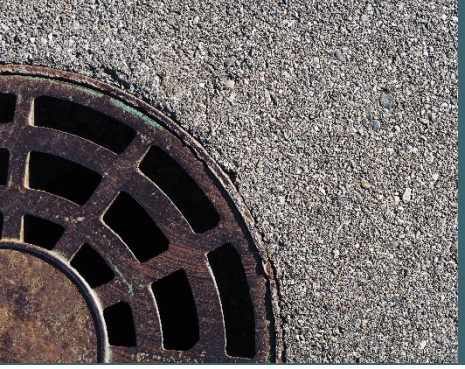


EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Municipal Separate Storm Sewer System (MS4) Program

Dry-Weather Screening: A Guide for Permittees

1.0 Background

The Municipal Separate Storm Sewer (MS4) Permit requires permitees to conduct dry weather screening. The intent of dry-weather screening (DWS) is to identify illicit connections/discharges into the MS4. DWS can assist with identifying illicit connections or discharges, such as improperly connected plumbing in residential, commercial, and industrial properties; floor drains connected to the MS4 in maintenance garages/public works facilities; and swimming pool filter backwash discharges directly connected to the MS4 instead of the sanitary sewer. Illicit discharges also include intermittent discharges, such as washing vehicles near a catch basin or dumping restaurant grease down a catch basin. Illicit discharges can be ongoing for years without being detected due to the intermittent nature or lack of investigation when dry-weather flow is present. DWS is an important tool to identify and eliminate pollutants entering the MS4 and ultimately surface waters.

2.0 Field Observations

In accordance with the MS4 permit, DWS must be conducted at all outfalls and points of discharge within the MS4 regulated area, or in accordance with the approved prioritization procedure. Permittees must wait at least 48-72 hours after any precipitation to perform DWS to adequately characterize dry-weather conditions.

A field observation allows for trained staff to observe the conditions and surrounding area of an outfall or point of discharge. At a minimum, the focus of the field observations shall be to observe the following:

- Presence/absence of flow
- Deposits/stains on the discharge structure or bank
- Vegetation condition
- Structural condition
- Biology (e.g., bacterial sheens, algae, and slimes)
- Water clarity
- Color
- Odor
- Floatable materials

Additional observations may be needed based on the land use and outfall/point of discharge characteristics. DWS results must be documented even if dry-weather flow or other issues are not identified. The documentation must include the observations identified above, as well as an identifier for the outfall/point of discharge, weather conditions (hours since last rain event), staff conducting the screening and a photo. An example of a field form is included in Attachment A.

Some municipalities may have outfalls that are submerged due to high water. Every effort should be made to screen these outfalls during times of the year when the outfall is exposed (e.g., summer months or when the water levels are lowered due to dam maintenance). When the outfall is constantly submerged, the next manhole or catch basin in the storm sewer must be DWS. This alternative location is still representative of the outfall and should be documented on a field form. Additionally, points of discharge should be DWS at the last manhole or catch basin before a jurisdictional boundary.

3.0 System Investigation

Following the identification of dry-weather flow, an upstream investigation must occur. This investigation will entail reviewing the storm sewer map and tracking or tracing the observed flow upstream to determine the origin. Accessing manholes or catch basins throughout the drainage area until a source is identified may be required. Televising may be necessary to inspect the storm sewer in between manholes or reach difficult locations. This type of investigation often reveals an improper connection, where a sanitary sewer is connected to the storm sewer system. The result of this investigation may identify multiple sources causing the illicit discharge. If the source of dry-weather flow is not immediately determined, field screening and/or source investigation may be needed.

4.0 Field Screening

If dry-weather flow is observed at the time of field observations and the source of flow is not immediately determined, field screening must be conducted immediately but not to exceed 1-2 days following the initial observation. Field screening parameters may vary based on the suspected illicit discharge. Below is a summary of suggested parameters to screen. Additional parameters may be selected based on field observations and the potential source of the illicit discharge.

Parameter	Action Level
pH	<6.5 or >9.0
E. coli	>1,000 counts (cts)/100ml*
Ammonia	>1.0 mg/l
Surfactants	>0.5 mg/l

*The partial body contact water quality standard is appropriate to use as a starting point; however, should in-stream *E. coli* concentrations continue to exceed the total body contact water quality standard (300 cts/100 ml) during wet and dry weather, the permittee will need to implement additional best management practices.

As part of collecting the *E. coli* sample for analysis, it may be beneficial to collect another sample for potential microbial source tracking (MST). MST is one of the tools available to characterize the sources of bacteria. If *E. coli* concentrations exceed the action level above it may be beneficial to

analyze a sample using the quantitative polymerase chain reaction (qPCR) method, which is one of the MST tools. This method allows the lab to distinguish between human and animal *E. coli* sources, which may aid in source investigation. The collection of a qPCR sample should occur when the initial *E. coli* sample is collected. The sample can then be frozen and taken to the laboratory later if needed for qPCR analysis.

Information regarding sampling collection and equipment/materials staff should have on hand is included in Attachment B.

Some municipalities may have groundwater seeping into their MS4 due to aging infrastructure. If groundwater contamination is suspected, additional information on permit requirements can be found on page 12 of the Illicit Discharge Elimination Program Compliance Assistance Document. If groundwater contamination is not suspected, field screening must occur to verify that the source of flow identified during field observations is indeed uncontaminated groundwater. The observation of clear flow without attributing physical characteristics such as odor, floatable materials, etc. does not always equate to uncontaminated discharges. Often, what appeared to be clear flow can have elevated *E. coli* concentrations. Confirmation parameters should include *E. coli* and other potential pollutants based on the surrounding land use.

5.0 Source Investigation

Once field screening is complete, a source investigation should begin immediately, but not to exceed two weeks following the initial observations. It may be appropriate to conduct the source investigation simultaneously while conducting field screening.

Using the storm sewer maps, begin to trace the dry weather flow upstream from the outfall or point of discharge. If the storm sewer system is large it may be best to spot check points where branches of the sewer system intersect to isolate a specific portion of the storm sewer system. Collecting samples from where the branches intersect may also help to isolate the source of the dry weather flow and/or the source of elevated field screening results.

Once the dry weather flow has been isolated, additional investigative strategies may be implemented such as dye testing or televising. It may also be beneficial to conduct an evaluation of the land use (residential, commercial, industrial etc.) as this will help narrow down the types of potential illicit discharges which may be encountered.

DYE TESTING

Dye testing is a tool that can be used to confirm the discharge pathway of a specific plumbing fixture (e.g., toilets, sinks, floor drains, sumps). In order to conduct dye testing the municipality must request approval in accordance with Rule 97 of the Part 4, Water Quality Standards (Part 4 Rules), promulgated pursuant to Part 31 Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451. Additional information on the process for obtaining authorization to use tracer dyes can be found on EGLE's website.

In addition to having a storm sewer system map, it is also important to have a map of the sanitary sewer system. Dye is placed in one plumbing fixture at a time, then flushed with water. Staff then verify if the dye is observed in the sanitary sewer system or storm sewer system, multiple staff may be required to check locations simultaneously. It may be beneficial to rotate the color of dye.

TELEVISING

A camera can be placed in a sewer line to determine if unknown connections have been made to the storm sewer. The camera can also be used to observe debris or potential leaching into the storm system through seeps, compromised pipe connections, and integrity of the stormwater asset. Televising provides an opportunity to inventory the storm sewer system as part of an asset management program.

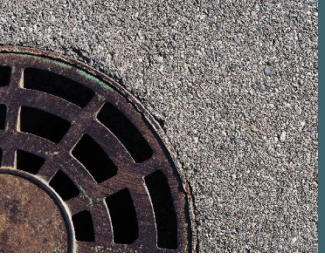
If DWS identifies an illicit discharge or connection, the municipality must follow its Illicit Discharge Elimination Program (IDEP) ordinance and enforcement response procedure included in their Storm Water Management Plan. Illicit discharges, including connections, should generally be eliminated within 30 days of identifying the source; however, it is understood that due to budget constraints and other challenges, a delay of up to 90 days may be needed.

6.0 Training

To ensure the success of the IDEP, employees are required to be trained. Existing employees must be trained at least once during the permit term and new hires within the first year of employment; however, annual training is recommended to remind staff of permit requirements. Training topics should include techniques for identifying illicit discharges and connections, including field observations, field screening and source investigation.

7.0 Suggested Resources

- Southeast Michigan Council of Governments IDEP Training 1 video
- Southeast Michigan Council of Governments IDEP Training 2 video
- The U.S. Environmental Protection Agency's Illicit Discharge Detection and Elimination Manual
- Minnesota Pollution Control Agency Illicit Discharge IDDE - YouTube



ATTACHMENT A

Municipal Separate Storm Sewer System (MS4) Program

Dry Weather Screening – Example Field Form

General Information

Date(s): _____

Structure ID: _____

GPS Coordinates/Address: _____

Inspector(s): _____

Pipe Size: _____

Material

- ☐ Reinforced Concrete Pipe (RCP)
- ☐ Polyvinyl Chloride (PVC)
- ☐ Steel
- ☐ High Density Polyethylene (HDPE)
- ☐ Other: _____

Weather

- ☐ Sunny
- ☐ Rainy
- ☐ Overcast
- ☐ Snow

Last Rain Event

- ☐ 48-72 Hours
- ☐ >72 Hours

Field Observations

Dry Weather Flow

- ☐ No
- ☐ Yes, Constant
- ☐ Yes, Intermittent
- ☐ Trace, Insufficient flow to sample
- ☐ Submerged

Color

- ☐ Clear
- ☐ Brown
- ☐ Gray
- ☐ Other _____

Vegetation

- ☐ None
- ☐ Algae
- ☐ Slime

Structure Condition

- ☐ Good
- ☐ Fair
- ☐ Poor

Sediment Accumulation

- ☐ No
- ☐ Yes
- ☐ Needs Cleaning

Floatables

- ☐ Sewage
- ☐ Suds
- ☐ Petroleum Sheen
- ☐ Bacterial Sheen
- ☐ Trash
- ☐ None
- ☐ Other _____

Odor

- ☐ Sewage
- ☐ Petroleum
- ☐ Detergent
- ☐ Rotten Egg
- ☐ None
- ☐ Other_____

Field Screening

Date(s): _____

Parameters	Action Level	Results
☐ **pH**	<6.5 or >9.0	
☐ **Temperature**	N/A	
☐ **E. coli**	>1,000 cts/100ml	
☐ **Ammonia**	>1.0 mg/l	
☐ **Surfactants**	>0.5 mg/l	
☐ **Other** _____		
☐ **Other** _____		

Source Investigation

Sewershed Investigation Conducted: ☐ Yes ☐ No

Land Use Type: ☐ Residential ☐ Commercial ☐ Industrial

Televised Investigation Conducted: ☐ Yes ☐ No

Dye Test Conducted (**Note:** Inform EGLE-WRD if performing dye testing): ☐ Yes ☐ No

Further Investigation Required: ☐ Yes ☐ No

Illicit Discharge Identified: ☐ Yes ☐ No

Date Identified: _____

Date Responsible Party Notified: _____

Date Elimination Required: _____

Date Eliminated: _____

Illicit Connection Identified: ☐ Yes ☐ No

Date Identified: _____

Date Responsible Party Notified: _____

Date Elimination Required: _____

Date Eliminated: _____

Enforcement Action Taken: ☐ Yes ☐ No

Summary:

Sample Collection Equipment and Methods

Sampling Equipment/Supplies

- Gloves
- Cooler
- Sample Bottles [obtained from laboratory]
- Wide Neck Plastic Bottles [for field screening]
- Pen/marker
- Sample collection dipper [stick with cup on the end to collect sample]
- Distilled Water [to rinse sample collection dipper between samples]
- String
- Ice, if collecting samples to be analyzed at a laboratory
- Chain of Custody form [from lab]
- Garbage Bag
- Flashlight
- Field form
- Sewer hook [to open sewer cover]

Collecting Samples

Collecting samples and analyzing them for certain parameters is useful to narrow down the type and source of illicit discharge. Samples may be collected and analyzed using field test kits or taken to a laboratory for analysis. Field test kits are a useful tool while in the field conducting a source investigation. If field test kits are used, ensure that probes are calibrated per the manufacturer's guidelines. Having samples analyzed by a laboratory may provide a more accurate result, and laboratories can test for additional parameters such as *E. coli*.

Sampling Methods

The following describes different sample collection methods that may be used to collect dry weather screening samples.

Sample Collection Dipper

There is some variety in sample collection dippers. Most dippers include an extendable handle with a cup attached to the end. Some collection dippers allow the sampler to attach a bottle at the end in lieu of an attached cup.

When collecting a sample, the sampler should collect the sample from the flowing outfall/point of discharge and avoid collecting a sample of stagnant water. The sample can then be transferred into the appropriate sample containers.

If using a dipper with an attached cup at the end, the cup must be decontaminated prior to the collection of additional samples. This may be accomplished by rinsing the cup with distilled water.

Bottle on String Collection

Secure string around the bottle. Remove the cap of the bottle, do not place the bottle cap on the ground. Lower the bottle into the storm structure. The sample should be collected from the flowing outfalls/point of discharge. Avoid collecting a sample of stagnant water. Retrieve the sample bottle and place the cap on bottle. If the bottles contain preservative, collect the sample in a plastic bottle, once the sample is collected pour the sample into the correct sample bottle.

Bottle in Hand Collection

The sampler should remove the cap of the bottle with one hand while holding the sample bottle with the other, do not place the bottle cap on the ground. The bottle should be placed in the flow and filled to the mark on the bottle. If the bottles obtained from the laboratory come pre-preserved, take care to avoid overfilling the bottle. Once the sample is collected, the cap should be secured on the bottle.

PRIOR TO COLLECTING SAMPLES

- Contact the laboratory to discuss hold times and to order bottles. A list of certified laboratories can be found on EGLE's Laboratory Certification Program Website.
- Review manufacturer's guidance on any field test kits you'll be using.
- Review maps of the storm sewer system.
- Review past weather to ensure there has been no precipitation in the last 48-72 hours.

Field Test Kit Samples

1. Gather all equipment that will be used. It may be beneficial to designate a field sampling bag.
2. Determine how best to collect a sample. [Sample collection dipper, bottle on string collection, bottle in hand collection.]
3. Label the sample bottles with a waterproof marker or pen [sample ID, date, time etc.]
4. Put on gloves. A new pair of gloves should be worn for each sample collected.
5. Open bottle, collect sample, and replace the cap. The sample should be collected from the center of the observed flow. Do not sample stagnant water. Note: a new sample bottle should be used for each sample collected. Do not reuse bottles.

6. Follow the directions in the field test kits. If using probes, ensure the probes are rinsed between samples.
7. Dispose of sample and bottle.

Laboratory Samples

1. Gather all equipment that will be used. It may be beneficial to designate a field sampling bag.
2. Determine how best to collect a sample. [Sample collection dipper, bottle on string collection, bottle in hand collection.]
3. Label the samples bottles with a waterproof marker or pen [sample ID, date, time etc.]
4. Put on gloves. A new pair of gloves should be worn for each sample collected.
5. Open bottle, collect sample, and replace the cap. The sample should be collected from the center of the observed flow, do not sample stagnant water.
6. Place sample in cooler with ice.
7. Fill out chain of custody.
8. Take to laboratory. Be sure to discuss hold times with the laboratory. Not every laboratory accepts *E. coli* samples on Fridays.