



WILLIAM & MARY

CHARTERED 1693

Office of the Associate Vice President for Facilities Management
P.O. Box 8795
Williamsburg, VA 23187-8795
(757) 221-2275

DIRECTIVE 764

TITLE: Storm Water Outfall Inventory and Dry Weather Screening (DWS) Inspection

EFFECTIVE DATE: April 12, 2016

REVISION OF: First Edition

I. SCOPE:

This directive applies to all members of the Facilities Management Department.

II. PURPOSE:

The purpose of this directive is to establish a standard operating procedure for storm water outfall inventory and dry weather screening (DWS) inspections.

III. POLICY:

Background

1. Provisions of the federal Clean Water Act (CWA) (33 USC § 1251 et seq.) require NPDES permits for storm water discharges from small MS4 operators. The Commonwealth of Virginia has issued coverage for the College of William and Mary under General Permit No. VAR040039 (General Permit for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems) effective for the period beginning July 1, 2013 through June 30, 2018.
2. The General Permit requires the College to “maintain an accurate storm sewer system map and information table” and “within 48 months of coverage under this state permit... complete an updated storm sewer system map and information table that includes all MS4 outfalls located within the boundaries...”
3. The General Permit also requires the College to “develop, implement, and update, when appropriate, written procedures to detect, identify and address unauthorized non-storm water discharges, including illegal dumping, to the small MS4. These procedures shall include... written dry weather field screening methodologies... that provide... the minimum number of field screening activities the operator shall complete annually.”
4. Outfall inventory and screening is an important part of an Illicit Discharge Detection and Elimination (IDDE) program. A good inventory and regular monitoring of the outfalls can help with source tracking of illicit discharges. It

can help target areas that would benefit from public outreach and education initiatives.

5. The policy of the College of William and Mary is to administer an illicit discharge detection and elimination (IDDE) program that complies with General Permit No. VAR040039.
6. This document is intended for use as a field guide and contains detailed instructions and sampling procedures. It describes the sampling procedures, schedule, lists the responsibilities of field personnel, and describes QA/QC procedures to be followed. Personnel are not required to memorize this document but rather to use it as a field reference guide.

Definitions

1. National Pollutant Discharge Elimination System (NPDES), means the federal program administered by the Environmental Protection Agency (EPA) for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing state permits, and imposing and enforcing pretreatment requirements under §§ 307, 402, 318, and 405 of the CWA. The term includes an approved program.
2. Virginia Pollutant Discharge Elimination System (VPDES) permit means a document issued by the State Water Control Board pursuant to the State Water Control Law authorizing, under prescribed conditions, the potential or actual discharge of pollutants from a point source to surface waters.
3. DEQ means the Commonwealth of Virginia Department of Environmental Quality, which is the administrative department overseen by the State Water Control Board. The College of William and Mary is served by the DEQ Tidewater Regional Office (DEQ-TRO), 5636 Southern Blvd, Virginia Beach, VA 23462; phone (757) 518-2000.
4. Municipal Separate Storm Sewer System (MS4), means all separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems or designated under 9VAC25-870-380 A 1.
5. Storm Sewer System means all facilities, structures and natural watercourses used for collecting and conveying storm water to, through and from drainage areas to the points of final outlet including, but not limited to the following: Streets, curbs and gutters, inlets, conduits and appurtenant features, canals, creeks, channels, catch basins, ditches, drains, sewers, streams, gulches, gullies, flumes, culverts, siphons, retention or detention basins, dams, floodwalls levees, pumping stations and wetlands.
6. Discharge means to dispose, deposit, spill, pour, inject, dump, leak or place by any means, or that which is disposed, deposited, spilled, poured, injected, dumped, leaked or placed by any means.
7. Illicit Discharge means any discharge to a MS4 that is not composed entirely of storm water, except discharges pursuant to a separate VPDES or state permit (other than the state permit for discharges from the municipal separate storm

sewer), discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3). The following non-storm water discharges are not considered illicit discharges:

- a. Water line flushing;
 - b. Landscape irrigation;
 - c. Diverting stream flows or rising groundwater;
 - d. Public safety activities, including, but not limited to, law enforcement and fire suppression;
 - e. Pumping of uncontaminated groundwater from potable water sources, foundation drains, irrigation waters, springs, or water from crawl spaces or footing drains;
 - f. Lawn watering and maintenance with lawn chemicals in accordance with manufacturer's recommendations;
 - g. Individual car washing on residential properties;
 - h. Street washing;
 - i. Uncontaminated condensate water;
 - j. De-chlorinated swimming pool discharges; or
 - k. Any activity authorized by a valid Virginia Pollutant Discharge Elimination System (VPDES) permit or Virginia Pollution Abatement (VPA) permit.
8. Outfall means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

IV. Process

Health and Safety Considerations

SAFETY IS ALWAYS THE PARAMOUNT CONSIDERATION. IF YOU HAVE CONCERN THAT A SITUATION IS UNSAFE, DO NOT PUT YOURSELF INTO THAT SITUATION. CONTACT A SUPERVISOR AND ASK FOR ASSISTANCE.

1. Sampling

- a. Storm water sampling is sometimes conducted in areas where safety hazards exist. Sampling personnel must always be aware of possible hazards and must take the necessary precautions to avoid dangerous situations. Some of the more common hazards are discussed below.
- b. Protection from Traffic. If the sample is collected from a manhole, drop inlet or gutter in a street, traffic control is an important consideration. Vehicles should be parked between the working area and oncoming traffic and flashing warning lights activated. Personnel should wear approved safety vests when drainage structures are located in a vehicular traffic area. Cones and flags may be utilized where appropriate.

- c. Samples should be obtained from drainage structures as quickly as possible. Sampling crews should replace the structure cover or grate and move vehicles and equipment to a location off the street. All sample analyses should be performed in a safe location away from the vehicular traffic area.
- d. Confined Space Entry. Manholes and enclosed storm drains may be considered confined spaces. Confined space procedures should be followed prior to entry.
- e. Removing Manhole Covers and Grates. Manhole covers and grates should be carefully removed using appropriate equipment provided. Hands and feet should not be used to assist in either opening or closing drainage structures.
- f. Emergencies. Every member of the investigating crew must be aware of procedures to be followed in case of an emergency. All field personnel should have a list of emergency telephone numbers, including the local hospital's general emergency number. All injuries and other problems should receive immediate medical attention and should also be reported as soon as practical to the field supervisor.
- g. Hazardous Waste Streams. Storm sewers may receive industrial wastes that contain corrosive or toxic materials. Skin contact with a waste stream must be avoided and long-handled samplers must be used for sampling. Field personnel should always be aware of possible hazards and take all necessary precautions to insure safety.
- h. Animals. A wide variety of animals, particularly insects and rodents, may inhabit drainage structures or sampling sites. Field personnel should always be on the lookout for these creatures to avoid painful and dangerous bites or stings. These hazards may include snakes. Field personnel must wear boots while investigating to minimize exposure to snake bites.
- i. Infection. Investigating personnel are always exposed to the possibility of infections. Disposable rubber gloves should be used to avoid skin contact with the waste stream. Personnel should wash their hands or use the provided hand sanitizer as required. Open cuts or sores should never be allowed to be exposed to a waste stream.

2. Surroundings

- a. Take care to notice your surroundings when inspecting a site that is away from the road or in the woods. Be on the lookout for overhead hanging limbs, barbed wire fences, animals, loose ground, rip-rap, fallen trees, or any other potential dangers.

3. Sample Analysis

- a. During sample analysis, sampling personnel should avoid any internal or external contact with chemicals and reagents included in the sampling kit. Skin and eyes may become irritated if exposed to the chemicals. Each member of the sampling team should wear protective safety goggles and disposable rubber gloves while performing the analyses. If exposure does occur, large amounts of water should be used to flush the exposed area and emergency procedures of the sampling kit manufacturer followed.
 - b. Sample analysis should be performed in a well-ventilated area to avoid inhalation of chemical fumes. Specific first aid instructions for each sampling procedure are listed on the materials safety data sheets included in the sampling kit.
4. First Aid
 - a. Field personnel should know first aid procedures and, if possible, one person in any crew should remain in a safe location during the course of the work. Included in first aid training should be procedures for resuscitation.
 - b. All field personnel should know at least the basics of first aid. A first aid kit will be provided to each sampling team. The supervisor will be available via phone, radio or some type of communication device and should be contacted in the event of a serious injury.
 5. Accident Reports
 - a. Reports should be filled out on all accidents regardless of the extent of the injury. In this way, conditions that cause repeated injuries may be isolated and corrected.

Equipment Preparation

1. Camera
2. Cell phone
3. Personal Protective Equipment, dictated by job being performed.
 - a. Gloves
 - b. Safety glasses
 - c. Boots
4. Test Kit
5. Thermometer
6. Sampling Bottles
7. Container of pre-determined volume (5 gallon bucket or 1 liter bottle)
8. Stop Watch
9. Tape Measure
10. Bottle of Deionized Water for rinsing sampling equipment.

11. Paper Towels
12. Bag/ Container for Trash
13. Outfall Inventory/ Sample Collection Field Sheet

Inspection Procedure

1. Scheduling
 - a. W&M has 57 outfalls within its MS4 permit area. All 57 outfalls shall be inspected annually. The list of outfalls and a location map is stored in the MS4 Permit Reporting Database maintained by the Director of Operations & Maintenance
 - b. The inspections should normally commence in May of each year and be completed by August
 - c. Outfalls should not be inspected if runoff-producing rainfall has occurred within the previous 48 hours.
2. In-office preparation
 - a. Identify and prepare maps and field sheets for the locations to be inspected.
 - b. Note location of access to outfall site and gather any necessary safety gear.
 - c. Prepare the field sheets and record as much of *Section 1: Background Data* as possible.
 - i. Accurate weather information is available from <http://www.weather.gov/>.
 - ii. Land Use information can be gathered from GIS drainage area maps available for each outfall.
 - d. Gather and calibrate all necessary equipment.
 - e. Charge batteries for all powered equipment.
3. Outfall Reconnaissance
 - a. Upon arriving at the site complete the remaining information in *Section 1: Background Data*.
 - b. Complete *Section 2: Outfall Description*. (ie. closed or open conveyance, material, shape, and dimensions). Determine whether flow is present. If flow is present, a sample needs to be taken, otherwise skip sampling and proceed to Step 6.5.
 - c. If flow is present sampling shall be conducted per Section 6.4. Sampling shall be conducted immediately if possible but no later than 24 hours after detection of a potential illicit discharge. If multiple illicit discharges are suspected, discharges suspected to be sanitary sewage or other significant contaminants shall be given a higher priority than less hazardous discharges such as non-contact cooling water or wash water.
4. Sampling

- a. Complete *Section 3: Quantitative Characterization*. Section 3 is for collection of quantitative characteristics such as flow, temperature, pH, ammonia concentration, and chlorine presence as noted on the field sheet.
 - i. Measurements for computing flow should be written down independently and not calculated in the field.
 - ii. Flow from a pipe outlet can be measured by determining the time it takes to fill a predetermined volume of a container. Care must be taken that all flow enters the container and accuracy of the timing. Timing should be at least 30 seconds to minimize errors in this procedure.
 - iii. Flow in a channel or open pipe may be determined by multiplying the velocity of the flow and the cross-sectional area. Use a tape measure to accurately determine the area based on depth, top width, bottom width, or other appropriate dimensions. Velocity is determined by floating an object in the middle of the flow stream and timing its passage over a predetermined distance. Measurement lengths should be relatively straight and free of debris or obstructions. A minimum of 10 feet is recommended to minimize errors in this procedure.
 - iv. Temperature measurement should be taken as near to the center of the flow as possible and of a minimum duration as recommended by the thermometer manufacturer.
 - v. Chemical testing shall follow manufacturer's instructions included in the sampling kit.
 - b. Complete *Section 4: Physical Indicators for Flowing Outfalls Only*. Note physical indicators of an illicit discharge for flowing outfalls such as odor, color, turbidity, and floatables. Provide rating of 1-3 as described under *Relative Severity Index*.
5. Infrastructure and IDDE Assessment
- a. Complete *Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls*. Assess the outfall for physical indicators of an illicit discharge (e.g. Outfall damage, deposit stains, abnormal vegetation, poor pool quality, pipe benthic growth, and sediment accumulation).
 - b. Complete *Section 6: Overall Outfall Characterization*. Provide overall opinion of illicit discharge activity based upon sampling results and physical indicators. An indication of "Suspect" or "Obvious" should be reported immediately to the Director of Operations & Maintenance (221-1205) and the Director of Environmental Health & Safety (221-2146) to be investigated.
 - c. Complete *Section 7: Data Collection*. Note whether a sample was collected, whether it was collected from flow or pool, and for what it will be tested.
 - d. Complete *Section 8: Any Non-Illicit Discharge Concerns*. Note any other concerns such as necessary repairs or trash at outfall or potential problems including:

- a. Incised channels or 'head cuts';
- b. Any structural problems such as cracked, missing, or broken components;
- c. Trees growing close to or over pipes;
- d. Little or no outlet protection (rip-rap);
- e. Erosion at outlets that could lead to broken pipes or could indicate a cave in; and
- f. Accumulation of sediment, vegetation, or other debris that could clog the outfall in the near future.

6. Final cleanup

- a. Wipe any test equipment that was in contact with the flow with paper towel and rinse with deionized water.
- b. Place used test strips and paper towels in trash bag and leave the site in as good or better condition than at arrival.

7. Determining the source of an Illicit Discharge

- a. If inspection and sampling of an outfall confirms the presence of an illicit discharge, refer to Facilities Management Directive 762, Illicit Discharge Detection for guidance on determining the source of the illicit discharge.
- b. If an illicit discharge is found but within six months of the beginning of the investigation neither the source of the discharge has been found nor the same non-storm water discharge has been found this shall be documented in the MS4 Permit Reporting database and the MS4 annual report.
- c. If an illicit discharge is intermittent, a minimum of three separate investigations shall be conducted to determine the source. The results of these investigations shall be documented in the MS4 Permit Reporting database and the MS4 annual report.

8. Elimination of an Illicit Discharge

- a. The majority of the watershed that enters the W&M MS4 is controlled by W&M. Therefore, any source of illicit discharge falls within the legal authority of W&M to remedy. The Director of Operations and Maintenance is authorized and directed to ensure that all necessary actions are taken to eliminate the discharge. If the discharge was caused by an unlawful act (such as illegal dumping) the W&M Police Department shall be notified and will investigate.
- b. The College property is bordered by the City of Williamsburg and James City County. If the source is determined to be from outside the college property the Public Works Department of the applicable jurisdiction will be contacted to assist with resolution of the problem.

9. Follow-up Action on Illicit Discharge Remedy

- a. After the remedy of an illicit discharge, additional inspections shall be conducted on the effected outfall as required by the cause of the illicit discharge. The outfall will continue to be inspected as part of the annual inspection process.

Records

1. An MS4 Permit Reporting Database shall be maintained by the Director of Operations & Maintenance. It shall include at a minimum:
 - a. Outfall Inventory & Inspection Tracker
 - b. Dry Weather Screening Field Collection Sheets
 - c. Identified illicit discharge investigation information
 - d. Report of remedy and follow-up action of illicit discharges
2. Hard copy and/or digital scan
 - a. Maintain a hard copy (or scan) in a file maintained by Facilities Management Operations and Maintenance
 - b. Keep a hard copy of any correspondence in file.
 - c. Hard copy files to be retained for a minimum of 5-years from the date of testing. This period of retention shall be extended automatically during the course of any unresolved litigation regarding illicit discharges.

V. ATTACHMENTS:

1. Sample Dry Weather Screening Field Collection Sheet.

VI. APPROVAL, AMENDMENT, AND GUIDANCE:

This policy was approved by the Associate Vice President of Facilities Management. The Director of Operations & Maintenance interprets this policy and is directed to review this policy periodically to ensure continued effectiveness.



Van Dobson, P.E.
Associate Vice President
Facilities Management

