents can sponsor a segment of the stream (i.e. 20 feet) which in turn gets them different levels of incentives at the park or in the community

Table 14: Summary of Funding Sources for the Tributary to Willow Creek BMPs

Source/ Group	Type
TRIBUTARY TO WILLOW CREEK BMP OPTION 1 – Open Vegetated Channel	
DEP – Growing Greener Grant	Funding Source - Conservation & Environmental Projects focused on water quality for planning and installation, requires 15% match
Berks County Conservation District	(Alternative funding source to DEP Grant)
Maiden Creek Watershed Association	(Alternative funding source to DEP Grant)
Schuylkill River Greenway Heritage Area	Funding source
Fleetwood School District	Preparation of a stormwater management agreement and grading easement between the property owner and the Borough
Berks Soil & Stone	Materials
Esbenshade's Garden Centers & Greenhouse	Donated/ Discounted plant material
Valley View Greenhouse and Nursery	Donated/ Discounted plant material
Edge of the Woods Nursery	Donated/ Discounted plant material
Borough of Fleetwood	Budget funds

Table 15: Summary of Funding Sources for the Tributary to Willow Creek BMPs

Source/ Group	Type
TRIBUTARY TO WILLOW CREEK BMP OPTION 2 – Rain Garden, Permeable Pavement, Open Vegetated Channel, Filter Runoff Reduction, Filter Bags	
PPL Foundation – Sustaining Grant	Funding for operations; applicable to organizations focused on education (Fleetwood School District may be applicant)
Environmental Education Grant	Funding source up to \$3000
Maiden Creek Watershed Association	Funding source
Schuylkill River Greenway Heritage Area	Funding source
Fleetwood School District	Preparation of a stormwater management agreement and grading easement between the property owner and the Borough

F M Brown's Sons Inc	Donated seeding mixes and turf management recommendations for the various properties
High School and Middle School Students	Installation of plant materials
Boy Scout and Girl Scout Troops	Installation of plant materials
Esbensshade's Garden Centers & Greenhouse	Donated/ Discounted plant material
Valley View Greenhouse and Nursery	Donated/ Discounted plant material
Edge of the Woods	Donated/ Discounted plant material
Borough of Fleetwood	Budget funds

Every project requires some level of assessment and design. Depending on the complexity and location of the project, a stream and/or channel design may contain any of the following components:

- Geomorphic Assessments and Stream Classification
- Site Surveys
- Hydrologic and Hydraulic Modeling
- Sediment Transport Assessment and Modeling
- Conceptual through final design development, including plans and specifications
- Environmental Permit development and coordination

As the permittee develops estimates on the amount of funding needed for a project, the costs are typically impacted by a variety of factors, many of which can be identified during the initial planning level. Factors that can impact a project include:

- Stream Size – larger streams require greater quantities of earthwork, stone and other materials, and more stream flow maintenance.
- Urban Watersheds – typically have more constraints to construction access, require outfall repairs, and often involve pedestrian considerations such as foot bridges and/or trails. Larger planting materials are often required for a more mature landscape than in rural areas.
- Relocation of Utilities – The presence of utilities that have to be relocated adds an additional level of construction cost to any given project
- Easement purchase/negotiation – Purchase of easements on private property can increase costs or delay construction activities. Access easements are often required across private property during construction.
- Weather – Harder to anticipate and plan for during a project, excessive rainfall or snowfall can delay projects and add costs to construction.

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 PAG-13 General Permit.

All stormwater BMPs installed under this PRP are subject to the Borough's stormwater management ordinance. Typical operation and maintenance activities for each BMP are included in this PRP, however task measures may be modified during the final design of the projects. If the BMP is located on private land, the landowner must convey an easement to the municipality to allow for access for periodic inspections and maintenance, as needed. Operation and maintenance activities conducted by the Borough on the BMPs shall be listed in its annual report.

Table 16: Responsible Parties for Operation and Maintenance of BMPs – Willow Creek

BMP Option # 1	Parties Responsible for O&M	O&M Activities	Frequency of Activities
Stream Restoration Willow Creek	Fleetwood Borough Public Works Director, maintenance staff	Visually inspect the bank and any installed structures	Annually
		Note and photograph any structures, rocks, banks for accelerated weathering, displacement or significant changes since the original construction	Annually
		Inspect the bank and structures after heavy rainfall	As Needed
Stream Restoration Willow Creek	Stream Sponsors, High School & Middle School Students, Boy Scouts & Girl Scout Troops	Clean Up event to clear debris and trash from the drainage area	Annual event coordinated with the Borough

Table 17: Responsible Parties for Operation and Maintenance of BMPs – Tributary to Willow Cr.

BMP Option #1	Parties Responsible for O&M	O&M Activities	Frequency of Activities
Open Channel Vegetation Tributary to Willow Creek	Fleetwood Borough Public Works Director, maintenance staff	Visually inspect the channel; remove weeds, debris and volunteer plants; replacement of any rip rap or stone areas	Monthly (first 6 months) Annually after 6 mo.
Open Channel Vegetation Tributary to Willow Creek	Fleetwood Area High School	Visually inspect the channel; conduct outdoor classroom exercise, provide Borough copy of the class exercise report	Annually

BMP Option #2	Parties Responsible for O&M	O&M Activities	Frequency of Activities
Rain Garden	Fleetwood Area School District	Visually inspect the area for signs of erosion; Clear accumulation of debris at pipe openings and discharge points	As Needed following construction
		Initial watering program to get plantings established	As Needed following construction
		Prune and weed swale to maintain appearance; Remove trash and debris	Monthly – when school is in session
		Submit maintenance log and report to Fleetwood Borough	Annually
Rain Garden	Fleetwood Borough	Remove and replace mulch	Every 2-3 years
		Prune and weed swale to maintain appearance; Remove trash and debris	Monthly – when school is not in session
		Inspect inflow area for sediment accumulation; Test planting bed pH soil, adjust as needed	Annually
		Replace dying vegetation	Annually
Permeable Pavements	Fleetwood Area School District	Designate restricted use areas near the pavement to prevent clogging materials from being washed into the area (mulch piles, truck washing areas, material storage, etc.)	Annual Training for Staff on restricted activities on or near permeable pavement

		Post signs at parking lot about restrictive uses for the area	As needed
		Weed removal	Monthly
		Maintenance Agreement with Fleetwood Borough	Prior to construction
Permeable Pavements	Fleetwood Borough	Vacuum Sweeper; Records of vacuum sweeping (preventative measure)	At least 2 times a year. More if needed Regenerative air vacuum sweepers recommended for regular maintenance
		Inspection for accumulated dust, sediment and debris	Quarterly
	Fleetwood Area School District		As Needed
Vegetated Swale	Fleetwood Area School District	Visually inspect the area for signs of erosion; Clear accumulation of debris at pipe overflow features and discharge points	As Needed At least 1 time per month
		Mow and trim vegetation to ensure safety, aesthetics, proper swale operations, and to suppress weeds and invasive plants	As Needed Mowing and trimming schedule to be directed by the Nursery supplier
		Provide summary of maintenance activities conducted to the Borough	Annually
		Provide training on proper uses of fertilizers, pesticides, de-icers and other materials within the	Annual Training for Maintenance Staff coordinated with Fleetwood Borough staff

		drainage area; review non-toxic alternatives	
Vegetated Swale	Fleetwood Borough	Visually inspect and check cross-section and longitudinal slopes	Annually
		Replace dying vegetation	Annually
		Inspect inflow area for sediment accumulation; Test planting bed pH soil, adjust as needed	Annually
Filter Strip Runoff Reduction	Fleetwood Borough	Inspect accumulation of debris, remove debris, flag and repair locations of channelization and /or erosion that need re-stabilized	At least twice a year
		Inspect vegetative for 85% sustained coverage, reestablish cover if >50% damage is observed, remove invasive/ unwanted plant growth	At least twice a year Min. 1 Inspection - during growing season Min. 1 inspection – during non-growing season
		Removal of sediment when accumulation exceeds 2 inches in depth	As Needed
		Legal agreement with property owner	Prior to BMP work List of maintenance and operation tasks to be provided in a written manual for both parties
	Property Owner	Inspection log for recording observations and maintenance activities	Annual submission of log forms to Borough

H. GENERAL INFORMATIONDairy Farm Easement Agreement

The filter strip runoff reduction BMP would be required to be located on the dairy farm, which is private property. Fleetwood Borough would need to enter into a legal agreement with the owner to establish the filter strip zone where vegetation would be permitted to grow, this could be achieved through an easement agreement. The filtering plants would be used to treat sheet flow across the grazing field. The field is also located in a FEMA designated Floodplain. A vegetated buffer in a floodplain can provide additional benefits, such as assist with stabilizing the banks of the stream. Some key components for proper design of the filter strip is location, its length, and slope to ensure proper spreading of the surface runoff. If runoff is not spread over the buffer, then channels can form through the plantings and defeat the function of the vegetated strip.

Stormwater Fee

The Borough has informally discussed the actions taken by other Pennsylvania municipalities to implement a fee to provide a long term sustainable funding source to cover the increasing maintenance and programming tasks required by its NPDES MS4 permit. The fee would be based on the area of impervious surface associated with each tax parcel. Properties that are exempt from school tax or property taxes would not be exempt from the stormwater fee. The fee could also be offset by the property owner through the installation of on-site BMPs, which would reduce the rate and volume of stormwater runoff from their property.

Fleetwood Borough has not moved forward on this topic as more information is needed. Additional information on how other municipalities have implemented the ordinance, how fees are managed and if the region would be establishing a joint municipal partnership to manage the entire watershed and share resources remain unknown.

PRP Implementation and Final Report

Under the PAG-13 General Permit, the permittee must achieve the required pollutant load reductions within five (5) years following DEP's approval of coverage, 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 coverage.

Which means Fleetwood Borough is required to submit a summary report by September 30, 2023 to DEP. This summary will review the work completed by the municipality between the years 2018 and 2023, and how the required pollution load reduction was satisfied. Report submission dates shall be verified once the municipality receives its approved coverage dates, which is listed on the PAG-13 NPDES permit.

Fleetwood Borough shall submit the PRP in accordance with the above requirements.