Illicit Discharge Detection and Elimination

FIELD GUIDE

For Elimination of Polluted Stormwater in Stormwater Systems

City of Hopewell, Virginia

JUNE 2015

ITEMS INCLUDED IN THIS GUIDE

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- Examples of what **IS** an Illicit Discharge (Polluted Stormwater)
- Illicit Connections
- Examples of what **IS NOT** an Illicit Discharge
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- Coordination of Actions Following Initial Field Review
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INTRODUCTION

The City of Hopewell, Virginia (City) is committed to ensuring that stormwater runoff from all its roadways and facilities comply with all federal and state environmental regulatory requirements.

Stormwater run-off is rainwater and melted snow that runs off the surface of streets, lawns, farms and construction and industrial sites. In undeveloped areas, much of the stormwater run-off is absorbed into the ground. That which is not absorbed by the ground ultimately flows into streams and rivers. Developed areas contain impermeable surfaces such as pavement and buildings that prevent stormwater from being absorbed into the ground, and thus increase stormwater runoff into storm drains, storm sewer systems and drainage ditches.

Excess stormwater run-off has the potential for causing infrastructure damage, downstream flooding and stream bank erosion. Also, metals, oils and grease, bacteria and other pollutants not filtered from the runoff can contaminate streams, rivers, wetlands, etc.

The Municipal Separate Storm Sewer System (MS4) Permit requires Hopewell to develop an Illicit Discharge Detection and Elimination (IDDE) program. The IDDE program must incorporate the following four elements:

- Develop an MS4 map showing the location of all outfalls: mapping to be completed by Central Office Maintenance Division;
- Develop and implement a plan to detect and address illicit discharges, including illegal dumping, to the Hopewell system;
- To the extent allowable under state law, prohibit illicit discharges into the MS4; and
- Inform public employees, businesses, and the general public of the hazards.

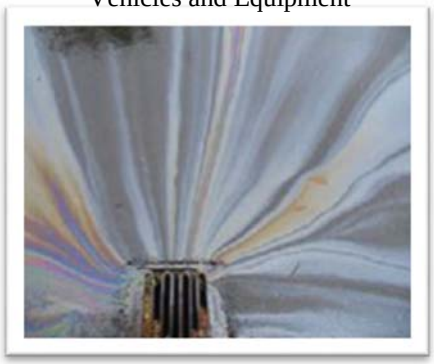
This IDDE Field Guide is designed to assist field personnel with detection, investigation and elimination of illicit discharges to Hopewell's regulated small MS4 and is designed to complement the Hopewell *Illicit Discharge Detection and Elimination Program Manual*. This guide describes conditions that personnel may encounter and actions they need to take, and it should be utilized in field operations.

EXAMPLES OF WHAT IS AN ILLICIT DISCHARGE

What is an Illicit Discharge?
An illicit discharge is defined in Hopewells's MS4 permit as "*any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a VPDES or VSMP permit (other than the VSMP 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).*"

Sanitary Stormwater from Showers, Sinks, etc.

Discharge of Oil, Fuel from Vehicles and Equipment



Grass Clippings and Leaves When Intentionally Blown into Drains

Solvents

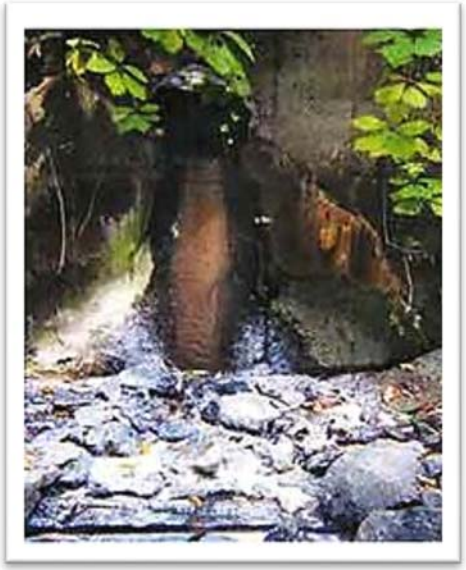
Cooking Oil and Grease

Cleaning Chemicals

Sediment

Improper Disposal of Radiator Fluid

Paints



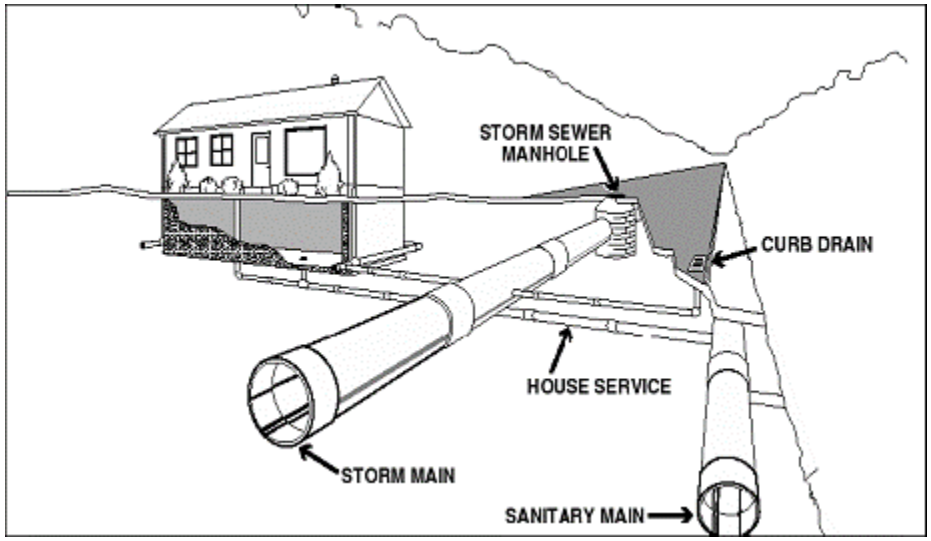
Non-residential Vehicle Wash Water

Mismanagement/Excess Road Salt

Illicit Connections

Illicit connections occur when drainage pipes or other conveyances are improperly connected to the storm drain system. These improper connections are often sources of illicit discharges. Examples include:

- A sewer pipe improperly connected to the storm sewer that is discharging raw sewage
- A shop floor drain that is connected to the storm sewer system
- A pipe from a residential household discharging gray water into storm drainage system



Unpermitted Cross-Connections

Unpermitted cross-connections are between the MS4 and sanitary sewer. Such connections increase the risk of introducing water polluted with human-related bacteria and other contaminants and are considered illicit discharges.

Sewer can be attached to pipes and manholes that were either not identified or mistakenly identified. These connections must be removed and proper connections made to ensure the integrity of the MS4.

EXAMPLES OF WHAT <u>IS NOT</u> AN ILLICIT DISCHARGE

Fire Fighting Activities

Agricultural Irrigation Water

Foundation/Footing Drains

Dechlorinated Swimming Pool Discharges

Landscape Irrigation and Lawn Watering

Water Line Flushing

EXAMPLES OF WHAT IS NOT AN ILLICIT DISCHARGE

Basement/Crawlspace Sump Pumps

Discharges from Potable Water Sources

Air Conditioning Condensation

Street Wash Water

Springs

Residential Car Wash Water

EXAMPLES OF WHAT IS NOT AN ILLICIT DISCHARGE

Other discharges not considered illicit discharges include:

- Uncontaminated groundwater infiltration,
- Uncontaminated pumped groundwater,
- Rising groundwaters,
- Flows from riparian habitats and wetlands, and
- Those discharges covered under a Virginia Pollution Discharge Elimination System (VPDES) or National Pollutant Discharge Elimination System (NPDES) permit;
- Fuel, oil or antifreeze spills related to a vehicular accident that is properly cleaned up through normal incident management practices are not considered an illicit discharge. Staff should nevertheless monitor the site during and/or after the incident to ensure that the cleanup is sufficient.
- Drums or other containers containing potentially hazardous materials that are found abandoned are considered unknowns or other potential hazardous materials cargo. Do **NOT** open containers. Contact your local hazardous material response team.

Are there any exceptions?

In the event that any of these activities are found to cause sewage, industrial wastes or other potentially significant sources of pollution to be discharged into the stormwater system, the source should be further investigated. The county or city having jurisdiction over the source shall be notified, as they have the authority to order the activity to cease.

ILLICIT DISCHARGE INITIAL FIELD REVIEW

The proper staff will conduct initial field reviews for potential illicit discharges. These assignments will be coded as Polluted Stormwater (IDDE).

Polluted Stormwater (IDDE) work orders are typically generated from one of the following sources:

1. **Staff or Citizens observe a suspect discharge and report it**
   - The proper staff will follow guidance to determine if a call needs to be routed to local HAZMAT or if it is considered an Illicit Discharge (ID).
   - The proper staff enters the information into the IDDE Tracking form.
   - Proper procedures are followed to track and eliminate the discharge.
   - Proper follow-up protocol are followed and documented to ensure that the ID was eliminated.

2. **Hopewell maintenance personnel observe an illicit discharge and report it to the City Engineer.**
   - The proper staff will follow guidance to determine if suspected ID need to be routed to local HAZMAT or if it is considered an Illicit Discharge (ID).
   - The proper staff enters the information into the IDDE Tracking form.
   - Proper procedures are followed to track and eliminate the discharge.
   - Proper follow-up protocol are followed and documented to ensure that the ID was eliminated.

Initial Field Review requires a site visit to determine if the condition described in the work order can be verified. The citizen or other reporting party should be contacted if the site location cannot be found, and in many cases, it may be advisable to meet them onsite. Many illicit discharges are intermittent and may not be present at the time of your visit, so the person may be capable of better isolating the time and circumstances surrounding the discharge they reported.

TECHNIQUES FOR CONDUCTING A FIELD INVESTIGATION

During field investigations, suspect discharges should be evaluated based on:

Odor

Odors may indicate an illicit discharge has occurred. The presence of sewage, sulfide, or rancid/sour odors may indicate the presence of wastewater in the system. Petroleum and chemical odors may indicate that a possible spill has occurred nearby.

Do not enter confined areas such as culverts, drop inlets, manholes or other enclosed areas to investigate the origin of odors. Gases may accumulate in these areas that can overcome the entrant.

Color

Certain water colors may also indicate the presence of an illicit discharge. Brown, gray, yellow, green, orange or red water should be noted. Water that is tinted brown may be due to the presence of naturally occurring tannins in the surrounding environment and may not be an illicit discharge. Turbid, cloudy water may indicate the presence of excessive siltation or other pollutants entering the stormwater.

Staining/Discoloration

The presence of stains or discoloration in or around an outfall may be signs that an illicit discharge is occurring or has occurred. Stains or discoloration often originate from natural sources, including water with high concentrations of iron or other minerals, lichen/fungi, and mineral deposits on stone or concrete.

Stressed/Dead Fish

Stressed or dead fish are a possible indication that an illicit discharge has occurred. A fish kill may be caused by naturally low dissolved oxygen levels during summer, or from lakes or streams freezing over during the winter. They can also be caused by diseases, overpopulation, or polluted runoff. Nevertheless, if multiple dead or stressed fish are observed, refer to the IDDE Central Office Team for further evaluation.

Other Observations

Containers, including drums and buckets may be found abandoned along the roadside. These containers may contain hazardous materials and should be avoided. Do **NOT** open containers. Contact your Regional Hazardous Materials Manager and/or the Transportation Operations Center for assistance.

Foam may be observed while performing an initial field review. Many instances of foam are natural; foam is produced when air is introduced to the water through stream turbulence, waterfalls or waves breaking on the shore. It can also occur from the natural breakdown of algae or other plant material. This natural foam may appear white at first, but will generally turn brown over time.

Natural foam in creek – not an illicit discharge

White foam in ditch – this is manmade in origin and is considered an illicit discharge

Foam that is white in color and has a sweet or scented odor is likely to be manmade. Examples of these include detergents, soaps, and shampoos. Always check the surrounding area for possible sources when foam is observed.

When disturbed, an organic sheen will crack and break into many small platelets.

Sheen

The appearance of a sheen can result from the presence of naturally occurring bacteria or petroleum contamination. The sheen's origin can be determined by touching it with a stick or other object. If the sheen breaks up into platelets or clumps, then it is due to the presence of naturally occurring bacteria in the water. If the sheen swirls (separates) and reforms (re- adheres), petroleum is present in the water. The pictures below are examples of a bacterial and petroleum sheen.

Do sheens always indicate an illicit discharge?

The presence of a bacterial sheen does not necessarily indicate an illicit discharge. Petroleum sheens are signs that petroleum has leaked or spilled, which indicates an illicit discharge has occurred or is occurring.

A petroleum sheen will swirl and reform itself rather than break apart.

Iron Bacteria

In areas throughout the state, an orange brown benthic growth may be observed in pipes, outfalls, and streams. This growth may appear as an orange, brown, red, yellow or grayish gelatinous slime. It can also appear as stains or as a “feathery” filamentous growth. A rainbow sheen may also be present. While unsightly, this growth is from iron bacteria that are naturally occurring in the soil and oxidize dissolved iron or manganese. The presence of iron bacteria does not typically indicate an illicit discharge.

Two examples of iron bacteria. Note the rainbow sheen.

DETERMINING THE SOURCE OF THE ILLICIT DISCHARGE

If the discharge is found in the Hopewell drainage system, the source of the discharge should be investigated by:

1) Tracking the illicit discharge to its point of entry into the Hopewell storm sewer system.

2) At the point of entry look to see if the source can be identified; examples include a leaking drum used to store used oil or a PVC pipe from a residence that is discharging gray water. Do not enter private property to do this.

3) Take pictures and notes on observations and exact location where the pollutant enters Hopewell's property.

At times, it may be difficult to determine the source of a discharge. The area around the discharge location should be visually surveyed to determine the:

- Location of outfalls and drainage pathways
- Upstream connections
- Potential upstream impacts (such as failing septic systems, etc.)
- Origins of pipes/culverts

By surveying the area upstream of a suspect discharge, the upstream connections as well as potential sources of discharges may be located.

An example of a source is a leaking septic system upstream impacting water quality downstream. Determining the origin of pipes and culverts can reveal unauthorized connections to Hopewell's stormwater system as well. Unauthorized connections are often sources of illicit discharges as well as cases of trespassing on Hopewell's property.

A reminder about safety:

At no time should anyone violate Hopewells safety rules in the investigation of a polluted stormwater complaint, including entering confined spaces.

DOCUMENTATION OF SUSPECTED ILLICIT DISCHARGES

All reports of illicit discharges and any field investigations must be documented.

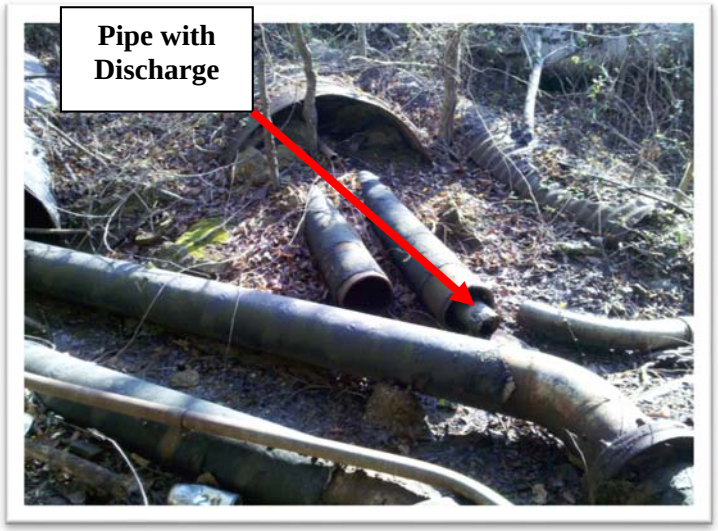
Photographs

Photographs should be taken during the investigation to support information in the Illicit Discharge Incident Tracking Sheet.

Photographs-
(1) Provide a visual record of conditions observed,
(2) Provide information to staff when further investigation is required, and
(3) Document changes in the outfall conditions over time.

In addition to close-up detailed photos, also take photos that capture the outfall and surrounding area ("Big Picture"). A "Big Picture" photo provides a frame of reference for anyone who has to perform a follow-up investigation at the site.

"Close-up" of oily substance discharging from pipe.



"Big Picture" photo shows pipe and surrounding layout.

The close-up photo by itself provides good detail of the discharge; however it is difficult to determine the true scale or location of the issue through viewing this photo alone. The “Big Picture” photo gives the investigator perspective as to the nature and severity of the discharge.

The photos below provide another example of close-up and “Big Picture” photos.

The source of this illicit discharge was determined by following the smell and excessive vegetation in the ditch line to a sewer manhole. The two pictures were taken in the spring. The grass in the yard had not yet come out of winter dormancy, but the grass in the ditch line was three times as tall, and was much greener than the yard.

“Close-up” of ditch where a sewage smell was reported.

“Big Picture” of the ditch line and nearest connection.

COORDINATION OF ACTIONS FOLLOWING INITIAL FIELD REVIEW

Suspect illicit discharges discovered during routine operations, or those otherwise reported, are coordinated differently depending on the issue. A few examples are noted below:

- Gray water issues that are discovered during ditching or cross pipe replacements are referred to the locality,
- Oil coming from cars in the parking lot, or sediment entering the stream from on-site erosion would be corrected by staff utilizing proper procedures.

An emergency response to a car accident; the fuel tank is ruptured and leaking fuel into the drain

CLOSURE FOR SUSPECT ILLICIT DISCHARGES

After all field investigations are complete, the work order can be closed in one of the following ways:

1. Once the illicit discharge is verified and the information is referred to the appropriate local or state official for action, the work order can be closed. Please include the name of the local official and the date of the contact. Ideally, the local official should be contacted by telephone, followed up by an e-mail or other written correspondence.

2. If the illicit discharge is verified but the source or type of discharge cannot be determined, please enter the information related to the investigation into the tracking system and any photos that were taken.

3. If the illicit discharge is intermittent (*), the site must be visited a minimum of three times to attempt to observe the discharge. If the discharge is not observed during any of these visits, note the attempts and close the work order.

4. If, after consultation with the Staff or Citizen making the report, the evidence of an illicit discharge cannot be found, the information related to the investigation should be entered into the tracking system. These incidents will be recorded in the IDDE tracking system and the investigation will be closed in accordance with established procedure.

***=An intermittent discharge is an illicit discharge that has been reported and verified, but upon further investigation is not flowing.**