



Ferguson Township
Centre County, PA

Ferguson Township Municipal Separate Storm Sewer System (MS4)

Stormwater Management Program Review

June 16, 2023 Board of Supervisors Meeting

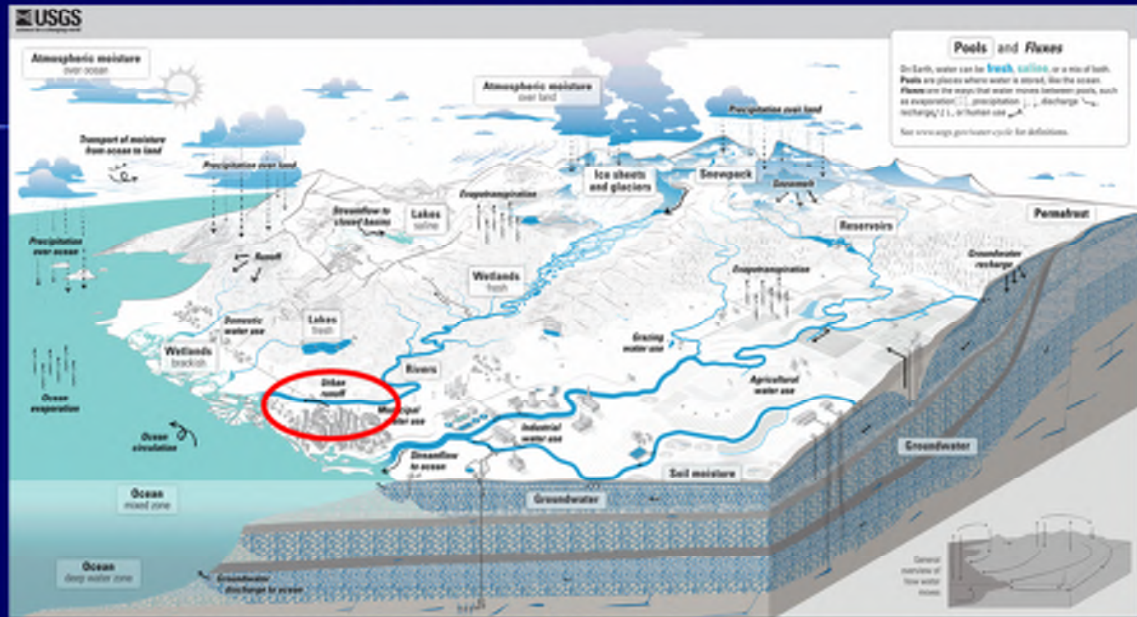
This is our annual public meeting, presentation and review of the Ferguson Township Stormwater Management Program. The written MS4 SW Program is an 18-page narrative detailing how we comply with our MS4 Permit. An electronic copy of the Program narrative, along with the power point presentation will be provided for distribution and posted on the Ferguson Township Website tomorrow. This presentation highlights the program and is provided to both educate and solicit any feedback. Please feel free to ask questions or reach out to me at any time. It is noted that in the future, I will try to complete this presentation earlier in the year and will include the stormwater program details with the board meeting packet. As a summary, the program content is remaining unchanged from last year with exception of a few minor wording updates. It is noted that various component updates will need to be completed for 2024.

NPDES - Phase II MS4 Permit

N ational	M unicipal
P ollution	S eparate
D ischarge	S torm
E limination	S ewer
S ystem	S ystem

The stormwater program is required as part of the Ferguson Township – NPDES - Phase 2 MS4 Permit. NPDES stands for National Pollution Discharge Elimination System. NPDES was created as an amendment to the Clean Water Act (CWA) of 1972 and established a permit program to control pollution by regulating the discharge of pollutants into the waters of the United States. MS4 stands for Municipal Separate Stormwater Sewer System. Generally speaking, the MS4 Permit mostly deals with management of “everyday health” activities in our urban area stormwater management systems. Ferguson Township has had an MS4 permit since 2003. Currently, this permit was most recently renewed and became effective on July 1, 2020 and expires on June 30, 2025.

Stormwater

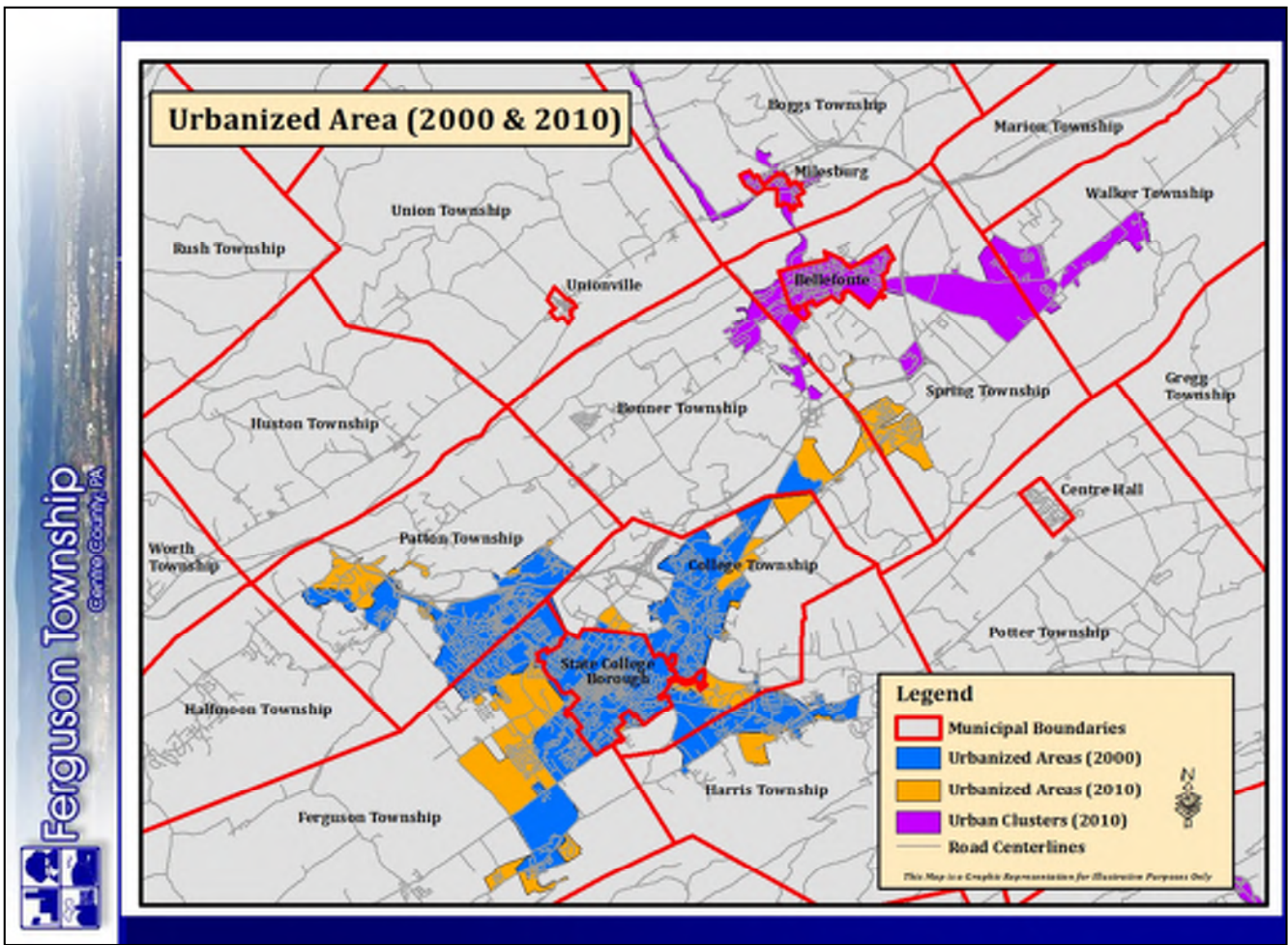


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Susquehanna River Basin:

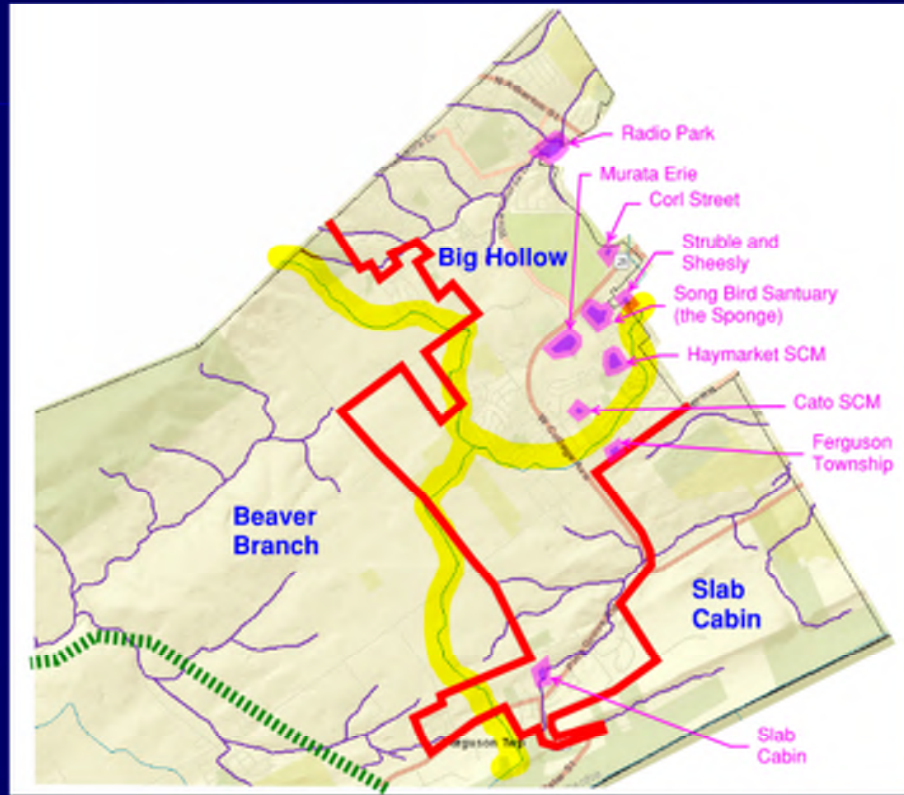
- **9% Developed Land**
- **Contributes 17% of the pollution load**

What do we mean by stormwater? Here you see a macro level view of one of the most important processes on Earth- the hydrologic cycle. Stormwater is runoff generated from precipitation events that flow over land and does not soak into the ground. Generally speaking, stormwater runoff volumes and peak rates from developed/urban areas, is significantly greater than in the natural environment, because of impervious surfaces, lawns and compacted soils. In the Susquehanna River Basin (Chesapeake Bay), development constitutes approximately 9% of the drainage area, where stormwater pollution in the Chesapeake Bay is approximately 17% of the pollution load. Stormwater runoff is often responsible for downstream degradation/erosion of streams conveying harmful pollutants like fertilizer, pet waste, chemical contaminants and trash. The MS4 permit is focused in on the stormwater systems of urban/developed areas.



The MS4 permit covers the urban areas of the Township based upon census data. For Ferguson Township, the boundary is expanded to include the undeveloped regional growth boundary. When 2020 census data is known, the permit boundary will likely change again. For example, this past permit cycle, Spring Township became an MS4 community and has joined the Spring Creek MS4 Partners that collaborate on some of our permit requirements.

Surface Waters and Sinkholes



As stated earlier, the MS4 permit, for now, regulates surface waters and stormwater runoff in the urban area. For context and additional information/here is an image showing the National Hydrologic Dataset Streams in purple.

One very interesting and unique characteristic which impacts stormwater in Ferguson Township is the local karst geology. Many of the drainageways are dry and much of our stormwater runoff drains to both known and unknown karst features- including in the drainage ways. Those Karst features drain directly to the groundwater which is discharged via springs in Spring Creek. Some well-known/documented karst features include Sheesley/Struble Sinkhole, Songbird Sanctuary, Corl Street, Haymarket Basin, Murata Erie and of course the karst feature outside of the Ferguson Township Building – along Whitehall Road.

As we regulate all our outfalls, this permit plays a crucial role in not only protecting our surface waters but protecting/preserving our groundwater. As such, during this presentation, you will often hear me referring to storm sewers as storm drains. These terms are one in the same; however, generally speaking, I use the term storm drain, as we do not have conveyance systems that are combined stormwater and sanitary sewer and storm drain has a less negative connotation; Storm drains should be conveying clean stormwater runoff.

Also, on this map you will see the yellow highlights and blue subwatershed callouts for Slab Cabin, Beaver Branch and Big Hollow. As another example of the unique characteristics created by karst geology, you will also see a green dashed line at the lower left of the image which denotes the ground water supply to the Spring Creek. Much of the stormwater and runoff in the Beaver Branch watershed is conveyed through karst features, to Spring Creek. While outside of the urban area, it highlights the importance of the many closed depression and karst geology on the west end of the Township, to Spring Creek.

What Does Our Permit Require?

- Implement a Stormwater Management Program (including SWM Ordinance)
 - Six Minimum Control Measures
 - Track progress toward goals
 - Document, Document, Document
 - Report on our progress
- Develop and Implement a Pollution Reduction Plan (PRP) for Chesapeake Bay and Impaired Waterways



Ferguson has developed and implemented a stormwater management program, under which the Township is required to implement 6 minimum control measures (or MCMs) which include multiple best management practices (BMPs) for each MCM, as well as a stormwater management ordinance. (In Ferguson Township Chapter 26)

For the current permit cycle, the Township is also required to complete the project based on our approved Pollution Reduction Plan which includes projects to reduce urban area pollutants by 10% for the permit period.

We must submit an annual report which documents that permit requirements are being met. It is noted that many of the MCMs are developed/implemented as a joint effort and in cooperation with the Centre Region MS4 Partners including College Township, Harris Township, Patton Township, Penn State University, Borough of State College, Spring Township.

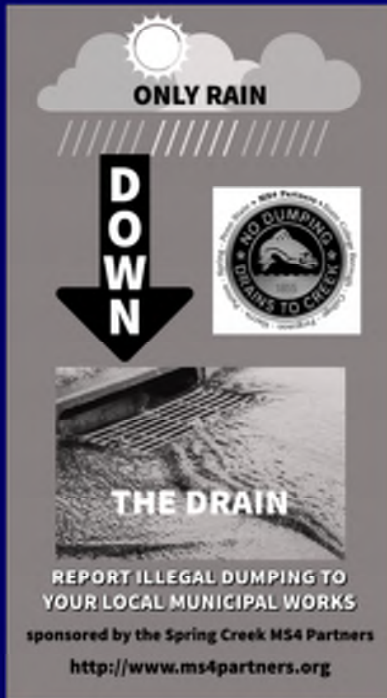
Stormwater Management Program

Six Minimum Control Measures (MCMs)

- | | |
|------------------------------------------------|-----------------------------------------------|
| 1. Public Education and Outreach | 4. Construction Site Runoff Management |
| 2. Public Involvement and Participation | 5. Post-Construction Stormwater Management |
| 3. Illicit Discharge Detection and Elimination | 6. Pollution Prevention and Good Housekeeping |

These are the 6 Minimum Control Measures as defined by DEP that are part of the permit and must be included within our program. Each is covered in the storm program narrative and will be reviewed in brief here.

MCM 1 Public Education and Outreach (PEOP)



- BMP#1 - Develop a written Public Education & Outreach Program (PEOP)
- BMP #2 - Target Audience Identification
- BMP #3 - Send Out Educational Material & Track Who Gets It.
- BMP #4 Send Out Educational Material to Target Audiences & Track Who Gets It.

MCM 1 outlines the general approach Ferguson Township takes in educating and informing the property owners, contractors, and visitors of the Township on the entire extent of the Stormwater Management Program, through inclusion in the development, implementation, evaluation, and updating of the stormwater plan. The purpose of this plan is to include, all those affected by the stormwater management rules and regulations of the Township through the education and outreach programs as described throughout the stormwater program. Educational materials include newsletters, brochures, posters, and maps, fact sheets, the website, etc. The image you see on the slide is the CDT add that was posted on March 19th, 2023.



PEOP Strategies

- Newsletters – Semi-annual property owners
- Brochure – “Stormwater Pollution Prevention” with all zoning permits
- Poster in lobby
- Spring Creek Watershed Map
- Fact Sheets – newsletter and website
- Storm Drain Stenciling
- Website – MS4 Partners.org & Twp page

The permit requires at least one newsletter per year. In total, we need to do at least 3 of the items on this list each year, however we strive do more than the minimum. The poster and the Spring Creek Watershed Map are on display on the easels in the back. Over the next year, there is a plan to roll out the storm drain stenciling program.

MCM 2 Public Involvement and Participation (PIPP)

- BMP#1 - Develop a written Public Education & Outreach Program (PEOP)
- BMP #2 - Target Audience Identification
- BMP #3 - Send Out Educational Material & Track Who Gets It.
- BMP #4 Send Out Educational Material to Target Audiences & Track Who Gets It.



MCM 2 documents the steps Ferguson Township takes in order to provide opportunities for Township residents and other stakeholders to participate in the development and implementation of the Township's Stormwater Management Plan. This includes advertised public meetings for the public to participate in; which include opportunities such as the stormwater management ordinance revisions (Chapter 26) Pollution Reduction Plan (PRP) development and implementation, an annual review meeting (this meeting), watershed cleanup day etc. In this photo you see the rain barrel workshop held by Clearwater on May 13th, 2023 in Patton Township. The program is monetarily supported by all the MS4 Partners.



PIPP Strategies for Notification

- Legal Notices of Public Meetings – CDT
- CDT MS4 Advertisement
- Optional Press Releases
- Ferguson Township Website
(<https://www.twp.ferguson.pa.us/public-works/pages/stormwater-management-program>)
- MS4 Partners Website
(<https://www.ms4partners.org/index.html>)
- Newsletters

These are various ways that the Township notifies constituents of the opportunities there are for involvement.

PIPP Strategies for Participation

- Partner with Other Groups
 - Watershed Clean-up
 - Rain Barrel Workshop
 - Water Resources Monitoring Project
- Storm Drain Stenciling (TBI)
- Adopt a Highway (Updates)
- Public Meeting
- Ordinance & PRP Development



These are some of the specific strategies that Ferguson Township uses for public participation. Once again, Storm Drain Stenciling is under development – The implementation plan will come to the Board some time in the next permit cycle- within the next year. While implementation has been in the budget annually (and will remain) finding the time to finalize and implement has been a challenge; however, I have reached out to vendors and begun to review costs for required materials. A couple of questions to think about is whether we want to use paint to mark the drains or go with more of a placard style marker. Should our placards say “Drains to Stream” or do we want to be more specific and differentiate which storm drains drain directly to Karst Features, such as “Drains to Sinkhole or Drains to Karst Feature”. All these and more will be discussed prior to implementation..

MCM 3 Illicit Discharge Detection and Elimination



Report any sighting of illicit discharge to Stormwater Engineer, Emergency Services, Police or DEP*

- BMP #1 IDD&E Plan
- BMP #2 Outfall Mapping
- BMP #3 Storm Drain System Collection Mapping
- BMP #4 Outfall Screening
- BMP #5 Stormwater Management Ordinance
- BMP #6 IDD&E Outreach

There is a lot of emphasis on this area of the permit to help keep our waterways clean by detecting things in the storm sewer system that shouldn't be there. Essentially, the only thing that should be in our storm drain system is stormwater runoff from precipitation.

The Illicit Discharge Detection and Elimination Program involves all areas within the Urbanized Area boundary of Ferguson Township- to which our permit pertains. Both the Township and residents participate in this program. The Township participates through approvals, inspections, maintenance and other enforcement measures covered in the rules and regulations of this section. Residents participate through public involvement meetings and training, observations, and complaints. Open lines of communication between the residents and the Township are essential to the success of the tasks contained in this section.

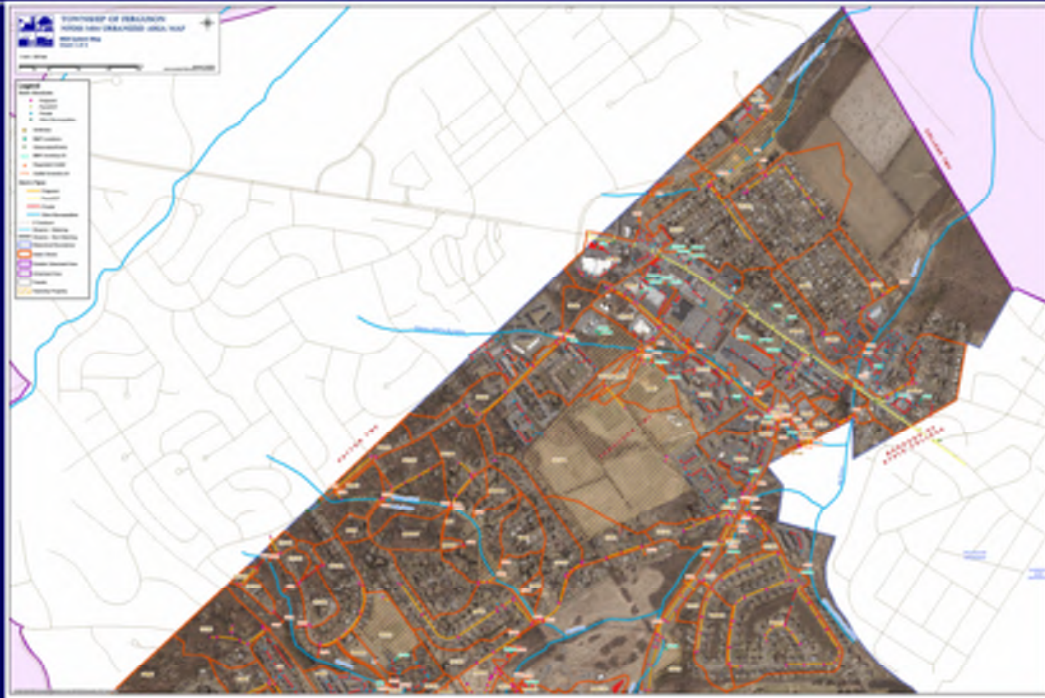
We as Township residents and employees should always be on the lookout for illicit discharge as part of our daily routine, so we can work toward a resolution where required. This goes for both inside and outside the growth boundary. It is noted that we should always consider safety first. If we come across a hazardous or flammable waste (or if you don't know), always contact emergency services first, for response by professionals who are trained to deal with a hazardous waste scenario. At any time the DEP may also be contacted.

IDDE Strategies

- **Maintain Storm Sewer System Map**
 - GIS Map
 - Update for Development / Capital Projects
- **Ordinance Prohibits Illegal Discharges**
 - Update Ordinance by 2024
- **Annual Dry Weather Screenings**
- **Investigate Complaints**
- **Report/Document Illicit Discharge & Report/Document and Eliminate the Source**

These are some of the strategies that we utilize. Examples of mapping follow. New permit requires some changes to our stormwater ordinance for what constitutes an illicit discharge. One of the changes involves residential car washing. Car washing is not permitted to discharge to the Twp stormwater system if cleaning agents are used. The car may be parked in a vegetated area for washing as long as the wash water is not being directed to a storm drain. Chapter 26 will be updated in 2024 and will also propose a change to penalties, dependent upon the section of the ordinance that is violated.

MS4 System Map



One page of System Map – available on Twp Stormwater Page. In addition to providing mapping for MS4, We are currently working on updates to the GIS data base for storm drain structures and pipes so that existing programmatic inspection of inlets, stormwater facilities and capital projects storm drain cleaning and pipe lining can be more efficiently programmed and tracked into the future.

MS4 System Map



Here is a slightly more enlarged area of the MS4 System. The map show the storm drain system private, PennDOT and public pipes, inlets, BMPs, outfalls, etc.

MCM 4 Construction Site Runoff Management (E&SC)

- BMP #1 -Township cannot issue a zoning permit until NPDES permit is authorized
- BMP #2 -Township responsibility to track and notify Centre County Conservation District (CCCD) of development activities.
- BMP#3 Ordinance requiring E&S Control BMPs (all development activities need E&S plan)

The Township relies upon Pennsylvania's Department of Environmental Protection statewide program to meet a portion of the permit requirements of this activity. Some activities are administered, permitted, tracked, inspected, and enforced by DEP or their agent, the Centre County Conservation District (CCCD).

The Township has an MOU with CCCD and all inquiries regarding construction site stormwater runoff are directed to the CCCD. As part of our subdivision and land development process, we cannot issue approvals until NPDES permits for construction activities or compliance with stormwater related ordinances are met.

MCM 5 Post-Construction Stormwater Management

- BMP #1 -Requires Implementation of Post Construction Stormwater Ordinance (Chapter 26)
- BMP #2 -Encourage Low Impact Development (LID)
- BMP #3 -Requires PCSM Operation and Maintenance



This chapter outlines the general approach Ferguson Township takes to ensure that Best Management Practices (BMPs) are implemented as part of Storm Water Management Site Plans related to construction activities and that the BMPs are being properly operated and maintained by the responsible party.

Generally speaking, in accordance with our stormwater ordinance, which is based on the Spring Creek Act 167 plan, and aside from some exemptions, any development activity with greater than 5000 sf of cumulative impervious area, must implement a stormwater management site plan. All development (including exempt development) in HQ watersheds, must implement stormwater controls however the current ordinance does not require a stormwater management site plan submission.

The stormwater engineer has implemented a simplified stormwater approach to help residents to understand and implement the required stormwater measures if the stormwater management site plan is not required.

As stated earlier, in 2024, portions of the stormwater requirements in Chapter 26, the Ferguson Township Stormwater Ordinance, will need to be updated in several areas, including but not limited to matching standards be in accordance with State Water Quality Volume Requirements (CG-1 and CG-2) and additional work standards within high quality streams.

PCSM Strategies

- **Maintain Stormwater Facility GIS Layer of BMPs**
 - All Permitted BMPs since 2003
 - All documents being migrated to GIS.
- **Inspection of BMPs**
 - Update inventory 69 sites, 158 BMPs and counting.....
 - Inspect 20% each year of the permit cycle
- **Enforcement per Ordinance**
- **Tracking**

Here are some of the strategies used to maintain our existing stormwater facilities. Continued organization and updates to the GIS are ongoing. The Township is moving toward scanning all copies of the stormwater management plans and reports to allow for more efficient inspection and enforcement.

MCM 6 Pollution Prevention / Good Housekeeping for Municipal Operations

BMP#1 – Develop a Written Pollution Prevention /Good Housekeeping Program (SOPs)

BMP#2 – Develop/Implement/Maintain Written Operation & Maintenance Program

BMP#3 – Develop/Implement an Employee Training Program for Appropriate Topics

Training provided to: All municipal employees, CRPR field employees, elected officials, police & fire responders, and contracted personnel - ANNUALLY

MCM 6 is the Pollution Prevention and Good House Keeping which municipal operations follows. An annual presentation is provided to all Ferguson Township Employees.

Pollution Prevention Strategies

- Fleet Maintenance Operations
- Fleet Fueling Operations
- Salt Storage / Application
- Road / Storm Sewer System Maintenance
- Waste Collection
- PPC / SPCC Program

We continue to develop and improve our operations. For the upcoming permit period, the stormwater engineer will complete a comprehensive review of the Preparedness, Prevention and Contingency Plan; and Spill Prevention, Control and Countermeasures Plan. We have continued to update the Township's Street Sweeping Program standard operating procedures, which will include certification of the material as clean fill. We continue to develop capital improvement project specs- particularly for storm drain cleaning, to ensure the projects are completed in accordance with Federal, State and the MS4 permit guidelines.

Pollution Reduction Plan (PRP)

Objective – Implement PCMs to produce tangible improvements to the quality of stormwater discharges in the Chesapeake Bay Watershed and impaired local waterways

Plan Components –

- Describe Planning Area / Evaluate Pollutant Loading
- Propose PCMs to reduce pollutants



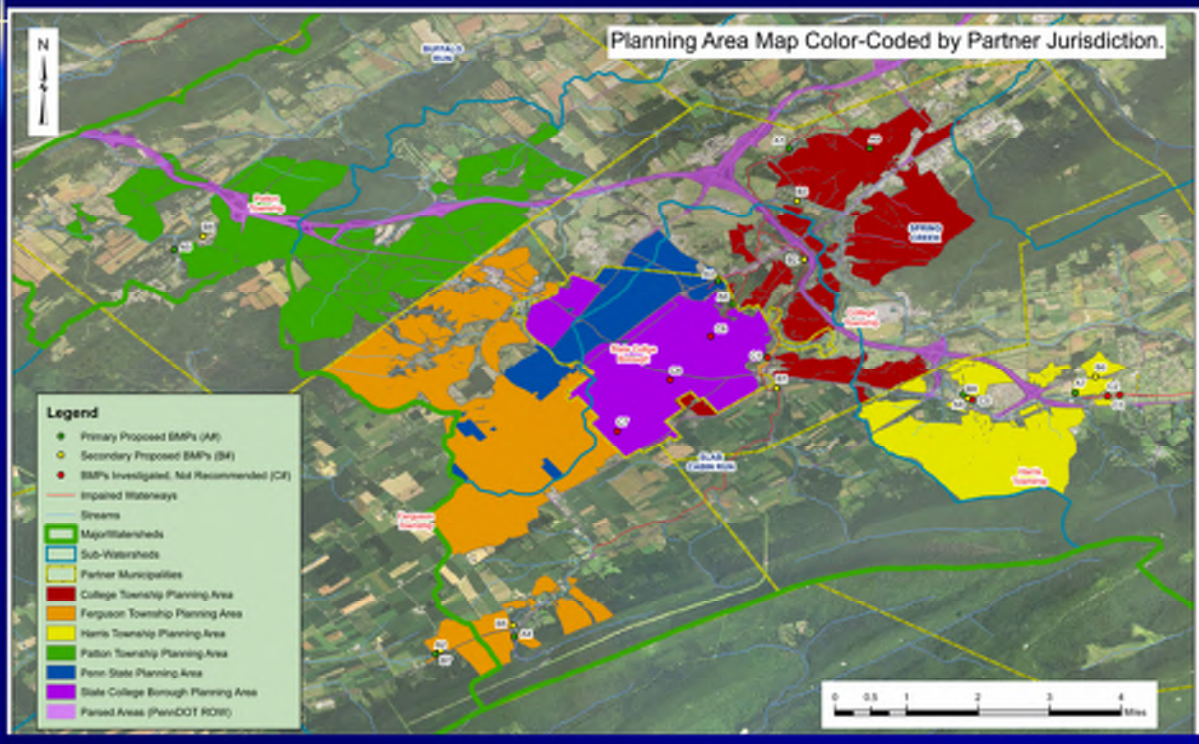
The PRP was developed along with the Centre Region MS4 Partners including: College Township, Harris Township, Patton Township, Penn State University, and the Borough of State College. The objective is to implement pollution control measures to produce tangible improvements to water quality in impaired local waterways and the Chesapeake Bay. The Bay itself is classified as impaired. In Ferguson Township, Slab Cabin Run (a high quality CWF) is classified as impaired (for sediment) as is Spruce Creek (to which Beaver Branch drains). Pollution reduction is accomplished by developing a pollutant loading model and then proposing Pollutant Control Measures or PCMs to reduce pollutant loading, based on DEP's expert panel report guidance.

Approved PRP Highlights

- Completed study/plan development, by consultant, with MS4 Partners, using Mapshed
 - Approved with current MS4 Permit (July 2020).
 - Determined requirement for reduction of sediment pollutant loading is 10% (this permit cycle).
 - Identified PCMs to be implemented during permit cycle to address permit requirements.
- Required to design, obtain easements, permitting, and construction of PCMs within permit cycle.

A significantly more detailed presentation was provided at a public meeting. to the Board, at a work session in January. This presentation will just provide a more abbreviated review in terms of the current stormwater program. The Partners entered into a multi-municipal agreement articulating obligations and responsibilities of each Partner. The Partners also drafted an agreement articulating obligations for funding, constructing, and maintaining BMPs for which there will be shared responsibilities. Ferguson Township is required to meet the pollution reduction goals spelled out by implementing projects by June 2025. It should be noted that for the future permit cycles (the next for which we will start planning for soon) it will probably make sense to complete our MS4 PRP preparation with the other municipalities. Further developments will be reviewed with the Board and Public as a full understanding of the next permit cycle requirements is better understood. As additional data is gathered and updated in our GIS system, Staff hopes to continue to update and refine the Township Pollution Loading Model for future cycles (expand the loading planning area, add additional PCM crediting, account for buffer and other stream restorations as well as green infrastructure and managed landscape implementation, and develop continuous simulation models.) We are currently looking at additional programmatic ways – including street sweeping and storm drain cleaning to obtain credit for the next PRP.

Approved PRP- Planning Areas and Project Locations



There are different pollution loading methodologies accepted by DEP. The pollution loading model utilized for this PRP is called Mapshed. This method utilizes more advanced/complex modeling and offers some additional higher quantities for Pollution Control Measures crediting (for example stream restoration). Based on continually developing standards, there will likely be some changes to the PRP requirements for the next permit cycle, both the type of project which can be credited, and the amount of crediting received.

Ferguson Township has urban area in the headwaters of two major basins, the Juniata River and West Branch of the Susquehanna. Beaver branch (Parts of Pine Gove Mills, Piney Hall) drains to spruce creek, the Juniata River. Slab cabin, Big Hollow and Thompson Run drain to spring creek, Bald Eagle Creek and then the West Branch of the Susquehanna. It is important to note that Pollution loading and the PRP reductions are based on surface flows loading. Given our karst geology, and the fact that a lot of stormwater does not make it to streams as surface flows, it allows for some interesting adjustments to the pollution reduction model- particularly in Big Hollow where pollution loading is significantly reduced. I.E. for the Big Hollow drainage area, because surface flows are primarily removed based on the karst geology, the pollution loading, which is based surface flows is almost nothing. It is also noted that the Big Hollow drainage area contains the majority of the urban in Ferguson Township.

Approved PRP-Loadings

Table D.3-3 Ferguson Township Existing Pollutant Load Summary

Watershed/Condition	TSS (lb./yr.)	TN (lb./yr.)	TP (lb./yr.)
Beaver Branch			
Baseload	100,703	1,309	63
Existing BMP Credit	0	0	0
Adjusted Baseload	100,703	1,309	63
Required Load Reduction	10,070	39	3
Spring Creek (Via Big Hollow)			
Baseload	1,461	672	2
Existing BMP Credit	0	0	0
Adjusted Baseload	1,461	672	2
Required Load Reduction	146	20	0
Slab Cabin Run (Spring Creek Watershed)			
Baseload	521,100	4,552	324
Existing BMP Credit	28,010	62	10
Adjusted Baseload	493,090	4,490	314
Required Load Reduction	49,309	135	16
Total Regulatory Load Reduction:	59,525	194	19

This slide shows Ferguson Township's pollution reduction requirements in lbs/year. Ferguson Township is required to reduce sediment loads in the Slab Cabin and Spring Creek Basin by 49,039 lbs/year and Beaver Branch Basin by 10,070 lbs/year. The reduction must be completed in the watersheds where they are required. As noted, the loading to Spring Creek (via Big Hollow- the subwatershed with the largest amount of urban area in the Township) has approximately 0.2% of the load as Slab Cabin, even though the mapped area is significantly larger. This is largely due to capture of stormwater by Karst features. Surface flows only reach Spring Creek in very large events.

PCM Locations



Design for the primary PRP projects for Beaver Branch and Slab Cabin is under way, as evidenced by the staff recommendation for approval of the preliminary design proposals that will be presented later. We have built out a schedule and timeline to complete the projects by June 2025. This slide provides a look at the primary PRP projects which Ferguson Township must complete. Currently, for the Slab Cabin Watershed, the Township still has the opportunity to complete a combination of A4 (300 l.f.) and participate with A3 (the Duck Pond Project which I will present on the following slide). It is anticipated that a preliminary design presentation will be made to the Board at the December 5th or 12th meeting to review the final options and gain board approval on how to proceed. As long as we complete any combination of the projects in a manner that reduces our pollution loading requirement, we will meet our pollution reduction goal.

PCM Locations



This is the PSU duckpond project has been completed. Ferguson Township would receive 17.5% credit if we contribute to the project (approximately 20,000 lbs/yr). The cost is estimated at \$100,000 plus annual maintenance costs. The largest unknown with this project is the life expectancy (gabions were used- which can have a limited life versus other hard armoring techniques) which would may result in higher maintenance/replacement costs in the future. We need to get details of the agreement for maintenance that would need to be signed with Penn State.

MS4 – SWMP Review

Open Discussion



An electronic copy of the narrative, along with the power point presentation will be provided for distribution and posted on the Ferguson Township Website. Please feel free to ask any questions or voice any concerns and/or to reach out to me at anytime.