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IDDE PROGRAM IMPLEMENTATION PLAN

City of Lynnwood Illicit Discharge Detection and Elimination Program

Prepared by Herrera

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IDDE PROGRAM IMPLEMENTATION PLAN

City of Lynnwood Illicit Discharge Detection and Elimination Program

Prepared for
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SECTION 1 – INTRODUCTION TO THE ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM PLAN

The City of Lynnwood (City) developed an Illicit Discharge Detection and Elimination Program Plan (IDDE Plan) as a guide for staff to use to identify, track down, and eliminate illicit discharges and illicit connections to the City's municipal separate storm sewer system.

> ***Illicit discharges*** include accidental spills such as gasoline or antifreeze that has leaked from a car or truck, illegal dumping of waste oil or paint into catch basins, and other contaminants introduced into stormwater, either accidentally or intentionally.
>
> ***Illicit connections.*** Examples include a utility sink or floor drain in a restaurant or factory connected to the stormwater drainage system instead of to the sanitary sewer, or when a property owner bypasses a failing septic system with a pipe that discharges sewage to a ditch or stream.
>
> ***Municipal Separate Storm Sewer System.*** The municipal separate storm sewer system is designed to convey stormwater and prevent flooding; it is often referred to as the MS4. It includes city streets, catch basins, curbs, gutters, ditches, manmade channels, and storm drains. This system will be referred to as the ***stormwater drainage system*** throughout this IDDE plan.

Why Was the IDDE Plan Developed?

Stormwater that flows through the City's storm drainage system is regulated under a federal permit administered by the Washington State Department of Ecology (Ecology 2009).

> The permit is called the National Pollutant Discharge and Elimination System (NPDES) Western Washington Phase II Municipal Stormwater Permit, but will be referred to throughout this IDDE Plan as the ***stormwater permit.***

The stormwater permit regulates discharges to the stormwater drainage system. Section S5 of the permit requires that the City develop a Stormwater Management Program, which includes developing and implementing an ongoing program to detect and remove illicit connections, discharges as defined in 40 CFR 122.26(b)(2), and improper disposal, including any spills into the stormwater drainage system owned or operated by the City. The City is required to fully implement the program by August 19, 2011.

In addition, the City is required to meet the bacteria criteria of the Washington State Water Quality Standards, Washington Administrative Code (WAC) 173-201A for Swamp Creek Basin within its jurisdiction.

Swamp Creek is on Ecology's 303(d) list for water quality impairments due to fecal coliform bacteria and a total maximum daily load (TMDL) implementation plan was developed in 2006 for the entire Swamp Creek basin including Scriber Creek, Golde Creek, and Tunnel Creek (Ecology 2006). This TMDL involves cooperation from several other jurisdictions including Snohomish County, Mountlake Terrace, Everett, Kenmore, Bothell, and Brier.

Implementing the IDDE plan will help reduce bacteria loading to the Swamp Creek drainage basin from common sources such as pet waste, illicit connections of wastewater to the storm drainage system, and failing septic systems.

What City Regulations Does the IDDE Plan Support?

In March 2010, the City added **Chapter 13.45 – Surface Water Quality**, to the Lynnwood Municipal Code (LMC) and adopted regulations to help control non-stormwater, illegal discharges, and/or dumping into the stormwater drainage system. The purpose of LMC 13.45 is to protect the City's surface and ground water quality by prohibiting the discharge of contaminants into surface waters, stormwater, and ground water, and outlining preventive measures to restrict contaminants from entering such waters. A copy of LMC Chapter 13.45 is attached in Appendix 1-1 for reference.

What Does the IDDE Plan Contain?

The IDDE Plan is organized in the following 12 sections:

- Section 1 – Introduction to the Illicit Discharge Detection and Elimination Program Plan
- Section 2 – Municipal Stormwater Drainage System Mapping
- Section 3 – Identifying Priority Areas for Illicit Discharge Investigations
- Section 4 – Identifying Illicit Discharges and Connections
- Section 5 – Conducting Dry Weather Outfall/Manhole Surveys
- Section 6 – Tracing the Source of an Illicit Discharge
- Section 7 – Removing Illicit Discharges and Connections
- Section 8 – Public Education Activities
- Section 9 – Staff Training
- Section 10 – IDDE Program Tracking and Evaluation
- Section 11 – References

The IDDE Plan outlines procedures that City Streets and Stormwater operation and maintenance personnel and other staff will use to identify, trace, and eliminate illicit discharges and connections to the City's stormwater drainage system.

The plan is designed to be user friendly, task oriented, and addresses each of the IDDE program components required by the stormwater permit. The IDDE plan also contains figures, photographs, and examples of illicit discharges and connections.

Who Will Implement the IDDE Plan?

Figure 1-1 below summarizes key City staff and contact information for those who will implement the IDDE Plan.

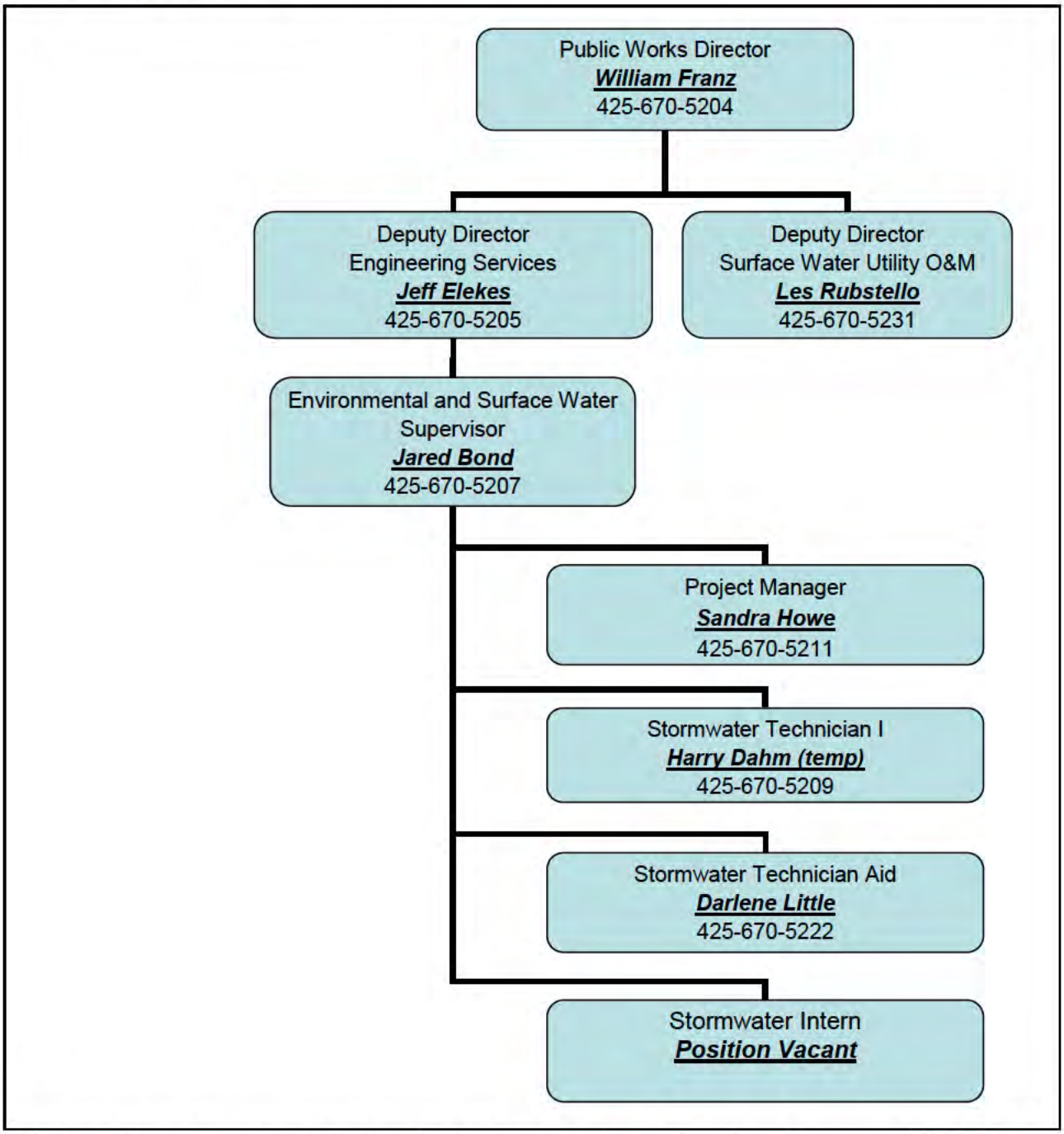


Figure 1-1. Organizational chart for implementation of the City of Lynnwood IDDE Plan.

Reporting Illicit Discharges

Report Any Illicit (Not Clean Water) Dumping
Call the Lynnwood Surface Water Pollution Hotline
425-670-KRUD (5783)
Don't Put KRUD down the outdoor drain.

The public should call the City's IDDE hotline (KRUD hotline) to report illicit discharges or connections; the number is advertised on the City's website: http://www.ci.lynnwood.wa.us/Content/Services.aspx?id=803

During business hours, the City Environmental and Surface Water Manager fields calls to the KRUD hotline. Calls made to the hotline after hours on evenings, weekends, and holidays are forwarded to a voice message system, and a notification that the call was received is automatically sent to the Environmental and Surface Water Manager's work cell phone so that follow up actions can be coordinated.

Depending on the type and size of the illicit discharge, the City Environmental and Surface Water Manager may be required to notify outside agencies for assistance.

Table 1-1. Agency contacts for illicit discharges.

Agency	Phone Number	When to Contact
Ecology Northwest Regional Office	1-425-649-7000	For spills into the municipal stormwater drainage system that constitute a threat to human health, welfare, or the environment. Must notify within 24 hours.
National Response Center	1-800-424-8802	All hazardous material and oil spills.
Washington Emergency Management Division	1-800-258-5990 or 1-800-OILS-911	All hazardous material and oil spills.
State Department of Health	1-360-236-4700	For spills that could cause bacterial contamination of shellfish beds.
Washington Department of Fish and Wildlife	1-360 902-2200	For spills that could impact threatened or endangered species or associated habitat.

Each time an illicit discharge is discovered, City staff must try to immediately determine what type of illicit discharge has occurred and whether it poses an immediate threat to human health or the environment. The following considerations must be made for each illicit discharge:

- What type of spill or discharge has been discovered
- How much material has been released (e.g., 1 gallon of paint, 10 gallons of gasoline, or 10,000 gallons of sewage)?
- Does the discharge involve a hazardous material and should the fire department or other emergency responders be notified?
- Is there a danger that the discharge may rapidly spread to a sensitive receiving water or cause serious damage to important habitat for salmonids or other aquatic species?
- Should Ecology or other agencies be notified?

SECTION 2 – MUNICIPAL STORMWATER DRAINAGE SYSTEM MAPPING

The City is preparing a comprehensive map of the City's stormwater drainage system that includes:

- Mapping the location of all stormwater outfalls and receiving waters and structural stormwater facilities owned, operated, or maintained by the City including all stormwater outfalls 24 inches or larger in diameter, as well as non-pipe tributaries (e.g., streams, ditches, or channels)
- Mapping the approximate boundaries of all drainage areas within the City and land uses within those areas
- All connections to the stormwater drainage system authorized or allowed by the City
- All geographic areas served by the City that do not discharge stormwater to surface waters
- Providing an electronic version of the map to Ecology upon request

Status of Mapping the Stormwater Drainage System

As of early 2011, the City has mapped all of its stormwater drainage system and all known manholes, catch basins, and outfalls in the City have been located.

During the summers of 2009 and 2010, City staff verified the locations of stormwater drainage system structures in the field such as culverts, outfalls, and inlets/outlets of stormwater detention ponds. The work involved conducting stream walks, working with property owners to obtain access, and opening manholes to verify how branches of the stormwater drainage system are connected. At each structure located, GPS coordinates and other information such as the outfall material of construction (e.g., concrete, or corrugated metal), pipe diameter, etc. was recorded using the data dictionary feature of the GPS. In the office, the data was downloaded into GIS and transferred to Cartegraph for storage.

The City purchased a camera for the Streets and Stormwater crews to use to conduct more frequent inspections of the stormwater drainage system. The City's Water and Sanitary Sewer crews currently use a camera to inspect the sanitary sewer.

Data on City infrastructure is currently stored in Cartegraph and will continue to be stored there. Data from Cartegraph can be exported to GIS to be updated or manipulated and then stored again in Cartegraph. The City has purchased software that links the two systems allowing more efficient data transfer and manipulation.

The City's goals for future mapping work include:

- Continuing to refine and correct the current mapped data
- Map private stormwater drainage systems located within the City and connections to the City stormwater drainage system
- Purchase a field laptop with remote access to the City's GIS system and maps
- Update existing data based on field observations as necessary

Field Equipment and Data Collection

The following equipment may be necessary when conducting field investigations related to mapping:

- Cell phone
- Laptop
- Trimble GPS unit
- Camera
- Whiteboard and pen for photographs
- Flashlight
- Backpack
- Tape measure
- Manhole lid puller
- Sledge hammer for manhole lids
- Traffic cones
- Safety vests
- Waterproof boots or waders
- First aid kit and sunscreen
- Clipboard and ID badge
- Machete & pruners

The following types of data should be gathered during field mapping activities:

- Pipe material
- Pipe size
- Pipe invert elevation if possible
- Structure type and size
- Description of open drainage or ditch
- Is flow present?
- Direction of flow
- Outfall damage
- Deposits or stains
- Abnormal vegetation
- Poor pool quality
- Pipe algae / growth
- Photographs (when necessary)
- Estimated flow rate

Stormwater Drainage Basins and Receiving Waters

The City has assembled detailed GIS data on the following stormwater drainage basins and receiving waters located within the City:

- Golde Creek
- Hall Creek
- Meadowdale Pond
- Perrinville Creek
- Poplar Creek
- Puget Sound
- Scriber Creek
- Swamp Creek
- Tunnel Creek
- Lund's Gulch Creek

These drainage basins and receiving waters are shown on Figures 2-1 and 2-2. This IDDE Plan will be updated if additional annexation areas or Municipal Urban Growth Areas (MUGAs) are incorporated into the City.

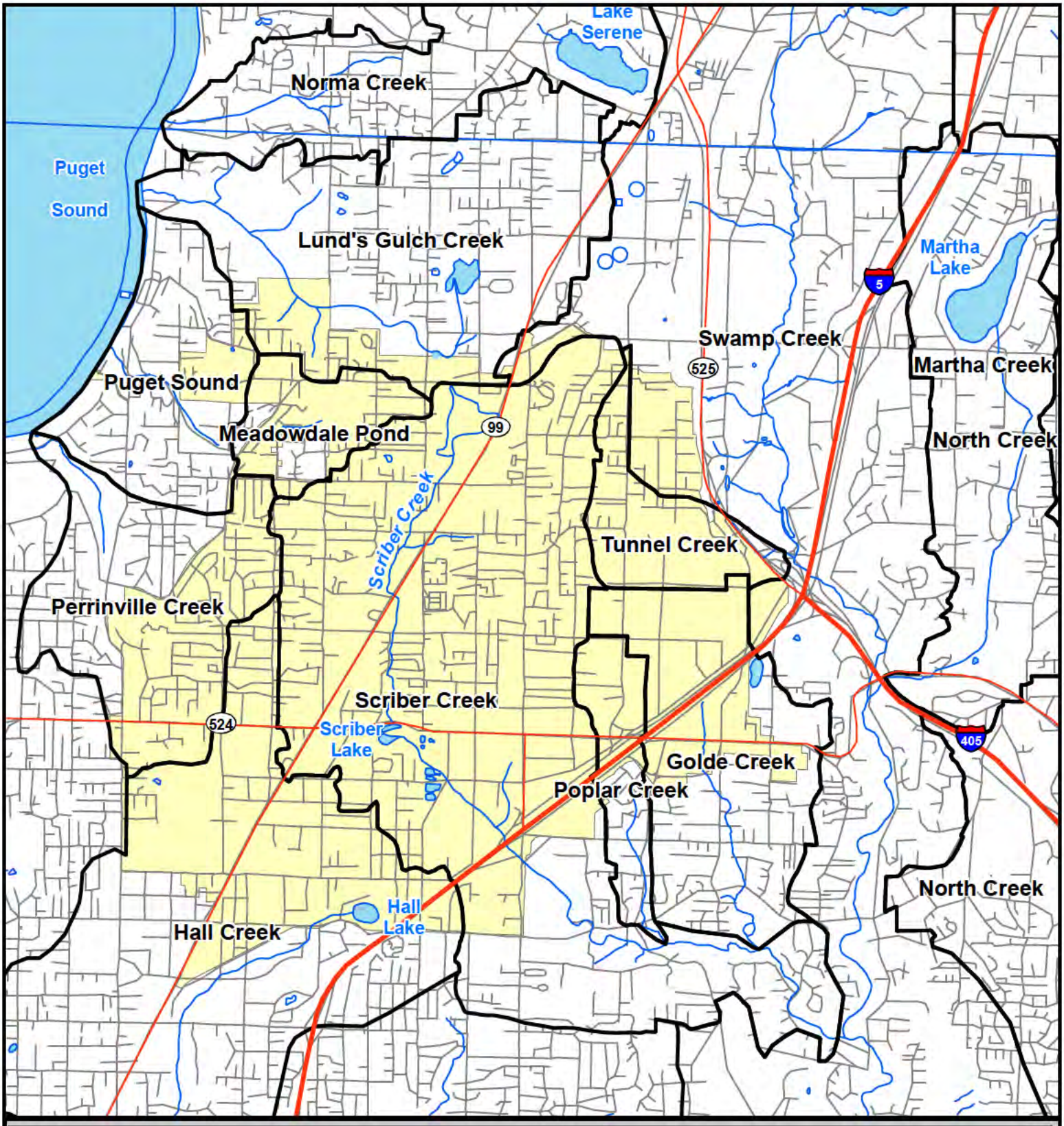


Figure 2-1. Drainage basins in the City of Lynnwood, Washington.

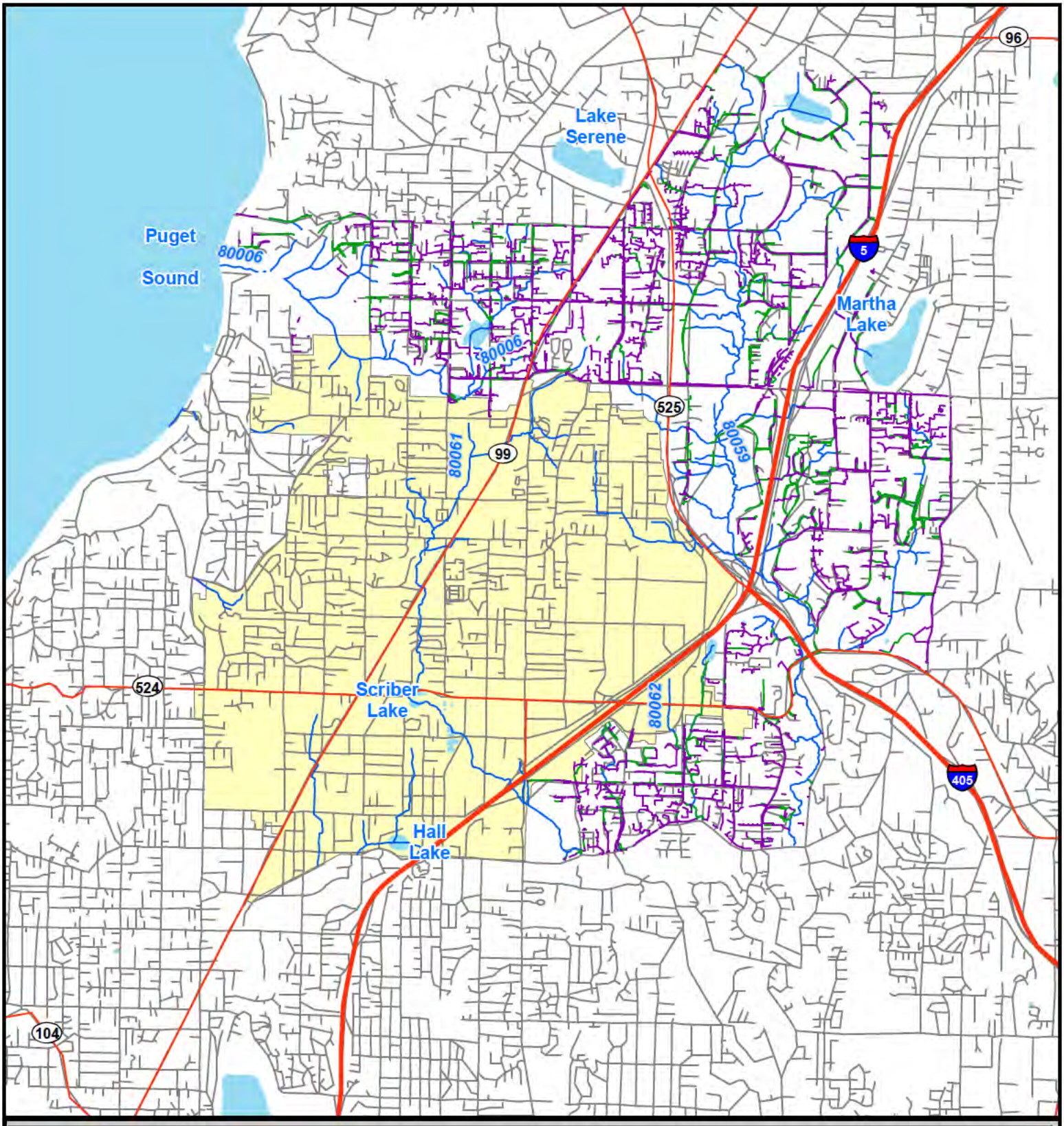


Figure 2-2. Receiving waters in the City of Lynnwood, Washington.

Section 3 – Identifying Priority Areas for Illicit Discharge Investigations

The City has begun identifying priority areas most likely to have illicit discharges or connections. The information will help field staff and managers decide where to conduct detailed field investigations to pinpoint and eliminate illicit discharges and connections. The process will include reviewing information contained in the City's Cartegraph/GIS database, gathering staff knowledge of the City's watersheds, determining where illicit discharges have been reported in the past, and compiling other information collected by field crews. This section describes priority areas already identified for future illicit discharge investigations, as well as procedures that staff can use to conduct a more detailed office assessment if needed.

Priority Areas Identified

The City has identified four main priority areas for conducting future investigations of illicit discharges and illicit connections. These include:

1. The State Route 99 corridor with a high concentration of properties zoned for general commercial use
2. State Route 524 / 196th Street SW with a high concentration of properties zoned for various types of businesses
3. Alderwood Mall and the immediate vicinity
4. Light industrial properties generally concentrated in the south-central portion of the City

Within these priority areas, the City will investigate businesses or activities that typically generate wastes that may contain fecal coliform bacteria, petroleum products, heavy metals, oil and grease, and soapy washwater. The City will conduct unannounced site inspections, public education and outreach, and follow-up investigations at:

- Businesses that generate pet waste (e.g., veterinary clinics, pet boarding centers, pet stores, and animal shelters) and public parks
- Automotive service centers and gas stations
- Restaurants
- Grocery stores and commercial retailers
- Light industrial manufacturing facilities

In addition, the City will investigate failing septic systems at residential properties and provide assistance or recommendations to homeowners to conduct repairs or maintenance, or help them connect their homes to the sanitary sewer system.

Office Assessment

An office assessment to determine priority areas for illicit discharge investigation should include the following four steps:

- Cartegraph/GIS assessment
- Apply screening factors to each drainage basin
- Prioritize receiving waters
- Develop maps for field assessment

Step 1 – Cartegraph/GIS Assessment

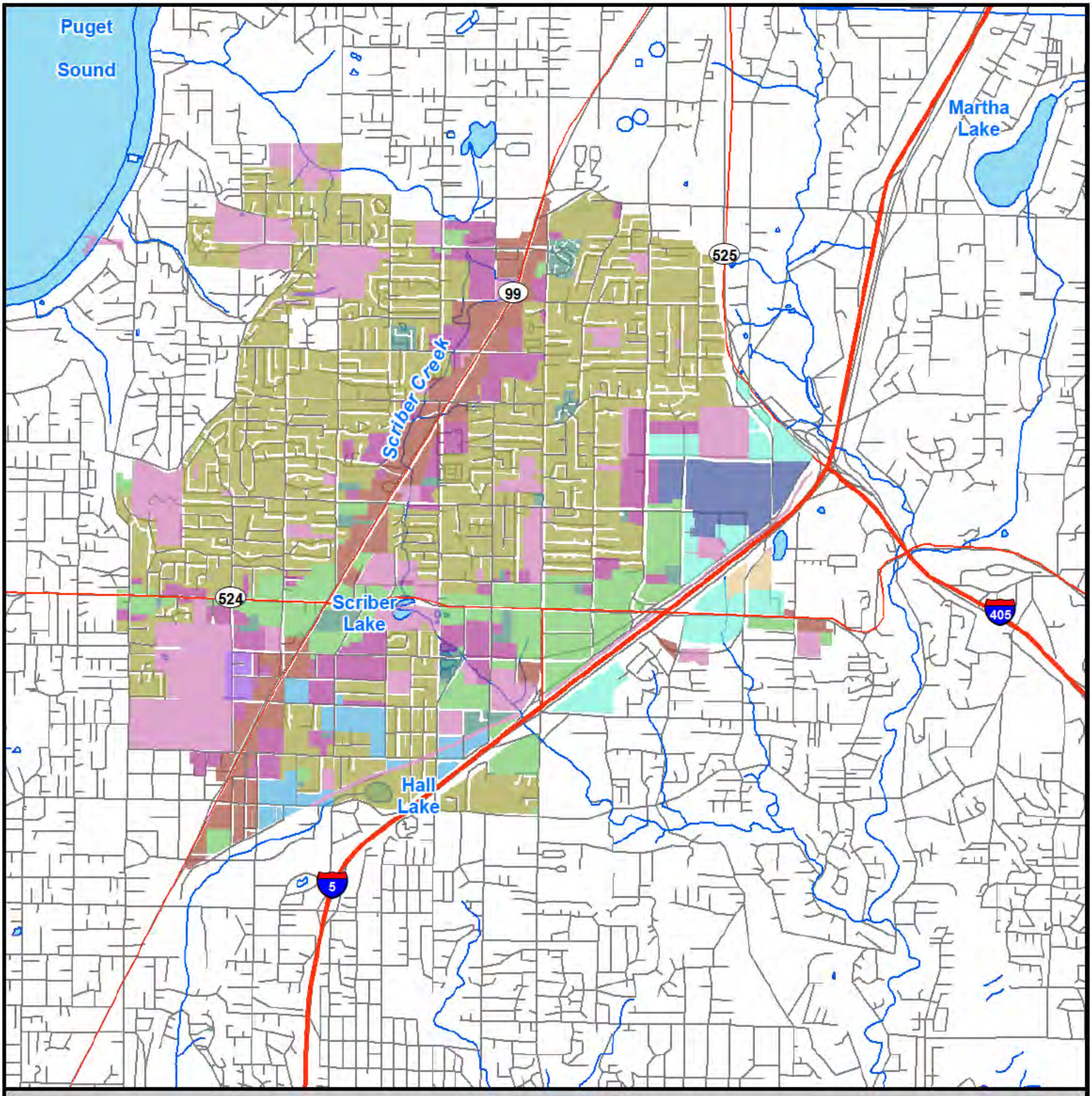
The *Illicit Discharge Detection and Elimination Guidance Manual* (CWP 2004) recommends a subwatershed assessment approach with drainage basins ranging from two to 10 square miles (1,280 to 6,400 acres). As shown in Table 3-1, all of the drainage basins within the City limits are smaller than this threshold, thus the illicit discharge prioritization can be performed on a watershed basis. Cartegraph/GIS data recommended for the office assessment includes:

- Aerial photos
- Drainage basin boundaries
- Hydrology (i.e., streams and lakes)
- Land use or zoning
- Outfalls
- Sewer system
- Storm drain system
- Streets
- Topography

Land uses in the City are shown on Figure 3-1.

Additional information that may be useful for the office assessment can be collected from a variety of different sources (e.g., electronic, hardcopy, or narrative) and includes:

- Age of development
- Condition of infrastructure



Legend

Zoning

- Business/various
- College District Mixed Use
- General Commercial
- Light Industrial
- Mixed Use
- Public
- Planned Commercial Development
- Planned Regional Center
- Planned Unit Development
- Residential (low/medium/high)
- Residential (7200/8400 sq ft)

Figure 3-1. Land uses in the City of Lynnwood, Washington.

N

0 1,750 3,500 7,000 Feet

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- Historical land uses (former industrial sites, landfills)
- Reported illicit discharges
- Septic system locations

Table 3-1. Drainage basins in the City of Lynnwood for illicit discharge prioritization.

Drainage Basin	Total Drainage Area (acres)	Percentage of Drainage Area Within City Limits	Total Drainage Area Within City Limits (acres)
Golde Creek	875	45%	394
Hall Creek	2,263	16%	362
Lund's Gulch Creek	1,440	13%	187
Meadowdale Pond	270	80%	216
Perrinville Creek	920	48%	442
Poplar Creek	230	54%	124
Puget Sound	600	100%	600
Scriber Creek	3,000	74%	2,220
Swamp Creek	16,000	1.2%	190
Tunnel Creek	300	94%	282

Step 2 – Apply Screening Factors to Each Drainage Basin

Screening factors recommended in the *Illicit Discharge Detection and Elimination Guidance Manual* (CWP 2004) were modified for the City and are summarized in Table 3-2. Low, medium, and high risk categories were developed for each screening factor and should be applied to each of the 10 drainage basins listed in Table 3-1. Apply a "1" to low risk criteria, a "2" to medium risk criteria, and a "3" to high risk criteria for each basin. A subset of screening factors can be selected and applied to each drainage basin or relative weights can be assigned to each screening factor if the City would like to prioritize drainage basins with particular risk factors.

Step 3 – Prioritize Receiving Waters

Based on the screening factors applied to each of the 10 drainage basins, the City will develop a prioritized list of receiving waters. The City is required to complete field assessments of the three highest priority water bodies by February 15, 2011, and assess one high priority waterbody each year thereafter.

Step 4 – Develop Maps for Field Assessment

Maps should be prepared to assist with the field assessment described in the following section that includes the following information (at a minimum):

- Streams
- Lakes
- Streets
- Landmarks

- Property boundaries
- Outfall locations.

Table 3-2. Screening factors for illicit discharge prioritization (adapted from CWP 2004).

Screening Factor	Low Risk	Medium Risk	High Risk
Past discharge complaints	No complaints	1 – 5 complaints per year	> 5 complaints per year
Dry weather water quality	Less than 50% of the water quality benchmark value(s)[a]	Exceedance of 50% of the water quality benchmark value(s)[a]	Two or more exceedances of water quality benchmark value(s) per year[a]
Industrial facility density	No industrial sites	Light industrial land use (LI)	Light industrial land use (LI) > 50% of drainage basin
Commercial business density	No commercial businesses	Limited, restricted, community, or neighborhood business land use (B2, B4, BC, & BN)	General commercial, business/technical park, or mixed use land use (CG, BTP, MU)
Stormwater outfall density	< 10 outfalls per stream mile	10 – 20 outfalls per stream mile	> 20 outfalls per stream mile
Age of development	< 25 years old	25 – 50 years old	> 50 years old
Sewer conversion (i.e., former septic system areas now connected to the sanitary sewer system)	Connected > 50 years ago	Connected 30 – 50 years ago	Connected within the last 30 years
Presence of older industrial operations	< 20 years old	20 – 40 years old	> 40 years old
Aging or failing sewer infrastructure	< 25 years old	25 – 50 years old	> 50 years old
Density of aging septic systems (i.e., > 30 years old)	< 25 older septic systems per square mile	25 – 100 older septic systems per square mile	≥ 100 older septic systems per square mile

a Water quality benchmark value for fecal coliform bacteria in the Swamp Creek TMDL (Ecology 2006) is 100 colony forming units (CFU) per 100 milliliters. CWP (2004) also recommends water quality benchmarks for ammonia-nitrogen concentrations (> 0.30 mg/L) and total phosphorus concentrations (> 0.40 mg/L). The City may set more stringent benchmarks or add additional parameters as needed.

Maps should be as simple as possible to provide ample space for recording notes or observations. Additional information that can be incorporated on the maps includes:

- Major land uses
- Specific industrial or commercial areas
- Storm drain network
- Septic system locations
- Aerial photographs (with faded colors for ease of note taking)

Field Assessment

Detailed procedures for field assessments are discussed in Section 4. Information collected during dry weather outfall/manhole surveys (e.g., outfalls where suspect or obvious illicit discharges are discovered) will be used to identify priority areas where follow-up investigations need to be pursued. Information collected during business source control inspections, health department inspections, and water quality monitoring will also be used to identify priority areas for future investigation and to reassign relative weights to the screening factors as needed.

Section 4 - Identifying Illicit Discharges and Connections

This section describes common sources of illicit discharges and connections, indicators of illicit discharges, and describes how to conduct dry weather outfall/manhole surveys. This section also discusses data that should be recorded during the surveys, how to conduct onsite water quality tests, and recommended sampling equipment.

Common Sources of Illicit Discharges and Illicit Connections

When trying to identify illicit discharges and illicit connections it is helpful to understand some of the most common sources and what types of land uses generate them. Tables 4-1 and 4-2 summarize sources of illicit discharges and illicit connections that result from activities on residential, commercial, or industrial properties, and active construction sites. Photos 4-1 through 4-31 depict some of the illicit discharge examples listed in Table 4-1.

Construction Sites and Illicit Discharges

Active construction sites are a common source of erosion/sediment, high pH runoff, spilled fuel, leaks from hydraulic lines, or spills of hazardous materials. The following is a partial list of things to consider when identifying illicit discharges at or near active construction sites:

- Are silt fences properly installed to prevent sediment from washing offsite?
- Has a construction entrance been established for trucks and other vehicles to access the site and is it being maintained (i.e., are quarry spalls packed full of sediment, is the contractor sweeping frequently, or is sediment being tracked offsite onto adjacent streets)?
- Is there evidence of spills from refueling activities, leaking hydraulic lines from excavators or other heavy equipment, or hazardous materials used onsite?
- Is the contractor properly managing concrete waste (i.e., properly containing wastes from washing out concrete trucks) and diverting water away from catch basins when preparing exposed aggregate surfaces such as driveways?
- Are soil stockpiles and other materials covered with plastic and sandbags to prevent erosion?
- Are other exposed soils covered with plastic or straw, or hydroseeded as soon as practicable to reduce erosion?
- Is the contractor using catch basin filter socks to protect drain inlets?

Table 4-1. Common sources of illicit discharges.	
Sources	**Examples**
Illegal dumping practices	• Paint • Motor oil • Antifreeze • Drywall mud • Washwater from mobile carpet cleaning operations • Grease from mobile food vendors • Slurry from concrete truck cleanout
Broken sanitary sewer line	• Sewage migrates from a broken sanitary line into an adjacent or nearby storm sewer line
Sanitary sewer overflows	• A sanitary sewer line becomes plugged and sewage overflows into a nearby stormwater drainage system catch basin
Inflow/infiltration into the sanitary sewer	• Clear water from rain and snowmelt and groundwater improperly drains or leaks into the sanitary sewer system via cracked pipes or loose connections. During heavy rainfall, this extra water causes the stormwater drainage system to overflow and cause an illicit discharge.
Septic system bypass	• A pipe used to bypass a failing septic system
Failing septic systems	• Homeowners fail to maintain their septic system and septage flows into a nearby catch basin or stream
Improper RV waste disposal	• Recreational vehicle (RV) owners dumping their sanitary wastewater into a stormwater drainage systemcatch basin
Washing activities	• Restaurants washing off greasy floor mats outdoors • Car washing at home or at a charity car wash that drains into a nearby stormwater drainage system catch basin • Pressure washing buildings with soapy water • Mobile carpet cleaning, floor cleaning or auto detailers improperly disposing of wash water
Excessive lawn fertilization	• Over-application of fertilizers, pesticides, or herbicides resulting in runoff with stormwater
Construction sites with poor temporary erosion and sediment control (TESC) BMPs	• Exposed soils or uncovered stockpiles and poorly installed silt fences that allow soil erosion • Sediment enters catch basins that do not have filter socks installed • Sediment is tracked offsite by vehicles due to lack of quarry spall construction entrance, or failure to sweep entrances daily
Construction sites with leaks, spills, and poor hazardous materials management	• Petroleum spills when refueling vehicles and equipment • Ruptured hydraulic lines or leaking equipment • Improper containment of slurry from concrete truck washout
Improper storage of waste materials	• Leaking dumpsters without lids • 55-gallon drums of grease stored outside without lids • Uncovered stockpiles of sand, gravel, vegetation debris • Uncovered materials awaiting disposal that have a high potential to spill or leak
Pump station failure	• Sewage pump station failure causes sewage to overflow and enter a nearby stormwater drainage system catch basin

Table 4-2. Common sources of illicit connections.	
Sources	**Examples**
Plumbing cross-connections	• A plumbing fixture in a building is mistakenly or intentionally connected to the stormwater drainage system instead of the sanitary sewer

Photo 4-1. Paint dumped in storm drain.

Photo 4-2. Spilled gasoline.

Photo 4-3. Septic system bypass.

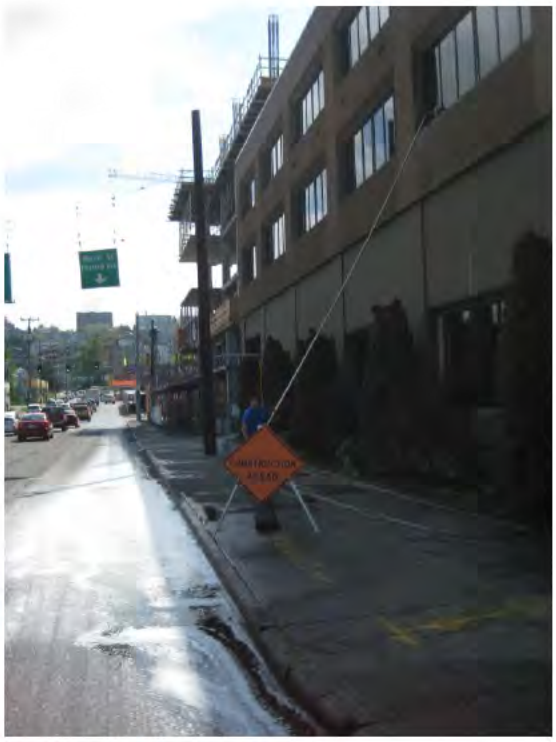


Photo 4-4. Soapy washwater.

Photo 4-5. Sewer pipe blockage overflowing into catch basin.

Photo 4-6. Downstream of sewer pipe blockage, flowing into wetland.

Photo 4-7. Paint in catch basin.

Photo 4-8. Chemical spill in roadway.

Photo 4-9. Paint from commercial painting company.

Photo 4-10. Paint discharge.

Photo 4-11. Paint along Spruce Way into ditch.

Photo 4-12. Antifreeze spill.

Photo 4-13. Soapy discharge.

Photo 4-14. Doughnut glaze truck overturned.

Photo 4-15. RV greywater or sewage discharge.

Photo 4-16. Restaurant grease drum.

Photo 4-17. Oil spill on lake.

Photo 4-18. Grease in catch basin.

Photo 4-19. Leaking water pump in secondary containment.

Photo 4-20. Dripping oil from compressor.

Photo 4-21. Functioning catch basin filter sock.

Photo 4-22. Catch basin plugged with sediment.

Photo 4-23. Catch basin without filter sock.

Photo 4-24. Oil spilled on catch basin blocked with plastic.

Photo 4-25. Drywall mud discharge.

Photo 4-26. Water line burst and subsequent soil erosion.

Photo 4-27. Turbid discharge.

Photo 4-28. Turbid discharge.

Photo 4-29. Construction entrance sediment trackout.

Photo 4-30. Smoke testing.

Photo 4-31. Dye testing.

What is not an Illicit Discharge?

It is important to be able to distinguish between natural phenomena or natural conditions for stormwater versus physical, chemical, or biological indicators that may indicate that stormwater is contaminated by an illicit discharge. Tables 4-3, 4-4, and 4-5 highlight some of the important natural phenomena and physical, chemical, and biological indicators to be aware of when investigating looking for illicit discharges; in the field and photos 4-32 through 4-37 depict natural phenomena. Table 4-6 presents recommended water quality sampling parameters for primary (screening) and secondary (follow-up) investigations

Table 4-3. Natural phenomena examples (adapted from CWP 2004 and GCHD 2002).

Natural Phenomena	Description	Photo Reference
Clear, colorless, odorless	• Clean stormwater has no color or odor, and light easily passes through a sample collected in a glass jar.	Photo 4-32
Organic sheen	• Bacteria create films or plates that float on the water surface and have an oily appearance when light bounces off of them. • Organic sheens tend to form plates that break apart on the water surface when you tap them with a stick or pencil. • Petroleum sheens in contrast tend to form rainbow sheens and do not break apart when tapped.	Photo 4-33
Foaming and tannins	• Natural foaming results from the die-off of aquatic plants that release oils. • Tannins are released during the decomposition of wood. • Natural foam bubbles tend to be brownish and do not have the rainbow sheen that soap bubbles often have. • Tannins tend to make water look dark brown or tea-colored.	Photo 4-34
Iron bacteria	• Iron bacteria combine dissolved iron or manganese with oxygen and form orange or rust-colored deposits on the banks of streams or the bottom of pipes.	Photo 4-35
Sediment / turbidity	• Sediment can be stirred up by the natural flow of water in streams, especially following recent rainfall, and can cause water to become cloudy or turbid. • Excess amounts of sediment may also indicate an illicit discharge from an active construction site or other source (not a natural phenomenon).	Photo 4-36
Algae blooms	• Thick layers of algae may form algae blooms in ponds, streams, or lakes. • Algae blooms may also form when excess amounts of nutrients (mainly phosphorus and nitrogen) runoff from lawns or commercial or industrial properties (not a natural phenomenon).	Photo 4-37

Table 4-4. Physical indicators of illicit discharges (adapted from CWP 2004 and GCHD 2002).			
Colors	**Description**	**Photo Reference**	**Recommended Test Parameters**
Tan to brown	• Sediment from soil erosion(sometimes a natural phenomenon) • Runoff from construction sites	Photos 4-36, and 4-26 thru 4-29	Turbidity
Blue green/brown green	• Sewage • Plankton bloom • Fertilizer runoff • Vehicle wash water • Tracing dye	Photos 4-4, 4-6, 4-13, and 4-31	Ammonia/potassium, detergents/ surfactants, temperature
Milky white	• Grease • Paint • Lime • Drywall compound	Photos 4-18, 4-7, 4-9, and 4-25	pH
Milky or dirty gray	• Washwater from commercial/industrial sources • Washwater from domestic sources (i.e., gray water)	Photo 4-4	Detergents/ surfactants,
Black	• Septic wastewater • Sulfuric acid • Turnover of oxygen depleted water	NA	pH, ammonia/potassium
Red, purple, black, blue	• Blood • Fabric dye • Paper ink from industrial or commercial operations	NA	NA
Orange-red	• Iron deposits • Iron bacteria (natural phenomenon) • Tracing dye	Photo 4-35	NA
Bright green	• Anti-freeze • Algae bloom (sometimes a natural phenomenon) • Tracing dye	Photos 4-12 and 4-37	pH
Odors	**Description**		
Musty	• Partially treated sewage • Livestock waste • Algae	NA	Ammonia/potassium, bacteria, temperature
Rotten egg/hydrogen sulfide	• Raw sewage • Sulfuric acid • Anaerobic water	NA	Ammonia/potassium, bacteria, temperature
Sewage	• Sharp foul, rotten, or fecal odor	NA	Ammonia/potassium, bacteria, temperature
Chlorine	• Broken drinking water line • Swimming pool flushing • Wastewater treatment plant • Industrial discharge	NA	Chlorine
Sharp, acrid, or pungent	• Chemicals • Pesticides • Solvents • Antifreeze	NA	pH
Rotten/spoiled	▪ Restaurant food waste	NA	NA

Table 4-4 (continued). Physical indicators of illicit discharges (adapted from CWP 2004 and GCHD 2002).			
Other Indicators	**Description**		
Sewage fungus	▪ Soft, gray, filamentous bacteria associated with low dissolved oxygen conditions	NA	Ammonia/potassium, bacteria, temperature
Surface scum or sheen	▪ Film ▪ Foam (sometimes a natural phenomenon) ▪ Petroleum sheen	NA	NA
Stains or deposits	▪ Iron-oxide bacteria (sometimes a natural phenomenon) ▪ Oil ▪ Powdery chemical residue	NA	NA
Floatables	▪ Sanitary waste ▪ Toilet paper ▪ Food waste	NA	NA
Outfall damage	▪ Spalling ▪ Cracking ▪ Chipping ▪ Corrosion	NA	NA

NA: not applicable

Table 4-5. Chemical and biological indicators used to identify illicit discharges (adapted from CWP 2004 and GCHD 2002).	
Chemical Indicator	**Description**
pH	• pH measures the hydrogen ion activity in stormwater on a scale from 1 to 14. • Water with a pH below 7.0 is acidic and water with a pH above 7.0 is alkaline or basic. • Stormwater typically has a pH between 6.5 and 8.5.
Turbidity	• Turbidity is a measure of how transparent or clear water is based on the amount of sediment or suspended particulates. • When higher amounts of suspended solids are in the water, it seems murkier and the turbidity is higher.
Chlorine	• Chlorine is added to the City's potable water supply. • Chlorine detected in stormwater could indicate a broken drinking water line, sewage, irrigation water, or swimming pool water that is discharging into the stormwater system.
Fluoride	• Fluoride is added to the City's potable water supply. • Fluoride detected in stormwater could indicate a broken drinking water line, sewage, irrigation water, or swimming pool water that is discharging into the stormwater system.
Ammonia (NH_3)	• Ammonia is produced by the decomposition of plant and animal proteins and is also a main ingredient in fertilizers. • Ammonia detected at high concentrations may indicate a sanitary wastewater or septic tank effluent source, ammonia-based cleaners, or fertilizer runoff.
Potassium	• Potassium is found at relatively high concentrations in sewage and can be used in combination with ammonia to distinguish between wash water and sanitary wastewater. • An ammonia/potassium ratio >1 may indicate sanitary wastewater rather than washwater contamination.
Detergents/surfactants	• Detergents contain substances called surfactants that are added to lower the surface tension of water to allow dirt or grease to be washed off more easily. • Surfactants detected in stormwater may indicate an illicit discharge of sanitary water or wash water.
Specific conductivity	• Specific conductivity (SC) is a measure of how well water can conduct an electrical current. • SC increases as the concentration of dissolved solids increases when pollutants migrate into stormwater.
Optical brighteners	• Optical brighteners are also added to household detergents to make clothes appear whiter after being washed. • Optical brighteners detected in stormwater may indicate an illicit discharge of sanitary water or wash water.
Biological	**Description**
Fecal coliform bacteria and *E. coli* bacteria	• *E. coli* is a type of fecal coliform bacteria commonly found in the intestines of animals and humans. • *E. coli* detected in stormwater may indicate an upstream discharge of sewage, septage from septic tanks, or feces from pets or wildlife.

mg/L: milligrams per liter

Table 4-6.	Recommended water quality sampling parameters for primary (screening) and secondary (follow-up) investigations.		
Water Quality Parameter	**Use**	**Recommended Test Method**	**Threshold to Trigger Further Investigation**
Primary (screening) parameters			
Ammonia	• High levels can indicate the presence of sanitary wastewater • Ammonia/potassium ratio >1 may indicate sanitary wastewater	• Field test strips	> 3 mg/L
Chlorine	• Elevated concentrations may indicate a broken drinking water line or swimming pool flushing	• Field test kit	> 0.2 mg/L
Fluoride	• Elevated concentrations may indicate a broken drinking water line or swimming pool flushing	• Field test strips	> 0.3 mg/L
Detergents/ surfactants	• Indicate the presence of detergent (e.g., from laundry, or car washing)	• Surfactant test kit	> 0.5 mg/L
pH	• Extreme pH values (low or high) may indicate commercial or industrial flows • High pH above 8 may indicate washwater, concrete washwater, or discharge	• Field meter • Field test strips	< 6.5 or > 8.5
Colors, odors, and other physical indicators	• Contaminated stormwater may exhibit discoloration, a noticeable odor, or other physical indications (e.g., soap suds) of contamination	• Visual and olfactory observations	Varies
Secondary (follow-up) parameters			
Bacteria (fecal coliform, *E. coli*)	• Used to indicate the presence of sanitary wastewater	• Laboratory analysis	> 100 CFU /100 mL[a]
Potassium	• High levels may indicate the presence of sanitary wastewater	• Field meter	>5 mg/L
Optical brighteners	• Used to indicate the presence of laundry detergents (which often contain fabric whiteners that fluoresce under black light)	• Optical brightener monitoring trap	Fluorescence observed under a black light
Temperature	• Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures. • Most useful during cold weather.	• Field meter or thermometer	Evaluate against "typical" surface water temperatures within each drainage basin during that time of year
Turbidity	• Used to indicate excess sediment potentially from construction site runoff or other sources	• Field meter	Significant levels above background levels typical within a drainage basin
Conductivity	• Used as an indicator of dissolved solids from potential pollutant sources	• Field meter	> 225 µS/cm

µS/cm = microsiemens per centimeter

mg/L = milligrams per liter

CFU/100 mL = colony forming units per 100 milliliters

[a] Water quality benchmark value for fecal coliform bacteria in the Swamp Creek TMDL (Ecology 2006) is 100 colony forming units (CFU) per 100 milliliters

Photo 4-32. Clear groundwater seepage.

Photo 4-33. Natural organic sheen.

Photo 4-35. Natural foam.

Photo 4-34. Natural iron bacteria.

Photo 4-37. Turbidity.

Photo 4-36. Algae.

SECTION 5 – CONDUCTING DRY WEATHER OUTFALL/MANHOLE SURVEYS

The tool used by many cities to conduct dry weather outfall/manhole surveys is called an Outfall Reconnaissance Inventory (ORI). The ORI involves inspecting all of the streams, tributaries, and lake shorelines in the City to locate outfalls and observe if there is water flowing from them during dry weather. Manholes located upstream of outfalls may also need to be surveyed during the ORI if a suspected illicit discharge is encountered.

The ORI has two main purposes:

1. Locating and recording GPS coordinates for all outfalls in the City to support completing the Cartegraph map of the entire stormwater drainage system
2. Observing all outfalls in the City during dry weather to identify areas with flowing water that may indicate an illicit discharge.

Definition of an Outfall

The definition of an outfall from the stormwater permit is very important to keep in mind during the ORI:

> "An outfall means a point source as defined by 40CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the State and does not include open conveyances connecting two municipal separate storm sewer systems, or pipes, tunnels, or other conveyances which connect segments of the same stream or other waters of the State and are used to convey waters of the state."

The stormwater permit requires that the City survey all outfalls 24 inches or larger that are part of the stormwater drainage system. However, smaller pipes and open drainages (e.g., ditches) can also convey pollutants to receiving waters. Field staff may encounter stormwater drainage system outfalls, permitted industrial discharge outfalls, and private drainage outfalls. Figure 5-1 shows several photographic examples of typical outfalls that may be encountered in the field. If time and budget allow, it is wise to record the GPS coordinates of all outfall pipes encountered, regardless of size. Particularly in sensitive drainage basins, locating as many outfalls as possible will help the City meet its goals for reducing pollutant loading in those areas.

During dry weather, flowing water in an outfall or manhole in the stormwater drainage system may indicate that an illicit discharge is occurring upstream. The source may be infiltrating ground water or the diversion of a surface stream. In most cases, visual observations and the results of field testing of water samples (described below) will help to distinguish between flows from an illicit discharge versus a natural source.

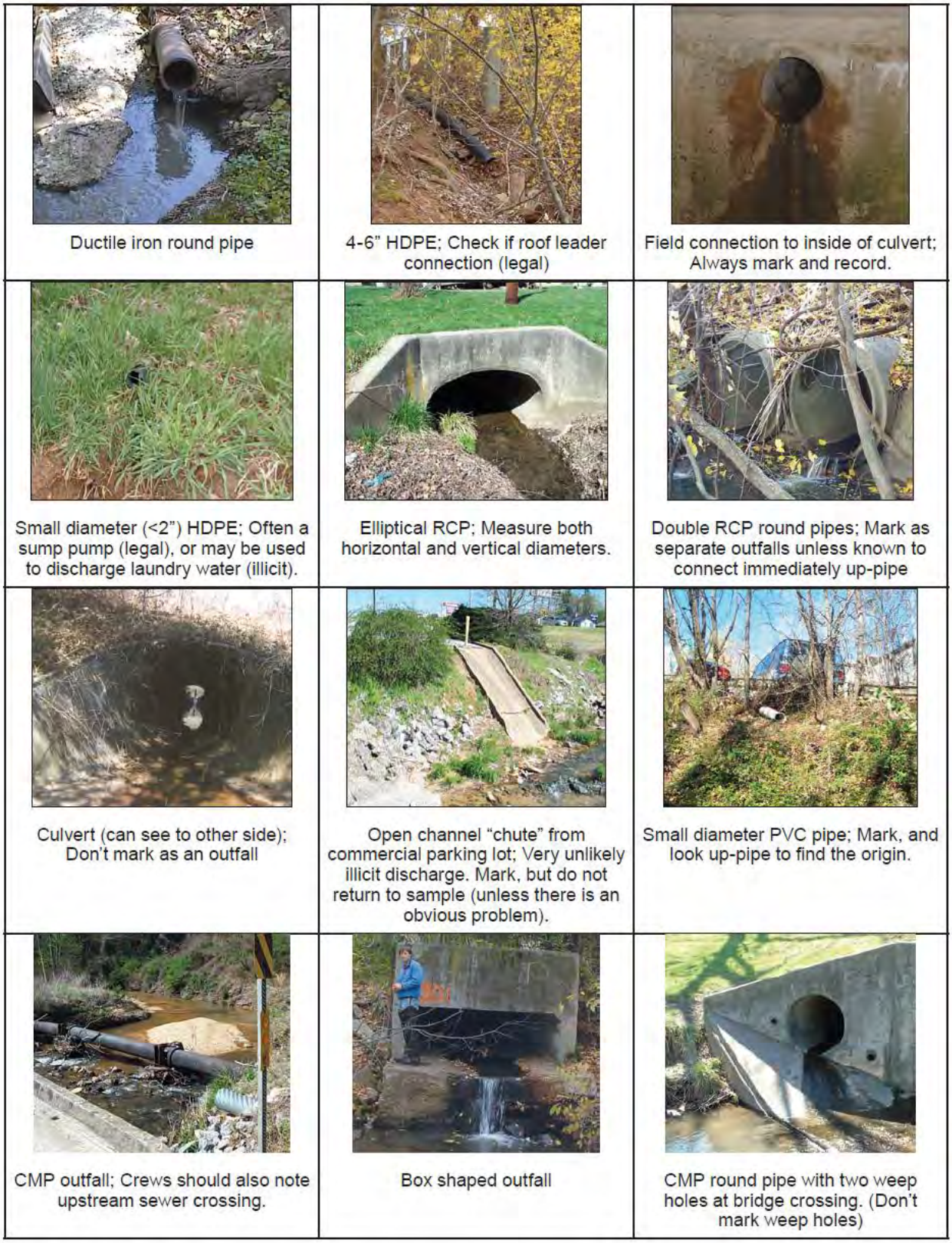


Figure 5-1. Examples of typical outfalls that may be encountered in the field.

The ORI should begin in the drainage basins of the three highest priority watersheds identified during the office assessment (described in Section 3) and continue in other drainage basins until all outfalls in the City are located and mapped. The office assessment compiles information such as concentrated areas of commercial/industrial activities, potentially failing septic systems, past water quality complaints, and drainage basins with known water quality issues.

Planning for ORI Field Work

When planning ORI field work, staff that maintain Cartegraph data and the Environmental and Surface Water Manager should be consulted to discuss the three highest priority drainage basins to survey and other drainage basins where the field work may occur. Before the field work, it will be helpful to determine which stormwater features have already been mapped and which areas have incomplete mapping. If possible, have the Cartegraph staff prepare large paper copy maps (e.g., 11 x 17 inches or larger printed on waterproof paper) of the areas that will be investigated in the field. Ideally the maps will show both the stormwater drainage system as well as the sanitary sewer system.

Procedure for Conducting ORI Inspections

A. ORI inspections should be conducted during the driest months of the year and ideally at least 48 to 72 hours after the last significant rainfall (e.g., rainfall over 0.1 inches or rainfall that produces runoff). [If outfalls still have flow during dry weather, a likely source is from groundwater inflow to the stormwater drainage system or from an illicit discharge or connection.]

B. Identify pairs of staff who will work together. The buddy system is recommended for field work for health and safety reasons. Consider other issues such as traffic control, confined space entry, and limited property access before heading out.

> ***Important Note:*** ***Only staff with confined-space training should enter a manhole or outfall.***

C. Drive or walk to the outfall that you are inspecting in the field. Assign a unique number to the outfall if the outfall does not already have one. Refer to the City's stormwater drainage system map and determine if you are inspecting an outfall not previously documented in the City system.

D. Use a dry erase white board and pen to write down the date, time, outfall number, and inspector(s) initials, and then take a photograph of the white board next to the outfall.

E. Record the latitude and longitude of the outfall at the end of the pipe using a GPS unit if this has not previously been done.

F. Record outfall inspection observations using either a drop-down menu (e.g., data dictionary) on the GPS unit, or a paper copy of the Outfall Reconnaissance Inspection Form (see Appendix 5-3).

G. Conduct field tests of water from flowing outfalls using the procedures described in the section below.

H. Determine if there appears to be an illicit discharge occurring based on your observations and water quality test data. Notify the Environmental and Surface Water Supervisor as soon as possible if an illicit discharge is found.

I. Upon returning to the office, download the field data obtained using the GPS unit into Cartegraph. Alternatively, enter the field data collected on paper field forms into Cartegraph by hand.

Conducting Water Quality Tests

In some cases, visual or olfactory observations of dry weather flow may be obvious enough to indicate that there is an illicit discharge occurring. If not, water quality sampling can be used to determine if the flow is from an illicit source.

Certain water quality parameters can indicate the likely presence or absence of a specific type of discharge. Some of these parameters can be measured in the field with test kits or probes; others must be analyzed in a laboratory. A wide variety of water quality parameters can be measured for an IDDE program, and many references exist that describe theses parameters. Table 4-6 lists water quality testing parameters that may be used during the primary (screening) and secondary (follow-up) investigations.

Water Quality Testing Equipment

- pH/temperature meter; pH buffers 4, 7, and 10; and spare batteries
- Turbidity meter and batteries
- Ammonia test strips
- Potassium meter and batteries
- Chlorine or fluoride test kit with reagents
- Detergents/surfactants test kit
- Cooler for transporting samples on ice destined for laboratory analysis

General Equipment

- Telescoping window washer's pole for collecting samples in deep manholes
- Stainless steel pitcher
- Long zip ties to attach stainless steel pitcher to telescoping pole

Procedure for Conducting Water Quality Tests

A. At the beginning of each day, calibrate and test each field meter that you will be using (e.g., pH meter, turbidity meter) according to the manufacturer's instructions.

B. Assuming two field staff will work together, one person can test a stormwater sample with field meters or test kits while the second person records general outfall information and water quality observations.

C. At a sample location in the field, triple rinse a 500 mL polyethylene (poly) container with the stormwater that you will be testing—use a telescoping pole and stainless steel pitcher if necessary to collect rinse water. After rinsing the container, collect a stormwater sample and pour some of it into a clean 8-ounce glass jar until it is nearly full. Proceed with the following specific water quality tests/steps as needed:

(i). **Soap Suds and General Observations:** Put a lid on the glass jar and vigorously shake the sample. Record the color, presence or absence of soap suds, etc. The glass jar can be reused a few times at different locations, but if it becomes coated with scum or oil, discard it and use a new jar at the next sampling location. Record all other observations regarding the outfall pipe, surrounding land use, etc. in a GPS unit or on a paper copy of the outfall inspection form.

(ii). **pH and Temperature:** Refill the glass jar from the poly container. Insert the pH and temperature probes into the glass jar. Slowly stir the sample with the probes until the readings stabilize (i.e., when the readings haven't changed for several seconds) and record the readings. A pH measurement may also be taken using test strips, but a meter will be more accurate.

(iii). **Turbidity:** Use more of the sample from the poly container to triple rinse a small glass vial that comes with the turbidity meter. Fill the vial and place a cap on it, dry off the vial with a Kim Wipe, and record the reading.

(iv). **Ammonia and Potassium:** Test the sample in the glass jar using an ammonia test strip and then take a potassium measurement using a field meter.

(v). **Free Chlorine (low level test) or Fluoride:** Test for either chlorine or fluoride, not both. Follow the instructions that accompany each test kit. If testing for free chlorine, make sure the colorimeter is set up to perform the low level test.

(vi). **Surfactants/detergents:** Lastly, perform the surfactants/detergents test according to the detailed instructions provided with the test kit.

(vii). Refer to the thresholds listed in Section 6 of the ORI form in Appendix 5-3 to evaluate if your water quality test results indicate a potential illicit discharge.

(viii). Also refer to the IDDE flow chart in Figure 5-2 below to determine what type of illicit discharge may be present.

(ix). If you suspect an illicit discharge, you may decide to collect a sample for laboratory analysis of **fecal coliform** or other parameters. Samples must be

collected only in containers provided by a laboratory. Samples must be properly labeled, and stored on ice and transported to the laboratory in a cooler. Refer also to Appendix E of the Center for Watershed Protection Manual for additional guidance on water quality parameters (CWP 2004).

(x). City field inspectors should follow up with the analytical laboratory to obtain the analytical results for any samples submitted for analysis such as for fecal coliform analysis if a sewage discharge is suspected.

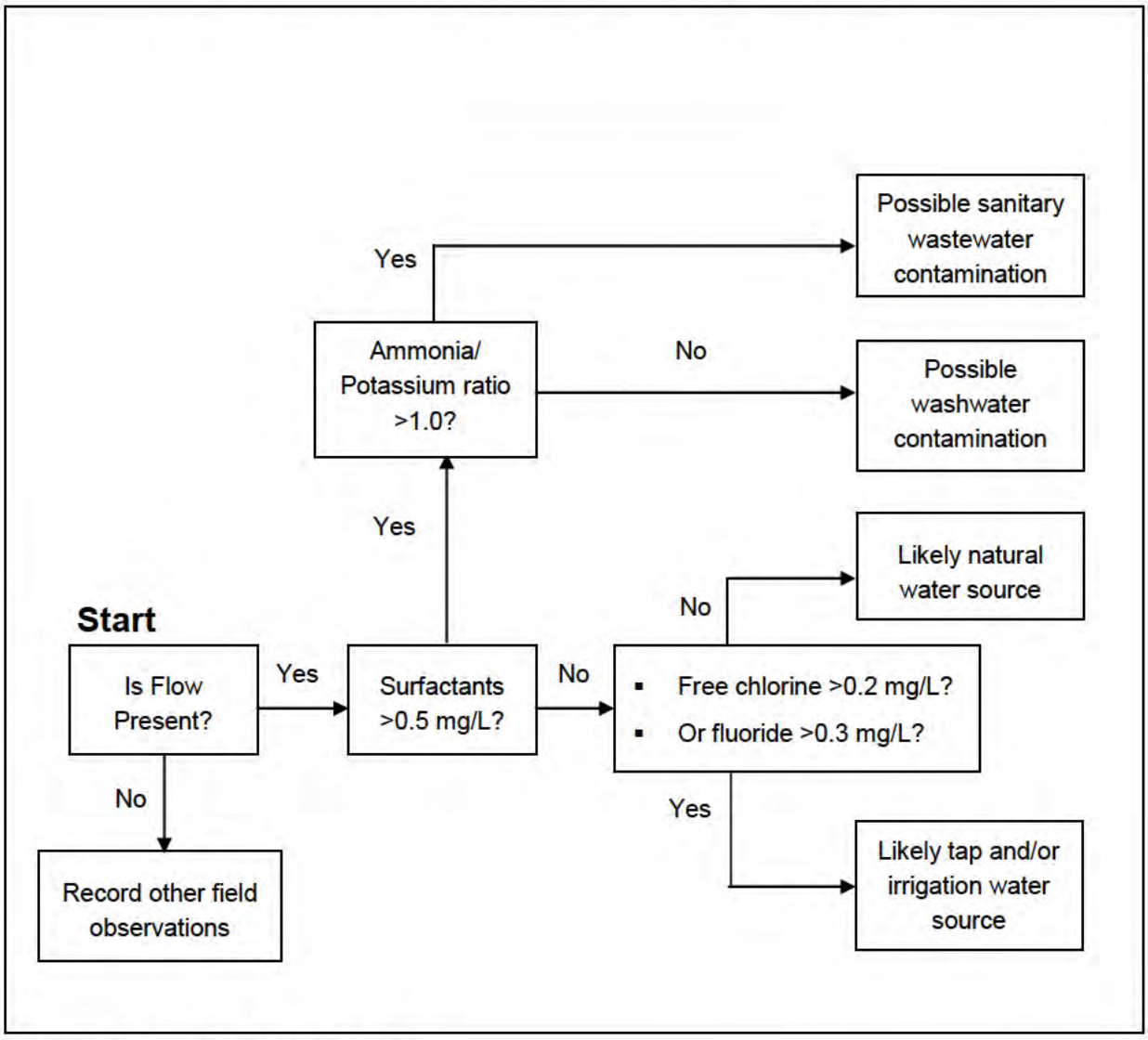


Figure 5-2. IDDE Flow Chart.

Section 6 – Tracing the Source of an Illicit Discharge

If an illicit discharge is identified through the screening steps provided in Section 5 or reported to the illicit discharge hotline, three primary methods can be used to trace the illicit discharge to its source:

- Catch Basin Investigations
- Drainage Area Investigations
- On-Site Investigations

The following equipment may be necessary when tracing the source of an illicit discharge:

- Sewer inspection camera and truck
- Two colors of testing dye
- Portable air blower for smoke testing
- Line plugs and sand bags with ropes for smoke testing
- Smoke sticks
- Laptop computer
- Trimble GPS unit
- Flashlight
- Facility drainage plan if available
- Camera
- Whiteboard and pen for photographs
- Two-way radios
- Manhole lid puller
- Sledge hammer for manhole lids
- Traffic cones
- Safety vests
- Clipboard and ID badge
- Public notification flyers (e.g., "smoke testing underway")

Catch Basin Investigations

Catch basin investigations of the storm drain network can be used to isolate an illicit discharge to a specific segment of the network. This method is useful for isolating discharges

in relatively small drainage areas with small diameter (less than 36 inches) outfalls and simple drainage networks. For more complex drainage networks and large diameter (greater than 36 inches) outfalls, field crews can split the storm drain network into segments and conduct water quality sampling at strategic junctions in the network.

Field crews should implement the following **five steps** during catch basin investigations:

1. Obtain a drainage map of the area being inspected.
2. Record visual observations and water quality sampling results at the outfall or reported illicit discharge location to determine the key indicators for this particular discharge.
3. Move to the next "upstream" catch basin (or next junction in the network for complex drainage areas) and record visual observations. If flow is present during dry weather, collect a sample for water quality testing.
4. Repeat these steps until a catch basin (or junction) is found with no evidence of the illicit discharge.
5. Follow up with an on-site investigation at specific properties located between the catch basin (or junction) with no evidence of the illicit discharge and the next "downstream" catch basin (or junction).

Drainage Area Investigations

Drainage area investigations can be divided in two parts: office and field assessments. Office assessments prioritizing certain drainage basins based on screening factors are discussed in Section 4. Field assessments are typically used in large basins where detailed catch basin inspections may be too time consuming or where the field staff are familiar with the businesses in the area of the reported illicit discharge. A drive-by (or "windshield") survey of the drainage area can be a useful tool to pinpoint potential locations for follow-up on-site investigations. Distinct color or odor characteristics are key indicators that are necessary for this type of investigation.

On-site Investigations

Once a catch basin or drainage area investigation has pinpointed a particular property or several properties that may be contributing to the observed illicit discharge, one or more of the following on-site investigation techniques can be implemented:

- Video inspection
- Dye testing
- Smoke testing
- Septic system inspection

Video Inspection

Video inspection should be used when looking for an illicit connection that is suspected between two manhole structures, or along an isolated segment of the storm drainage system. Video inspection of the storm drain system or sanitary sewer system is performed using a sewer inspection camera, also known as a push camera. Video inspections can provide important documentation of actively flowing illicit connections, grease buildup, and other deposits or conditions produced by illicit discharges.

When purchasing a camera for stormwater drainage system video inspections, the following specifications are useful to consider:

- Radial view (inspecting top, bottom, and sides of a pipe; viewing lateral connections)
- Color video capabilities
- Lighting extent (entire periphery of pipe should be illuminated by a lamp on the camera)
- Maneuverability (camera and lights should swivel both horizontally and vertically)

Field crews should implement the following steps during video inspections:

1. Obtain a drainage map of the area being inspected.
2. Determine pipe diameter and if standing water is present in the drainage pipe.
3. Select appropriate camera size and propulsion method (i.e., tractor, crawler, skid, or raft) for the drainage pipe.
4. Place camera and propulsion assistance (if required) into the selected catch basin.
5. Record video and observe camera progress on Closed-Circuit Television (CCTV)
6. Review video and record the following visual observations (if applicable):
    - Heavily stained pipe
    - Grease build-up on pipe walls
    - Food scraps
    - Toilet paper or paper products
    - Soap suds
    - Chemicals (if in an industrial area)
    - Paint or other waste products

Dye Testing

Dye testing should be used when an illicit connection is suspected within a particular building at a property located along an isolated segment of the storm drainage system. Dye testing is typically performed on all plumbing fixtures within a building (i.e., all sinks, toilets, and floor drains are tested) using different colored dyes to test each fixture. The goal is to locate a particular building fixture that is illegally connected to the storm drainage system so that the building owner can hire a plumber to properly connect the fixture to the sanitary sewer. Refer to Appendix 6-1 for a copy of the City of Lynnwood Dye Testing Results form.

Field crews should implement the following steps during dye testing:

1. Review storm drain and sanitary sewer maps to identify lateral sewer connections and access points including building sanitary sewer as-built drawings.
2. Notify property owners to obtain permission to enter home/facility.
3. Notify local public health and state water quality staff regarding when and where dye testing will be occurring.
4. Obtain a site utility plan and identify fixtures that will be tested.
5. Identify type of dye (i.e., tablets, liquid, strips, powder, wax cakes, wax donuts) that will be used.
6. Designate field staff positions (i.e., dye tester and field verifier).
7. Field verifier – Select the closest sanitary sewer manhole for visual observations.
8. Dye tester – Flush or wash dye down the fixture or storm drain being tested and then contact the field verifier using a two-way radio.
9. Field verifier – Use a million candle power light (or another bright light) to check if the dye appears. Take photographs of the dye, if possible.
10. Field verifier – If no dye is detected in the sanitary sewer manhole after two separate flushes have occurred, halt the dye testing until it appears.
11. Field verifier – Locate the missing dye by checking downgradient storm drains or outfalls for the presence of dye, determining if the sewer line is clogged, and verifying that the facility is not connected to a septic system.
12. Dye tester – Record the date, time, dye color, and the fixtures that were tested on a site utility plan.

Smoke Testing

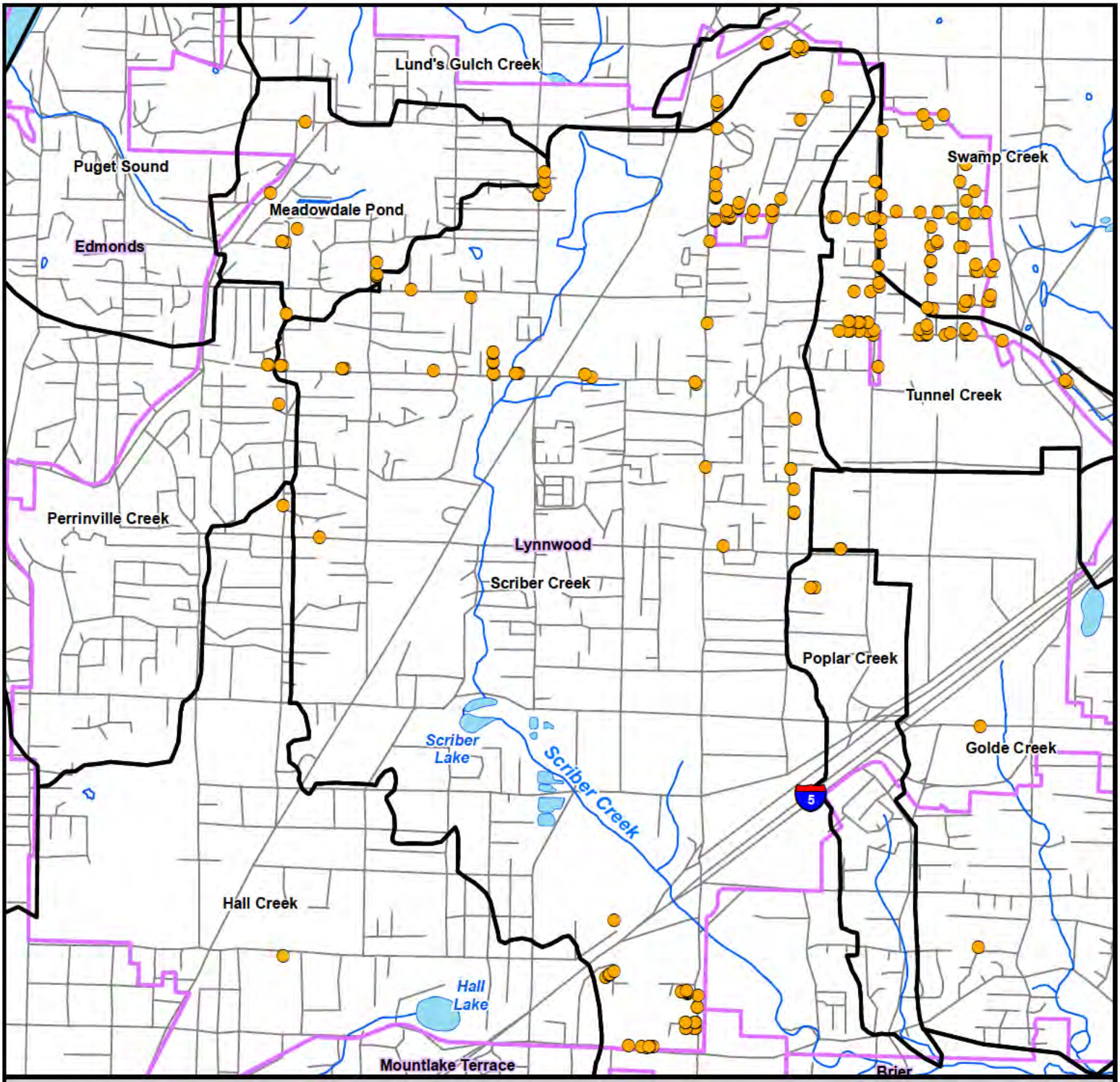
Smoke testing should be used as an alternative to video inspections or dye testing, especially when pipe diameters are too small for video inspections and gaining access to multiple properties makes dye testing an infeasible option. The City has smoke testing equipment and occasionally performs smoke tests.

Field crews should implement the following steps during smoke testing:

1. Review storm drain and sanitary sewer maps.
2. Notify the public at least two weeks prior to testing and provide the following information:
    - Date testing will occur
    - Purpose for smoke testing
    - Precautions residents can take to prevent smoke from entering home or businesses
    - What to do if smoke enters a home or business
    - Health concerns associated with the smoke
    - A number residents can call to notify the City of chronic respiratory problems
3. Notify local fire and police departments and 911 call centers on the day that smoke testing will occur.
4. Identify type of smoke (i.e., smoke bomb, smoke candle, liquid smoke) that will be used.
5. Identify additional equipment needs (e.g., manhole safety equipment, squirrel cage or direct-drive propeller blowers, sewer plugs).
6. Seal off storm drain segment being tested using one of the following methods:
    - Sandbags – Lower into place with a rope from the street surface
    - Inflatable balls – Inflate slightly larger than the pipe, place in a mesh bag with an attached rope, and lower into place.
    - Expandable plugs – Insert from the ground surface.
7. Release smoke and force through storm drain system using a blower.
8. Station staff at points of suspected illicit connections of cracks/leaks.
9. Record and photograph any escape of smoke above-ground (indicating an illicit connection or damaged infrastructure).

Septic System Investigations

On-site septic system investigations can be conducted via a homeowner survey, a surface condition analysis, or a detailed system inspection. The existing septic system locations in the City can be found on Figure 6-1. City staff should coordinate investigations of suspected failing septic systems with Snohomish County Surface Water Management and the Snohomish County Health Department. As part of the fecal coliform bacteria TMDL for Swamp Creek, these agencies are identifying septic system areas within the County with the highest



Legend

- Geocoded septic system address
- Creek
- Road
- Water body
- Basin Boundary
- City boundary

Note: The Maple precinct is reported to have 60-80 homes on septic systems; however, these addresses have not been documented and are not included in this figure.

Figure 6-1. Septic System Locations in the City of Lynnwood, Washington (Source: Lynnwood, 2008).

N

0 1,100 2,200 4,400 Feet

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potential for creating surface water problems (Ecology 2006). The City should prioritize septic system investigations in these problem areas.

Homeowner Survey

When an illicit discharge from a failing septic system is suspected at a particular property, City staff should conduct a homeowner survey. The survey involves interviewing property owners regarding maintenance and the current condition of their septic systems. The survey should be performed if information about the property is not already available from Snohomish County Surface Water Management or the Snohomish County Health Department.

Example survey questionnaires from CWP (2004), New Hampshire (2008), and the University of Minnesota (2009) are included in Appendix 6-2 and include the following types of questions:

1. How many people live here?
2. How old is your septic system?
3. How often do you have your septic system tank pumped?
4. Do you have any problems with your septic system (odors, surface discharge, clogging)?
5. Does sewage back up into your house?
6. Do you park any vehicles or equipment on your drain field?
7. Which of the following water-using machines do you have?
    - Washing machine
    - Garbage Disposal
    - Dishwasher
    - Water softener
    - Hot tub or whirlpool bathtub

Surface Condition Analysis

The surface condition analysis is a quick, visual site assessment of properties with septic systems to identify obvious indicators of septic system failure.

Key yard surface conditions from CWP (2004) include:

1. Foul odors in the yard
2. Wet, spongy ground
3. Lush plant growth near the drain field
4. Burnt grass near the drain field

5. Algae blooms or excessive weed growth in adjacent ditches, ponds, and streams
6. Shrubs or trees with root damage within 10 feet of the system
7. Stormwater flowing over the drain field
8. Cave-ins or exposed system components
9. Visible liquid on the surface of the drain field
10. Obvious system bypasses (e.g., cheater pipes)

Detailed System Inspections

If there are obvious signs that a septic system is failing based on the homeowner survey or surface condition analysis, the homeowner should hire a certified professional to conduct a detailed system inspection and maintenance. A list of certified pumpers and installers is provided on the Snohomish County Health Department website (http://www.snohd.org/snoEnvHealth/www/pumpInstal.htm).

A detailed inspection typically consists of the following steps:

1. The septic tank will be pumped and checked for cracks, leaks & deterioration. The inlet and outlet baffles inside the tank will also be checked.
2. If a pump tank is present, the electrical components and floats are checked.
3. If the property has a conventional, gravity fed system, a camera will be run from the outlet baffle of the septic tank through the delivery line and into the distribution box (if present).The camera will help locate the distribution box and check for delivery line breaks or blockage.
4. The distribution box will be dug up and exposed for investigation. This will provide important information on the condition of the system (i.e., whether the system is contaminated with sludge, the water level is too high, or the disposal field is saturated).
5. A camera will be sent down each lateral line in the disposal field where the wastewater is filtered through layers of gravel and select fill material before percolating down to the groundwater. Each lateral line will be checked for possible breaks, standing water, root growth, sludge build up or signs of high water table.

Financial Assistance for Homeowners with Failing Septic System

The Housing Authority of Snohomish County (HASCO) offers a Housing Rehabilitation Loan Program to provide home improvement loans to lower-income homeowners within Snohomish County. Residents can qualify for loans with low interest rates ranging from 0% to 3% based on the following gross annual household incomes:

- 1 person: $45,100
- 2 people: $51,550

- 3 people: $58,000
- 4 people: $64,400

Homeowners are encouraged to contact Jackie at the Housing Authority of Snohomish County for more information at 425-293-0555.

Section 7 - Removing Illicit Discharges and Connections, and Enforcement

This section provides an overview of the basic steps the City and staff can take to remove illicit discharges and connections, followed by detailed response procedures. Examples of illicit discharges and potential responses are also included followed by information on responsibilities, staffing, and schedule.

Basic Steps to Remove Illicit Discharges and Connections

1. The legal authority to remove illicit discharges and illicit connections is established in the City's IDDE Ordinance (LMC 13.45). Escalating enforcement actions may range from spending time educating citizens or business owners about how they may be causing an illicit discharge to issuing a fine when someone is caught dumping substances into a catch basin. The City staff response to an illicit discharge will vary depending on what the situation is and who is involved. The basic steps to follow in removing illicit discharges and connections are provided below, followed by detailed response procedures that City staff should follow when responding to complaints and reports of illicit discharges and spills. Enlist the support of the Fire Marshall and other key players in the City. Meet with them and inform them of the City's IDDE program and response procedures and how they can assist with identifying illicit discharges and removing them.

2. Respond as quickly as possible to illicit discharge complaints and identify the property owner if possible; notify them that an illicit discharge has been identified

3. If appropriate, the City's Environmental and Surface Water Manager will notify authorities (e.g., Ecology or the local fire department) that an illicit discharge has been identified and will relay what actions that are being taken to have it removed

4. Provide technical assistance to homeowners or businesses on how to eliminate the discharge

5. Use escalating enforcement and legal actions if the discharge is not eliminated as outlined in LMC 13.45.

6. Conduct follow-up inspections

7. Periodically review and amend existing procedures as necessary to meet the requirements and timelines required under section S5.C.3.c.v of the stormwater permit by August 19, 2011.

Escalating Response and Enforcement Actions

Enforcement actions related to illicit discharges and illicit connections are coordinated with the City's Code Enforcement division. Escalating enforcement actions listed in LMC 13.45 shall be taken in the following order of precedence:

1. **First Violation:** written notice to cease and desist activity, notification of violation and warning, including education on preventing further illicit discharges.
2. **Second Violation:** written notice to cease and desist activity, and notice of violation and order of corrective action.
3. **Third Violation:** written notice to cease and desist activity, and citation for civil infraction shall be issued in accordance with the provisions of LMC 1.40.
4. **Fourth Violation:** written notice to cease and desist activity, citation for civil infraction, and order assessing civil penalties shall be issued in accordance with the provisions of LMC 1.40.
5. **Fifth Violation and thereafter:** written notice to cease and desist activity, citation for civil infraction, and order assessing civil penalties shall be issued in accordance with the provisions of LMC 1.40, and pursuit of criminal charges.
6. Daily civil penalties may also apply for each violation for the fourth violation, fifth violation, and thereafter. These fines shall be cumulative, accruing daily until the required corrective action is taken, and will be assessed as follows:
    - First day: $100 for each violation
    - Second day: $200 for each violation
    - Third day: $300 for each violation
    - Fourth day: $400 for each violation
    - Each additional day: $500 for each violation

Responding to Complaints and Reports of Illicit Discharges and Spills

The process for responding to water quality complaints or reports of suspected illicit discharges is as follows:

1. All calls to the KRUD hotline will be logged in Cartegraph.
2. All City staff who receive a complaint or report of an illicit discharge will notify the Environmental and Surface Water Manager.
3. The Environmental and Surface Water Manager will determine if the Lynnwood Fire Department, Ecology, or other agencies listed in Section 6 need to be notified. If not

enough information is received from the initial phone call to the KRUD hotline then field staff must update the Environmental and Surface Water Manager as soon as they arrive onsite.

4. The City's goal is to dispatch Stormwater staff to investigate the illicit discharge within 48 hours.

5. Field staff responding to the complaint will gather necessary equipment before leaving the office (e.g., a digital camera, Illicit Discharge Incident Tracking Form, water quality test kits, sample collection containers, etc.). A copy of the City of Lynnwood Illicit Discharge Incident Tracking Form is included in Appendix 7-1.

6. Field staff will arrive onsite, take photos, talk to property owners, interview witnesses, collect water quality samples, etc. The goal should be to collect as much detailed information as possible. This is especially important if the situation ends up requiring escalating enforcement actions that potentially lead to litigation.

7. If necessary, field staff will notify Code Enforcement staff to assist with writing a notice of violation to the offending party. A citation for a civil infraction will be necessary if this is the third violation for a property owner, business, or contractor. Daily civil penalties may also be assessed for each violation as outlined above.

Example Response Scenarios

There are several scenarios that may be encountered when tracking illicit discharges or responding to citizen complaints. Some examples of illicit discharges or connections, potential response, and associated follow-up actions are provided in Table 7-1.

Table 7-1.	Examples of illicit discharges, potential responses, and follow-up actions	
Type of Illicit Discharge	**Potential Response**	**Follow-up Actions**
Residential		
Septic tank has failed	Notify homeowner that the system appears to be failing. Provide technical assistance for system maintenance to be performed. Provide written documentation of the incident to the homeowner that defines a deadline to have the problem fixed.	Document and notify the Environmental and Surface Water Manager
Hose at curb discharging swimming pool water	Notify the property owner that they must dechlorinate the swimming pool water or prove that they have already done so. Provide technical assistance (e.g., where to buy dechlorination tablets and test strips).	Document and notify the Environmental and Surface Water Manager
Commercial/Industrial		
Grease spilled behind a restaurant	Issue a written notice to the business owner to cease and desist the activities that resulted in the spill, and to immediately clean up the spill. Warn against pressure washing or other methods that could transport the grease to nearby catch basins.	Document and notify the Environmental and Surface Water Manager
Oil or paint dumped in a catch basin	Interview witnesses if possible. Issue a written notice to cease and desist dumping, notification of violation and warning, including education on preventing further illicit discharges	Document and notify the Environmental and Surface Water Manager
Dry cleaning solvent or petroleum sheen discovered in a stream	Immediately investigate areas upstream to identify and stop the source of the discharge.	Document and notify the Environmental and Surface Water Manager
Antifreeze spilled near a catch basin	Immediately isolate the catch basin with a drain cover or absorbent boom and absorb as much of the spill as possible with kitty litter or similar material.	Document and notify the Environmental and Surface Water Manager
Mobile food vendor dumps grease into a catch basin	Issue a written notice to the business owner to cease and desist dumping grease. Use kitty litter or other absorbent to clean up the catch basin.	Document and notify the Environmental and Surface Water Manager
Automobile accident results in spilled antifreeze and motor oil	A tow truck company that responds to the accident typically is responsible for cleaning up small spills at the scene of an accident. The fire department may assist with cleanup for large spills or serious accidents.	Document and notify the Environmental and Surface Water Manager
Municipal		
Municipal sanitary sewer line is plugged	During repairs, sewage shall be bypassed to the nearest *downstream sanitary sewer line* that is not plugged. Discharging to a nearby storm drain is illegal	Document and notify the Environmental and Surface Water Manager
Fuel tank on a City dump truck is leaking	Immediately take the truck out of service and schedule repair. Place a drip pan under the truck's fuel tank until repairs can be made.	Document and notify the Environmental and Surface Water Manager
Construction Sites		
Hydraulic fluid leak at a construction site	Notify the offending party that you've observed the leak and advise them to immediately cleanup the fluid using a spill kit, and to fix the leaking vehicle.	Document and notify the Environmental and Surface Water Manager
Concrete contractor washing out truck at the curbside	Notify the contractor that concrete truck washout must be contained in an eco pan or into a temporary slurry pit onsite.	Document and notify the Environmental and Surface Water Manager
Muddy water coming off of a construction site	Notify the property owner that they shall immediately install or repair existing BMPs to stop the discharge of sediment-laden runoff.	Document and notify the Environmental and Surface Water Manager

SECTION 8 - PUBLIC EDUCATION ACTIVITIES

This section summarizes the City's public education activities related to illicit discharges and illicit connections.

Public Education Activities

The City is required to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. The City will distribute appropriate information to target audiences via the City's website, brochures, and presentations at schools and businesses. City staff will evaluate existing publicly available IDDE educational materials to review whether they clearly identify the hazards associated with illicit discharges. Any necessary changes to the current public education program will be made and new materials will be developed, if necessary.

Ongoing efforts to educate the public about illicit discharges include:

- Annual budget for education grants of $15,000 distributed every year.
- Installing pet waste management stations at local parks and regularly gives away pet waste bag dispensers at local parks and at public events.
- Using a portable stormwater educational booth to provide stormwater education at City fairs and public events.
- Publishing educational articles in *Inside Lynnwood*, a quarterly newsletter.
- Installing awareness signage at creek crossings and distributed storm drain "dump no waste" discs to citizens to post at neighborhood storm drains.
- Installing signs at Scriber Lake Park, Scriber Creek Park, and Mini-Park in the Scriber Creek/Swamp Creek watershed to restrict feeding of waterfowl.
- Implementing the 2006 TMDL plan for the Swamp Creek basin that includes working closely with Snohomish County, Mountlake Terrace, Everett, Kenmore, Bothell, and Brier to educate the public about ways to reduce fecal coliform bacteria loading to the basin.

Photo 8-1. Pest waste management station.

Photo 8-2. Portable stormwater education booth.

The City's goal is to focus its ongoing education and outreach efforts where it can have the most impact, particularly in the four priority areas listed below (see Section 4):

1. The State Route 99 corridor with a high concentration of general commercial zoned properties
2. State Route 524 / 196th Street SW with a high concentration of properties zoned for various types of businesses
3. Alderwood Mall and immediate vicinity
4. Light industrial properties generally concentrated in the south-central portion of the City

Within these priority areas, the City will work to educate businesses owners and homeowners where illicit discharges and illicit connections are most likely to occur including:

- Businesses that generate pet waste (e.g., veterinary clinics, pet boarding centers, pet stores, and animal shelters) and public parks.
- Automotive service centers and gas stations
- Restaurants
- Grocery stores and commercial retailers
- Light industrial manufacturing facilities
- Homes suspected of having failing septic systems.

In addition, the city is providing citywide public education on proper pesticide and fertilizer use and is working to restrict the use of phosphorus-containing fertilizers in the scriber lake and hall lake drainage basins.

SECTION 9 - STAFF TRAINING

Training for Municipal Staff Directly Responsible for IDDE

In December 2009, the City hired a consultant to provide initial training for all field staff responsible for identification, investigation, termination, cleanup, and reporting of illicit discharges. Section S5.C.3.f.i of the permit requires follow-up training on an as-needed basis to address changes in procedures, techniques, or requirements. The City plans to conduct annual refresher training for key IDDE program staff. The training may include a discussion of the following topics:

- Outfall inspection procedures
- Water quality testing procedures and sampling techniques
- Data management
- Staffing and equipment needs
- Lessons learned from City illicit discharge investigations and from neighboring jurisdictions
- Successes or challenges with resolving illicit discharges and illicit connections
- Recommendations for IDDE program improvement

Staff training records are maintained in Cartegraph.

Training for Other Municipal Staff who May Encounter Illicit Discharges

In November 2009, the City hired a consultant to provide initial training for City field staff, who as a part of their normal duties may observe an illicit discharge. The training focused on the identification of illicit discharges/connections and how to report or respond to these illicit discharges/connections. Section S5.C.3.f.i of the permit requires follow-up training on an as-needed basis to address changes in procedures, techniques, or requirements. The City plans to conduct annual refresher training for:

- Streets and stormwater staff
- Utilities crews
- Building inspectors
- Parks maintenance staff

- Police officers and fire fighters

The following training topics may be addressed in each training:

- Brief review of Chapter 13.45 – Surface Water Quality and prohibited versus allowed discharges to surface waters.
- Slideshow of illicit discharges, including recent photo examples of discharges encountered by City staff
- Illicit discharges that City staff have encountered in the field and how they were resolved
- City procedures for reporting and following up on illicit discharges (e.g., contacting the Environmental and Surface Water Supervisor; taking photos; recording the location, date, time, and anyone spoken to, etc.)

Staff training records are maintained in Cartegraph.

Section 10 – IDDE Program Tracking and Evaluation

An important component of the IDDE program is a tracking and reporting system. A summary of the information collected for the tracking and reporting system will be included in the annual report to Ecology. The information stored in the tracking and reporting system should be evaluated on an annual basis at a minimum to adjust the IDDE program as needed.

Tracking and Reporting

The City currently uses Cartegraph to store and analyze data and produce maps. Other jurisdictions use Microsoft Access or even Excel to track data used to generate their annual reports to Ecology. The following information (summarized by IDDE program section below) should be tracked and reported in Cartegraph to assist with annual report preparation and program evaluation.

IDDE Section 1 – Introduction to the Illicit Discharge Detection and Elimination Program Plan (see Notifications for Illicit Discharges)

- Number of illicit discharge complaints received through the IDDE hotline and number of complaints investigated
- Feedback received from public education efforts

IDDE Section 2 – Municipal Stormwater Drainage System Mapping

- Percentage of storm drainage system mapped

IDDE Section 3 – Identifying Priority Areas for Illicit Discharge Investigations

- Prioritized list of receiving waters
- Results of field assessments of the high priority waterbodies

IDDE Section 4 – Identifying Illicit Discharges

- Number of outfalls screened
- ORI data
- Digital photographs
- Follow-up monitoring

IDDE Section 5 – Conducting Dry Weather Outfall Surveys

- Number of dry weather outfall inspections performed

IDDE Section 6 – Tracing the Source of an Illicit Discharge

- Length of stormwater drainage system videotaped
- Number of illicit connection inspections performed (including dye testing, smoke testing, and video inspection)
- Number of septic system inspections conducted
- Number and types of illicit discharges or connections identified from video inspections, dye testing, smoke testing, and septic system investigations

IDDE Section 7 – Removing Illicit Discharges and Connections, and Enforcement

- Number of discharges eliminated
- Maintenance and repair data from illicit connections
- Status and disposition of enforcement actions

IDDE Section 8 –Public Education Activities

- Summer of public education outreach activities conducted
- Feedback received from public education efforts

IDDE Section 9 – Staff Training

- Dates of staff training
- Number of trainings presented and number of staff trained
- Feedback received from staff training

Evaluation and Assessment

The City currently tracks time billed for IDDE related work and investigations by having staff record their time to an IDDE specific task on their timesheets. The City will make adjustments to the IDDE program over time in response to the types of illicit discharges identified, program obstacles, and development of emerging technologies. The effectiveness of various IDDE strategies can be assessed based on the following recommendations provided in CWP (2004) and the NEIWPCC (2003):

- Record the number of IDDE hotline calls received and associated number of confirmed illicit discharges investigated, and determine if the use of the hotline increases over time.
- Evaluate changes in the water quality of receiving waters over time in areas where illicit discharges have been investigated and eliminated.

- Evaluate the number of illicit discharges and/or quantity of illicit discharges eliminated using different enforcement and compliance measures listed in Section 7.
- Evaluate the staff time spent on each program component by tracking time spent on different IDDE tasks on employee timesheets.

SECTION 11 – REFERENCES

In addition to the references listed below, a list of resources related to IDDE are included in Appendix 11-1.

CWP. 2004. Illicit Discharge Detection and Elimination – A Guidance Manual for Program Development and Technical Assessments. Center for Watershed Protection, Ellicott City, Maryland. October 2004.

Ecology. 2006. Swamp Creek Fecal Coliform Bacteria Total Maximum Daily Load Water Quality Improvement Report and Implementation Plan. Publication Number 06-10-021. Prepared by the Washington State Department of Ecology. June 2006.

Ecology. 2009. Western Washington Phase II Municipal Stormwater Permit – National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Western Washington. State of Washington Department of Ecology, Olympia, Washington. Issued January 17, 2007; modified June 17, 2009.

GCHD. 2002. A Guidance Manual for Identifying and Eliminating Illicit Connections to Municipal Separate Storm Sewer Systems (MS4). Prepared by the Galveston County Health District, Pollution Control Division, Galveston, Texas. August 2002.

Herrera. 2009. Surface Water Management Comprehensive Plan. Prepared for the City of Lynnwood Public Works Department. Herrera Environmental Consultants, Inc., Seattle, Washington. September 17, 2009.

NEIWPCC. 2003. Illicit Discharge Detection and Elimination Manual, a Handbook for Municipalities. Prepared by the New England Interstate Water Pollution Control Commission, Lowell, Massachusetts. January 2003.

New Hampshire. 2008. Anonymous Septic System Survey (Example). Prepared by the New Hampshire Department of Environmental Services Volunteer Lake Assessment Program.

Snohomish County. 2002a. Swamp Creek Drainage Needs Report, DNR No. 2. Snohomish County Department of Public Works Surface Water Management Division, December 2002. Accessed via agency website on December 18, 2008. http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/Library/Publications/Urban_Drainage/DNR/Swamp_DNR.htm

SPU. 2010. Excerpts from the draft Quality Assurance Project Plan under development for Seattle Public Utilities' Illicit Discharge Detection and Elimination program. Provided via email by Ellen Stewart, Source Control Supervisor, Seattle Public Utilities. March 17, 2010.

University of Minnesota. 2009. Homeowner Survey – Onsite Septic System. August 5, 2009.

Wayne County. 2008. Wayne County Illicit Connection/Discharge Elimination Training Program presentation. Wayne County, Michigan.

APPENDIX 1-1

Chapter 13.45 – Surface Water Quality

Chapter 13.45
SURFACE WATER QUALITY

Sections:

13.45.005 Purpose.

The purpose of this chapter is to protect the city's surface and ground water quality by providing minimum requirements for reducing and controlling the discharge of contaminants. The city council recognizes that water quality degradation can result either directly from one discharge or through the collective impact of many non-point source discharges. Therefore, this chapter prohibits the discharge of contaminants into surface and stormwater and ground water, and outlines preventive measures to restrict contaminants from entering such waters. These measures include education, source control, implementation of best management practices (BMPs), as well as enforcement, amongst others. (Ord. 2834 § 1, 2010)

13.45.010 Definitions.

The definitions in this section apply throughout this chapter unless the context clearly requires otherwise.

"AKART" means all known, available and reasonable methods of prevention, control and treatment. AKART represents the most current methodology that can be reasonably required for preventing, controlling or abating the pollutants associated with a discharge. AKART applies to both point and non-point sources of pollution.

"Best management practices" or "BMPs" mean the best available and reasonable physical, structural, managerial or behavioral activities, that, when used singly or in combination, eliminate or reduce the contamination of both surface and ground waters.

“Chapter” means this chapter and any administrative rules and regulations adopted to implement this chapter.

“Clean Water Act” means 33 U.S.C. 1251 et seq., and any subsequent amendments thereto.

“Combined sewer” means a system that collects sanitary sewage and stormwater in a single sewer system.

“Director” means the Lynnwood public works director, and/or the director’s designee.

“Discharge” means to throw, drain, release, dump, spill, empty, emit, or pour forth any matter or to cause or allow matter to flow, run or seep from land or be thrown, drained, released, dumped, spilled, emptied, emitted or poured into water.

“Drainage facility” means a constructed or engineered feature that collects, conveys, stores or treats surface and stormwater runoff. “Drainage facility” includes, but is not limited to, a constructed or engineered stream, pipeline, channel, ditch, gutter, lake, wetland, closed depression, flow control or water quality treatment facility, erosion and sediment control facility and other structure and appurtenance that provides for drainage.

“Ground water” means all waters that exist beneath the land surface or beneath the bed of any stream, lake or reservoir or other body of surface water, whatever may be the geological formation or structure in which such water stands or flows, percolates or otherwise moves.

“Hazardous material” means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

“Hyperchlorinated” means water that contains more than 10 mg/liter chlorine.

“Illicit connection” means any manmade conveyance that is connected to a municipal separate storm sewer without a permit, excluding roof drains and other similar type connections. Examples include sanitary sewer connections, floor drains, channels, pipelines, conduits, inlets, or outlets that are connected directly to the municipal separate storm sewer system.

“Illicit discharge” means any direct or indirect non-stormwater discharge to the city’s storm drain system, except as expressly allowed by this chapter.

“Low impact development” is a stormwater management strategy that emphasizes conservation and use of existing site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns on the site.

“Municipal separate storm sewer system (MS4)” means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

A. Owned or operated by the city of Lynnwood;

B. Designed or used for collecting or conveying stormwater;

C. Which is not part of a publicly owned treatment works (POTW); and

D. Which is not a combined sewer.

"National Pollutant Discharge Elimination System" or "NPDES" means the national program for controlling pollutants from point source discharges directly into waters of the United States under the Clean Water Act.

"National Pollutant Discharge Elimination System (NPDES) permit" means an authorization, license or equivalent control document issued by the Environmental Protection Agency or the Washington State Department of Ecology to implement the requirements of the NPDES program.

"Non-stormwater discharge" means any discharge to the storm drain system that is not composed entirely of stormwater.

"Person" means an individual and his or her agent or assign, municipality, political subdivision, government agency, partnership, corporation, business or any other entity.

"Pollutant" means any substance which, when added to water, would contaminate or alter the chemical, physical, or biological properties of any waters of the state. This includes a change in temperature, taste, color, turbidity, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state as will or is likely to create a nuisance. It also includes any substance which renders such waters harmful, detrimental, or injurious to the public health, safety, or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish, or other aquatic life.

"POTW" means any device or system used in treatment of municipal sewage or industrial wastes of a liquid nature which is publicly owned.

"Premises" means any building, lot, parcel of land, or portion of land, whether improved or unimproved, including adjacent sidewalks and parking strips.

"Receiving waters" means bodies of water or surface water systems to which surface runoff is discharged via a point source of stormwater or via sheet flow.

"Source control BMP" means a BMP intended to prevent contaminants from entering surface and stormwater or ground water including the modification of processes to eliminate the production or use of contaminants. Source control BMPs can be either structural or nonstructural. Structural source control BMPs involve the construction of a physical structure on site, or other type of physical modification to a site. An example of a structural source control BMP is building a covered storage area. A nonstructural source control BMP involves the modification or addition of managerial or behavioral practices. An example of a nonstructural source control BMP is using less toxic alternatives to current products or sweeping parking lots.

"State waste discharge permit" means an authorization, license, or equivalent control document issued by the Washington State Department of Ecology in accordance with Chapter 173-216 WAC.

"Storm drainage system" means publicly or privately owned facilities, including the city's municipal separate storm sewer system, by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, ditches

and/or swales, pumping facilities, retention and detention basins, natural and human made or altered drainage channels, reservoirs, and other drainage structures.

"Stormwater" or "surface water" means water originating from rainfall and other precipitation that is found on ground surfaces and in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, wetlands, and shallow ground water.

"Stormwater pollution prevention plan (SWPPP)" means a document which describes the best management practices and activities to be implemented by a person to identify sources of pollution or contamination at a premises and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater conveyance systems, and/or receiving waters to the maximum extent practicable.

"Treatment BMP" means a BMP intended to remove contaminants once they are already contained in stormwater. Examples of treatment BMPs include oil/water separators, biofiltration swales and wetponds. (Ord. 2834 § 1, 2010)

13.45.015 Applicability.

This chapter shall apply to all discharges entering the MS4, ground waters, or a waterbody from any developed or undeveloped lands, unless explicitly exempted by the city. (Ord. 2834 § 1, 2010)

13.45.020 Administration.

The director or his designee is authorized to implement the provisions of this chapter. To do so, the director is authorized to promulgate and adopt administrative rules and regulations as necessary. The director will coordinate the implementation and enforcement of this chapter with other departments of the city. (Ord. 2834 § 1, 2010)

13.45.025 Illicit discharges into Lynnwood surface waters prohibited.

A. Illicit Discharges. It is unlawful for any person to cause or permit to discharge any contaminants into surface and stormwater, the storm drainage system, ground water or stream. Contaminants that, if discharged, would constitute an illicit discharge include, but are not limited to, the following:

1. Trash or debris;
2. Construction materials;
3. Petroleum products including but not limited to oil, gasoline, grease, fuel oil, heating oil;
4. Any and all automotive fluid, parts and products;
5. Metals in either particulate or dissolved form;
6. Flammable or explosive materials;
7. Radioactive material;
8. Batteries;
9. Acids, alkalis, or bases;
10. Paints, stains, resins, lacquers or varnishes;
11. Degreasers and solvents;
12. Drain cleaners;

13. Pesticides, herbicides or fertilizers;
14. Steam cleaning wastes;
15. Soaps, detergents or ammonia;
16. Swimming pool drainage;
17. Chlorine, bromine and other disinfectants;
18. Heated water;
19. Domestic animal wastes;
20. Sewage;
21. Recreational vehicle waste;
22. Animal carcasses;
23. Food wastes;
24. Bark and other fibrous materials;
25. Collected lawn clippings, leaves or branches;
26. Silt, sediment or gravel;
27. Dyes, except as stated in LMC 13.45.040;
28. Chemicals not normally found in uncontaminated water;
29. Any other process-associated discharge except as otherwise allowed in this section;
30. Any hazardous material or waste not listed above.

B. Illicit Connections. Any connection identified by the director that could convey anything not composed entirely of surface and stormwater directly to surface and stormwater or ground water is considered an illicit connection and is prohibited, with the following exceptions:

1. Connections conveying allowable discharges under this chapter;
2. Connections conveying allowable discharges pursuant to an NPDES permit. (Ord. 2834 § 1, 2010)

13.45.030 Best management practices.

A. BMP Design. The owner or operator of a commercial or industrial establishment shall provide and maintain, at its own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drainage system or waterbody through the use of these structural and nonstructural BMPs. Further, any person responsible for a premises which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and nonstructural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system.

For any activity which may result in illicit discharges, the director may require the use of the Washington State Department of Ecology's 2005 Stormwater Management Manual for Western Washington, Volume IV, Source Control BMPs, and Volume V, Runoff Treatment BMPs (hereafter "manual") or other appropriate manual or guidance (as approved by the director). The manual outlines requirements identifying best management practices, including pollutant source control for any activity, operation, or facility which may cause or contribute to pollution or contamination of stormwater, the storm drain system, or waters of the United States.

Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed in compliance with the provisions of this section. These BMPs shall be part of an SWPPP as necessary for compliance with requirements of the NPDES permit.

B. Activities Requiring BMPs. BMPs shall be applied to any business or residential activity that might result in prohibited discharges. Activities that might result in prohibited discharges should use and maintain appropriate BMPs (as approved by the director), and may include but are not limited to the following:

1. Potable water line flushing;
2. Lawn watering with potable water;
3. Dust control with potable water;
4. Automobile and boat washing;
5. Pavement and building washing;
6. Swimming pool and hot tub maintenance;
7. Auto repair and maintenance;
8. Building repair and maintenance;
9. Landscape maintenance;
10. Hazardous waste handling;
11. Solid and food waste handling; and
12. Application of pesticides. (Ord. 2834 § 1, 2010)

13.45.035 Emergency spill control plan.

A. Regulated Businesses. The following parties shall be required to prepare and implement, at their own expense, an emergency spill control plan:

1. Any owners or operators of a facility that is already required by state or federal law to have an emergency spill control plan; and
2. A new or used oil generator. A “new or used oil generator” is any person whose act or process produces used oil. Private resident “do-it-yourselfer” used oil generators are not subject to regulation but are required to properly dispose of all used oil generated.

B. Contents of Emergency Spill Control Plan. An emergency spill control plan is subject to review and approval by the director, and shall contain the following elements:

1. A description of the facility including the owner’s name and address;
2. The nature of the activity at the facility;
3. The types of chemicals used or stored at the facility;
4. A site plan showing the location of storage areas for chemicals, the locations of sewer and storm drains, the areas draining to them, and the location and description of any devices to stop spills from leaving the site such as positive control valves, berms, or absorbent material;
5. Cleanup procedures, materials, and their locations;
6. Notification procedures to be used in the event of a spill, such as notifying key personnel and regulatory agencies. At a minimum, agencies such as the Washington State Department of Ecology, the Lynnwood Fire Department, and the Lynnwood surface water utility shall be notified;

7. The name of the designated responsible person(s) with overall spill cleanup and notification responsibility;

8. Time retention for records.

C. Implementation of Emergency Spill Control Plan.

1. The designated responsible person(s), and any other key personnel, shall be trained in the implementation of the emergency spill control plan.

2. Prepare a summary of the plan and post it at appropriate points in the building, identifying the designated responsible person(s), location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill.

3. All employees shall be informed of the location of the emergency spill control plan, and shall know who the designated responsible person(s) is.

4. The emergency spill control plan shall be reviewed and updated if necessary annually.

5. Immediately notify the Washington State Department of Ecology and the Lynnwood surface water utility if a spill may reach sanitary or storm sewers, ground water, or surface water.

6. Immediately clean up spills in accordance with the emergency spill control plan. Absorbent material shall not be washed down a floor drain or storm sewer.

7. Locate emergency spill containment and cleanup kit(s) in high potential spill areas. The contents of the kit shall be appropriate for the type and quantities of chemical liquids stored at the facility.

8. The emergency spill control plan shall be made available to city personnel upon request.

D. Necessary Facility Repairs or Improvements. If, upon evaluation of information obtained by the director, it is determined that repairs or structural improvements are necessary in order to eliminate threats to the surface water system, the director may require the owner or operator to complete such repairs or improvements at their own expense. (Ord. 2834 § 1, 2010)

13.45.040 Discharges not considered illicit.

A. Discharges Not Considered Illicit. The following types of discharges shall not be considered illicit discharges for the purpose of this chapter unless the director determines that the type of discharge, whether singly or in combination with other discharges, is causing significant contamination of surface and stormwater or ground water:

1. Spring water, including spring water with naturally occurring iron oxide bacteria;

2. Diverted stream flows;

3. Uncontaminated water from crawl space pumps, foundation drains or footing drains;

4. Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));

5. Pumped ground water flows that are uncontaminated;

6. Materials placed as part of an approved habitat restoration or bank stabilization project;

7. Natural uncontaminated surface water or ground water;

8. Flows from riparian habitats and wetlands;

9. Collected rainwater that is uncontaminated;

10. Uncontaminated ground water that seeps into or otherwise enters stormwater conveyance systems;

11. Air conditioning condensation;

12. Irrigation water from agricultural sources that is commingled with stormwater runoff;

13. Discharges from emergency fire fighting activities; and

14. Other types of discharges as determined by the director.

B. Dye Testing. Dye testing is allowable on an as-needed basis, but requires verbal notification to the director at least one day prior to the date of test. The Snohomish County health district does not need to provide advance notification.

C. Other Exceptions. A discharge will not be considered illicit if:

1. That responsible person has properly designed, constructed, implemented and is maintaining BMPs, and is carrying out AKART as required by this chapter, but contaminants continue to enter surface and stormwater or ground water; or

2. That responsible person can demonstrate that there are no additional contaminants being discharged from the site above the background conditions of the water entering the site.

3. Emergency response activities or other actions that must be undertaken immediately or within a time too short to allow full compliance with this chapter in order to avoid an imminent threat to public health or safety shall be exempt from this section. The director by public rule may specify actions that qualify for this exception in city procedures. A person undertaking emergency response activities shall take steps to ensure that the discharges resulting from such activities are minimized. In addition, this person shall evaluate BMPs and the site plan, where applicable, to restrict recurrence. (Ord. 2834 § 1, 2010)

13.45.045 Inspection and monitoring of discharges.

A. Access to Facilities.

1. As a condition of service, all persons and premises connected to the municipal storm drainage system shall allow the city to:

a. Enter onto the person’s property at reasonable times after notice, and with the permission of the property owner, to inspect the system and any connection made to the system by the property owner or to install appropriate monitoring equipment. This provision shall not be interpreted to limit the city’s rights under any easement, license or right arising from a public right-of-way.

b. Inspect records of the person relating to discharges to the city system upon request and at reasonable times.

2. Failure to permit entry or inspection may result in the following actions or consequences:

a. The city may at its sole option seek a search warrant from a court of competent jurisdiction.

b. If it is later determined that a violation of this chapter has occurred, the violation shall be assumed to have been occurring from the date of the city's original request and to have continued until discovered by the city. Each and every day shall be a separate violation. This presumption may be overcome by the presumed violator only by clear and convincing evidence that the violation began at a later date. (Ord. 2834 § 1, 2010)

13.45.050 Notification of spills.

Notwithstanding other requirements of law, as soon as any person responsible for a premises or operation, or responsible for emergency response for a premises or operation, has information of any known or suspected release of materials which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the storm drainage system, or waterbodies, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release, said person shall immediately notify:

A. Emergency response agencies (if necessary) of the occurrence via emergency dispatch services; and

B. The city's illicit discharge hotline. (Ord. 2834 § 1, 2010)

13.45.055 Violations.

It shall be unlawful for any person to violate any provision of this chapter. Any person found to be in violation of any provision of this chapter shall be guilty of a misdemeanor. Each day's violation of the provisions of this chapter shall be deemed a separate offense.

Any person who, through an act of commission or omission, aids or abets in a violation shall be considered to have committed a violation of this chapter. The director may take enforcement action, in whole or in part, against any violator. Each violator is jointly and severally liable for a violation of this chapter. The decisions whether to take enforcement action, what type of action to take, and which person to take action against, are decisions entirely within the director's discretion.

Furthermore, any person who violates any provision of this chapter or any provision of any requirement issued pursuant to this chapter may also be in violation of the Clean Water Act and may be subject to the sanctions of that act including civil and criminal penalties. (Ord. 2834 § 1, 2010)

13.45.060 Enforcement.

The director shall have the authority to enforce any and all provisions of this chapter.

A. Public Nuisance. Any violation of any provision of this chapter is a threat to public health, safety, and welfare, and is declared and deemed a public

nuisance, and is subject to the terms and provisions of the code enforcement chapter of the Lynnwood Municipal Code (Chapter 1.40 LMC).

B. Escalating Enforcement. When a violation of this chapter has been committed, the director may use an escalating method of progressive severity to gain compliance; however, the director may take any enforcement action without regard to precedence, or any available legal recourse provided by law, to eliminate or end an emergency. Escalating enforcement actions shall be taken in the following order of precedence:

1. First Violation. Written notice to cease and desist activity, notification of violation and warning, including education on preventing further illicit discharges.

2. Second Violation. Written notice to cease and desist activity, and notice of violation and order of corrective action.

3. Third Violation. Written notice to cease and desist activity, and citation for civil infraction shall be issued in accordance with the provisions of Chapter 1.40 LMC.

4. Fourth Violation. Written notice to cease and desist activity, citation for civil infraction, and order assessing civil penalties shall be issued in accordance with the provisions of Chapter 1.40 LMC.

5. Fifth Violation and Thereafter. Written notice to cease and desist activity, citation for civil infraction, and order assessing civil penalties shall be issued in accordance with the provisions of Chapter 1.40 LMC, and pursuit of criminal charges. (Ord. 2834 § 1, 2010)

13.45.065 Penalties.

When a violation of this chapter has been committed, the following penalties may be assessed:

A. Corrective Actions. The director shall have the authority to require any and all of the following corrective actions in order to gain compliance with this chapter:

1. Cease and desist or stop work order;
2. Elimination of illicit connection;
3. Abatement of any and all contaminants;
4. Implementation of source control or treatment BMPs;
5. Restoration of affected property, waterway, or conveyance;
6. Other actions deemed necessary by the director.

B. Abatement by City.

1. City Action. If the violation has not been corrected pursuant to the requirements set forth in the notice of corrective action, the city may enter upon the subject premises and is authorized to take any and all measures necessary to abate the violation. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the city or designated contractor to enter upon the premises for the purposes set forth above and the city may pursue any lawful remedy at its disposal.

2. Recovering Cost of Abatement. Should a person be found in violation of this chapter, the city shall be entitled to recover all abatement costs, personnel

expenses, sampling and monitoring costs, attorney's fees, court costs and other administrative expenses associated with enforcement hereof.

C. Civil Penalties. Any person found to be in violation of this chapter may be subject to civil penalties. Civil penalties shall constitute a personal obligation of the person against whom the penalties were imposed. An assessed civil penalty must be paid to the office of the finance director, city of Lynnwood. The provisions of this section are in addition to, and not in lieu of, any other penalty, sanction, or right of action provided by the law.

1. Daily Fines. These fines shall be cumulative, accrue daily until the required corrective action is taken, and be assessed as follows:

a. First day: $100.00 for each violation.

b. Second day: $200.00 for each violation.

c. Third day: $300.00 for each violation.

d. Fourth day: $400.00 for each violation.

e. Each additional day: $500.00 for each violation.

2. Economic Benefit. The director may assess a civil penalty equivalent to the economic benefit the violator derives from the violation. The value of the assessed penalty shall be documented, and shall be based on the greater of: the resulting increase in value of the property or business received by the violator for not complying with this chapter; or the savings of construction or retrofit costs realized by the violator for not complying with this chapter.

3. Use of Collection Agency Authorized. The city, in its sole and exclusive discretion, may retain a collection agency to collect any and all fines assessed under this chapter. When a collection agency is used, fines will be collected at a rate of 150 percent pursuant to RCW 19.16.500.

D. Criminal Penalties. Any person found to be in violation of this chapter may be subject to criminal penalties, as prescribed by state law, RCW 90.48.140. (Ord. 2834 § 1, 2010)

13.45.070 Appeals.

Any person who objects to a final order of the city under this chapter may file an appeal to the hearing examiner. The person shall file a written protest objecting to the order of the city with the city clerk within 14 days of the order. The city shall process the appeal under Process VI, LMC 1.35.600. (Ord. 2834 § 1, 2010)

13.45.075 Severability.

If any paragraph, clause, sentence, section or part of this chapter or the application thereof to any person or circumstances shall be adjudged by any court of competent jurisdiction to be invalid, such order or judgment shall be confined in its operation to the controversy in which it was rendered and shall not affect or invalidate the remainder of any part thereof to any other person or circumstances and to this end the provisions of each paragraph, clause, sentence, section or part of this chapter are hereby declared to be severable. (Ord. 2834 § 1, 2010)

APPENDIX 5-3

City of Lynnwood Outfall Screening Inspection Form

City of Lynnwood – Outfall Reconnaissance Inspection Form

Section 1: Background Data

Receiving Water	Outfall ID:
Date:	Time:
Outdoor Air Temperature:	Inspector(s):
Amount of Precipitation in the Past 48 Hours (inches):	Photo's Taken (Y/N)
Land Use in Drainage Area (Check all that apply): ☐ Industrial ☐ Residential ☐ Commercial ☐ Park	Nearest Address:_____ Business or Park Name (if applicable): _____

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
					Fill in for all Outfalls
Storm Sewer (Closed Pipe)	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Clay / drain tile ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other:_____	Diameter/ Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
Open drainage (swale/ditch)	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other _____	☐ Trapezoid ☐ Parabolic ☐ Other:		Depth: Top Width: Bottom Width:	

Section 3: Physical Indicators for Outfalls

INDICATOR OBSERVED?	YES	NO	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐	☐ Excessive ☐ Inhibited	
Turbid/cloudy plunge pool below outfall	☐	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe algae/growth	☐	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	
Do physical indicators suggest an illicit discharge is present ☐ YES ☐ No				

Flow or Water Present?	☐ Yes ☐ No	**If No, Go to Section 4 and close ORI** **If Yes, continue with Sections 4 through 7.**
Flow Description	☐ Trickle ☐ Moderate ☐ Substantial	

Section 4: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

City of Lynnwood – Outfall Reconnaissance Inspection Form

Section 5: Physical Indicators For Flowing Outfalls

INDICATOR OBSERVED?	YES	NO	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐	☐ Sewage ☐ Rancid/sour/rotten ☐ Sulfide ☐ Petroleum/gas ☐ Laundry ☐ Other:	☐ 1–Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color (color chart)	☐	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange/Red ☐ Multi-Color ☐ Other:	☐ 1–Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Floatables (Does Not Include Trash)	☐	☐	☐ Sewage ☐ Soap suds ☐ Petroleum (oil sheen) ☐ Grease ☐ Other:	☐ 1–Few/slight; origin not obvious	☐ 2 – Some; indications of origin	☐ 3 - Some; origin clear
Natural phenomena	☐	☐	☐ Organic sheen ☐ Foam ☐ Tannins ☐ Algae ☐ Iron bacteria ☐ Other:			
Do physical indictors (flowing) suggest an illicit discharge is present? ☐ Yes ☐ No (Continue with Sections 6 and 7)						

Section 6: Data Onsite Sampling – Primary Screening

PRIMARY SCREENING PARAMETERS	FIELD TEST RESULT	TRIGGER FOR FURTHER INVESTIGATION	INVESTIGATE FURTHER FOR ILLICIT DISCHARGE? (Y/N)	EQUIPMENT
pH		< 6.5 or > 8.5	☐ Yes ☐ No	Field meter
Temperature		>10° F warmer than normal for that waterbody	☐ Yes ☐ No	Field meter
Turbidity		>25 NTU	☐ Yes ☐ No	Field meter
Ammonia		>3 mg/L	☐ Yes ☐ No	Field test strips
Potassium		>5 mg/L	☐ Yes ☐ No	Field meter
Fluoride *		> 0.3 mg/L	☐ Yes ☐ No	Field test kit
Free chlorine *		>0.2 mg/L	☐ Yes ☐ No	Low level colorimeter
Surfactants/detergents		> 0.5 mg/L	☐ Yes ☐ No	Field test kit
Do primary screening results suggest an illicit discharge is present ☐ YES ☐ No				

***** Either fluoride or free chlorine may be used as an indicator to detect potable water in the stormwater drainage system

Section 7: Follow-up Investigation of Suspected Illicit Discharge or Illicit Connection

Do the screening results above suggest that an illicit discharge is present? ☐ YES ☐ NO

If YES, follow up with tracking down the discharge and eliminating it at the source if possible.

1. Name of staff responsible for further investigating this illicit discharge? _____
2. Date this form was turned over for further investigation? _____

APPENDIX 6-1

City of Lynnwood Dye Testing Results Form

City of Lynnwood Dye Testing Results

Inspection Date: _____

Name of Facility: _____

Address: _____

Watershed: _____

☐ Proper connection – all fixtures dye tested have been found to be properly connected to the sanitary sewer system.

☐ Incomplete: _____
(provide reason)

☐ Inconclusive – unable to detect dye in the sanitary sewer system

☐ Illicit connection – fixtures identified that are resulting in pollution of City of Lynnwood surface waters

☐ Illicit discharge risk – situation or poor housekeeping identified that may lead to pollution of City of Lynnwood surface waters

Type of Fixture Tested	Number	Illicit Connection Identified
Floor drain(s)		
Trench drain(s)		
Catch basin(s)		
Catch basin(s) with oil-water separator		
Hand sink(s)		
Utility sink(s)		
Chemistry lab sink(s)		
Laundry tub(s)		
Toilet(s)		
Urinal(s)		
Sump pump drain(s)		
Swimming pool sump drain(s)		
Machinery process water		
Direct discharge		
Outdoor trailer washing		
Failing septic system		
Other:		
Other:		

APPENDIX 6-2

Anonymous Septic System Survey (Example) and Homeowner Survey - Onsite Septic System

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Homeowner Survey – Onsite Septic System

These questions help septic system professionals determine the best level of care for your septic system. The questions can also help troubleshoot problems, address needed upgrades or changes, or other issues.

Name_____ Phone Number_____

Address_____

County/Township_____Permit No._____

Information about the home and residents:

1. The house/cabin is used _____ full time, year-round _____ seasonal or part-time
2. Number of people living in the home: _____adults _____children age 0 – 11 _____ children age 12 & up
3. Current number of bedrooms _____ number of bedrooms in original design_____

   number of bathrooms: _____full _____three-fourths _____half
4. Do you have an in-home business? _____ If yes – what is it?_____

Information about the Septic System: *italicized answers best protect your system.*

5. Number of septic tanks or chambers in tanks:_____ capacity of tanks in gallons_____ ____ unknown
6. Date of last pumping or evaluation: _____ How many tanks pumped_____ ____ unknown
7. Are there risers on the septic tank maintenance holes? _____*yes* _____no ____unknown
8. Are the risers insulated for freezing protection, and well secured for safety? _____*yes*_____no____unknown
9. Is there an effluent screen on the outlet baffle of the tank? _____*yes* _____no ____unknown
10. If an effluent screen is present, do you maintain it? _____the pumper checks it ____ yes _____unknown
11. Do you know how old your septic system is? _____no _____yes, installed in _____
12. Are you aware of any problems or repairs? _____ Describe:_____

    _____
13. Has the system ever frozen? _____Yes, specify where_____ ____no___unknown
14. Do you use septic tank or system additives? ____*no* ___yes, we have added_____
15. Have you noticed any odors?_____ Where?_____
16. We have: ___in-ground soil treatment area ___above ground___other_____
17. We mow the grass over the drainfield regularly _____*yes* _____no
18. We keep all vehicles, snowmobiles, dirt bikes, 4-wheelers, other items off our drain field area ____*yes* ___no
19. Pumps: ___yes, our system has pumps ___no ___unknown Gallons/dose _____ Doses/day____
20. Alarms: ___alarms are present for pumps and/or effluent screen. _____Alarms do not work

    ___unknown _____we do not have any alarms.
21. Well: _____yes _____no Well casing depth_____feet Distance from drainfield_____feet
22. Is this your first home with a septic system? _____

    Are you familiar with the "dos and don'ts" of a septic system? _____

    Do you have a copy of the *Septic System Owner's Guide* from the University of Minnesota? _____

UNIVERSITY OF MINNESOTA

Homeowner Survey – Onsite Septic System

Household product and use information: *italicized answers best protect your system.*

23. **Garbage Disposal:** (*circle*) _____*no* _____yes, and use it ___often _____rarely _____never
24. **Dishwasher:** _____no _____yes _____loads per week

    we use _____*gel* or _____ powdered detergents. _____ we read labels for phosphorus content.

    Does it discharges to the septic system? _____yes _____ *no*
25. **Clothes Washer:** _____no _____yes, _____and wash _____ loads/week. _____We wash more than 1 load/day.

    We have: _____an older agitator top loading washer _____suds-saver washer ____front loading washer

    We use ___ *liquid* or ____ powdered laundry detergents. Lint screen on the washer? _____*Yes* ___ no

    Amount of laundry bleach used in one week:_____ Type? _____

    Does it discharge to the septic system? _____yes _____ no
26. **Water Softener:** _____no _____yes, and it discharges to the septic system __yes ___ *no*
27. **Other water treatment filter:** what:_____ it discharges to the septic system __yes ___ *no*
28. **Whirlpool bathtub**: _____no _____yes, and it discharges to the septic system __yes ___ no
29. **Sump Pump**: _____no _____yes, and it discharges to the septic system __yes ___ *no*
30. **Floor, roof or other drains**: _____no _____yes, and it discharges to the septic system __yes ___ *no*
31. **Skin care products:** _____bath and shaving oils, creams, moisturizers: ____yes, we use these, times/week: _____
32. **Anti-bacterial soaps, cleansers**: _____yes, we use these _____*no, we do not use anti-bacterials.*
33. **Cleaning products**: indicate those used:_____ Every-flush toilet cleaners ____after-shower door cleansers

    _____drain cleaners _____bleach-based kitchen and bathroom cleansers.

    List other commonly used cleaning products:_____
34. **Toilet Paper**: number of rolls used per week _____
35. **Prescription Drugs used long-term**: _____no ____yes,

    _____type of medicine

    _____type of medicine
36. We dispose of un-needed prescription drugs by_____
37. Please attach system sketch if available. Include: footing drains, surface drainage and system replacement area

What questions do you have?

Anonymous Septic System Survey (Example)

Dear _____ Watershed Property Owner:
(Lake Name)

In order to assess the threats to the quality of our lake, the lake association is sending each property owner in the watershed a septic system survey. We ask that this survey be completed by a member of each household. This information will help us better understand the state of the septic systems in the watershed and the impact that these systems may be having on the quality of the lake. Because these issues are sometimes sensitive, we have decided to conduct an anonymous survey. You only need to fill out the questions that are asked below and you do not need to include your name, address, or lot number. We encourage you to be honest in your responses, as this will assist us in better understanding the threats to our lake and how to protect our lake. Remember, as the lake quality declines, property values along the lake and the recreational values of the lake will decline as well.

If you have any comments, or would like to include your name and address, please feel free to include this information on the back of the survey in the indicated location.

Thank you for participating!

Sincerely,

_____ Association
(Lake Name)

---

1. Is there a septic system on your property?

Yes No

2. How old is your septic system (in years)?

1 – 10 10 – 15 15 – 20 20 – 25 I don't know

3. How many feet from the shore of the lake is your septic system located?

10 – 20 20 -50 50 – 75 Greater than 75 feet

4. Is the property used year round or seasonally?

Year round Seasonally

5. If you are a seasonal resident, how many months out of the year do you spend in your lake home? _____

6. In what condition is your septic system?

Good Moderate Poor I don't know

7. Do you have any problems with your septic system (odors, surface discharge, clogging)?

Yes No

8. Have you made any repairs to your septic system?

Yes No

9. How often do you have your septic system tank pumped?

Every 1 – 3 years Every 3 – 5 years Every 10 years Never

10. What size lot do you own?

¼ acre ½ acre 1 acre greater than 1 acre

11. How far away from the lake edge is your home located?

10 – 20 feet 20 – 50 feet 50 – 75 feet greater than 75 feet

12. How far away from the edge of the nearest tributary to the lake is your home located?

10 – 20 feet 20 – 50 feet 50 – 75 feet greater than 75 feet

13. What is your drinking water source?

Dug Well Drilled Well Public Water Bottled Water I don't know

14. How many bedrooms does your home/cottage have?

1 2 3 More than 3

15. How many people typically occupy your lot? _____

16. Which of the following water-using machines do you have on your lake-front dwelling?

Washing Machine Garbage Disposal Dishwasher Water Softener Other:_____

17. Other Comments (optional):

When this form is complete, please mail it to:

_____

(include lake association address)

For more information, contact: _____

(Include contact person and phone number)

APPENDIX 7-1

City of Lynnwood Illicit Discharge Incident Tracking Form

City of Lynnwood Illicit Discharge Incident Tracking Form

Incident ID or ERTS No.:

1. Incident Location

Closest street address:	Drainage Basin:
Business name if applicable:	
Brief description of incident/complaint:	

☐ Investigated: **No further action is necessary.**
☐ **Sections 4, 5, and 6 of this form also completed?**
Date investigated
Describe why no further action is necessary:

Primary Location Description	**Secondary Location Description:**		
☐ Stream corridor *(In or adjacent to stream)*	☐ Outfall	☐ In-stream flow	☐ Along banks
☐ Upland area *(Land not adjacent to stream)*	☐ Near storm drain	☐ Near other water source (storm water pond, wetland, etc.):	
Narrative description of location:			

2. Upland Problem Indicator Description

☐ Dumping	☐ Oil/solvents/chemicals	☐ Sewage
☐ Wash water, suds, etc.	☐ Other: _____	

3. Stream Corridor Problem Indicator Description

Odor	☐ Sewage	☐ Laundry	☐ Rancid/sour/rotten	☐ Petroleum (gas)
	☐ Sulfide (rotten eggs)	☐ Other: describe in "Narrative" section below		
Color	☐ Clear	☐ White	☐ Brown	☐ Orange/red
	☐ Gray	☐ Green	☐ Yellow	☐ Other
Floatables	☐ Sewage	☐ Soap suds	☐ Petroleum/oil sheen	☐ Grease
	☐ Other: describe in "Narrative" section below			

Natural Phenomena	☐ Organic platy sheen	☐ Iron bacteria	☐ Algae
	☐ Tannins (tea colored)	☐ Foam	☐ Other

Narrative description of problem indicators:

4. City Responder Information

Call taken by:	Precipitation (inches) in past 24 - 48 hrs:
Call time:	Call date:

5. Reporter Information

Incident time:	Incident date:
Caller contact information (*optional*):	

6. Investigation Notes	
Suspected violator (name, personal or vehicle description, license plate #, etc.):	
Initial investigation date:	Investigators:
☐ Referred to Ecology ☐ Referred to COL Code Enforcement	
Time between call and investigation:	
Date case closed: ☐ Ecology notified of the City's resolution of the incident	
Notes:	

7. Entity Responsible for Discharge/Cleanup	
Business Name (if applicable):	Contact Person:
Address:	Telephone:
Email address:	

APPENDIX 11-1

Resources

Resources

Resources at the Center for Watershed Protection's website (http://www.cwp.org):

- ORI Field Sheet & Database
- Illicit Discharge Hotline Incident Tracking Sheet
- Chemical Mass Balance Model (CMBM) Setup & Input File
- Inappropriate Discharge Detection and Elimination: What Phase I Communities Are Doing to Address the Problem (Zielinski and Brown 2003)

Components of Effective IDDE Programs:

- U.S. EPA's Stormwater Phase II Final Rule Fact Sheet Series: IDDE Minimum Control Measure
  http://www.epa.gov/npdes/pubs/fact2-5.pdf
- U.S. EPA's Menu of BMPs: Illicit Discharge Detection and Elimination
  http://www.epa.gov/npdes/stormwater/menuofbmps/illicitdischarge
- The Rouge River Project Illicit Discharge Elimination Program
  www.rougeriver.com/techtop/illicit/index.html
- A Guidance Manual for Identifying and Eliminating Illicit Connections to Municipal Separate Storm Sewer Systems (Galveston County Health District, 2002)
  www.gchd.org/pages/pollution/GuideManual.pdf

Other Interesting Reading:

- A Guidance Manual for Illicit Discharge Detection and Elimination. Stormwater Magazine (Stormwater Magazine 2007)
  http://www.forester.net/sw_0701_guidance.html
- A Watershed-Based Approach to Stormwater Management (Stormwater Magazine 2005)
  http://www.forester.net/sw_0507_watershed.html
- Illicit Discharge Detection and Dry Weather Flows (Stormwater Magazine 2005)
  http://www.forester.net/sw_0507_illicit.html
- Illicit Discharge Detection and Elimination (Stormwater Magazine 2004)
  http://www.forester.net/sw_0403_illicit.html
- Microbial Source Tracking Study for South Cypress Creek (City of Memphis, TN 2003):
  http://www.cityofmemphis.org/pdf_forms/MicrobialSourceTrackingStudy.pdf

- Sherlocks of Stormwater: Effective Investigation Techniques for Illicit Connection and Discharge Detection (Wayne County Department of Environment 2003) http://www.epa.gov/owow/nps/natlstormwater03/40Tuomari.pdf

National Guidance on Related Topics:

- Decentralized Wastewater Treatment Systems: A Program Strategy http://www.epa.gov/owm/septic/pubs/septic_program_strategy.pdf
- Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems http://cfpub.epa.gov/owm/septic/septic.cfm?page_id=289
- U.S. EPA's Menu of BMPs: Volunteer Monitoring http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=17