

Mount Joy Township Illicit Discharge Detection and Elimination (IDDE) Program Manual

PAG133578

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Background

Mount Joy Township (MJT) is a second-class township located in northwestern Lancaster County. Most of the Township's storm sewer infrastructure is situated within the right-of-way of the 65+ miles of roads owned and maintained by the Township. MJT maintains an inventory of storm sewer system assets and stormwater BMPs in the CS Datum and QGIS computer databases. An initial digitization was performed as part of MJT's Notice of Intent for an MS4 NPDES permit in 2017. We update the asset database when storm sewer infrastructure is replaced or added, and when private stormwater BMPs are constructed.

MJT contains three HUC-12 watersheds: Chiques Creek (including the Donegal Creek and Little Chiques Creek subwatersheds), Conewago Creek, and Conoy Creek. The Township's Pollutant Reduction Plan produced two maps detailing these areas and the generalized land cover of the 74 delineated storm sewer sheds (SSS) located within the regulated municipal separate storm sewer system (MS4) area. The number and size of the 74 SSS are categorized by watershed below:

HUC-12 Watershed	# of SSS	Total SSS Area (Acres)
Chiques Creek	35	327.60
Conewago Creek	10	146.12
Conoy Creek	29	295.87

Pennsylvania's GP-13 (MS4 NPDES permit) authorizes stormwater discharges from an MS4 to surface waters. GP-13 permit holders must create and implement a Stormwater Management Program (SWMP) and its six minimum control measures, or MCMs. MCM #3 requires permit holders to "develop, implement and enforce a program to detect and eliminate illicit discharges

into the permittee's regulated small MS4." In the regulatory sense, the GP-13 defines an illicit discharge as...

any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except non-stormwater discharges as described in the "Discharges Authorized by this General Permit" section of this General Permit.

Examples of illicit discharges include dumping of motor vehicle fluids, household hazardous wastes, grass clippings, leaf litter, animal wastes, or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-stormwater waste into a municipal separate storm sewer system. Illicit discharges can be accidental or intentional.

The following discharges are authorized by the GP-13 as long as they do not cause or contribute to pollution:

1. Discharges or flows from firefighting activities.
2. Discharges from potable water sources including water line flushing and fire hydrant flushing, if such discharges do not contain detectable concentrations of Total Residual Chlorine (TRC).
3. Non-contaminated irrigation water, water from lawn maintenance, landscape drainage and flows from riparian habitats and wetlands.
4. Diverted stream flows and springs.
5. Non-contaminated pumped ground water and water from foundation and footing drains and crawl space pumps.
6. Non-contaminated HVAC condensation and water from geothermal systems.
7. Residential (i.e., not commercial) vehicle wash water where cleaning agents are not used.
8. Non-contaminated hydrostatic test water discharges, if such discharges do not contain detectable concentrations of TRC.

The Center for Watershed Protection (CWP) created *Illicit Discharge Detection and Elimination: A Guidance Manual* in October 2004 as a foundational resource for municipal IDDE programs. This manual, in conjunction with the GP-13 requirements, serves as the basis for our program. The CWP manual established a four-part definition for illicit discharges that supplements the GP-13's definition:

1. Illicit discharges are defined as a storm drain that has measurable flow during dry weather containing pollutants and/or pathogens. A storm drain with measurable flow but containing no pollutants is simply considered a discharge.
2. Each illicit discharge has a unique frequency, composition and mode of entry in the storm drain system.

3. Illicit discharges are frequently caused when the sewage disposal system interacts with the storm drain system. A variety of monitoring techniques is used to locate and eliminate illegal sewage connections. These techniques trace sewage flows from the stream or outfall, and go back up the pipes or conveyances to reach the problem connection.
4. Illicit discharges of other pollutants are produced from specific source areas and operations known as “generating sites.” Knowledge about these generating sites can be helpful to locate and prevent non-sewage illicit discharges. Depending on the regulatory status of specific “generating sites,” education, enforcement and other pollution prevention techniques can be used to manage this class of illicit discharges.

The Desktop Assessment

The CWP manual established a five-step desktop assessment of illicit discharge potential for MS4s. This assessment is used to guide program decisions such as the frequency of outfall monitoring based on risk potential within an SSS, which is assessed in terms of illicit discharge potential, or IDP. Areas of high IDP per a pre-defined set of criteria are subject to dry weather field screening of outfalls for non-stormwater flows and sampling of dry weather discharges for chemical and biological parameters.

Key objectives of the desktop assessment are:

- Screen problem catchments/subwatersheds
- Create a GIS or other database system to track outfalls
- Gain an overall assessment as to the severity of illicit discharge problems in the community
- Generate basic mapping for subsequent field work

Step 1: Delineate Subwatersheds

The Township’s SSS were originally delineated in the preparation of supporting documentation for the Township’s MS4 permit application in 2017. Several areas were added or modified in a May 2019 update, bringing the total SSS to 74. Each SSS was delineated by modeling the catchment areas that drain to the swales, inlets, and storm pipes connected to an outfall. No new subwatersheds or substantial infrastructure has been added to the municipal system since then. Therefore, those 74 SSS are the basis for this analysis. Eight map panels are included in this document, illustrating the storm sewer infrastructure inventoried throughout the Township. These panels coincide with the maps included in the MS4 permit submission, though the content has been updated. The infrastructure is color-coded by ownership: Mount Joy Township (including jointly owned by the Township), PennDOT, or private. The drainage areas of the 74 regulated outfalls are contained in panels 1, 3, 4, and 8.

Step 2: Inventory Storm Sewer Assets

Storm sewer system assets such as inlets, pipes, swales, and stormwater BMPs are managed in the CS Datum system. CS Datum is a user-friendly, browser-based asset management program that allows Township personnel to access information at the desk and in the field. This platform also enables personnel to report outfall screening findings directly into the database from the field via connected device. Its questionnaire format is easy to use and feeds DEP’s standardized “MS4 Outfall Field Screening Report” for easy inclusion in the Township’s annual report to the Commonwealth. Assets digitized into CS Datum are exported as shapefiles for use in MJT’s GIS database to create maps and perform other analysis in conjunction with other publicly available base mapping data.

Step 3: Compute Discharge Screening Factors

The CWP manual recommends using ten screening factors to identify which SSS have high IDP. Our program uses nine of the ten since the factor related to combined sewer systems is not applicable to MJT.

Discharge Screening Factor	Description	MJT GIS Field
Past Discharge Complaints and Reports	High frequency of discharge complaints or spill responses	INCIDENT
Poor Dry Weather Water Quality	2 or more samples/year exceeding benchmark values for bacteria, nutrients, conductivity, or other predetermined indicators	DRY_QUAL
Density of Generating/Industrial NPDES Sites	Greater than 10 generating sites or 5 industrial NPDES stormwater sites per sq. mi	IND_DSCH
Outfall Density	Greater than 20 outfalls per stream mile	DENSITY
Age of Development	Majority of development older than 50 years	OLD_DEV
Sewer Conversion	Septic systems connected to sanitary sewer within last 30 years	SWR_CONV
Presence of Older Industrial Operations	5% of area occupied by industrial sites more than 40 years old	OLD_IND

Discharge Screening Factor	Description	MJT GIS Field
Aging or Failing Sewer Infrastructure	Sewer age exceeds design life or clusters of pipe breaks, spills, overflows, I/I are reported	OLD_SWR
Density of Aging Septic Systems	Greater than 100 septic drain fields per sq. mi.	SEPTIC

Step 4: Screen for High IDP Areas

We analyzed the drainage areas of the 74 regulated outfalls with GIS, resulting in the identification of 5 high-IDP SSS. At least one discharge screening factor was identified as present in the following SSS:

SSS#	Screening Factor
021	Older Industrial Operations
022	Older Industrial Operations
206	Aging Septic Systems
208	Aging Septic Systems
209	Aging Septic Systems

Step 5: Provide Maps to Support Field Investigations

Township personnel performing field investigations have access to paper and/or electronic map formats to locate outfalls, observation points, and their drainage systems. MCM #3, BMP #2 lists the following features required to be on our system maps:

- Municipal boundary
- Urbanized (regulated) area boundary
- Location of outfalls and/or observation points
- Locations and name of all surface waters that receive discharges from outfalls

The collection of 8 map panels depicts the Township’s storm sewer assets, both inside and out of the regulated areas, as specified in MCM #3, BMP #3. The permit also requires us to inventory and show “privately-owned components of the collection system where conveyances or BMPs on private property receive stormwater flows from upstream publicly-owned components.” MJT’s inventory includes and differentiates between elements owned by the Township, the Commonwealth, or private parties. Required storm sewer features include:

- Roads
- Inlets
- Piping
- Swales

- Catch basins
- Channels
- Any other components of the storm sewer collection system

Although these maps have been created for regulatory compliance, CS Datum is a more valuable resource in the field because of its interactivity. Storm sewer infrastructure is depicted with base mapping such as aerial imagery and property lines that can make locating these features easier. Standard protocol for field investigations requires personnel to have access to CS Datum via smartphone, tablet, or other connected device. A PDF version of the system maps should be stored on the tablet/device to supplement the CS Datum platform.

Field Screening

MCM #3, BMP #4 specifies an outfall screening schedule based on location and IDP. New permittees like MJT must screen all regulated outfalls at least twice within the current five-year permit cycle. Additionally, the Township is obligated to respond to reports of suspected or confirmed illicit discharges associated with the storm sewer system. For this initial cycle, the 74 outfalls are split into two sections so each outfall can be screened twice in the 2020-2023 period. The 5 high-IDP outfalls are denoted with an asterisk and will be screened annually.

Years 2020 & 2022		Years 2021 & 2023	
021*	018	021*	117
022*	019	022*	118
206*	020	206*	119
208*	025	208*	120
209*	026	209*	121
001	027	101	122
002	028	102	123
003	029	103	124
004	030	104	125
005	031	105	126
006	032	106	127
007	033	107	128
008	034	108	129
009	301	109	201
010	304	110	202
012	305	111	203
013	306	112	204
014		113	205
015		114	207
016		115	210
017		116	

Regular Screening Protocol

Whether performing a scheduled outfall screening or investigating an illicit discharge complaint, Township personnel will use PaDEP's *MS4 Outfall Field Screening Report* worksheet to report observations and test results. CS Datum allows the user to input information and observations directly into DEP's standard reporting form through the menu-based interface. A field inspection is initiated by selecting the outfall on the map screen or outfall table. The location, pipe specifications, and baseline information for each outfall is pre-populated with existing data. On-site observations like weather conditions and characteristics of dry weather flow are entered directly into the device. If dry weather flow is observed existing an outfall or observation point, sampling should take place in accordance with the testing procedures below. Any discharge consisting of very high turbidity or strong odors and colors should also be sampled. If a screening is conducted without a device utilizing CS Datum, personnel must document their observations directly onto the *MS4 Outfall Field Screening Report*.

Regular Dry Weather Field Screening Protocol

Dry weather field outfall screening shall occur on an annual basis in accordance with the table above. All high-IDP outfalls are screened annually and the remaining outfalls are screened in alternating years. The CWP manual recommends conducting dry weather inspections under the following conditions:

- During dry season and leaf off conditions
- After a dry period of at least 48 hours
- Low groundwater levels

Furthermore, MCM #3, BMP #4(3) specifies that the discharge shall be sampled if it exhibits any of the following characteristics:

- Color
- Odor
- Floating solids
- Scum
- Sheen
- Substances that result in deposits
- Turbidity
- Other apparent pollutants

Sample Testing

If an outfall discharge exhibits any of the above characteristics, two samples must be gathered in sterilized containers. One of the two samples will be evaluated at the municipal facility. The LaMotte StormWatch Drain Monitoring Kit and ammonia testing strips allow us to test for

seven parameters. The table below lists them and the “action level” at which the parameter exceeds acceptable tolerances. Results from these tests will be entered into the field screening report. This report will be included in the Township’s MS4 Annual Report to DEP.

Parameter	Action Level
Total Residual Chlorine	≥ 0.3 ppm
Copper	≥ 0.5 ppm
Phenols	≥ 1.0 ppm
Turbidity	Medium-high or higher
Detergent	≥ 0.4 ppm
pH	< 6 or > 9
Ammonia-Nitrogen	10 mg/L

Investigating Illicit Discharges

Outfall screening is a systematic method to help identify and eliminate ongoing or recurring illicit discharges. However, the system employs either annual or bi-annual inspections that most likely will not catch isolated incidents. The Township has an obligation to investigate reports of dry weather flows or an apparent illicit discharge through the Township storm sewer system. These complaints may be generated by the general public or Township personnel. Complaints can be filed in person, by phone or email, or via the instructions found on our website, mtjoytwp.org.

A complaint will be logged into the Township database and investigated as soon as possible, with higher priority given to imminent threats to surface water quality (e.g. reports of sewage, chemicals, discoloration in the flow, or the presence of automobile fluids resulting from an accident). From there, personnel should undertake a storm drain network investigation.

Storm Drain Network (“Trunk”) Investigations

The purpose of a trunk investigation is to narrow down the source of a discharge to a specific segment of the storm sewer system draining to an outfall. Our mapping initiative is critical in supporting these investigations and subsequent pollution eliminations. Three options are set forth by the CWP manual with a decision-making framework to guide Township personnel:

- *Work progressively up the trunk from the outfall and test manholes along the way*

- *Split the trunk into equal segments and test manholes at strategic points of the storm drain system*
- *Work progressively down the trunk (i.e., from the headwaters of the storm drain network and move downstream)*

The decision to move up, split, or move down the trunk depends on the nature of the drainage system and the surrounding land use. The three options also require different levels of advance preparation. Moving up the trunk can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Splitting the trunk requires a little more preparation to examine the storm drain system and find the most strategic manholes to sample. Moving down the trunk requires even more advance preparation, since the most upstream segments of the storm drain network may be poorly understood.

A desktop analysis of land use and parcel configuration within an outfall's drainage area is a reasonable precursor and/or follow-up to the trunk investigation. This supplemental information can prove useful for the investigators and is also accessible in the field through the CS Datum application.

Elimination of Illicit Discharges

MCM #3, BMP #4 requires the Township to take enforcement action upon the discovery and/or confirmation of the presence of an illicit discharge. Again, we turn to the CWP manual on how to proceed with eliminating the pollutants. It suggests these four questions to determine how to proceed:

- Who is responsible?
- What methods will be used to repair?
- How long with the repair take?
- How will removal be confirmed?

Table 26 of the CWP manual is a concise matrix of response actions based on the above questions and resultant answers:

Table 26: Methods to Fix Illicit Discharges		
Type of Discharge	Source	Removal Action(s)
Sewage	Break in right-of-way	Repair by municipality
	Commercial or industrial direct connection	Enforcement
	Residential direct connection	Enforcement; Incentive or aid
	Infrequent discharge (e.g., RV dumping)	Enforcement; Spill response
	Straight pipes/septic	Enforcement; Incentive or aid
Wash water	Commercial or industrial direct connection	Enforcement; Incentive or aid
	Residential direct connection	Enforcement; Incentive or aid
	Power wash/car wash (commercial)	Enforcement
	Commercial wash down	Enforcement
	Residential car wash or household maintenance-related activities	Education
Liquid wastes	Professional oil change/car maintenance	Enforcement; Spill response
	Heating oil/solvent dumping	Enforcement; Spill response
	Homeowner oil change and other liquid waste disposal (e.g., paint)	Warning; Education; Fines
	Spill (trucking)	Spill response
	Other industrial wastes	Enforcement; Spill response

Article VIII of the Mount Joy Township Stormwater Management Ordinance (Chapter 113 of the Township’s Code of Ordinances) prohibits various connections to the municipal storm sewer system. It also prohibits certain discharges into the system, which are illicit discharges under the scope of the ordinance. Article IX provides the Township the authority to enforce the ordinance and compel corrective actions to eliminate illicit discharges from the system and waterways in general. This authority, in conjunction with all recorded stormwater management easements granted to the Township allows us to access property containing storm sewer infrastructure and illicit discharge sources. As a rule of thumb, investigations will use the public rights-of-way as much as possible before entering private property.