2019 MS4 Employee Educational Workshop

MS4 PROGRAM: MCM #3 AND #6

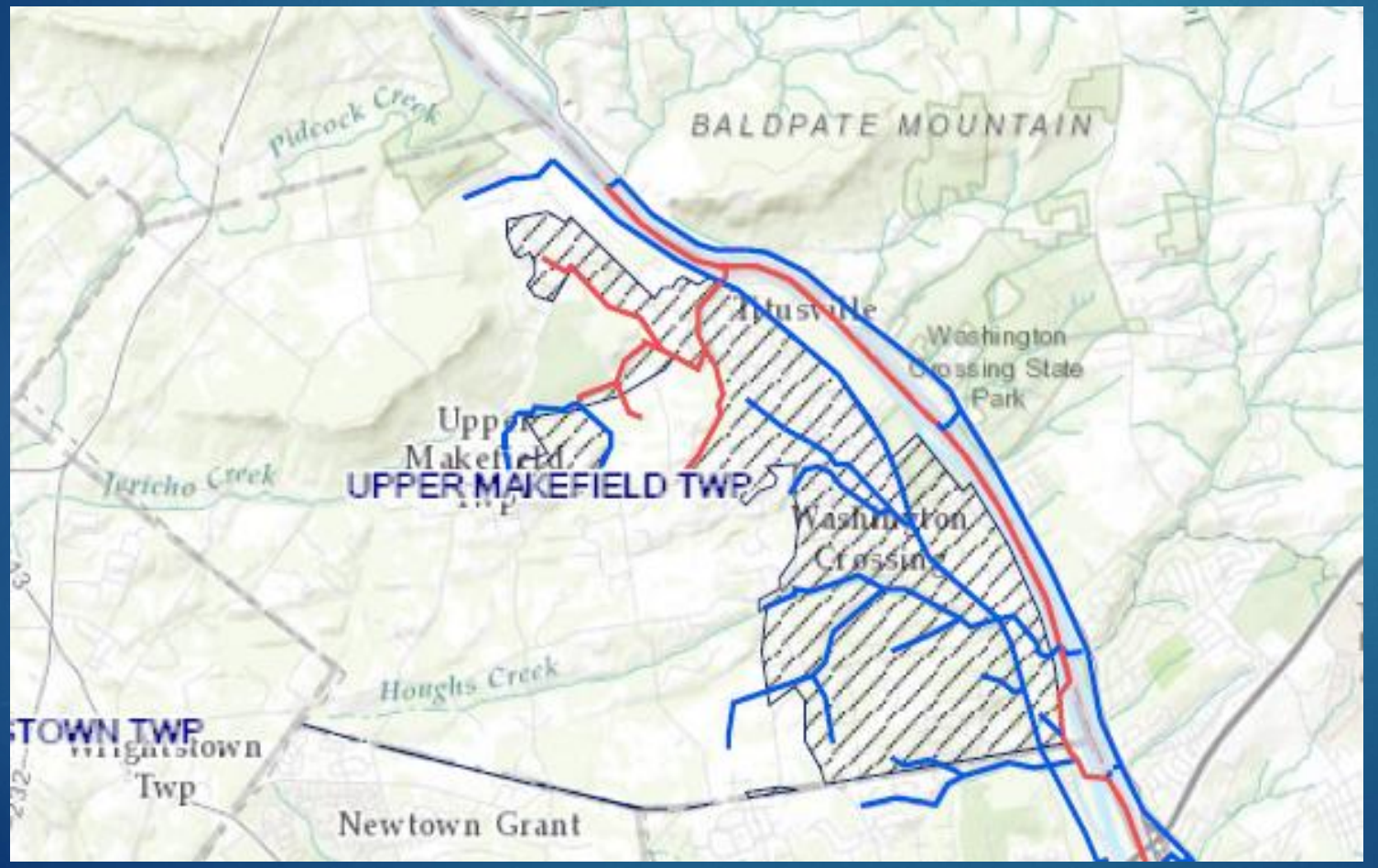
UPPER MAKEFIELD TOWNSHIP

(SOME SLIDES USED ARE MODIFIED FROM PRESENTATION S BY LAND STUDIES AND THE CENTER OF WATERSHED PROTECTION)

What is MS4

- Municipal Separate Storm Sewer System
- It is a collection of structures including retention basins, ditches, roadside inlets and underground pipes, designed to gather stormwater from built-up areas and discharge it, without treatment, into local streams and rivers.
- Called a separate system because it's not connected to the sanitary sewer system which drains waste water from inside a home to a sewage treatment facility or a private septic system.
- Many rural developments have stormwater management structures, but only communities that the United States Census Bureau classifies as "Urbanized Areas," or UAs, based on population density, are required to become part of the MS4 program. And yes a portion of Upper Makefield is designated as Urban Area.

The Upper Makefield Urban Area (impaired streams in RED)



MS4_STREAMS

Impaired Stream

Unimpaired Streams

MS4_URBAN_AREAS

TMDLs and PRPs

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Bucks County						
UPPER MAKEFIELD TWP	PAG130010	No		Delaware River		Mercury (5)
				Jericho Creek	Appendix E-Siltation (5)	

Background - MS4 Upper Makefield MS4 Status

- On 9/14/17 a General Permit was submitted to PADEP
- The review letter was received from PADEP on July 18, 2018.
- Based on the Land Studies draft Watershed Report for Upper Makefield Township and with discussions with PADEP, it was determined that an Individual MS4 Permit to enable the Township to include areas outside of the designated Urban Area should be submitted.
- On November 30, 2018 an Individual Permit was submitted

Minimum Control Measures (MCM's)

- For the Annual Reporting, there are six MCM's required
  - MCM #1 – Public Education and Outreach
  - MCM #2 – Public Participation and Involvement
  - MCM #3 – Illicit Discharge Detection and Elimination
  - MCM #4 – Construction Site Runoff Control
  - MCM #5 – Post-Construction Stormwater Management
  - MCM #6 – Pollution Prevention and Good Housekeeping

- MS4 Annual Reports are due on September 30th of each year for the period July 1 through June 30

Program Overview

- The purpose of this workshop is for everyone to walk away with something tangible towards compliance with the MS4 program
- For this workshop we would like for everyone to:
  - Have a grasp of specifically what should be in a written plan for MCM #3 (specifically BMP #4) and #6 by:
    - Reviewing what the permit requires
    - Walking through a Public Works facility to associate site conditions with the permit requirements
  - Understand an MS4 audit process and what to expect
  - Briefly talk about the TMDL and PRP requirements

MCM 3
Illicit Discharge and Elimination (IDDE)

MCM #3 has six Best Management Practices (BMP's) to be used

- MCM #3 Illicit Discharge Detection and Elimination (IDDE) – to locate and stop illicit Discharges into the MS4
  - BMP #1 – Have a written IDDE program to include dry weather screening and sampling of dry weather flows
  - BMP #2 – Map streams and outfalls to include all outfalls, locations and names of surface waters, creeks, ponds, lakes, basins, swales, etc.
  - BMP #3 – map the storm sewer collection system, watershed boundaries and roads (to include streets, catch basins, curbs, basins and artificial channels)
  - BMP #4 – Outfall Screening
  - BMP #5 – Enact stormwater ordinance
  - BMP #6 – Educational outreach on IDDE

Documentation needed for MCM#3

- Copy of written IDD&E Program Plan, which includes:
  - Records of outfall screening and inspections
  - Results, documentation on identified IDD&E and resolutions
  - Maps of all outfalls, receiving waters and stormwater collection system
  - Outfall sampling records
  - Ordinance prohibiting illicit discharges
  - Tracking system for outfall screening (Excel spreadsheet, for example)
  - Be sure the IDD&E Program Plan describes the processes for screening, tracing, resolution and enforcement.
- Mapping your MS4 is critical. The map should include your entire stormwmater collection system, including all outfalls. Drainage areas feeding each outfall should also be delineated. The map of your MS4 should be completed by the 4th year of permit coverage. If you are operating under a renewed permit, mapping should already be complete.

MCM #3 IDDE - BMP #1

- Develop and implement a written IDD&E program for the detection, elimination, and prevention of illicit discharges into your MS4.
- The program must include dry weather field screening of outfalls for non-stormwater flows, and sampling of dry weather discharges
- Selected chemical and biological parameters test results are to be used as indicators of possible discharge sources

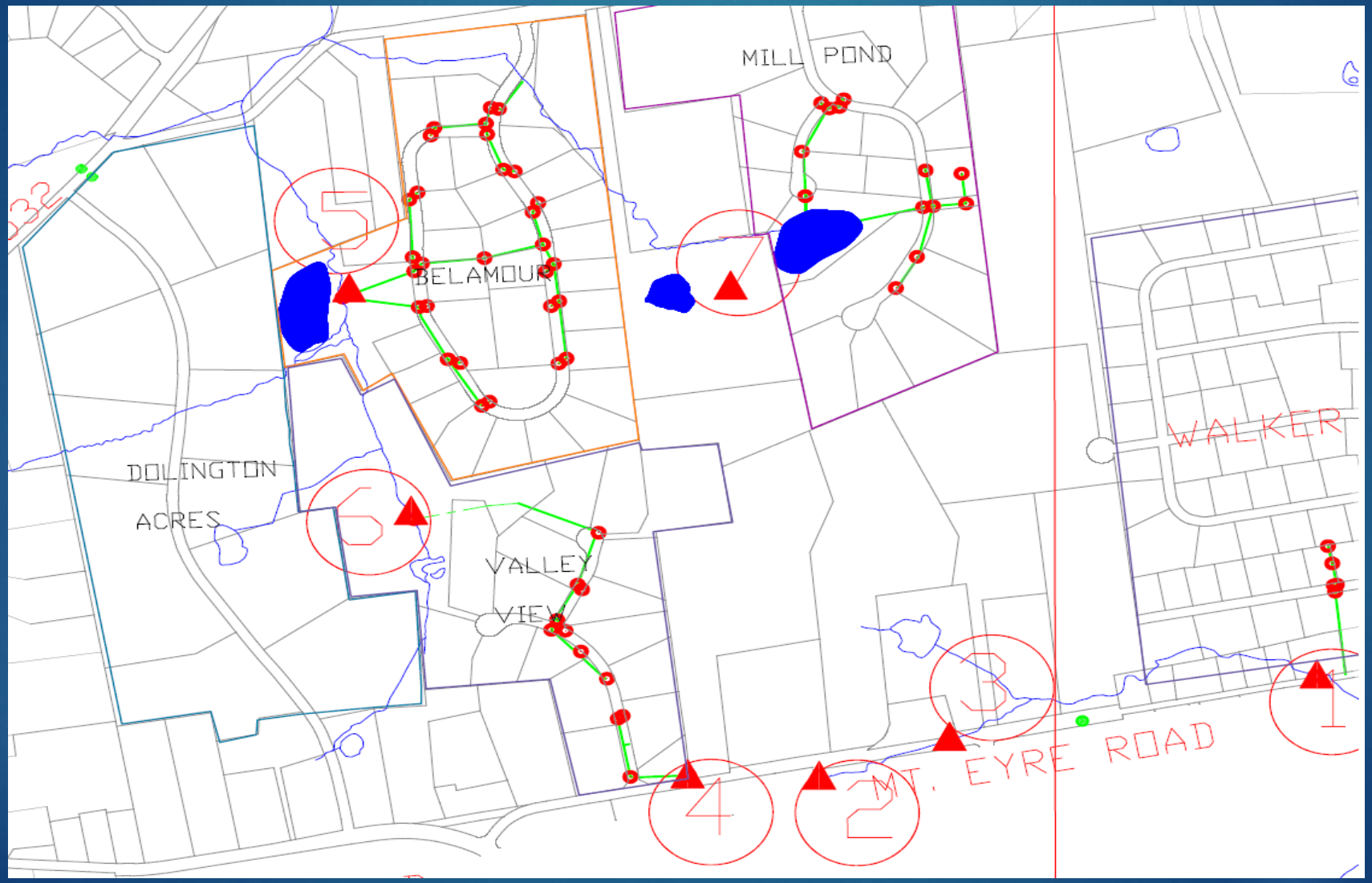
MCM #3 IDDE - BMP #2

- Map streams and outfalls. The map must show the location of all outfalls and the locations and names of all surface waters of the Commonwealth that receive discharges from those outfalls.
- Surface waters that should be included are creeks, streams, ponds, lakes, basins, swales, and channels that receive stormwater discharges.
- Maps should be developed within the first year of permit coverage and updated/maintained from thereafter.

MCM #3 IDDE - BMP #3

- The storm sewer collection system including pipes, municipal watershed boundaries and roads (including streets, catch basins, curbs, basins and artificial channels) must be mapped.
- This map can be created in conjunction with BMP #2.

MCM#3 - Mapping



MCM #3 IDDE - BMP #4

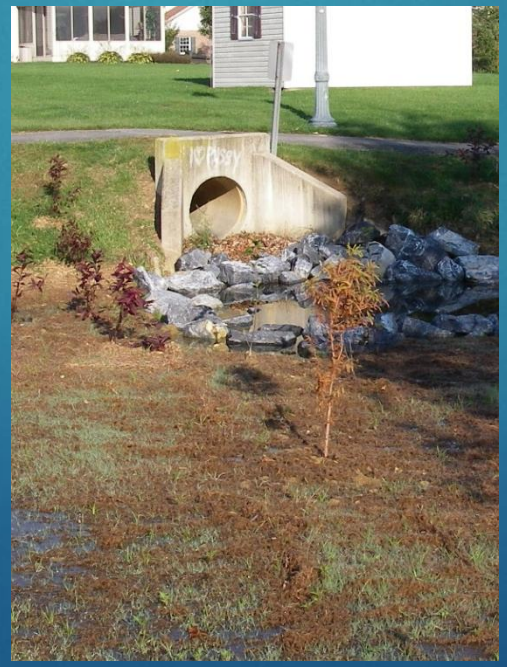
- Outfall screenings must be done in your MS4.
- "Screening" means that you physically check your outfalls and report the results as outlined in your SWMP.
- Documentation is key – write down who went, what they found, include their inspection checklist and any photos taken.
- New permittees need to screen each outfall twice (screen 40% of outfalls each year of the permit term).
- During subsequent permit terms, outfalls are to be screened once per permit term (screen 20% of outfalls each year).

Outfall (for MS4 Permits) – for monitoring

The point where a conveyance or system of conveyances that disposes stormwater that are owned or operated by a municipality; and is **designed or used for collecting or conveying storm water** to a defined and discernible point from which pollutants are or may be discharged—and that discharges to waters of the United States is an ***Outfall.***

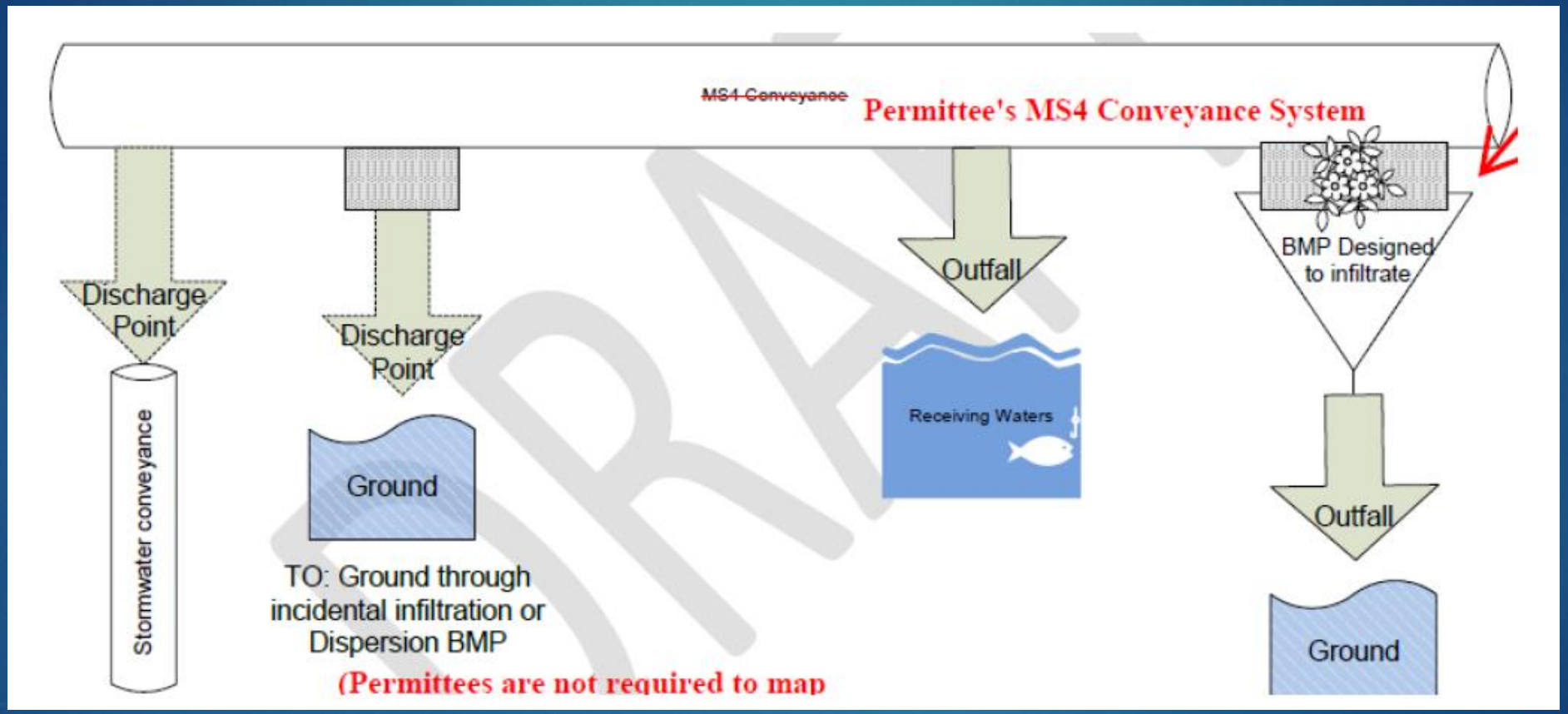
Outfall

Not an outfall



Not an outfall

Outfall vs. Discharge



Screening Form

3800-FM-BCW0521 12/2015
MS4 Outfall Field Screening Report

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MS4 OUTFALL FIELD SCREENING REPORT

BACKGROUND INFORMATION

Permittee Name:	NPDES Permit No.: PA
Date of Inspection:	Outfall ID No.:
Land Uses in Outfall Drainage Area (Select All):	Latitude: ____° ____' ____"
☐ Industrial ☐ Urban Residential	Longitude: ____° ____' ____"
☐ Commercial ☐ Suburban Residential	Dry Weather Inspection? ☐ Yes ☐ No
☐ Open Space ☐ Other:	Date of Previous Precipitation:
	Amount of Previous Precipitation: in
Inspector Name(s):	Were Photographs Taken? ☐ Yes ☐ No
	Are Photographs Attached? ☐ Yes ☐ No

OUTFALL DESCRIPTION

TYPE	MATERIAL	SHAPE	DIMENSIONS	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other	☐ Circular ☐ Single ☐ Elliptical ☐ Double ☐ Box ☐ Triple ☐ Other ☐ Other	Diameter: ____ in	☐ In Water ☐ With Sediment
☐ Open Channel	☐ Concrete ☐ Earthen ☐ Rip-Rap ☐ Other	☐ Trapezoid ☐ Parabolic ☐ Other	Depth: ____ in Top Width: ____ in Bottom Width: ____	

Dry Weather Flow Present at Outfall During Inspection? ☐ Yes ☐ No *(If No, skip to Certification Section)*

Description of Flow Rate: ☐ Trickle ☐ Moderate ☐ Significant ☐ N/A

DRY WEATHER FLOW EVALUATION

Does the dry weather flow contain color? ☐ Yes ☐ No If Yes, provide a description below.

Does the dry weather flow contain an odor? ☐ Yes ☐ No If Yes, provide a description below.

Is there an observed change in the receiving waters as a result of the discharge? ☐ Yes ☐ No
If Yes, provide a description below.

Does the dry weather flow contain floating solids, scum, sheen or substances that result in deposits? ☐ Yes ☐ No
If Yes, provide a description below.

3800-FM-BCW0521 12/2015
MS4 Outfall Field Screening Report

Were sample(s) collected of the dry weather flow? ☐ Yes ☐ No (If Yes, No. Samples: ____)

FIELD / LABORATORY ANALYSIS

PARAMETER	RESULTS	UNITS	PARAMETER	RESULTS	UNITS
Flow Rate		GPM	Fecal Coliform		No./100 mL
pH		S.U.	COD		mg/L
Total Residual Chlorine (TRC)		mg/L	BOD5		mg/L
Conductivity		µmhos/cm	TSS		mg/L
Ammonia-Nitrogen		mg/L	TDS		mg/L
Other: ____			Oil and Grease		mg/L
Other: ____			Other: ____		

Indicate the parameters above that were analyzed by a DEP-certified laboratory:

ILLICIT DISCHARGES

Is the dry weather flow an illicit discharge? ☐ Yes ☐ No

If Yes, describe efforts made to determine the source(s) of the illicit discharge.

Describe corrective actions taken by the permittee in response to the finding of an illicit discharge.

Inspector Comments:

RESPONSIBLE OFFICIAL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

Responsible Official Name	Signature
Telephone No.	Date

Typical Screening Report

Outfall Reconnaissance Inventory/ Sample Collection Field Sheet

Section 1: Background Data

Subwatershed: NESHAMINY CREEK		Outfall ID: H-45	
Today's date: 5/23/07		Time (Military):	
Investigators: SCOTT MURREN		Form completed by: R.J. PATEL	
Temperature (°F):	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera: SONY DIGITAL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☒ Steel ☐ Other: _____	☒ Circular ☐ Eliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 30	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☒ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream	(applicable when collecting samples)				
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		RESULT	UNIT	EQUIPMENT
☐ Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____" ____"	Ft, In	Tape measure
	Measured length	____" ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Thermometer
pH			pH Units	Test strip/Probe
Ammonia			mg/L	Test strip

Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☒ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☒ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No	
2. If yes, collected from:	☐ Flow	☐ Pool	
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM ☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Typical Screening Photo

Complaint Form

CITIZEN COMPLAINT
ILLICIT DISCHARGE REPORTING FORM

Name: _____ **Contact Phone Number:** _____

Date: _____ **Time Discharge Discovered:** _____

Date of Last Rain Event: _____ **Estimated Quantity of Rain:** _____ **in.**

LOCATION OF DISCHARGE (indicate nearby street intersections, addresses, and/or landmarks for reference): _____

_____

_____

WHERE WAS DISCHARGE FOUND? OPEN DITCH STREAM PIPE OUTFALL OTHER: _____

WAS WATER FLOW OBSERVED? NO YES

WAS FLOW SOLID OR PULSING? SOLID PULSING

WAS A PHOTO TAKEN? NO YES (Please attach a copy to form)

ODOR: NONE MUSTY SEWAGE ROTTEN EGGS SOUR MILK OTHER: _____

COLOR: CLEAR RED YELLOW BROWN GREEN GREY OTHER: _____

CLARITY: CLEAR CLOUDY OPAQUE

WAS THERE AN:
OILY SHEEN YES NO
GARBAGE/SEWAGE YES NO
OTHER: _____

ADDITIONAL INFORMATION TO ASSIST IN THE INVESTIGATION: _____

_____

_____

Follow up Investigation (to be completed by CCD staff)
OUTFALL NO: _____ **INSPECTOR NAME** _____ **PHONE** _____

FIELD ANALYSIS:
WATER TEMP: _____ °F / °C
pH: _____
PHENOL: _____ mg/l
CHLORINE (Total): _____ mg/l
COPPER: _____ mg/l
DETERGENTS: _____ mg/l

WAS A LABORATORY SAMPLE COLLECTED? NO YES
(if yes attach copy of chain-of-custody record)
COMMENTS: _____

_____

_____

DATA SHEET FILLED OUT BY: (signature): _____ DATE: _____

Additional notes to file: _____

_____

Follow-up with Complainant: _____

_____

_____

MCM #3 IDDE - BMP #5

- Enact a stormwater management ordinance to implement and enforce a SWMP. Sections that should be included are prohibitions, right of entry, and enforcement.
- The ordinance must meet the requirements listed in the MS4 Stormwater Management Ordinance Checklist.
- Ordinance-related BMPs of MCMs 3, 4 and 5 can be combined into a single stormwater management ordinance.
- Ordinances associated with an Act 167 Stormwater Management Plan that was approved by DEP in 2005 or later meet the requirements of BMP #5. You can also meet the ordinance requirement by utilizing DEP's model MS4 Stormwater Management
- Ordinance or by developing an ordinance that meets all applicable requirements outlined in the MS4 Stormwater Management Ordinance Checklist.

MCM #3 IDDE - BMP #6

- Provide educational outreach on IDD&E to your target audience.
- Programs should be developed to encourage and facilitate public reporting of illicit discharges, illegal dumping, or outfall pollution.

MCM 6
Pollution Prevention/Good Housekeeping

MCM #6 has three Best Management Practices (BMP's) to be used

- MCM #6 Pollution Prevention/Good Housekeeping – to insure reduction in the amount and type of pollution entering from municipally owned and maintained facilities
  - BMP #1 – identify and document all facilities and activities that are owned and/or operated by the permittee (municipality) and have potential for generating stormwater runoff.
  - BMP #2 – Develop, implement and maintain a written operation and maintenance (O&M) program
  - BMP #3 – Develop and implement an employee training program that address topics to further the goal of preventing or reducing the discharge from municipal operations.

Documentation for MCM#6

- DEP will ask to see an inventory of municipal facilities and land uses that contribute stormwater to MS4, including all facilities owned and operated by the permittee (e.g., street sweeping, fleet care, storage yards, composting sites, streets, lots).
- The O&M plan will need to be shown to the inspector, as well as the written employee training program (includes contractors and consultants) and a list of trainings with frequency and participants.
- DEP will also want to see the activities associated with the listed facilities. These activities can often have greater pollution potential than the facilities. Keep track of these activities and document the actions.

MCM #6: Pollution Prevention / Good Housekeeping BMP#1

Identify and document all operations that are owned or operated by the permittee and have the potential for generating pollution in stormwater runoff to the regulated small MS4. This includes activities conducted by contractors for the permittee. Activities may include the following:

- street sweeping; snow removal/deicing; inlet/outfall cleaning; lawn/grounds care; general storm sewer system inspections and maintenance/repairs; park and open space maintenance; municipal building maintenance; new construction and land disturbances; right-of-way maintenance; vehicle operation, fueling, washing and maintenance; and material transfer operations, including leaf/yard debris pickup and disposal procedures. Facilities can include streets; roads; highways; parking lots and other large paved surfaces; maintenance and storage yards; waste transfer stations; parks; fleet or maintenance shops; wastewater treatment plants; stormwater conveyances (open and closed pipe); riparian buffers; and stormwater storage or treatment units (e.g., basins, infiltration/filtering structures, constructed wetlands, etc.).

MCM #6: Pollution Prevention / Good Housekeeping BMP#2

Develop, implement and maintain a written O&M program for all operations that could contribute to the discharge of pollutants from the regulated small MS4, as identified under BMP #1.This program shall address stormwater collection or conveyance systems within the regulatedMS4. The written O&M program shall stress pollution prevention and good housekeeping measures, contain site-specific information, and include the following:

- Management practices, policies, and procedures shall be developed and implemented to reduce or prevent the discharge of pollutants to the regulated small MS4s. The permittee shall consider eliminating maintenance area discharges from floor drains and other drains if they have the potential to discharge to storm sewers.
- Maintenance activities, maintenance schedules, and inspection procedures to reduce the potential for pollutants to reach the regulated small MS4s.
- Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, salt / sand (anti-skid) storage locations and snow disposal areas. Controls for solid chemical products stored and utilized for the principal purpose of deicing roadways for public safety must be consistent with the BMPs for existing salt storage and distribution sites contained in the PAG-03 NPDES General Permit for Stormwater Discharges Associated with Industrial Activity.
- Procedures for the proper disposal of waste, including dredge spoil, accumulated sediments, trash, household hazardous waste, used motor oil, street sweepings, and other debris.

MCM #6: Pollution Prevention / Good Housekeeping BMP#3

Develop and implement an employee training program that addresses appropriate topics to further the goal of preventing or reducing the discharge of pollutants from operations to the regulated small MS4. The program may be developed and implemented using guidance and training materials that are available from federal, state or local agencies, or other organizations. All relevant employees and contractors shall receive training (i.e., public works staff, building, zoning, and code enforcement staff, engineering staff, police and fire responders, etc.). Training topics shall include operation, inspection, maintenance and repair activities associated with any of the operations identified under BMP #1. Training must cover all relevant parts of the permittee's overall stormwater management program that could affect operations, such as illicit discharge detection and elimination, construction sites, and ordinance requirements.

- Employee training shall occur at least annually and shall be documented in writing and reported in Annual MS4 Status Reports. Documentation shall include the date(s) of the training, the names of attendees, the topics covered, and the training presenter(s).

Sample Plan

Activity or Facility	Operation and Maintenance Practice
Highway Garage	Drains inside of building are tied to sanitary sewer system. Vehicle washes and maintenance will be done inside the new building. Salt for roadways is stored inside of building or under tarps to prevent materials form entering MS4. Fueling operation is coded to only allow personnel with keys access. Fuel tanks are inspected on a regular basis, and an automatic shutoff is on system. Emergency information is posted near fueling operation.
Municipal Building	Landscaping is maintained around building to help reduce stormwater runoff and the overall impervious area of the area.
Street Sweeping	Street sweeping is conducted weekly. The goal of the program is to street sweep all roads four times per year. Materials captured from street sweeping is used as clean fill or properly disposed of.
Deicing	During winter weather, salt is used for deicing on state and Municipal owned roads. Salt use is minimized to the best extent possible to ensure safe roadways. Salt is kept indoors or under tarps to eliminate any potential for discharging to the MS4 from the storage area.
Inlets / Outfalls	Inlets and outfalls are cleaned as needed based upon complaints, hot spots, or observed issues. Material is used as clean fill or properly disposed of. Inlets are repaired and or replaced during the annual road paving program.
Lawn / Grounds Care	Municipal fields and grassy areas are cut throughout the year to allow plant growth. Bare areas are seeded as needed.
Stormwater Collection Systems	Stormwater collection systems are inspected and cleaned as needed based upon complaints or observed issues. Problems are repaired when discovered. Depending on the problem, Municipal staff may repair or the work may be contracted out.

Example Plan

- The above plan is not detailed enough for MCM #6 BMP #2 requirements
- The following spreadsheet utilizes the example of the Highway Garage above but provides detail that works to incorporate aspects of MCM #6 BMPs #2 and #3

Questions?

Contact Information:

Wes Plaisted

Tri-State Engineers and Land Surveyors, Inc.

wplaisted@tse-ls.com

(215) 357-5950 x-108