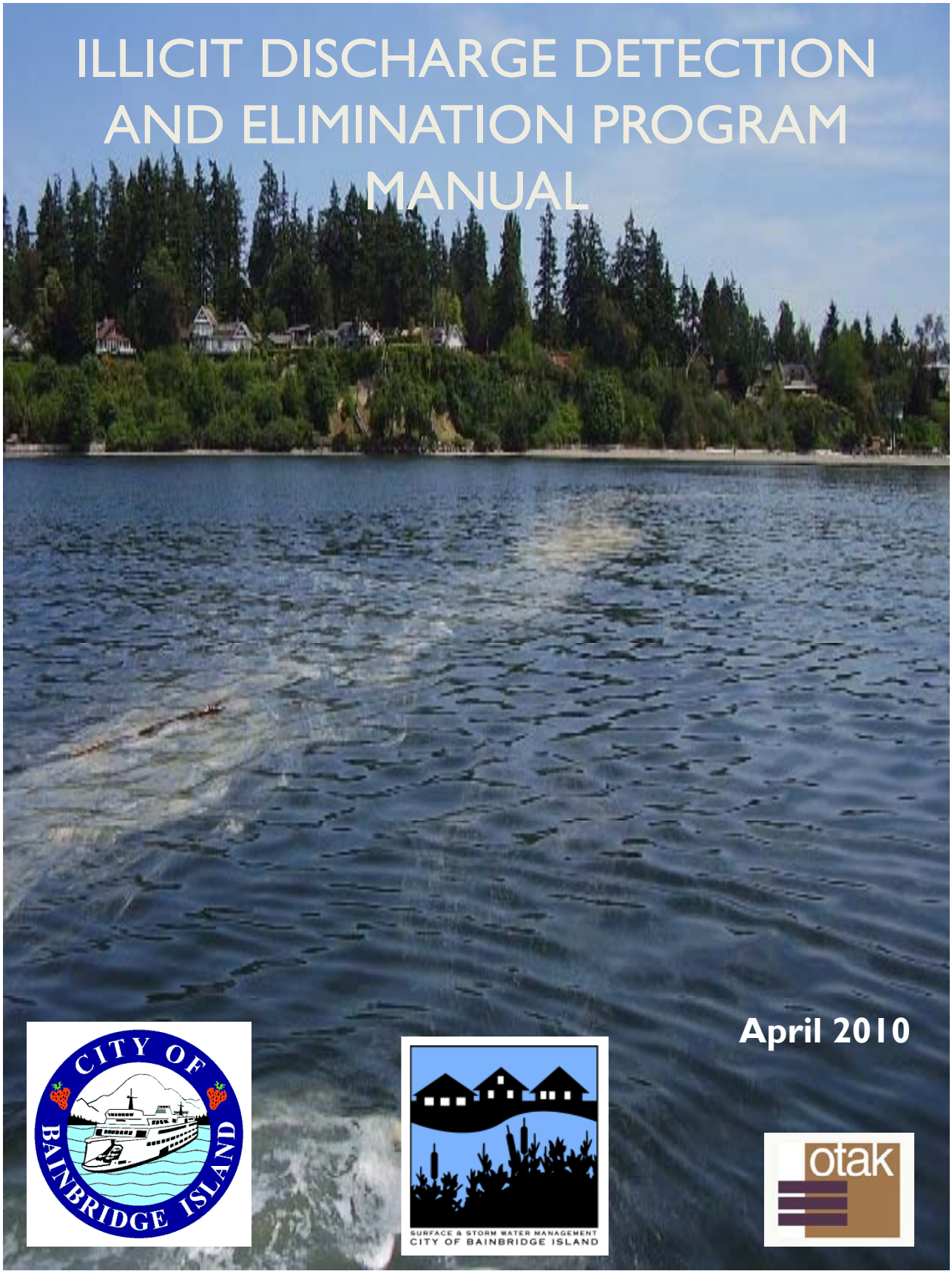
ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM MANUAL



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CITY OF BAINBRIDGE ISLAND

SURFACE & STORM WATER MANAGEMENT
CITY OF BAINBRIDGE ISLAND

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Bainbridge Island
Illicit Discharge Detection and Elimination Program Manual

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Cover Reference: Algal Bloom off Wing Point (2009)

Section 1 – Introduction

1.1 Background

Protecting and preserving water quality within the City's surface water is a key focus area of the SSWM program

The City of Bainbridge Island has made a strong commitment to protect and manage Bainbridge Island's natural resources. Within the Public Works Department's Water Resources Program, the Surface and Stormwater Management (SSWM) program seeks to minimize the negative effects of development and pollution, while maximizing environmental protection and conservation. Protecting and preserving the quality of the City's surface water is a key focus area of the SSWM program.

According to the US EPA's 2000 National Water Quality Inventory, 39 percent of assessed river and stream miles, 46 percent of assessed lake acres, and 51 percent of assessed estuarine square miles do not meet water quality standards. The top causes of impairment include siltation, nutrients, bacteria, metals (primarily mercury), and oxygen-depleting substances. Polluted stormwater runoff, including runoff from urban/suburban areas and construction sites is a leading source of this impairment. To address this problem, EPA established the National Pollutant Discharge Elimination System (NPDES) program as part of the Clean Water Act to regulate stormwater discharges.

In the State of Washington, EPA has delegated the NPDES program administration to the Department of Ecology. Ecology issued a Phase II Municipal Stormwater Permit to the City of Bainbridge Island in January 2007. The Phase II Permit requires the City to have a stormwater management program (SWMP) with five major conditions. One of those conditions requires that "The SWMP shall include 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 municipal separate storm sewers owned or operated by the Permittee." (Permit Condition S5.C.3) The City must have a fully implemented illicit discharge detection and elimination (IDDE) program in place by August 2011. Therefore, the overreaching program goal is to prevent, locate, and correct illicit discharges.

The City's IDDE program is managed by the Water Resources Group within the Engineering Division of Public Works. Maintenance staff and construction site inspectors also play an important role identifying illicit discharge problems and responding to clean-up requests. However, all Public Works (Engineering and Operations and Maintenance), Planning and Community Development and Police staff will play a role in locating, identifying and reporting potential illicit discharges.

1.2 Summary of the IDDE Program

The Phase II Permit requires the permittees to develop an IDDE program encompassing the elements listed below. Each element is addressed in the sections of this IDDE Program Manual as noted below.

- Develop a municipal storm sewer system map (Section 2);
- Adopt an ordinance to prohibit non-stormwater, illegal discharges, and/or dumping into the storm sewer system (Section 3);
- Implement an on-going program to detect and address non-stormwater discharges, spills, illicit connections, and illegal dumping (Section 4, 5, 6);
- Educate employees, businesses, and the general public about illicit discharge concerns (Section 7);
- Adopt and implement procedures for program evaluation and assessment (Section 8);
- Maintain records of all IDDE program activities (Section 8); and
- Provide IDDE training for municipal staff. (Section 9)

Oil Spill dumped from storage drum

This manual is intended to assist City staff in implementing the IDDE program. It is to be used as a guidance document for staff in their day-to-day activities related to IDDE. This document can also be used as a training tool to ensure that all staff are following the same procedures in responding to illicit discharge concerns.

Section 2 – Storm Sewer System Map

2.1 Overview

The first major component of the City's illicit discharge program is the mapping of the municipal stormwater drainage system. Maintaining an accurate map of the stormwater drainage system will make it easier for the City to track and locate the source of suspected illicit discharges. The NPDES Phase II Permit outlines minimum information that should be included in the City's municipal storm sewer system map:

- Location of all known municipal storm sewer outfalls, receiving waters, and structural BMPs owned, operated, or maintained by the City,
- Tributary conveyances (type, material, size) leading to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area),
- Drainage areas and land use for the drainage basins contributing to outfalls that are 24-inches or larger (or have an equivalent cross-sectional area),
- Locations of new connections to the City's stormwater drainage system, and
- Drainage areas within the City that do not discharge to surface water (aka closed depressions).

The Department of Ecology requires the map be prepared in GIS format and the map must be made available to Ecology upon request.

The City's mapping efforts are primarily focused on mapping the locations of outfalls and the drainage system infrastructure (pipes, ditches, catch basins, manholes, and stormwater facilities). While the NPDES Phase II Permit only requires mapping the infrastructure that leads to large outfalls, the City of Bainbridge Island is developing a comprehensive map of the City's stormwater infrastructure. This map can be used to schedule and track maintenance activities and plan for capital improvement projects.

2.2 Mapping Procedures

In 2007, the Water Resources Group developed the *City of Bainbridge Island Drainage System Mapping Field Guide* (See Appendix A). The Field Guide is a quick reference to be used by staff and volunteers when mapping the City's drainage features. In addition to providing detailed information about features that should be mapped and the types of information to collect, the Field Guide includes:

- Safety Procedures
- Field Equipment Checklist
- General Field Guidelines
- Definitions

- Contact Information

Using the Field Guide, City staff or contracted crews locate drainage features and record the locations and feature attributes using GPS receivers. The data is then downloaded and imported into the City's GIS map. Sketches of the drainage infrastructure are completed in the field. These sketches are used to verify or clarify the electronic mapping information downloaded from the GPS receiver.

Field crews begin at a downstream outfall location and then trace the tributary drainage system upstream. Facility mapping is limited to public right-of-way areas. After the public drainage system is fully mapped, the City will use as-built drawings from recent developments and require existing systems to be mapped to capture private drainage infrastructure.

Latex paint washed into a detention pond

The City is developing Standard Operating Procedures (SOPs) to further clarify the steps involved in the mapping process. These SOPs will help ensure the data collected is consistent and accurate over time. The SOPs related to the City's IDDE program, including SOPs for mapping the stormwater drainage system are included in Appendix F.

Section 3 – IDDE Ordinance

3.1 What is an Illicit Discharge?

An illicit discharge is "…any direct or indirect non-stormwater discharge to the stormwater drainage system, except as permitted or exempted in BIMC 15.22.050.[1]" Examples of illicit discharges include:

- A measurable flow during dry weather that contains pollutants or pathogens,
- Disposal of vehicle maintenance fluids into a storm drain;
- Hosing or washing loading areas in the vicinity of storm drain inlets;
- Leaking dumpsters flowing into a storm drain inlet; and
- Old and damaged sanitary sewer line leaking fluids into a cracked or damaged storm sewer line.

An illicit discharge is "… any direct or indirect non-stormwater discharge to the stormwater drainage system…"

3.2 What is an Illicit Connection?

An illicit connection is "Any drain, conveyance or hydraulic connection…which allows an illegal discharge to enter the stormwater drainage system…" or "Any drain or conveyance connected from a residential, commercial or industrial land use to the stormwater drainage system which has not been documented in plans, maps, or equivalent records and approved by the city." (BIMC 15.22.020) Examples of illicit connections include:

- Sanitary sewer piping that is connected directly from a building to the stormwater system;
- A basement or shop floor drain that is connected to the stormwater system; or
- A cross connection between the municipal sanitary sewer and the stormwater system.

3.3 City of Bainbridge Island IDDE Ordinance

October 22, 2008, the City adopted Ordinance 2008-14 (effective date November 3, 2008), which adds a new chapter (15.22) to the Bainbridge Island Municipal Code to address IDDE. Portions of BIMC 15.22.050 are included below. A copy of the full ordinance and code chapter, including definitions and a listing of discharges specifically or conditionally allowed under the BIMC, is included in Appendix B.

[1] City of Bainbridge Island Municipal Code 15.22.020.

A. Prohibition of Illegal Discharges.

1. No person shall discharge or cause to be discharged into the City's stormwater drainage system or waters of the state, any materials, including but not limited to, pollutants or waters containing any pollutants.
2. Prohibited discharges include, but are not limited to, the following:
   a. Trash or debris;
   b. Construction materials;
   c. Petroleum products including, but not limited to, oil, gasoline, grease, fuel oil, heating oil;
   d. Antifreeze and other automotive products;
   e. Metals in excess of naturally occurring amounts, in either particulate or dissolved form;
   f. Flammable or explosive materials;
   g. Chemicals not normally found in uncontaminated water;
   h. Acids, alkalis, or bases;
   i. Painting products;
   j. Degreasers and/or solvents;
   k. Drain cleaners;
   l. Commercial and household cleaning products;
   m. Pesticides, herbicides, or fertilizers;
   n. Steam cleaning wastes;
   o. Pressure washing wastes;
   p. Soaps, detergents, or ammonia;
   q. Chlorinated spa or swimming pool water;
   r. Domestic or sanitary sewage;
   s. Animal carcasses;
   t. Food wastes;
   u. Yard wastes;
   v. Silt, sediment, or gravel;
   w. Any hazardous material or waste;
   x. Wastewater or process wastewater (including filtered or purified wastewaters).

Fuel oil in a drainage swale

B. Prohibition of Illicit Connections.

1. The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.
2. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. Waste Disposal.

No person shall throw, deposit, leave, maintain, or keep in or upon any public or private property, the MS4, or Water of the State, any refuse, rubbish, garbage, litter, or other discarded or abandon objects, articles, or accumulations that may cause or contribute to pollution. Wastes deposited in proper waste receptacles for the purposes of collection are exempt from this prohibition.

Section 4 – Illicit Discharge Detection Procedures

4.1 Purpose

Illicit discharges and connections are identified through Citizen Reporting, Interdepartmental or Interagency Referral, or through Outfall Reconnaissance Inventory (ORI) activities. The City relies on local citizens, City field staff, and comprehensive water resource program inspections to detect potential problem areas quickly, so that they can be addressed before they cause significant water quality degradation .

The Citizen Reporting procedures and Interagency Referral service coordinated through Kitsap County allows local citizens to call one number when they suspect a problem and be routed to the appropriate agency. This convenience encourages residents to participate in the reporting process and helps the City to receive timely reports of obvious problems like illegal dumping, spills, or strong odors. The City's outfall inspections provide regular opportunities to document the conditions of the outfalls and identify potential problems that may not be obvious to the general public.

4.2 Citizen Reporting and Interdepartmental/Interagency Referral

4.2.1 Contact Information

A central reporting phone line, Kitsap One, has been established to handle water quality incident reports countywide. Citizens that suspect an illicit discharge, an illicit connection, or an illegal dumping action can call Kitsap One at (360) 337-5777 or (800) 825-4940 to report the incident. The Kitsap One operator determines the location of the problem and will route the call to the appropriate agency or jurisdiction for response.

During normal business hours (Monday thru Friday 8:00 am to 4:00 pm) citizens reporting incidents that have occurred within the city limits can also report the incident directly to the Public Works department (206-842-2016). Likewise, any City department or outside agency can report water quality incidents to Kitsap One or the City's Public Works department. The City also utilizes SeeClickFix for online reporting and tracking of illicit discharge reports.

After hours, emergency problems should be reported through 911, where operators will assess the severity of the incident and determine if emergency response (fire, hazmat, etc) is needed. Callers will then be put in contact with the City's on-call utility contact to address the problem. Residents that encounter a non-emergency incident are encouraged to report the problem the next business day through Kitsap One or directly to the City's Public Works department.

If after hours messages are left on the City's Public Works voicemail, staff follow-up with the caller during the next business day.

4.2.2 Problem Documentation

When water quality incident reports are received at Public Works (either directly or from Kitsap One) the staff person taking the call should complete the Water Quality Incident Report Form and submit it to the Water Resources Program for follow up. The Water Quality Incident Report Form is located in Appendix C and electronic versions are available on the City's network[2].

The City is developing Standard Operating Procedures (SOPs) to direct the Public Works clerks and Utilities On-Call staff in how to handle illicit discharge reports. These SOPs include flow charts to help staff collect the appropriate information for the type of problem being reported. The SOPs are included in Appendix F.

Once recorded, incident information is referred to the appropriate City department and/or staff person for follow-up. In most cases, IDDE problems should be referred to the Water Resources Group for further investigation. Staff will either follow the investigation procedures in Section 5 to identify the source of the problem or, if the source is known, the corrective action procedures outlined in Section 6 will apply.

4.3 Outfall Inspection Procedures

The City will conduct an Outfall Reconnaissance Inventory (ORI) to visually inspect each known outfall from the City's stormwater drainage system to identify areas of obvious pollution or non-stormwater discharges. Outfall inspections locate potential problem areas without the need for in-depth laboratory analysis. Potential problem discharges can be identified by outfalls that are flowing during dry weather (potential illicit connection) or outfalls that have high turbidity, strong odors, or unusual colors.

Outfall inspections locate potential problem areas without the need for in-depth laboratory analysis

Note: If inspection staff encounter a transitory discharge, such as a liquid or oil spill, during inspection activities, the problem should be immediately referred to the appropriate agency or response contractor (i.e. NRC Environmental) for clean-up. Staff should also complete the Water Quality Incident Report Form located in Appendix C.

[2] See H:\New SSWM\Illicit Discharge Detection and Elimination\Incident Report

4.3.1 Prioritization Schedule

The City estimates that the storm drainage infrastructure includes approximately 175 outfalls that discharge to creeks, harbors, shoreline, or other receiving waters. Detailed mapping of the City's stormwater system is in progress, so detailed outfall information for some receiving waters may not be available until the mapping is complete in 2011. A generalized map of the City's stormwater system is included Appendix D. More detailed maps will be included in this manual as they are developed.

Turbid runoff from construction

The Phase II Permit requires that the City prioritize receiving waters for visual inspection to identify the areas most likely to include illicit discharges. Receiving water priorities have been set based on drainage area characteristics. High priority has been given to outfalls in neighborhoods of older homes utilizing septic systems and areas of commercial and/or industrial activity. The City also considered complaint history, downstream habitat, data collected through the City's Water Quality and Flow Monitoring program, information from the Kitsap County Health District, including the Pollution Identification and Correction (PIC) program, and recreational shellfish monitoring program when prioritizing receiving waters. Receiving waters that are scheduled for screening through Kitsap County's PIC Program do not need to be inspected through the City's IDDE program, as the PIC program will identify potential pollution sources in those areas. The detailed receiving water priority table is included in Appendix D.

The Phase II Permit requires the City to inspect the outfalls in three high priority receiving waters by the end of 2010 and one high priority receiving water each year after. For 2009 and 2010, the three priority receiving waters are:

- Eagle Harbor – Middle Harbor Winslow East (D3)
- Eagle Harbor – Outer Harbor Winslow East (D5)
- Port Madison Bay – Outer Madison Bay (A2)

Other high priority receiving waters include portions of Fletcher Bay and Agate Passage. After 2010, the ORI priorities will be set annually based on the priority table included in Appendix D and additional information collected through mapping efforts and citizen complaint calls.

4.3.2 Responsibility

Inspections are the responsibility of the Water Resources Engineer. Inspections may be performed by City staff or by outside consultants hired by the City. In either case, all field reports will be reviewed by the Water Resources Engineer.

4.3.3 Timing

Timing is important when scheduling ORI field days. The preferred conditions for outfall inspections include:

- Dry season – preferably in summer or early fall
- No run-off producing rainfall with last 48 hours[3]
- Daytime low tide to access tidally influenced outfalls
- Low vegetation (avoid late spring when access may be hindered by heavy vegetation)

The preferred conditions allow detection of flows when there should be none and prevent the dilution of pollutants.

ORI Inspection

4.3.4 Equipment

Prior to conducting field work, crews should assemble all required equipment (see Table 4-1) and review records from prior inspections in the same area to become familiar with the outfall locations and any potential inspection challenges. Field crews should prepare for consecutive days of field work when possible.

Table 4-1
Field Equipment for Outfall Inspections

Minimum 2 person crew	Machete/Clippers
Safety Gear – vest, hard hat, cones	Flash light or headlamp
Field Notebook/Pencils	Tool Box – hammer, tape measure, duct tape,
Outfall Inspection Report Forms	zip ties
Map or Aerial Photo of Inspection Area	Spray paint or other marker
GPS Unit	First Aid Kit
Cell phone w/ charged battery	Clear sample bottles
Digital camera w/ charged battery	Wide mouth container
Compass	Watch with second hand

[3] After long periods of heavy rain, field crews should allow 3-4 days of an antecedent dry period before starting or resuming inspections, so that rainfall runoff has a chance to clear the storm drainage system.

4.3.5 Activities

During ORI field days, field crews should visually inspect each outfall and the immediate surrounding area, photograph the current conditions, and complete the Outfall Inspection Report form located in Appendix C.

Potential problems are indicated by outfalls that are flowing in dry weather and/or foul odors or discolored water in or around the outfall pipe. If a flowing outfall is encountered, field crews should attempt to first determine if the flow is retreating seawater from the previous tide. If retreating tide has been ruled out as the source of the flow, then a flowing outfall indicates a potential illicit discharge concern.

When illicit discharge problems are identified field crews will photograph the problem area and conduct a quick visual inspection of the surrounding area to identify any obvious pollution sources[4]. These simple actions can give valuable direction to the upcoming IDDE inspection. Field crews should also report problem areas to the Water Resources Engineer within 24 hours of completing the field investigation, file all outfall report forms, and update the record keeping database as appropriate. Additional record keeping information is included in Section 8.

During field inspections, crews should also note whether the outfalls have maintenance issues, such as trash around the outfall or damaged infrastructure that should be brought to the attention of the Operations and Maintenance Division, Utility Supervisor. Observed spills or environmental hazards should be immediately reported to the Water Resources Group and the incident should be documented using the Water Quality Incident Report Form located in Appendix C. The Water Resources Group will work with the City's contracted clean-up agency (currently NRC Environmental) to clean-up and properly dispose of the spilled material.

4.5 Follow-up Actions

When potential problem areas are identified, field crews should report the observations to the Water Resources Engineer. Based on the severity of the problem, the Water Resources Engineer will direct staff to open a case log and begin the investigation procedures outlined in Section 5. The Water Resources Engineer will also determine if other City departments or outside agencies need to be involved. For example, polluted discharges that may be the cause of leaking septic tanks warrant contacting the Kitsap County Health District for assistance and follow-up.

[4] Where obvious illicit discharges are identified, field crews should consider collecting samples of the discharge, if possible, and begin filling out the Incident Response form to investigate the source of the pollutants as described in Section 5.

Section 5 – Investigation Procedures

5.1 Purpose

Potential illicit discharge problems can be revealed through outfall inspections or reports from staff, tenants, or the public as described in Section 4. When a complaint is reported, the Phase II Permit requires that a follow-up investigation be initiated within seven (7) days, on average. The follow-up investigation could include a site visit to look at the problem area, review of mapping information, review of past complaints or investigations at the location, or other data collection and review. Once a problem has been verified (either through a routine outfall inspection or follow-up to a called-in complaint) the City will begin an official illicit discharge investigation, following the procedures outlined in this section. Figure 5-1 illustrates the steps that lead to an illicit discharge investigation.

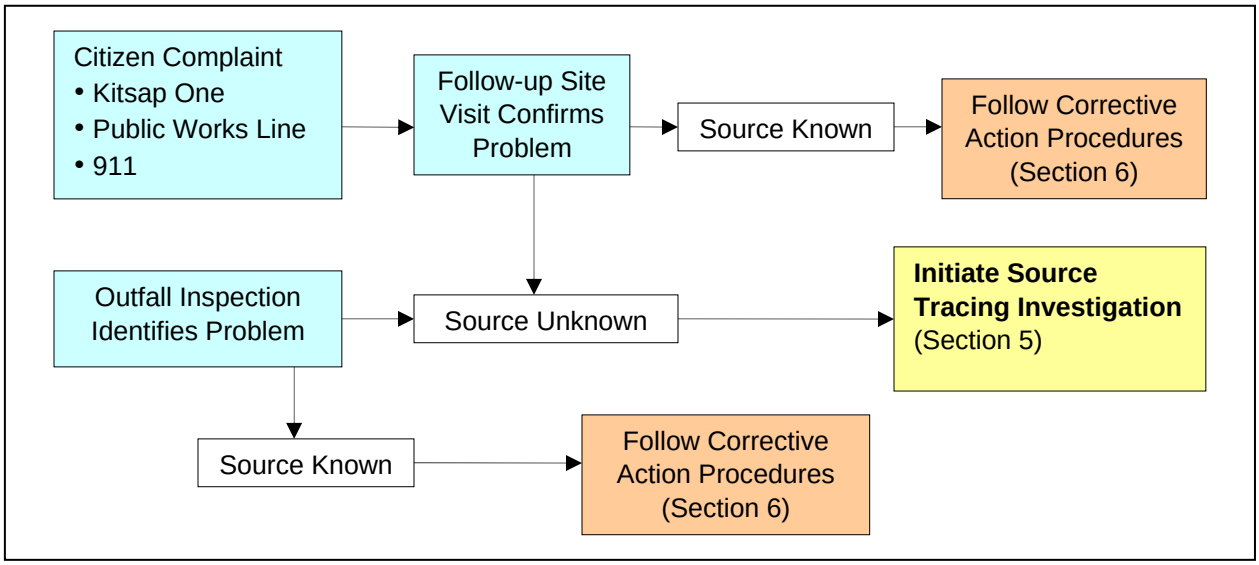


Figure 5-1. Routes to an Illicit Discharge Investigation

When an illegal dumping or illicit discharge problem is directly observed by a member of the City staff, it is generally not necessary to follow these investigation procedures. In those scenarios, the source of the problem discharge is already known. Problems revealed through direct observation referred directly to the corrective action information in Section 6. In the event that a reported problem does not have a defined source, the procedures in this section should be followed to trace the sources of the illicit discharge.

5.2 Source Investigation Priority Levels

Table 5-1 outlines the priority levels to assist City staff in determining the appropriate response time for initiating a source investigation after a problem is identified in the field. Priority levels are based on the suspected pollutant source(s) of a reported problem. According to the Phase II Permit, illicit discharge investigations should begin within seven days of identifying a problem. In most cases, the City of Bainbridge Island strives to respond faster than the required timeline.

Table 5-1
Source Investigation Priority Levels

Priority Level	Suspected Pollutants		Response Time (Work Days)
1	• Alkalis • Automotive products • Bases • Cleaning products • Degreaser or solvent • Drain cleaner • Fertilizer • Flammable/explosive materials	• Herbicide • Metals • Painting products • Pesticide • Petroleum • Process Wastewater • Sewage • Unknown chemicals	1-2
2	• Ammonia • Construction runoff (silt, sediment, gravel)	• Detergents • Food waste (fats, oils, grease) • Soap	3-5
3	• Car washing • Pressure washing waste • Spa or pool water	• Steam cleaning waste • Yard waste	5-7
4	• Animal carcasses • Bacteria • Construction materials • Debris	• Foam • Rust • Trash • Other	Within 10 days

Priority levels were determined based on the potential public health and/or water quality threat posed by a given pollutant. The response time indicates a target time frame for opening a case log and initiating a source investigation as described in Section 5.3. *Contact Emergency Services (911) and Bainbridge Island Water Resources Group immediately if discharge poses severe threat to human health or the environment.*

Contact Emergency Services (911) and Bainbridge Island Water Resources Group immediately if discharge poses severe threat to human health or the environment

5.3 Tracing the Source

This section outlines the basic tools that can be used to trace the source of a suspected illicit discharge. Source tracing begins when a suspected problem area is identified through the ORI, field assessment/testing, or a complaint call. When the source of the non-stormwater discharge is not known, one of two primary methods can be used to locate the source of an illicit discharge:

- Method A – Storm Drain Network Investigations
- Method B – Drainage Area Investigations

The method used will depend on the type of information collected or reported, level of understanding of the drainage network, and existing knowledge of operations and activities on the surrounding properties. All source tracing investigations should be documented and recorded on the Incident Response report form provided Appendix C.

5.3.1 Open a Case Log

When problems are identified, a case log should be opened in the Incident Investigation Case Number Log assigning a case number, creation date, case description and the primary staff contact/investigator. A work order is created in the MUNIS IDDE Tracking Database listing the property name, person responsible, and tracking all information related to the observed or suspected problem. The investigator assigned to the case shall keep an accurate log of labor, materials and costs associated with the investigation for invoicing the responsible party. The case log should be opened prior to completing any additional field work unless the nature of the discharge necessitates immediate response. The file should include copies of the following, if applicable:

- Water Quality Incident Report Form;
- Copy of Outfall Inspection Report;
- Incident Response field forms;
- Photographs;
- Additional field notes;
- Lab testing results;
- Compliance letters sent and responses received;
- Correspondence (mail, email, telephone logs);
- Proof of corrected problems (contract and invoice or clean field investigation report).

Any field investigations, photographs, corrective actions, or other activities associated with the suspected problem area should be documented in the case log. This becomes the City's official record of the IDDE investigation. Additional record keeping information is included in Section 8.

5.3.2 Method A – Storm Drain Network Investigations

The source of some illicit connections or discharges can be located by systematically isolating the area from which the polluted discharge originates. This method involves progressive investigation at manholes in the storm drain network to narrow down the location where the illegal discharge is entering the drainage system. This method is best used to identify constant or frequent discharge sources such as an illicit connection from a sewer system or sink drain into the storm drainage network. One-time illegal discharges (such as a surface spill or intentional dumping into the storm drain system) should be investigated using Method B described later in this section.

Field crews should work progressively upstream from the outfall and inspect manholes until indicators reveal that the discharge is no longer present. Manhole observations can be time-consuming, but they are generally a necessary step before conducting other tests. In particularly large storm drain systems, it may be helpful to first identify major branches of the system and test one manhole at the downstream end of each branch. This can help to reduce the area that must be investigated.

Latex paint residue on catch basin

Storm drain network investigations include the following steps:

1. Consult the drainage system map (if available) and identify the major branches[5].
2. Starting from the outfall, observe and take probe readings at the next upstream manhole or junction to see if there is evidence of polluted discharge. As with the outfall inspections, field crews are looking for the presence of flow during dry weather, foul odors, colors or stained deposits, oily sheen, floatable materials, and/or unusual probe readings.
3. Repeat observations and probe readings at each upstream manhole or junction until a junction is found with no evidence of discharge; the discharge source is likely located between the junction with no evidence of discharge and the next downstream junction.
4. Work downstream from the "clean" manhole or junction to isolate the location where the polluted discharge is entering the storm drain system.
5. If discharge is evident from private property initiate private property site entry procedures.

[5] If a drainage system map is not available or major branches cannot be identified, then manhole observations and probe readings must be done at each successive upstream manhole to map the drainage system and isolate the location of the polluted discharge entry. In such a case, field crews should also use the GPS unit to locate each observed manhole and add the location readings to the City's drainage system map.

6. Document all findings on the Incident Response Report Form and record all information in the database case log.

Figure 5-2 shows the observation steps to isolate the location where an illicit discharge is entering the storm drainage network.

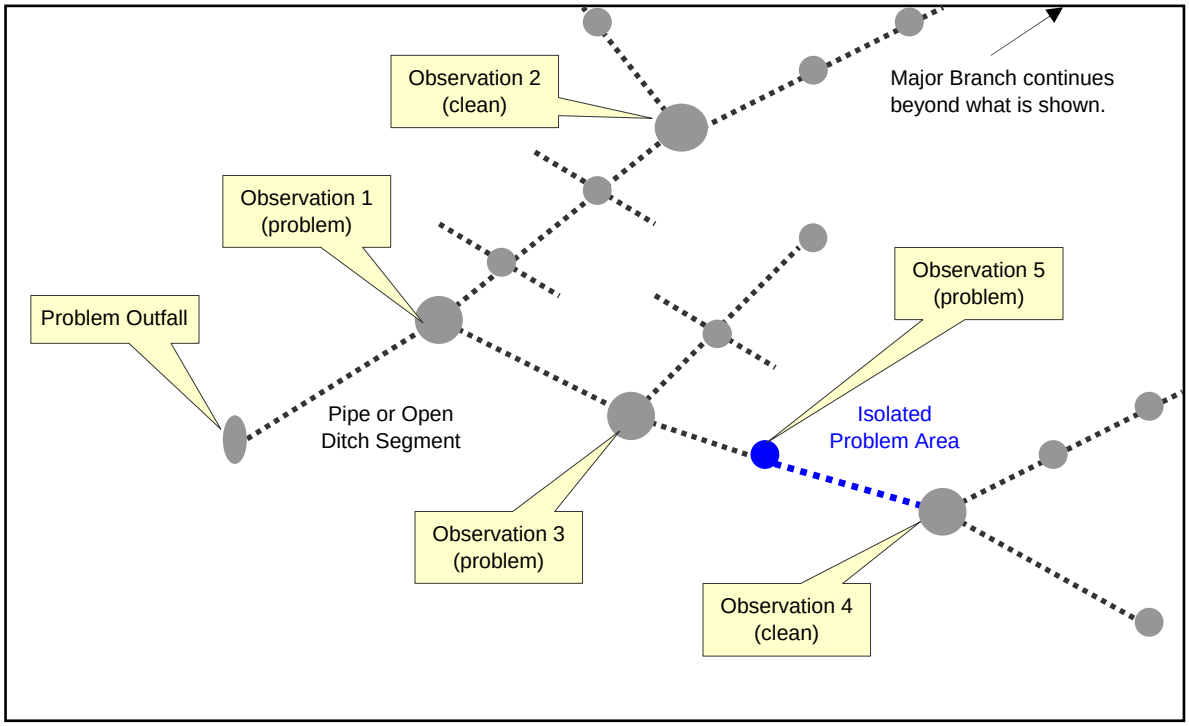


Figure 5-2. Storm Drain Network Observation Steps

When visual inspections are not enough to isolate the source of the illegal discharge, a number of additional field tests can be performed. These include:

- Dye testing,
- Video Testing/Camera-ing/TVing,
- Smoke testing,

The Center for Watershed Protection's *Illicit Discharge Detection and Elimination: A Guidance Manual* provides instructions for employing these testing techniques. The relevant pages from that manual are included in Appendix E.

Confirmed illicit discharge sources should be referred to the follow-up actions and corrective action procedures described at the end of this section and in Section 6.

5.3.3 Method B – Drainage Area Investigations

The source of some illegal discharges can be determined through a survey or analysis of the drainage area of the problem outfall. Drainage area investigations are particularly useful when the discharge observed at the outfall has a distinct or unique characteristic that can allow field crews to quickly determine the type of activity or non-point source that is generating the discharge. However, drainage area investigations are generally not helpful in tracing sewage discharges, since they are not related to a specific land use.

Bainbridge Island outfall

Drainage area investigations should begin with a discussion between the field crews, Water Resources Engineer, and other knowledgeable City staff to identify the type of site most likely to produce the observed discharge. Table 5-2 shows some of the activities or land uses most likely associated with specific discharge problems.

Table 5-2
Common Discharges and Potential Sources

Observed Discharge	Potential Causes
Clogging Sediment	Construction activity without proper erosion and sediment controls Roadway sanding operations Outdoor work areas or material storage areas
Thick Algae Growth	Fertilizer Leak or Spill Landscaping operations Hydroseeding following Construction Failing or leaking septic system
Oil	Refueling operations Vehicle or machinery maintenance activities
Sudsy discharge	Power washing of buildings Vehicle or equipment washing operations Mobile cleaning crew dumping Laundry or Cleaner Household greywater discharge
Clogged Grease	Restaurant sink drain connection to stormwater system
Sewage	Failing or leaking septic systems

Staff should make a list of likely discharge sources and consult City land use and drainage system maps to identify areas of likely pollutions sources near the storm drain network. Field crews should then conduct a windshield survey of the drainage area to confirm and identify potential sources of

the discharge. Once potential discharge sites are identified, City staff should conduct individual site inspections to locate the specific source of the illegal discharge. In some cases, dye testing (See Appendix E) may be needed to confirm that a suspected activity is actually draining into the storm drain network.

All drainage area investigations should be documented on the Incident Response Report Form and recorded with the database case log.

5.3.4 Equipment

Prior to conducting field work, crews should assemble all required equipment (see Table 5-3) and review the outfall inspection records or water quality incident reports from the area to become familiar with the background information and potential pollution sources.

Table 5-3
Field Equipment for Source Investigations

Minimum 2 person crew	Machete/Clippers
Safety Gear –vest, hard hat, cones	Flash light or headlamp
Field Notebook/Pencils	Tool Box – hammer, tape measure, duct tape, zip ties
Incident Response Forms	
Map or Aerial Photo of Area	Pick or CB grate/cover remover
GPS Unit	Spray paint or other marker
Cell phone w/ charged battery	First Aid Kit
Digital camera w/ charged battery	Field Test Kit (see Appendix E)
Compass	

5.3.5 Analytical Sampling (if needed)

If illicit discharge sources cannot be identified based on a storm drain network investigation and/or drainage area investigation, the Water Resources Engineer may request that water samples be collected from potential problem discharges and sent to the lab for analytical testing. The results of lab tests may isolate the source or type of illegal discharge. Lab tests may also be important for documentation in the event that an enforcement action must be taken against a tenant or property operator. Table 5-4 shows the recommended water quality testing parameters. Appendix E includes additional information regarding indicator parameters in water quality testing.

Table 5-4 Water Quality Test Parameters and Uses	
Water Quality Test	Use of Water Quality Test
Conductivity	Used as an indicator of dissolved solids. Used to distinguish between seawater and stormwater.
pH	Extreme pH values (high or low) may indicate commercial or industrial flows. Not useful in determining the presence of sanitary wastewater (tends to have a neutral pH like uncontaminated base flows).
Temperature	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures.
Ammonia	High levels can be an indicator of the presence of sanitary wastewater
Surfactants	Indicate the presence of detergent (e.g. laundry, car washing)
Total Chlorine	Used to indicate inflow from potable water sources. Not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long (it will combine with organic compounds).
Potassium	High levels may indicate the presence of sanitary wastewater.
Bacteria	Sanitary wastewater or septic systems.

Source: *Illicit Discharge Detection and Elimination Manual* (New England Interstate Water Pollution Control Board, January 2003)

Results of any analytical testing should be recorded on the Incident Response Report Form and reported to the Water Resources Engineer. Testing results may lead to another round of field investigations using either Method A or B. All data shall be recorded in the database case log.

5.4 Follow-Up Actions

Once the source of an illicit discharge has been identified, the field crews should initiate private property site entry procedures (if needed), notify the property owner or operator of the problem, and provide the appropriate educational materials and/or a copy of BIMC 15.22. This is an important first step in the corrective action process. Field crews should also notify the Water Resources Engineer, complete the Incident Response report form, and enter all information in the database case log to document the findings. The Water Resources Engineer and Code Enforcement Officer can then begin working through the corrective action steps outlined in Section 6.

Section 6 – Corrective Action

6.1 Purpose

The City will respond to identified illicit discharges, illicit connections, or illegal dumping activities using progressive enforcement actions. Corrective actions will focus first on education to promote voluntary compliance and escalate to increasingly severe enforcement actions if voluntary compliance is not obtained. The Water Resources Engineers and Code Enforcement Officer should use judgment in exercising the right mix of compliance assistance and enforcement to correct identified problems. The administrator may immediately levy fines if the violation is found to be willful, intentional or egregious.

Corrective actions will focus first on education to promote voluntary compliance

In the event the violation constitutes an immediate danger to public health or safety, the administrator is authorized to enter upon the subject property…to take any and all measures necessary to abate the violate and/or restore the property. Any expense related to such remediation…shall be fully reimbursed by the property owner and/or responsible party. (BIMC 15.22.080(B))

6.2 Voluntary Compliance

The preferred approach to address illicit discharge problems is to pursue voluntary compliance through property owner or responsible party education. Often, business operators and property owners are not aware of the existence of illicit connections or activities on their properties that may constitute an illegal discharge. In these cases, providing the responsible party with information about the connection or operation, the environmental consequences, and suggestions on how to remedy the problem may be enough to secure voluntary compliance.

Illicit discharge examples needing corrective action

Education begins during the site investigation when the operation or connection is first confirmed. Property owners and operators should be notified that the problems must be corrected in a timely manner and that the City will be conducting a follow-up site visit to verify compliance. Field staff should also provide the property operator with an educational brochure describing illicit discharge violations and a copy of BIMC 15.22. Field staff should also remind property owners of their obligation to report discharges to the proper agencies.

6.2.1 Operational Problems

Property owners are responsible for correcting operational problems that are leading to illegal discharges to the storm drainage system. This could include moving washing activities indoor or undercover, covering material storage areas, locating an appropriate discharge location for liquid wastes, or other operational modifications. Through site visits and education, the City can provide technical assistance to aid property owners in identifying the required modifications.

6.2.2 Structural Problems

Most illicit connection problems will require a structural modification to correct the problem. Structural repairs can be used to redirect discharges such as sewage, industrial, and commercial cross-connections. Such cross-connections must be re-routed to an approved sanitary sewer system. Correcting structural problems is the responsibility of the property owner, though the city may provide technical assistance throughout the process.

6.3 Enforcement Actions

When voluntary compliance does not produce the desired result, the City is required to pursue follow-up enforcement action. All enforcement actions will be the responsibility of the Water Resources Engineer and the Code Enforcement Officer. Table 6-1 and Figure 6-1 outline the detailed enforcement steps. More serious violations or continued non-compliance may warrant a more aggressive, enforcement-oriented approach.

Table 6-1
Illicit Discharge Enforcement Steps

Enforcement Step	Details	Responsibility
Step 1 – Initial Actions	• Provide educational materials (i.e. brochure and copy of BIMC 15.22) • Encourage voluntary compliance • Provide summary letter* setting expected compliance date • Additional staff support or technical assistance • Request evidence of corrected problem (if applicable) • Site visit to verify compliance	WR Engineer
Step 2 – Follow-up Actions	• Send “notice of violation” letter* to property owner regarding unresolved issues • Set second compliance date (determined on individual incident basis) • Site visit to verify compliance	WR Engineer; Code Enforcement Officer

Table 6-1 Illicit Discharge Enforcement Steps		
Enforcement Step	Details	Responsibility
Step 3 – Final Actions	• Send second "notice of violation" letter* indicating that unresolved issues will be referred to prosecutor • City may correct problems and send bill to property owner • Levy fines following BIMC 1.26 or outline community service requirements	Code Enforcement Officer

* Keep copies of all letters within the case log database

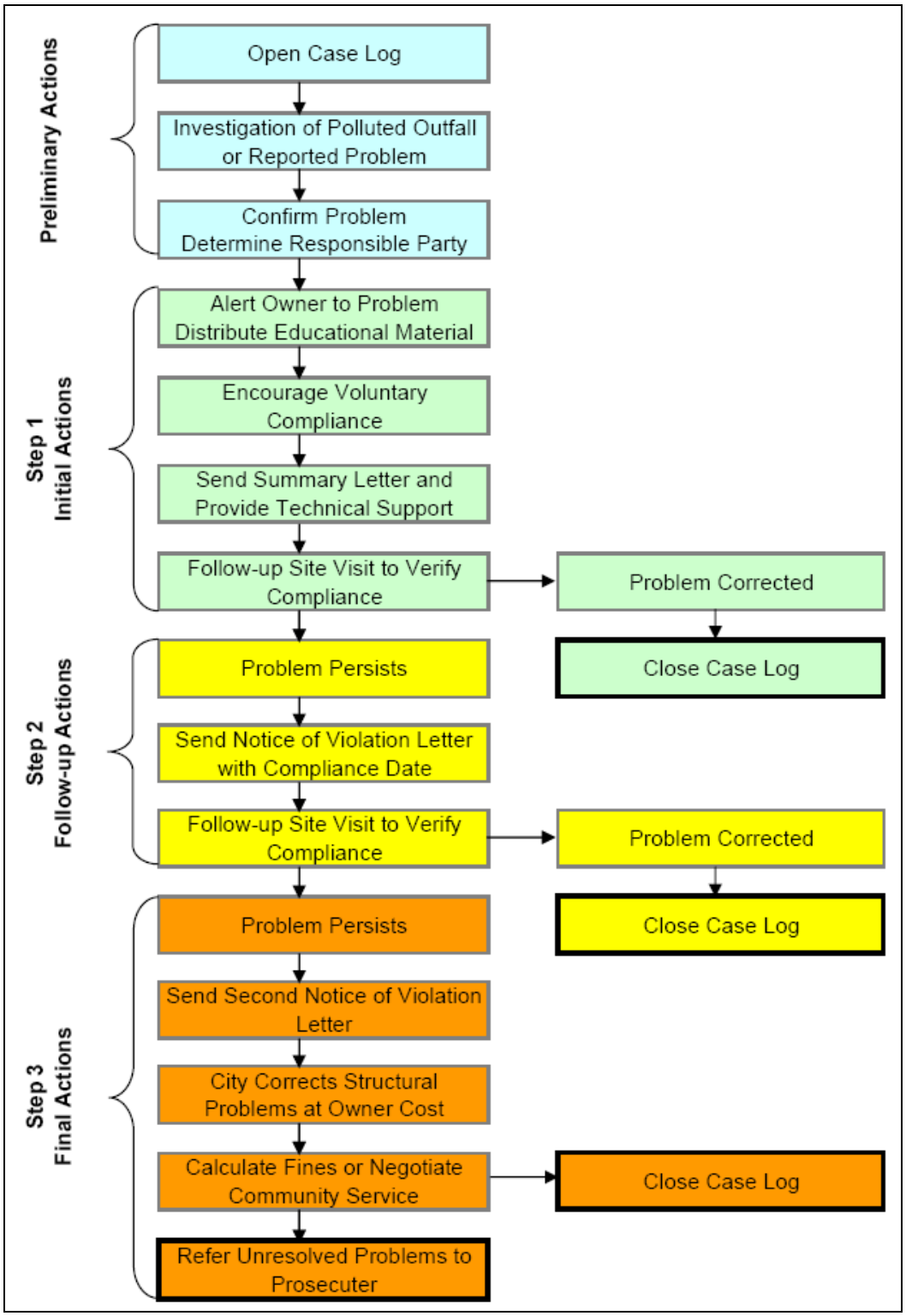


Figure 6-1: City of Bainbridge Island IDDE Enforcement Steps

6.3.1 Enforcement Timeline

The timeline of corrective action procedures is highly dependent on the nature of the violation and the responsiveness and cooperation from the person(s) responsible. The urgency of addressing identified problems will be based on the nature of the pollutant in question and potential impacts to downstream waters. Compliance dates should be included in all violation notices

The Phase II Permit requires identified problems to be corrected and illicit connections removed within 180 days of identifying the source. If property owners are not addressing problems in a timely manner, the City may step in and perform the repairs necessary to remove an illicit connection, eliminate an illicit discharge, and/or clean-up a dumping incident. Property owners will also be responsible for reimbursing the City for any costs occurred in correcting IDDE problems.

The Phase II Permit requires identified problems to be corrected and illicit connections removed within 180 days of identifying the source

6.3.2 Potential Fines

Illicit discharge violations are subject to fines and penalties under BIMC 1.26. Civil infraction fines (BIMC 1.26.035) can be in the amount of $500 per day and civil penalties can reach $1,000 per day starting at the date set for compliance (in the original notice of violation letter) until compliance is actually achieved. The City has the ability to back charge costs and penalties to the violator or reduce or waive the penalty if the property owner can show that they have been actively working to correct the problem and have run into time delays beyond their control. Repeat offenders may also find themselves subject to criminal penalties under BIMC 1.26.100.

6.3.3 Community Service Option

The City's IDDE ordinance allows to City to arrange for violators to conduct community service rather than paying the fines and penalties in BIMC 1.26. The following guidelines should be used in establishing appropriate community service activities:

- The activity should take a time equivalent to the staff time spent investigating the illicit discharge incident.
- The activity should also require the violator to learn more about stormwater or water quality issues, so that they have a better understanding of their role in protecting water quality in the future.
- The activity should provide a benefit to the City's water quality program, either directly through participation in water quality program activities or indirectly through education of the public.

Some examples of applicable community service activities include:

- Produce an educational brochure about IDDE and deliver to surrounding neighbors and/or businesses.

- Help set-up and staff the City's Water Resources program booth at a local community event.
- Provide field assistance to City staff working on mapping the stormwater drainage system or conducting outfall inspections.
- Provide field assistance to City staff in collecting water quality or groundwater monitoring data.
- Give a presentation about IDDE regulations at a local business networking group (Rotary, Chamber of Commerce, etc).
- Assist with preparations for the annual Water Resources program open house.

6.3.4 Record Keeping

Effective enforcement procedures require comprehensive recordkeeping and documentation to show that all program steps have been followed. Throughout the problem investigation and corrective action activities, all information related to the incident or property in question should be documented in the case log. Section 8 discusses illicit discharge record keeping in greater detail.

Section 7 – Public Education

The NPDES Phase II Permit requires the City to conduct outreach activities to educate the public and business community about water quality protection. Outreach activities focus on reducing pollutants at the source by educating the public and businesses about their ultimate impact on the natural environment. Many members of the community are apt to modify behaviors once they understand the potential negative consequences.

Outreach activities focus on…educating the public and business about their ultimate impact on the natural environment

To date, the City has conducted outreach activities aimed at educating local residents about natural yard care techniques, habitat protection, and personal impact on the natural environment. These programs have been well received by the general public, and the City is hoping to expand the education efforts and direct more focus to the local business community.

Illicit discharge detection and elimination will be the focus on the educational outreach to the local business community. Over the long term, the education program will include two major components. The first will be a business education program focused on informing business owners and their employees of their responsibilities related to water quality protection. The second, longer term, component is the development of a business recognition program aimed at promoting those businesses that are taking active steps to protect water quality (including reducing potential for illicit discharges).

The details of the City's education and outreach program are described in a previously published document: *IDDE Education & Outreach Program, City of Bainbridge Island* (Appendix G). The report includes a prioritization of target business, suggested outreach strategies, schedule of activities, and sample outreach materials. The report also includes a conceptual description of the business recognition program that can be used as a framework for developing the program when funding and staff are available.

Section 8 – Record Keeping

The NPDES Phase II Permit requires the City to keep records of all stormwater program activities. Thorough record keeping is particularly important for a successful IDDE program. Records of past problems can help focus an investigation in the right direction or identify repeat offenders. Thorough record keeping is also critical to the enforcement process. Examples of the different types of information to be retained are included below:

Citizen Complaints – retain Water Quality Incident Report Forms
Outfall Inspections – maintain Outfall Inspection forms, catalog and organize photographs, enter open case logs for suspected problem areas.
Investigations – retain Incident Response forms, photographs, conversation records, and lab testing results.
Corrective Action – in addition to the information collected during the investigation process, retain copies of compliance letters, correspondence with property owners, and proof of corrected problems (contract and invoice for completed work or clean field investigation report)

8.1 Data Sources

Outfall Inspections – ORI data is captured using a GPS or Total Station unit. Custom ArcPad forms are used to store attribute information obtained in the field. A simple procedure uploads new information to the project's geodatabase. The geodatabase uses an Access Database interface to save and retrieve data.

Investigations – Illicit discharge investigation records utilize a compliant tracking system developed using Microsoft Access 2007. A case log is created for each individual compliant call. The system tracks actions completed by the Investigator including: education opportunities, technical assistance, communications, sample collected and enforcement.

Financial Records – Financial records are stored in a separate database using MUNIS software. A work order is created for each compliant investigation. The work order and case log are linked by the unique case number. The MUNIS Work Order module allows the City to capture vendor invoices, employee's hours, equipment allocation and inventory supplies.

8.2 Long Term Record Storage

The NPDES permit required that all IDDE program records be retained for a minimum of five (5) years. However, longer term record storage will be helpful in building a library of data that describes pollutant problems

on Bainbridge Island. To facilitate this process the City will maintain the two most recent inspection reports for each receiving water / outfall location. Case log files (including analytical sampling results) will be kept for at least ten (10) years, or longer as data storage availability allows.

Section 9 – Staff Training

The City has developed a comprehensive training schedule to meet the requirements of the NPDES Phase II Permit. That schedule is documented in the *Bainbridge Island NPDES Compliance Staff Training Plan* memorandum (Otak, November 2007). Two primary trainings have been identified related to IDDE:

- Training for all staff that are routinely in the field to educate them on what constitutes an illicit discharge problem and how to report suspected problems. (Target date of December 2009, Due by February 2010)
- Training for illicit discharge responders on proper identification, investigation, clean-up, disposal, and reporting techniques for illicit discharges. (Target date of June 2009, due by August 2009)

These trainings are generally conducted by Water Resource's staff using materials developed for other aspects of the IDDE program. The City has developed a PowerPoint presentation that is used for conducting the overview training for all field staff. In addition to meeting the permit deadline of getting all field staff trained prior to February 2010, the City will schedule follow-up trainings as needed to keep the information fresh or introduce new information acquired during implementation of the IDDE program. These follow-up trainings will typically occur every 18 months as shown in the *NPDES Compliance Staff Training Plan.*

Training for illicit discharge responders will primarily include distribution and review of this procedures manual as well as a refresher on City spill response procedures. Follow-up trainings for illicit discharge responders may take the form of debriefings following significant IDDE incidents. Debriefings allow staff to review the actions that were taken and identify what worked well and what should be modified for future responses.

Section 10 – References

2008 Priority Area Work List for the Pollution Identification and Correction Program, Kitsap County Health District, April 2008

Bainbridge Island Municipal Code, Chapter 1.26 and 15.22.

Bainbridge Island, NPDES Compliance Staff Training Plan, Otak, Inc, November 26, 2007.

City of Bainbridge Island Drainage System Mapping Field Guide.

IDDE Education & Outreach Program, City of Bainbridge Island, Otak, Inc, January 8, 2008.

Illicit Discharge Detection and Elimination: a Guidance Manual for Program Development and Technical Assessments, Center for Watershed Protection and Robert Pitt (University of Alabama), October 2004.

Illicit Discharge Detection and Elimination Manual: A Handbook for Municipalities, New England Interstate Water Pollution Control Commission, January 2003.

Illicit Connection/Illegal Discharge (IC/ID) Detection and Elimination Model Program Guidance, San Diego Stormwater Copermittees Jurisdictional Urban Runoff Management Program (URMP), November 13, 2001.

Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide, Robert Pitt, et al, EOA publication 600/R-92/238, January 1993

Port of Seattle – Marine Division; Illicit Discharge Detection and Elimination Guidance Manual, Otak, Inc., August 2009.

Appendix A
Outfall Mapping Field Guide

City of Bainbridge Island
Public Works Department
280 Madison Avenue N.
Bainbridge Island, WA 98110

206-842-2016

City of Bainbridge Island

Drainage System Mapping Field Guide

This Field Guide is a quick reference to the different attributes staff and volunteers will find in the field when mapping the City of Bainbridge outfall drainage features. Contact the City's Water Resources Engineer for questions concerning the use of this manual.

Contact Numbers

Emergencies: 911

General Field Mapping Questions:
Melva Hill, (206) 780-3724 (work)
(206) 730-5113 (cell)

Water Quality Concerns:
Jalyn Cummings, (206) 780-3752 (work)
(206) 793-9844 (cell)

GOOD LUCK AND THANK YOU FOR HELPING MAP BAINBRIDGE ISLAND'S DRAINAGE SYSTEM!

Steel Pipe—Rare to find in the field.

Thalweg—The lowest part of the channel where low flow travels.

Toe—The point at which the slope of the channel wall becomes flat or nearly flat.

Top—The point at which the ground breaks downward to form the defined channel.

Trash Rack—Only found on pipe ends. The overwhelming majority of outfalls do not have a trash rack. Most trash racks are aluminum, but it is important that when measuring the pipe invert that you enter the material of the pipe itself, and not of the trash rack. In the adjacent photo the trash rack goes into an HDPE Smooth pipe, while the trash rack itself is aluminum.

Yard Drain—A small catch basin that connects a private drainage system, such as from a gutter, to a larger street drainage system. These are usually found on front lawns, and have smaller than 8-inch pipe diameters.

Overflow—Usually a part of a detention pond. An overflow is most often made of rock, and is designed to allow water to escape from a detention pond to prevent flooding when it reaches a certain level.

Perforated Corrugated Metal Pipe (Perforated CMP)—Extremely rare to run across in the field. It is just CMP with holes in it.

Perforated Polyvinyl Chloride (Perforated PVC)—A thin plastic pipe, usually aqua green or white in color. Perforated PVC is usually part of a yard drainage system, and tends to be eight inches or less in diameter.

Pipe Invert (PI)—The bottom elevation of a pipe.

Polyvinyl Chloride Smooth (PVC Smooth)—Smooth plastic pipe. A thick plastic pipe, aqua green or white. It is most often found in newer developments. PVC Smooth (no holes) can be found in up to 18-inch sizes.

Stagnant Water—An area near a drain point that has water that is not moving, and hasn't for a long period of time. It may have plants or algae growing in it or other signs that it may have been there for quite awhile, even when it has not been raining.

Start Ditch—The point at which runoff starts to converge into a defined channel. Often near the top of a hill. A very important feature to measure so that the ditch length can be measured using GIS.

Stream—Flowing body of water (channel), often the outfall of a drainage network. No data points need to be taken in a stream.

INTRODUCTION

As field technicians you are responsible for the accurate inventory of the City's drainage system in predetermined areas. The elements of interest in these systems include all catch basins, pipes, culverts, outfalls, stormwater facilities, and conveyance system outfalls. All appropriate drainage networks must be mapped and documented in their entirety. Utilize field notebooks and sketches for the documentation of the drainage network you are mapping and any irregularities within a network.

Please remember that you are a representative of the City: be courteous and polite. Feel free to refer questions to Public Works, Storm and Surface Water Management: (206) 842-2016.

Responsibilities

City Staff (full time or temporary) will be paired with volunteers to retrieve drainage inventory information. City Staff are responsible for operating the data collection (GPS) units. This procedure entails systematically collecting all relevant information regarding constructed drainage systems while employing quality control measures to ensure the accuracy of data retrieved.

Volunteers will assist City staff with data collection by locating features in the field, taking measurements, identifying material types and structure conditions, and preparing field sketches of the mapped systems.

SAFETY PROCEDURES

Safety is our first priority when working in the field. It is crucial that every crewmember have the proper attire. Safety gear/equipment will be provided to field personal before he/she begins work in the field.

Always wear your safety vest.

All field personnel should carry proper identification. City staff should carry business cards and be willing to identify themselves to members of the public if approached or questioned.

Since a large portion of the work done occurs near the roadway, visibility is your best weapon in preventing accidents.

- Always find a safe place to park
- Get off the roadway as much as possible.
- Cone off your vehicle and any equipment so they can be clearly seen by motorists
- Use signage when working on or near a roadway for an extended period of time.

During inclement weather, use your best judgment to determine whether conditions are safe for field work. Creek banks and ditch slopes can become very slippery when wet. Never enter a creek or ditch when water is flowing swiftly. Even knee high water can knock you off your feet. Always test water depths with a rod or other object before crossing.

NEVER ENTER A STRUCTURE—UNDER ANY CIRCUMSTANCE!!!

Flow Control Structure—A large catch basin with a metal device in it that is designed to restrict flow out of the catch basin. Usually located near a detention pond.

GIS—Geographic Information System. An electronic database that graphically presents information collected in the field.

GPS—Global Positioning System. Uses satellites for accurate triangulation of position in the field.

Grate—A frame of metal bars used to let water into a CB while blocking large debris from entering the structure.

HDPE Corrugated Pipe— Corrugated High Density Polyethylene Pipe—Usually found on small (12” or smaller) diameter pipes. Tends to be flexible, and usually black in color. Same as HDPE Smooth, but corrugated on the inside.

HDPE Smooth Pipe—Smooth High Density Polyethylene Pipe. Whether a material is considered smooth or corrugated is determined from the inside, not the outside, of the pipe. HDPE is usually black, and corrugated on the outside and smooth on the inside.

HDPE Solid Wall—Solid Wall High Density Polyethylene Pipe. Smooth interior and exterior with a solid wall and would be a continuous, jointless pipe (heat welded).

Outfall—An outfall is a drainage feature that empties into a natural drainage system, usually a creek, a lake, or a pond. An outfall is usually a pipe, but it can also be a ditch or channel.

Catchment Divide—The point at which water starts flowing in two different directions. A top of a hill or a low spot of a ditch with no drainage out are two examples.

Conveyance Swale/Ditch—A swale or ditch that is designed for the purpose of moving water downstream. Unlike bioswales, a standard swale won't have established vegetation but rather is grass lined.

Corrugated Aluminum Pipe—Often hard to distinguish from Corrugated Metal Pipe (CMP). It is usually shinier and in newer areas. Does not have rust associated with it.

Corrugated Metal Pipe (CMP)—Often found in older developments and roads. It is corrugated inside and out. Often have rust spots on it. Dull in color. CMP pipes may also be coated with a black rubbery layer around the inside of the pipe.

CMP Arch Culvert

Concrete Box Culvert

Ductile Iron (DI)—Thin metal pipe with black coating around the outside. It is rare to find this type of pipe out in the field.

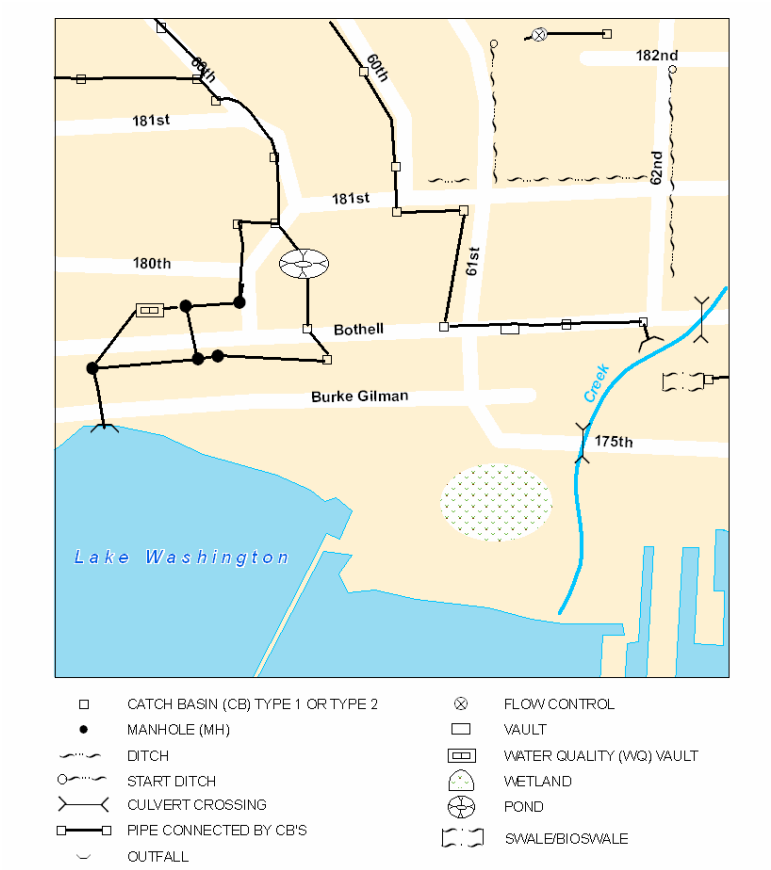
FIELD EQUIPMENT CHECKLIST

- ☐ Orange safety vest
- ☐ Steel toe boots/shoes
- ☐ First aid kit
- ☐ Water
- ☐ Basemap of area 'mapping' at 1:100 scale
- ☐ Water proof writing notebook and utensil
- ☐ Digital Camera
- ☐ GPS unit
- ☐ Compass
- ☐ Tape Measure
- ☐ Rod
- ☐ Catch Basin crow bar and ½ inch hex key
- ☐ Machete
- ☐ Clippers
- ☐ Dye tracing kit
- ☐ Sunscreen
- ☐ Hat or hardhat

GENERAL FIELD GUIDELINES

Field Sketches

Use the base map of the area you are mapping to sketch the system you encounter. Include symbols and notes to document the natural and constructed drainage system network.



DEFINITIONS

Azimuth—angle that indicates the direction water is flowing. 0° is due north. Angles are measured clockwise from due north (i.e. water flowing toward 3 o'clock (or east) is a 90° azimuth).

Berm—A raised obstacle that blocks water (i.e. small dam).

Bioswale—A shallow flat bottom swale, usually with vegetation, designed to move water slowly in an effort to remove pollutants and nutrients.

Catch Basin Type 1—A relatively shallow (48"), rectangular catch basin with a grate or lid and at least one pipe out (POT); Some will have a pipe incoming (PIN) and a pipe out (POT).

Catch Basin Type 2—A circular catch basin often with a solid lid (manhole) designed to be maintained and entered by a person, therefore, it will have metal steps and/or a ladder and will be wider in diameter to allow a person to get inside and move around easily.

CB Type 1

CB Type 2

DO NOT ENTER CATCH BASINS!!!

Water Quality Facilities

When mapping outfalls, enter the following information attributes into the GPS Unit:

Type

- oil/water separator
- standard baffle separator
- proprietary Storm Filter
- proprietary Storm Septor
- proprietary Vortechnic

Manhole cover for proprietary water quality facility:

Features to Map

Outfalls—where a closed (piped) conveyance system empties into a natural channel. Map the end of the outfall pipe.

Drainage Structures—catch basins (CBs), manholes (MHs), and drainage inlets. Map at the center of each structure lid. For drainage inlets, map at the center of the opening along the curb line.

Ditches—manmade channels, generally along the roadside. May be either vegetated or lined with earth. Map the ends (generally at culvert or pipe ends), the ditch center, and any major bends. For long ditches, map additional points every 300 feet.

Culverts—a pipe connecting two ditches on either side of a roadway or driveway. Map each end of the culvert with invert elevation.

Pipes—connect drainage structures in a closed conveyance system. Map each end of the pipe in the drainage structure. A pipe end without a structure should be mapped as an outfall.

Stormwater Facilities—including detention and water quality ponds, infiltration ponds, retention ponds, grass swales, and bioretention swales. Map the inlet of each facility (i.e. where water discharges from the conveyance system into the facility.)

Water Quality Facilities—a facility inserted in a catch basin or manhole. These facilities include oil/water separators, standard baffle separators, and proprietary systems like Storm Filters, Storm Septors, and Vortechnics. *Hint* = frequently the facility is

listed on the structure lid. Map the center of the catch basin or manhole lid.

Data Collection Order

Start at downstream end of drainage network system (identified on basemap at beginning of shift) and work your way upstream. Do this by starting at the outfall and move landward by following the pipe direction to the next lid or grate. At a split in the network, follow one branch to the most upstream end. Then go back to the original split and follow another branch in the network to the most upstream end. Continue in this manner until all of the branches in the network have been mapped.

Consistent Measurements

It is critical that data collection points be consistent throughout the mapping process. The "Features to Map" section identifies the correct points for collecting data at each surface water feature.

GPS Reading Challenges

If the vegetation coverage is too dense to get a GPS reading of a particular feature then take a reading (if possible) at the centerline of the nearest roadway, and then use the tape measure to measure the distance to the desired feature. Record the centerline reading and offset distance in the GPS unit in the field notes. If the vegetation is too dense to get ANY readings in an area, sketch the drainage system on the field map and make a note of which areas are missing data. Crews can then return in a leaf off time (fall/winter) to collect the GPS readings.

Stormwater Facilities

When mapping outfalls, enter the following information attributes into the GPS Unit:

Detention Pond—where stormwater is collected and released (from a pipe at the downstream end) at a controlled rate to reduce erosion. Measure the flow control structure to map on GIS.

Detention Pipe—An underground pipe that is designed to filter and store water. Access holes are usually covered by a solid circular lid. Measure the solid circular lid to map on GIS.

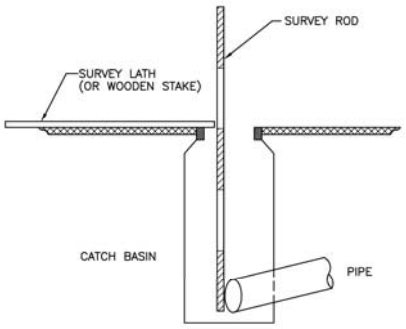
Infiltration Pond—looks like a detention pond, but all water infiltrates into the ground. Will not have a flow control structure, but may have an outlet pipe for overflows. Measure the flow control structure to map on GIS.

NEVER ENTER A STRUCTURE—UNDER ANY CIRCUMSTANCE!!!

Pipe Inverts—measure down the vertical distance from the top of the structure rim to the bottom inside of each connecting pipe. Record in feet. See directions and sketch below.

To get the measure-down of any pipe in a catch basin, use the measure down rod.

- Place the bottom of the rod on the pipe invert.
- Lay a survey lath across the top of the catch basin.
- Holding the measure-down rod as straight as possible, read the measurement to the top of the survey lath.
- Subtract 2/100 (0.02) of a foot from the measurement, due to lath width.
- Enter it into the measure down field.
- Note: The measure down fields is the only fields where you will report in tenths of feet, all other measurements are recorded in full feet or inches.



SCHEMATIC DIAGRAM DEMONSTRATING HOW TO TAKE THE INVERT ELEVATION OF A PIPE AT THE BOTTOM OF A CATHC BASIN/MANHOLE.

Private/Commercial Property

The intent of this project is to map features within the public right-of-way. When drainage systems cross private property, mark the locations on field sketch. Do not enter private property.

Field Tips

Never record an azimuth if you are not sure of the direction of flow. The following approaches can be used to determine connections in the drainage system:

- Dye Tracing—use within a closed pipe system (not natural drainage) when there is water in the network and drainage points leading into and out of structure can be identified.
- Use the crowbar to bang on one of pipe or a catch basin rim and listen for echo at other nearby structures to find the other end.
- Dense vegetation on the ground can be an indicator of a pipe end—where water is coming to the surface.

Outfalls

When mapping outfalls, enter the following information attributes into the GPS Unit:

Material—(see definitions)

- Concrete (Conc)
- Corrugated Metal Pipe (CMP)
- Ductile Iron (DI)
- High Density Polyethylene (HDPE)—smooth inside and corrugated outside
- Head Welded HDPE (HW HDPE)—smooth inside and smooth outside
- Polyvinyl Chloride (PVC)

Size—measure the inside diameter of the pipe and record the value in inches. Typical dimensions are 8", 12", 18", 24", 30", 36", 42", and 48".

Invert

- Measure the bottom of the pipe (flow line elevation).
- If the pipe is 'perched' above the ground, measure both the pipe invert and the distance from the pipe invert to the ground.
- If the pipe is 'buried' below the ground, record the amount buried using a percentage—25%, 50% or 75% of the pipe is buried.

Catch Basins/Manholes

When mapping outfalls, enter the following information attributes into the GPS Unit:

Type—(see definitions)

- Type 1
- Type 2
- Alternate (anything else)

Pipe Diameters—measure inside diameter in inches. This is the same information as the pipe features.

Structure Diameter—required for Type 2 manholes. 48" is the most common diameter. Other common diameters are 60" and 72".

Pipe Labels—(see Figure 3)—Pipe Out (POT) is the pipe which water leaves a structure (catch basin or manhole). There will always be a pipe out in every catch basin. Pipe In (PIN) is the pipe in which water enters the structure. PINS are numbered clockwise from the POT location.

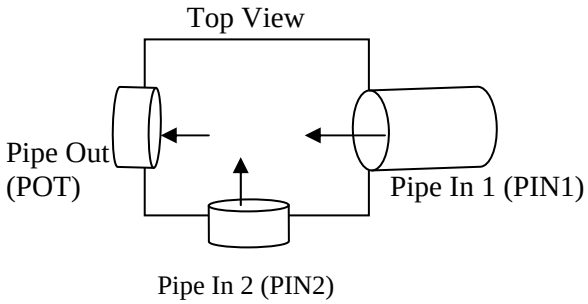


Figure 3—Proper pipe labels in a catch basin.

Ditches

When mapping outfalls, enter the following information attributes into the GPS Unit:

Material—(predominant material in bottom/sides of ditch):
- Grass
- Gravel
- Dirt
- Riprap

Density of vegetation
- None
- Sparse
- Thick
- Overgrown

Condition
- Full of sediment
- Eroded; needs repair
- Damaged; needs repair
- Blockage; remove
- Spill or contamination; needs cleanup
- Debris Removal; tree limbs and/or power poles

Thalweg—lowest point in the ditch (similar to 'invert').

Culverts

When mapping outfalls, enter the following information attributes into the GPS Unit:

Material—(see definitions)
- Concrete (Conc)
- Corrugated Metal Pipe (CMP)
- Ductile Iron (DI)
- High Density Polyethylene (HDPE)—smooth inside and corrugated outside
- Head Welded HDPE (HW HDPE)—smooth inside and smooth outside
- Polyvinyl Chloride (PVC)

Size—measure the inside diameter of the pipe and record the value in inches. Typical dimensions are **8", 12", 18", 24", 30", 36", 42", and 48"**. For box, arch or elliptical culverts, take a width and height measurement (see Figure 1). Measure height from the thalweg to the highest point. Measure width at the center for box or elliptical culverts and at the bottom for arched culverts.

Culvert Invert—measure down the vertical distance from the top of the road/ground to the bottom inside of the culvert pipe (see Figure 2). Inverts should be measured at both the upstream and downstream side of the culvert. If sediment has filled the bottom of the pipe, measure to the top inside of the pipe and use the pipe diameter to determine the invert elevation. Record in feet.

Trash Rack
- Yes
- No

Notes—Record other important findings and/or observations.

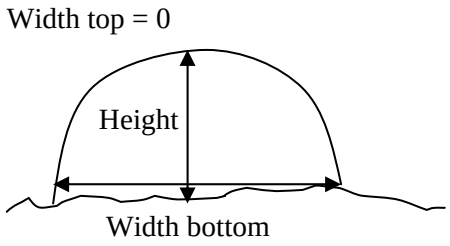


Figure 1—Measuring an arch or elliptical culvert

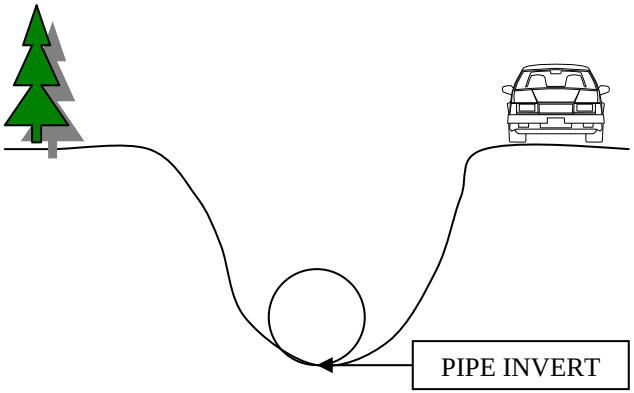


Figure 2—Measuring a pipe invert

Pipes

When mapping outfalls, enter the following information attributes into the GPS Unit:

Material—(see definitions)

- Concrete (Conc)
- Corrugated Metal Pipe (CMP)
- Ductile Iron (DI)
- High Density Polyethylene (HDPE)—smooth inside and corrugated outside
- Head Welded HDPE (HW HDPE)—smooth inside and smooth outside
- Polyvinyl Chloride (PVC)

***Diameter*—**measure the inside diameter in inches. For crushed pipes, take multiple measurements to determine the original pipe diameter and note the condition in the field sketch/notebook or GPS unit. Common pipe diameters are **8", 12", 18", 24", 30", 36", 42", and 48"**.

It may be difficult to measure the diameter in deep catch basins or shallow catch basins that have a pipe offset under the lip of the catch basin. Make your best educated guess of the diameter based on the other end of the pipe, other pipes in the same catch basin, or other pipes in the same drainage system.

Azimuth—measured from the upstream end of the pipe in the direction of flow.

Pipe Invert—measure down the vertical distance from the top of the structure rim to the bottom inside of the pipe. Record in feet.

NEVER ENTER A STRUCTURE—UNDER ANY CIRCUMSTANCE!!!

Appendix B
IDDE Ordinance

ORDINANCE NO. 2008-14

AN ORDINANCE of the City of Bainbridge Island, Washington relating to adoption of regulations for illicit discharge detection and elimination and adding a new Chapter 15.22 to Title 15 of the City of Bainbridge Island Municipal Code.

WHEREAS, the City of Bainbridge Island (the "City") is regulated under the Washington State Department of Ecology's Western Washington Phase II Municipal Stormwater Permit (the "Permit"); and

WHEREAS, the Permit became effective in February 2007 and contains various requirements for stormwater management and operations that must be implemented over the 5-year permit term ending February 15, 2012; and

WHEREAS, the Permit broadly applies to City activities that include maintenance and operations of City facilities, permitting of development, inspections and enforcement of regulations, and other activities conducted in the City's Municipal Separate Storm Sewer System; and

WHEREAS, the City will be adopting code policies and procedures as needed to comply with the Permit; and

WHEREAS, to meet the conditions of the Permit, a Stormwater Management Program ("SWMP") has been prepared that outlines all requirements of the Permit and a summary of the City's work program to meet those requirements over the 5-year permit term, and will be updated annually to incorporate progress on implementing the SWMP and changes to projected future work efforts; and

WHEREAS, the proposed Illicit Discharge Detection and Elimination chapter becomes an addition to the Bainbridge Island Municipal Code intended to meet Condition S.5C.3 of the Permit with the goal of improving and maintaining water quality in compliance with the Clean Water Act; now, therefore,

THE CITY COUNCIL OF THE CITY OF BAINBRIDGE ISLAND, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. A new Chapter 15.22 is added to Title 15 of the Bainbridge Island Municipal Code to read as follows:

“Chapter 15.22

ILLICIT DISCHARGE DETECTION AND ELIMINATION

Sections:

15.22.010 Purpose.

The purpose of this chapter is to regulate the city’s municipal separate storm sewer system (“MS4 or stormwater drainage system”) regarding the introduction of pollutants that would adversely impact surface and groundwater quality of the state of Washington in order to comply with requirements of the city’s National Pollutant Discharge Elimination System (“NPDES”) permit. The intent of this chapter is to:

A. Control the introduction of pollutants to the stormwater drainage system by any person and/or entity.

B. Prohibit illicit connections and discharges to the stormwater drainage system and receiving waters.

C. Establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this chapter.

15.22.020 Definitions.

1. “Best management practices” or “BMPs” means physical, structural, and/or managerial practices that, when used singly or in combination, prevent and/or reduce pollution of water. BMPs are listed and described in the Stormwater Management Manual for Western Washington and the City of Bainbridge Island Pollution Control Manual.
2. “Clean Water Act” means the federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), and any subsequent amendments thereto.
3. “Hazardous Materials” 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.

4. "Illegal Discharge" means any direct or indirect non-stormwater discharge to the stormwater drainage system, except as permitted or exempted in BIMC 15.22.050.

5. "Illicit Connection" is defined as either of the following:

    a. Any drain, conveyance, or hydraulic connection whether surface or subsurface, which allows an illegal discharge to enter the stormwater drainage system including but not limited to any conveyances which allow sewage, process wastewater, or wash water to enter the stormwater drainage system and any connections to the stormwater drainage system from indoor drains and sinks, regardless of whether the connection had been previously allowed, permitted, or approved by the city or other authorized public agency.
    b. Any drain or conveyance connected from a residential, commercial or industrial land use to the stormwater drainage system which has not been documented in plans, maps, or equivalent records and approved by the city.

6. "Municipal Separate Storm Sewer System (MS4)" or "stormwater drainage system" means the system of conveyances including sidewalks, roads with drainage systems, municipal streets, catchbasins, curbs, gutters, ditches, manmade channels, or storm drains owned and operated by the city and design or used for collecting or conveying stormwater.

7. "National Pollutant Discharge Elimination System (NPDES) Phase II Permit" means the "Western Washington Phase II Municipal Stormwater Permit" issued by the Washington State Department of Ecology with an effective date of February 16, 2007 and subsequent reissues.

8. "Non-Stormwater discharge" means any discharge to the stormwater drainage system that is not composed entirely of stormwater.

9. "Pollutant" or "Pollution" shall be construed to mean such contamination or other alteration of the physical, chemical, or biological properties of any of the waters of the state including, 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 or render 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; as defined in RCW 90.48.020 as now existing or hereafter amended.

10. "Stormwater" means surface water runoff resulting from rainfall, snowmelt, or other precipitation.
11. "Wastewater" or "Process wastewater" means any liquid or water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.
12. "Watercourse" and "river or stream" means any portion of a channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state including areas in which fish may spawn, reside, or through which they may pass, and tributary waters with defined bed or banks, which influence the quality of fish habitat downstream. This includes watercourses which flow on an intermittent basis or which fluctuate in level during the year and applies to the entire bed of such watercourse whether or not the water is at peak level. This definition does not include irrigation ditches, canals, stormwater run-off devices, or other entirely artificial watercourses, except where they exist in a natural watercourse which has been altered by humans.
13. "Waters of the state" means all lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington as defined in RCW 90.48.

15.22.030 Applicability.

This chapter shall apply to all water entering the stormwater drainage system and waters of the state within the city jurisdiction.

15.22.040 Administration.

The public works director or designee shall administer this chapter and shall be referred to as the administrator. The administrator shall have the authority to develop and implement procedures to administer and enforce this chapter.

15.22.050 General provisions.

A. Prohibition of Illegal Discharges.

1. No person shall discharge or cause to be discharged into the city's stormwater drainage system or waters of the state, any materials, including but not limited to, pollutants or waters containing any pollutants.
2. Prohibited discharges include, but are not limited to, the following:
    a. Trash or debris;
    b. Construction materials;

c. Petroleum products including, but not limited to, oil, gasoline, grease, fuel oil, heating oil;
d. Antifreeze and other automotive products;
e. Metals in excess of naturally occurring amounts, in either particulate or dissolved form;
f. Flammable or explosive materials;
g. Chemicals not normally found in uncontaminated water;
h. Acids, alkalis, or bases;
i. Painting products;
j. Degreasers and/or solvents;
k. Drain cleaners;
l. Commercial and household cleaning products;
m. Pesticides, herbicides, or fertilizers;
n. Steam cleaning wastes;
o. Pressure washing wastes;
p. Soaps, detergents, or ammonia;
q. Chlorinated spa or swimming pool water;
r. Domestic or sanitary sewage;
s. Animal carcasses;
t. Food wastes;
u. Yard wastes;
v. Silt, sediment, or gravel;
w. Any hazardous material or waste;
x. Wastewater or process wastewater (including filtered or purified wastewaters).

3. The following discharges are allowed by this chapter if the discharges do not contain pollutants. The administrator may evaluate and remove any of the exemptions if it is determined that they are causing an adverse impact.

a. Diverted stream flows (i.e., channeled or piped streams);
b. Rising ground waters and springs;
c. Flows from riparian habitats and wetlands.
d. Uncontaminated ground water infiltration (as defined in 40 C.F.R. 35.2005(20));
e. Uncontaminated pumped ground water;
f. Foundation and footing drains;
g. Air conditioning condensation;
h. Irrigation water from agricultural sources that is commingled with urban stormwater;
i. Water from crawl space pumps;
j. Non-stormwater discharges covered by another NPDES permit;
k. Discharges from emergency fire fighting activities;
l. Discharges specified in writing by the administrator as being necessary to protect public health and safety.

4. The following types of discharges shall only be permitted if the stated conditions are met:

    a. Discharges from potable water sources, including water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water; planned discharges shall be de-chlorinated to a concentration of 0.1 ppm or less, pH-adjusted if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments in the storm drainage system;
    b. Discharges from lawn watering and other irrigation runoff; these shall be minimized through water conservation efforts;
    c. Dechlorinated spa or swimming pool discharges; the discharges shall be dechlorinated to a concentration of 0.1 ppm or less, pH-adjusted and reoxygenized if necessary, volumetrically and velocity controlled to prevent re-suspension of sediments in the storm drainage system. The temperature of the discharge water shall not exceed 65 degrees Fahrenheit. Spa or swimming pool cleaning wastewater and filter backwash shall not be discharged to the storm drainage system.
    d. Street and sidewalk wash water, water used to control dust, and routine external building wash down that does not use detergents; the amount of street wash, dust control, and building wash water shall be minimized. At active construction sites, street sweeping must be performed prior to washing the street.
    e. Dye testing with verbal notification to the city at least twenty-four (24) hours prior to the time of the test;
    f. Discharges resulting from maintenance, repair, or operation of fire fighting equipment and facilities that are not directly associated with public fire fighting, including discharges from public fire fighting training exercises, unless city-approved best management practices are implemented.

5. Discharge prohibitions shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Environmental Protection Agency or Washington State Department of Ecology, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the stormwater drainage system.

B. Prohibition of Illicit Connections.

1. The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

2. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. Waste Disposal.

No person shall throw, deposit, leave, maintain, or keep in or upon any public or private property, the stormwater drainage system, or waters of the state, any refuse, rubbish, garbage, litter, or other discarded or abandon objects, articles, or accumulations that may cause or contribute to pollution. Wastes deposited in proper waste receptacles for the purposes of collection are exempt from this prohibition.

15.22.060 General requirements.

A. Requirement to Eliminate Illegal Discharges.

The administrator may require by written notice that a property owner or person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge, clean up the polluting matter and, if necessary, take measures to eliminate the source of the discharge to prevent the reoccurrence of discharges. The administrator may charge all associated costs thereof to the property owner or responsible party.

B. Requirement to Eliminate Illicit Connections.

The administrator may require by written notice that a property owner or person responsible for an illicit connection to the stormwater drainage system eliminate the connection by a specified date, regardless of whether or not the connection had been established or approved previously.

C. Requirement to Implement Best Management Practices.

The owner or operator of a commercial or industrial establishment and property owners shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the stormwater drainage system or waters of the state through the use of structural and non-structural BMPs (as defined in BIMC 15.20.030). The administrator may require any person responsible for a property or premise, which is, or may be, the source of an illicit discharge to implement, at their own expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the stormwater drainage system.

D. Watercourse Protection.

Any person owning property through which a watercourse passes shall keep and maintain that part of the watercourse within the property free of trash, debris, and other items that would pollute or contaminate the flow of water through the watercourse.

E. Notification of Illegal Discharges.

1. Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation has information of any known or suspected illegal discharges into the stormwater drainage system or waters of the state, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release.

2. In the event of an illegal discharge of hazardous materials into the stormwater drainage system or waters of the state, said person shall immediately notify emergency dispatch services (911) and the Public Works Department (206-842-2016).

3. In the event of an illegal discharge of non-hazardous materials into the stormwater drainage system or waters of the state, said person shall notify the Public Works Department by phone (206-842-2016), by facsimile (206-780-3710), or in person within forty-eight (48) hours after said discharge.

4. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be kept and maintained on a permanent basis from the effective date of this chapter.

15.22.070 Inspections and Investigations.

A. Facility and Property Inspections.

The administrator shall be permitted to enter and inspect facilities subject to regulation under this chapter as often as may be necessary to determine compliance with this chapter. If a property owner has security measures in force which require proper identification and clearance before entry into its premises, the property or facility owner/operator shall make the necessary arrangements to allow access to the administrator.

B. Facility and Property Access.

1. Facility operators shall allow the administrator ready access to all parts of the premises for the purposes of inspection, sampling, examination, and

copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and/or federal law.

2. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the property owner at the written or oral request of the administrator and shall not be replaced. The costs of clearing such access shall be borne by the property owner.

C. Monitoring and Sampling.

1. The administrator has the right to install or require the property owner to install monitoring equipment as is reasonably necessary in the opinion of the administrator to conduct appropriate monitoring and/or sampling of the facility's stormwater discharge. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the property owner at his/her own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.
2. All data shall be collected in accordance with a sampling and analysis plan that is approved by the administrator.

15.22.080 Enforcement.

A. Failure to Comply.

It is unlawful for any person to violate any provision or fail to comply with any of the requirements of this chapter. Any activity or action caused or permitted to exist in violation of this chapter is a violation subject to enforcement under BIMC 1.26.

B. Emergency Access and Reparation.

In the event the violation constitutes an immediate danger to public health or safety, the administrator is authorized to enter upon the subject private property, without giving prior notice, to take any and all measures necessary to abate the violation and/or restore the property. Any expense related to such remediation undertaken by the city shall be fully reimbursed by the property owner and/or responsible party. Any relief obtained under this section shall not prevent the city from seeking further relief or applying other penalties as outlined in BIMC 1.26.

C. Civil Infraction.

Except as provided in subsection D of this section, conduct made unlawful by this chapter shall constitute a civil infraction and is subject to enforcement and

fines as provided in BIMC Chapter 1.26.035. A civil infraction under this section shall be processed in the manner set forth in BIMC Chapter 1.26.

D. Misdemeanor.

Any person who again violates this chapter within twelve (12) months after having been found by the Bainbridge Island Municipal Court to be in violation of this chapter, commits a misdemeanor and any person who is convicted thereof shall be punished as provided in BIMC 1.24.010.A.E.

E. Civil Penalty.

In addition to any civil infraction fine, criminal penalty, and/ or other available sanction or remedial procedure, any person engaging in conduct made unlawful by this chapter shall be subject to a cumulative civil penalty in the amount of $1,000 per day for each violation from the date set for compliance until the date of compliance. Any such civil penalty shall be collected in accordance with BIMC 1.26.090.

F. Additional Remedies.

1. In addition to any other remedy provided by this chapter or under the Bainbridge Island Municipal Code, the city may initiate injunction or abatement proceedings or any other appropriate action in courts against any person who violates or fails to comply with any provision of this chapter to prevent, enjoin, abate, and/or terminate violations of this chapter and/or to restore a condition which existed prior to the violation. In any such proceeding, the person violating and/or failing to comply with any provisions of this chapter shall be liable for the costs and reasonable attorneys' fees incurred by the city in bringing, maintaining and/or prosecuting such action.
2. The administrator may provide the option for compensation of all or part of any penalties incurred by any person(s) to be made in the form of community service approved by the administrator that will be of benefit to the environment and the city. The person(s) and administrator will enter into a formal, written agreement providing for the community service. This agreement shall include in detail description of the service(s) to be rendered by the person(s) in penalty for noncompliance of this chapter. The description shall include a completion date with a mutually agreed compensation structure to offset the above mentioned penalties.
3. Any person who violates any provision of this chapter may also be in violation of the Federal Clean Water Act, NPDES Phase II Permit, and/or RCW 90.48 and may be subject to sanctions including civil and criminal penalties. Any enforcement action authorized under this chapter shall also include written notice to the violator of such potential liability."

Section 2. Severability. If any one or more section, subsections, or sentences of this ordinance are held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portion of this ordinance and the same shall remain in full force and effect.

Section 3. Effective Date. This ordinance shall take effect on and be in force five (5) days from and after its passage, approval, and publication as required by law.

PASSED by the City Council this 22nd day of October, 2008.

APPROVED by the Mayor this 22nd day of October, 2008.

_____
Darlene Kordonowy, Mayor

ATTEST/AUTHENTICATE:

_____
Rosalind D. Lassoff, CMC, City Clerk

FILED WITH THE CITY CLERK:	July 15, 2008
PASSED BY THE CITY COUNCIL:	October 22, 2008
PUBLISHED:	October 29, 2008
EFFECTIVE DATE:	November 3, 2008
ORDINANCE NUMBER:	2008-14

Appendix C
IDDE Reporting Forms
- Water Quality Incident Report Form
- Outfall Inspection Report
- Incident Response Form

WATER QUALITY INCIDENT REPORT FORM

(Call NRC Environmental If Spill is Significant)

Today's Date____/____/____ Time Reported _____ CORR LOG#_____

Call Taker's Name _____ #_____

Date of Incident ___/___/___ Time of Occurrence _____

Caller Information

Name _____
First Middle Last

Business Name _____

Street Address _____
_____

City_____ State_____ Zip_____

E-mail_____

External Ref. #_____

Phone:_____ Ext_____ Type_____

□ *Caller Requests to Remain Anonymous*

Location of Incident:

Business or Location Name_____

Street Address_____
_____

City Bainbridge Island State WA Zip 98110

County, Region Kitsap County

Land use: Commercial □ Residential □

Rural □ Forest □ Shoreline □

Park/Open space □ Other_____

Directions/Landmarks_____
_____
_____
_____
_____

Incident Description

Matrix Soil □ Sediment □ Water □

Contaminate □ Oil/Fuel □ Sewage/Septic
□ Detergents □ Other_____

Odor: ☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other*_____

Color: ☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other*_____

Floatables: ☐ Toilet Paper ☐ Suds ☐ Oil Sheen ☐ Excessive Algae ☐ Other*

Quantity _____ **Cause**_____

Other Agencies Complainant Contacted:

Agencies Responding ___Fire ___Police ___City Other_____

Referred to 911? □ YES □ NO

Referred to:

Name_____Phone_____Ext_____Type_____

***Additional Information**

OUTFALL INSPECTION REPORT

Section 1: Background Data

Watershed:	Date/Time:	Last rain (circle): > 72 hours < 72 hours
Receiving Water:	Investigators:	Temperature:
Outfall ID:	Photos:	Tide:
Location (Lat/Long, GPS LMK#, etc):	Other Background Notes:	

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe ☐ Single ☐ Double	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other:_____	☐ Circular ☐ Elliptical ☐ Box ☐ Other:_____	Diameter _____ Height/Width _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open Drainage	☐ Concrete ☐ Earthen ☐ Rip-rap ☐ Other:_____	☐ Trapezoid ☐ Parabolic ☐ Other:_____	Depth:_____ Top Width:_____ Bottom Width:_____	

Section 3: Initial Assessment:

Flow Present?	☐ No ☐ Yes (Complete Section 5 and 6):	If both questions are answered "No," outfall is not a suspected illicit discharge. Complete Sections 4 and 7 and file report. No further action is required.
Illicit Discharge Concern? (based on visual observation)	☐ No ☐ Yes (Complete Section 6)	

Section 4: Additional Observations

Note any non-illicit discharge concerns observed at the outfall that should be reported to maintenance (e.g., trash, outfall damage, excessive vegetation impeding flow, or needed infrastructure repairs)**:**

Section 5: Field Data for Flowing Outfalls

FLOW ESTIMATE			MEASUREMENT	UNIT	EQUIPMENT	CALCUATED FLOW
☐ Trickle ☐ Moderate ☐ Substantial	☐ Flow – Volume Method	Volume		Liter	Bottle	
		Time to fill		Sec	Stop Watch	
	☐ Flow – Area Method	Flow depth		In	Tape measure	
		Flow width		Ft, In	Tape Measure	
		Measured length		Ft, In	Tape Measure	
		Time of travel		Sec	Stop Watch	

Section 6: Physical Indicators of Potential Illicit Discharge

INDICATOR (Check if Present)	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
☐ Flow Odor	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Flow Color	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other*	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
☐ Turbidity	See severity index (Collect sample in bottle)	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
☐ Floatables (Do not include trash)	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other*	☐ 1 – Few/slight; origin not obvious	☐ 2 – Indications of origin (e.g., possible suds or oil sheen)	☐ 3 – Obvious origin
☐ Deposits or Stains	☐ Oily ☐ Flow Line ☐ Paint ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Poor Pool Quality	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
☐ Pipe Benthic Growth	☐ Brown ☐ Orange ☐ Green ☐ Other*	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
TOTAL INDICATOR SCORE (add Severity Index scores):				

*Describe Here:

Section 7: Action Level (Circle one)

No Suspected Illicit Discharge (Total Indicator Score: 3 or lower)	**Suspected Illicit Discharge** (Total Indicator Score: 4-7)	**Obvious Illicit Discharge** (Total Indicator Score: 8 or higher)
No further action required	Open Case Log Refer for Investigation	Open Case Log Refer for Investigation and Corrective Action

INCIDENT RESPONSE FORM

Section 1: Background Data

Watershed:	Date/Time:	Last rain (circle): > 72 hours < 72 hours
Receiving Water:	Investigators:	Temperature:
Outfall ID:	Photos:	Tide:
Location (Lat/Long, GPS LMK#, etc):	Summary of Problem:	
Date of Initial Inspection or Problem Report:		

Suspected Pollutants (circle):	PRIORITY LEVEL*
Alkalis Automotive products Bases Cleaning products Degreaser or solvent Drain cleaner Fertilizer Flammable/explosive materials Herbicide Metals Painting products Pesticide Petroleum Process Wastewater Sewage Unknown chemicals	1
Ammonia Construction runoff (silt, sediment, gravel) Detergents Food waste (fats, oils, grease) Soap	2
Car washing Pressure washing waste Spa or pool water Steam cleaning waste Yard waste	3
Animal carcasses Bacteria Construction materials Debris Foam Rust Trash Other _____	4

*Refer to IDDE Program Manual for target response times based on priority level

Section 2: Investigation Methods

☐ Storm Drain Network Investigation ☐ Drainage Area Investigation ☐ Other: _____

Section 3: Field Notes

Describe field activities (e.g. manholes inspected, odors/colors observed, suspected land uses, activities observed, any dye testing, smoke testing, or video testing conducted, etc):

Attach map, field sketch, or additional notes as needed to describe field activities.

Section 4: Sampling Data (as needed)

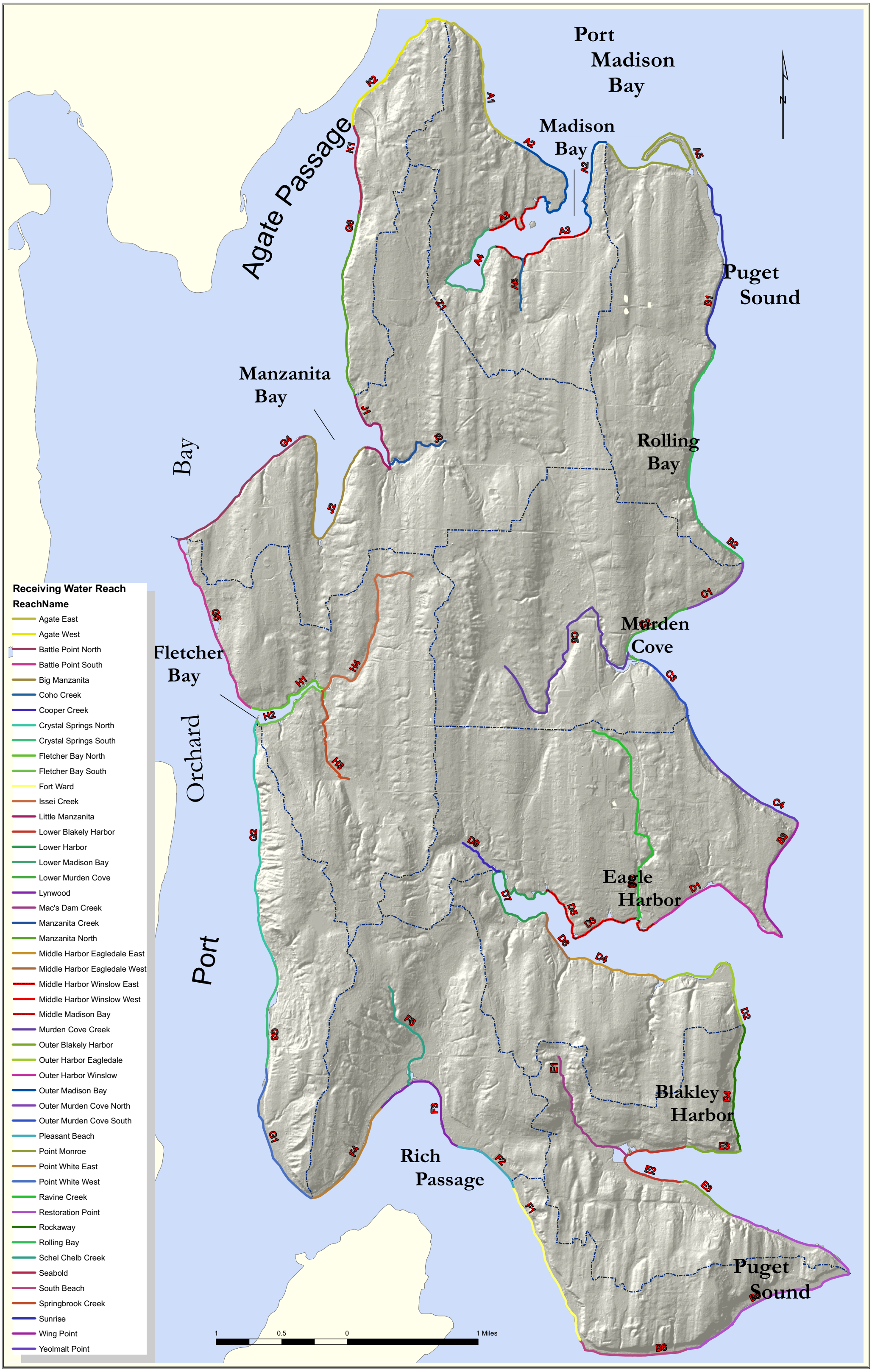
Attach any laboratory testing results to this form and file with case log.

FIELD TEST PARAMETERS							
Date of Field Tests:							
PARAMETER	EQUIPMENT	UNIT	Describe location:	Describe location:	Describe location:	Describe location:	Describe location:
Temperature	Thermometer	○C					
pH	Probe	pH Units					
DO	Probe	mg/L					
Conductivity	Probe	ms/cm					
Ammonia	Test Strip	mg/L					

Section 5: Additional Observations

Note any other concerns observed during investigations (e.g., trash, damage, excessive vegetation impeding flow, or needed repairs)**:**

Appendix D
- Receiving Water Prioritization
- Receiving Water Locations Map
- Receiving Water Prioritization Table


Port Madison Bay
Madison Bay
Agate Passage
Puget Sound
Manzanita Bay
Rolling Bay
Fletcher Bay
Murden Cove
Orchard
Eagle Harbor
Port
Blakley Harbor
Rich Passage
Puget Sound
N
Receiving Water Reach
ReachName
Agate East
Agate West
Battle Point North
Battle Point South
Big Manzanita
Coho Creek
Cooper Creek
Crystal Springs North
Crystal Springs South
Fletcher Bay North
Fletcher Bay South
Fort Ward
Issei Creek
Little Manzanita
Lower Blakely Harbor
Lower Harbor
Lower Madison Bay
Lower Murden Cove
Lynwood
Mac's Dam Creek
Manzanita Creek
Manzanita North
Middle Harbor Eagledale East
Middle Harbor Eagledale West
Middle Harbor Winslow East
Middle Harbor Winslow West
Middle Madison Bay
Murden Cove Creek
Outer Blakely Harbor
Outer Harbor Eagledale
Outer Harbor Winslow
Outer Madison Bay
Outer Murden Cove North
Outer Murden Cove South
Pleasant Beach
Point Monroe
Point White East
Point White West
Ravine Creek
Restoration Point
Rockaway
Rolling Bay
Schel Chelb Creek
Seabold
South Beach
Springbrook Creek
Sunrise
Wing Point
Yeolmalt Point
1
0.5
0
1 Miles

Receiving Water Prioritization Table

RECEIVING WATER	SUBSET	SITE IDENTIFIER	PRIORITY	QUALIFIER
Port Madison Bay	Agate Point to Point Monroe	A		
	Agate East	A1	L	
	Outer Madison Bay	A2	H	MAR (2)
	Middle Madison Bay	A3	M	
	Lowe Madison Bay	A4	M	
	Pt. Monroe	A5	M	
	Coho Creek	A6	L	
Puget Sound	East Island, Pt. Monroe to Beans Pt. except specific named rec. waters	B		
	Sunrise	B1	L	
	Rolling Bay	B2	M	C
	Wing Point	B3	L	
	Rockaway	B4	L	
	Restoration Point	B5	L	
	South Beach	B6	L	
Murden Cove	Skiff Point to Yeomalt Point	C		
	Outer Murden Cove North	C1	L	
	Lower Murden Cove	C2	M	
	Outer Murden Cove South	C3	L	
	Yeomalt Point	C4	L	
	Murden Cove Creek	C5	M	
Eagle Harbor	Wing Point to Creosote	D		
	Outer Harbor Winslow	D1	M	
	Outer Harbor Eagledale	D2	L	PIC
	Middle Harbor Winslow East	D3	H	C,FT
	Middle Harbor Eagledale East	D4	L	PIC
	MiddleHarbor Winslow West	D5	H	C
	Middle Harbor Eagledale West	D6	L	PIC
	Lower Eagle Harbor	D7	L	
	Ravine Creek	D8	M	C
	Cooper Creek	D9	L	
Blakely Harbor	Jasmine Point to Restoration Point	E		
	Lower Blakely Harbor	E2	M	OR
	Outer Blakely Harbor	E3	M	OR
	Mac's Dam Creek	E1	M	OR

Receiving Water Prioritization Table

RECEIVING WATER	SUBSET	SITE IDENTIFIER	PRIORITY	QUALIFIER
Rich Passage	Beans Point to Point White	F		
	Fort Ward	F1	M	C
	Pleasant Beach	F2	L	
	Lynwood	F3	L	
	Point White East	F4	L	
	Schel Chelb Creek	F5	L	
Port Orchard Bay	Point White to Hidden Cove Road end	G		
	Point White West	G1	L	PIC
	Crystal Springs North	G2	L	PIC
	Crystal Springs South	G3	L	PIC
	Battle Point North	G4	L	
	Battle Point South	G5	L	
	Manzanita North	G6	L	
Fletcher Bay	Olympus Beach to Fletcher Landing	H		
	Fletcher Bay North	H1	H	C
	Fletcher Bay South	H2	H	C
	Springbrook Creek	H3	H	C
	Issei Creek	H4	H	
Manzanita Bay	Arrow Point to Dock Street	J		
	Little Manzanita	J1	M	
	Big Manzanita	J2	L	
	Manzanita Creek	J3	L	
Agate Passage	Agate West Dock St. to Hidden Cove road end	K		
	Agate West	K1	H	
	Seabold	K2	H	

PIC - Previous PIC
C - Commerical
H- High Priority
M - Medium Priority
L - Low Priority
MAR- Marina
FT - Ferry Terminal/Yard
OR- Older Residential

Appendix E

IDDE Investigation Resources

- Field Equipment List
- Smoke Testing, Dye Testing, Video Testing (CWP)
- Water Quality Sampling Parameters (NEIWPCC)

Field Equipment Checklists

Equipment for Outfall Inspections

- ☐ Minimum 2 person crew
- ☐ Safety Gear – boots, high visibility vest, hard hat, safety cones
- ☐ Field Notebook/Pencils
- ☐ Outfall Inspection Report Forms
- ☐ Map or Aerial Photo of Inspection Area
- ☐ GPS Unit
- ☐ Cell phone w/ charged battery
- ☐ Digital camera w/ charged battery
- ☐ Compass
- ☐ Machete/Clippers
- ☐ Flash light or headlamp
- ☐ Tool Box – hammer, tape measure, duct tape, zip ties
- ☐ Spray paint or other marker
- ☐ First Aid Kit
- ☐ Clear sample bottles
- ☐ Wide mouth container and watch with second hand

Equipment for Incident Response

- ☐ Minimum 2 person crew
- ☐ Safety Gear – boots, high visibility vest, hard hat, safety cones
- ☐ Field Notebook/Pencils
- ☐ Incident Response Forms
- ☐ Map or Aerial Photo of Area
- ☐ GPS Unit
- ☐ Cell phone w/ charged battery
- ☐ Digital camera w/ charged battery
- ☐ Compass
- ☐ Machete/Clippers
- ☐ Flash light or headlamp
- ☐ Tool Box – hammer, tape measure, duct tape, zip ties
- ☐ Pick or CB grate/cover remover
- ☐ Spray paint or other marker
- ☐ First Aid Kit
- ☐ Field Test Kit (see next)

Equipment for Field Test Kit

- ☐ Dye Tracer
- ☐ Test Strips
- ☐ Sets of sample bottles for laboratory
- ☐ Coolers (non metallic) and ice packs
- ☐ Laboratory chain of custody forms
- ☐ Nitrile gloves – clean, non talc
- ☐ Multi-parameter probe
- ☐ Turbidimeter
- ☐ Extension sampling pole/sludge pole
- ☐ Kim-wipes
- ☐ Distilled water for equipment decontamination
- ☐ Deionized water for field blanks
- ☐ Storage bags – clean zip-type
- ☐ Garbage bags
- ☐ Sharpie Markers/Pencils/Pens

Table 56: Techniques to Locate the Discharge		
Technique	**Best Applications**	**Limitations**
Dye Testing	• Discharge limited to a very small drainage area (<10 properties is ideal) • Discharge probably caused by a connection from an individual property • Commercial or industrial land use	• May be difficult to gain access to some properties
Video Testing	• Continuous discharges • Discharge limited to a single pipe segment • Communities who own equipment for other investigations	• Relatively expensive equipment • Cannot capture non-flowing discharges • Often cannot capture discharges from pipes submerged in the storm drain
Smoke Testing	• Cross-connection with the sanitary sewer • Identifying other underground sources (e.g., leaking storage techniques) caused by damage to the storm drain	• Poor notification to public can cause alarm • Cannot detect all illicit discharges

TIP

The Wayne County Department of the Environment provides excellent training materials on on-site investigations, as well as other illicit discharge techniques. More information about this training can be accessed from their website: http://www.wcdoe.org/Watershed/Programs___Srvcs_/IDEP/idep.htm.

Figure 63: Dye Testing Plumbing (NEIWPCC, 2003)

Dye Testing

Dye testing is an excellent indicator of illicit connections and is conducted by introducing non-toxic dye into toilets, sinks, shop drains and other plumbing fixtures (see Figure 63). The discovery of dye in the storm drain, rather than the sanitary sewer, conclusively determines that the illicit connection exists.

Before commencing dye tests, crews should review storm drain and sewer maps to identify lateral sewer connections and how they can be accessed. In addition, property owners must be notified to obtain entry permission. For industrial or commercial properties, crews should carry a letter to document their legal authority to gain access to the property. If time permits, the letter can be sent in advance of the dye testing. For residential properties, communication can be more challenging. Unlike commercial properties, crews are not guaranteed access to homes, and should call ahead to ensure that the owner will be home on the day of testing.

Communication with other local agencies is also important since any dye released to the storm drain could be mistaken for a spill or pollution episode. To avoid a costly and embarrassing response to a false alarm,

crews should contact key spill response agencies using a "quick fax" that describes when and where dye testing is occurring (Tuomari and Thomson, 2002). In addition, crews should carry a list of phone numbers to call spill response agencies in the event dye is released to a stream.

At least two staff are needed to conduct dye tests – one to flush dye down the plumbing fixtures and one to look for dye in the downstream manhole(s). In some cases, three staff may be preferred, with two staff entering the private residence or building for both safety and liability purposes.

The basic equipment to conduct dye tests is listed in Table 57 and is not highly specialized. Often, the key choice is the type of dye to use for testing. Several options are profiled in Table 58. In most cases, liquid dye is used, although solid dye tablets can also be placed in a mesh bag and lowered into the manhole on a rope (Figure 64). If a

Table 57: Key Field Equipment for Dye Testing
(Source: Wayne County, MI, 2000)

Maps, Documents
- Sewer and storm drain maps (sufficient detail to locate manholes)
- Site plan and building diagram
- Letter describing the investigation
- Identification (e.g., badge or ID card)
- Educational materials (to supplement pollution prevention efforts)
- List of agencies to contact if the dye discharges to a stream.
- Name of contact at the facility

Equipment to Find and Lift the Manhole Safely (small manhole often in a lawn)
- Probe
- Metal detector
- Crow bar
- Safety equipment (hard hats, eye protection, gloves, safety vests, steel-toed boots, traffic control equipment, protective clothing, gas monitor)

Equipment for Actual Dye Testing and Communications
- 2-way radio
- Dye (liquid or "test strips")
- High powered lamps or flashlights
- Water hoses
- Camera

Figure 64: Dye in a mesh bag is placed into an upstream manhole (left); Dye observed at a downstream manhole traces the path of the storm drain (right)

longer pipe network is being tested, and dye is not expected to appear for several hours, charcoal packets can be used to detect the dye (GCHD, 2002). Charcoal packets can be secured and left in place for a week or two, and then analyzed for the presence of dye. Instructions for using charcoal packets in dye testing can be accessed at the following website: http://bayinfo.tamug.tamu.edu/gbeppubs/ms4.pdf.

The basic drill for dye tests consists of three simple steps. First, flush or wash dye down the drain, fixture or manhole. Second, pop open downgradient sanitary sewer manholes and check to see if any dye appears. If none is detected in the sewer manhole after an hour or so, check downgradient storm drain manholes or outfalls for the presence of dye. Although dye testing is fairly straightforward, some tips to make testing go more smoothly are offered in Table 59.

Table 58: Dye Testing Options

Product	Applications
Dye Tablets	• Compressed powder, useful for releasing dye over time • Less messy than powder form • Easy to handle, no mess, quick dissolve • Flow mapping and tracing in storm and sewer drains • Plumbing system tracing • Septic system analysis • Leak detection
Liquid Concentrate	• Very concentrated, disperses quickly • Works well in all volumes of flow • Recommended when metering of input is required • Flow mapping and tracing in storm and sewer drains • Plumbing system tracing • Septic system analysis • Leak detection
Dye Strips	• Similar to liquid but less messy
Powder	• Can be very messy and must dissolve in liquid to reach full potential • Recommended for very small applications or for very large applications where liquid is undesirable • Leak detection
Dye Wax Cakes	• Recommended for moderate-sized bodies of water • Flow mapping and tracing in storm and sewer drains
Dye Wax Donuts	• Recommended for large sized bodies of water (lakes, rivers, ponds) • Flow mapping and tracing in storm and sewer drains • Leak detection

Table 59: Tips for Successful Dye Testing
(Adapted from Tuomari and Thompson, 2002)

Dye Selection
- Green and liquid dyes are the easiest to see.
- Dye test strips can be a good alternative for residential or some commercial applications. (Liquid can leave a permanent stain).
- Check the sanitary sewer before using dyes to get a "base color." In some cases, (e.g., a print shop with a permitted discharge to the sanitary sewer), the sewage may have an existing color that would mask a dye.
- Choose two dye colors, and alternate between them when testing multiple fixtures.

Selecting Fixtures to Test
- Check the plumbing plan for the site to isolate fixtures that are separately connected.
- For industrial facilities, check most floor drains (these are often misdirected).
- For plumbing fixtures, test a representative fixture (e.g., a bathroom sink).
- Test some locations separately (e.g., washing machines and floor drains), which may be misdirected.
- If conducting dye investigations on multiple floors, start from the basement and work your way up.
- At all fixtures, make sure to flush with plenty of water to ensure that the dye moves through the system.

Selecting a Sewer Manhole for Observations
- Pick the closest manhole possible to make observations (typically a sewer lateral).
- If this is not possible, choose the nearest downstream manhole.

Communications Between Crew Members
- The individual conducting the dye testing calls in to the field person to report the color dye used, and when it is dropped into the system.
- The field person then calls back when dye is observed in the manhole.
- If dye is not observed (e.g., after two separate flushes have occurred), dye testing is halted until the dye appears.

Locating Missing Dye
- The investigation is not complete until the dye is found. Some reasons for dye not appearing include:
- The building is actually hooked up to a septic system.
- The sewer line is clogged.
- There is a leak in the sewer line or lateral pipe.

Video Testing

Video testing works by guiding a mobile video camera through the storm drain pipe to locate the actual connection producing an illicit discharge. Video testing shows flows and leaks within the pipe that may indicate an illicit discharge, and can show cracks and other pipe damage that enable sewage or contaminated water to flow into the storm drain pipe.

Video testing is useful when access to properties is constrained, such as residential neighborhoods. Video testing can also be expensive, unless the community already owns and uses the equipment for sewer inspections. This technique will not detect all types of discharges, particularly when the illicit connection is not flowing at the time of the video survey.

Different types of video camera equipment are used, depending on the diameter and condition of the storm sewer being tested.

Field crews should review storm drain maps, and preferably visit the site before selecting the video equipment for the test. A field visit helps determine the camera size needed to fit into the pipe, and if the storm drain has standing water.

In addition to standard safety equipment required for all manhole inspections, video testing requires a Closed-Circuit Television (CCTV) and supporting items. Many commercially available camera systems are specifically adapted to televise storm sewers, ranging from large truck or van-mounted systems to much smaller portable cameras. Cameras can be self-propelled or towed. Some specifications to look for include:

- The camera should be capable of radial view for inspection of the top, bottom, and sides of the pipe and for looking up lateral connections.
- The camera should be color.
- Lighting should be supplied by a lamp on the camera that can light the entire periphery of the pipe.

When inspecting the storm sewer, the CCTV is oriented to keep the lens as close as possible to the center of the pipe. The camera can be self-propelled through the pipe using a tractor or crawler unit or it may be towed through on a skid unit (see Figures 65 and 66). If the storm drain has ponded water, the camera should be attached to a raft, which floats through the storm sewer from one manhole to the next. To see details of the sewer, the camera and lights should be able to swivel both horizontally and vertically. A video record of the inspection should be made for future reference and repairs (see Figure 67).

Figure 65: Camera being towed

Smoke Testing

Smoke testing is another "bottom up" approach to isolate illicit discharges. It works by introducing smoke into the storm drain system and observing where the smoke surfaces. The use of smoke testing to detect illicit discharges is a relatively new application, although many communities have used it to check for infiltration and inflow into their sanitary sewer network. Smoke testing can find improper

Figure 66: Tractor-mounted camera

Figure 67: Review of an inspection video

connections, or damage to the storm drain system (Figure 68). This technique works best when the discharge is confined to the upper reaches of the storm drain network, where pipe diameters are to small for video testing and gaining access to multiple properties renders dye testing infeasible.

Notifying the public about the date and purpose of smoke testing before starting is critical. The smoke used is non-toxic, but can cause respiratory irritation, which can be a problem for some residents. Residents should be notified at least two weeks prior to testing, and should be provided the following information (Hurco Technologies, Inc., 2003):

- Date testing will occur
- Reason for smoke testing
- Precautions they can take to prevent smoke from entering their homes or businesses
- What they need to do if smoke enters their home or business, and any health concerns associated with the smoke
- A number residents can call to relay any particular health concerns (e.g., chronic respiratory problems)

Program managers should also notify local media to get the word out if extensive smoke testing is planned (e.g., television, newspaper, and radio). On the actual day of testing, local fire, police departments and 911 call centers should be notified to handle any calls from the public (Hurco Technologies, Inc., 2003).

The basic equipment needed for smoke testing includes manhole safety equipment, a smoke source, smoke blower, and sewer plugs. Two smoke sources can be used for smoke testing. The first is a smoke "bomb," or "candle" that burns at a controlled rate and releases very white smoke visible at relatively low concentrations (Figure 69). Smoke bombs are suspended beneath a blower in a manhole. Candles are available in 30 second to three minute sizes. Once opened, smoke bombs should be kept in a dry location and should be used within one year.

The second smoke source is liquid smoke, which is a petroleum-based product that is injected into the hot exhaust of a blower where it is heated and vaporized (Figure 70). The length of smoke production can vary depending on the length of the pipe being

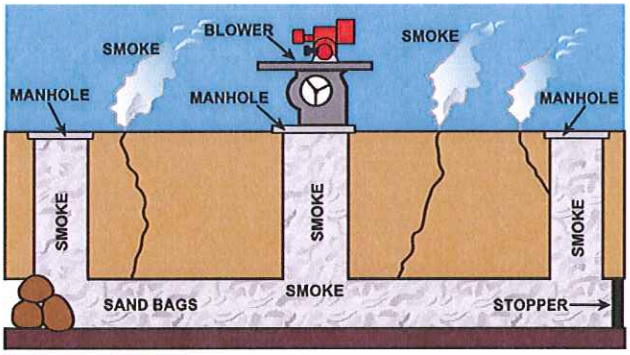


Figure 68: Smoke Testing System Schematic

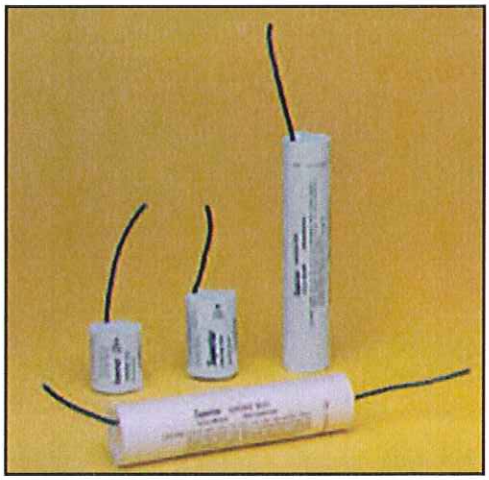


Figure 69: Smoke Candles

Figure 70: Smoke blower

tested. In general, liquid smoke is not as consistently visible and does not travel as far as smoke from bombs (USA Blue Book).

Smoke blowers provide a high volume of air that forces smoke through the storm drain pipe. Two types of blowers are commonly used: "squirrel cage" blowers and direct-drive propeller blowers. Squirrel cage blowers are large and may weigh more than 100 pounds, but allow the operator to generate more controlled smoke output. Direct-drive propeller blowers are considerably lighter and more compact, which allows for easier transport and positioning.

Three basic steps are involved in smoke testing. First, the storm drain is sealed off by plugging storm drain inlets. Next, the smoke is released and forced by the blower through the storm drain system. Lastly, the crew looks for any escape of smoke above-ground to find potential leaks.

One of three methods can be used to seal off the storm drain. Sandbags can be lowered into place with a rope from the street surface. Alternatively, beach balls that have a diameter slightly larger than the drain can be inserted into the pipe. The beach ball is then placed in a mesh bag with a rope attached to it so it can be secured and retrieved. If the beach ball gets stuck in the pipe, it can simply be punctured, deflated and removed. Finally, expandable plugs are available, and may be inserted from the ground surface.

Blowers should be set up next to the open manhole after the smoke is started. Only one manhole is tested at a time. If smoke candles are used, crews simply light the candle, place it in a bucket, and lower it in the manhole. The crew then watches to see where smoke escapes from the pipe. The two most common situations that indicate an illicit discharge are when smoke is seen rising from internal plumbing fixtures (typically reported by residents) or from sewer vents. Sewer vents extend upward from the sewer lateral to release gas buildup, and are not supposed to be connected to the storm drain system.

Ammonia

Ammonia is a good indicator of sewage, since its concentration is much higher there than in groundwater or tap water. High ammonia concentrations may also indicate liquid wastes from some industrial sites. Ammonia is relatively simple and safe to analyze. Some challenges include the tendency for ammonia to volatilize (i.e., turn into a gas and become non-conservative) and its potential generation from non-human sources, such as pets or wildlife.

Boron

Boron is an element present in the compound borax, which is often found in detergent and soap formulations. Consequently, boron is a good potential indicator for both laundry wash water and sewage. Preliminary research from Alabama supports this contention, particularly when it is combined with other detergent indicators, such as surfactants (Pitt, IDDE Project Support Material). Boron may not be a useful indicator everywhere in the country since it may be found at elevated levels in groundwater in some regions and is a common ingredient in water softeners products. Program mangers should collect data on boron concentrations in local tap water and groundwater sources to confirm whether it will be an effective indicator of illicit discharges.

Chlorine

Chlorine is used throughout the country to disinfect tap water, except where private wells provide the water supply. Chlorine concentrations in tap water tend to be significantly higher than most other discharge types. Unfortunately, chlorine is extremely volatile, and even moderate levels of organic materials can cause chlorine levels to drop below detection levels. Because chlorine is non-conservative, it is not a reliable indicator, although if very high chlorine levels are measured, it is a strong indication of a water line break, swimming pool discharge, or industrial discharge from a chlorine bleaching process.

Color

Color is a numeric computation of the color observed in a water quality sample, as measured in cobalt-platinum units (APHA, 1998). Both industrial liquid wastes and sewage tend to have elevated color values. Unfortunately, some “clean” flow types can also have high color values. Field testing by Pitt (IDDE Project Support Material) found high color values associated for all contaminated flows, but also many uncontaminated flows, which yielded numerous false positives. Overall, color may be a good first screen for problem outfalls, but needs to be supplemented by other indicator parameters.

Conductivity

Conductivity, or specific conductance, is a measure of how easily electricity can flow through a water sample. Conductivity is often strongly correlated with the total amount of dissolved material in water, known as Total Dissolved Solids. The utility of conductivity as an indicator depends on whether concentrations are elevated in “natural” or clean waters. In particular, conductivity is a poor indicator of illicit discharge in estuarine waters or in northern regions where deicing salts are used (both have high conductivity readings).

Field testing in Alabama suggests that conductivity has limited value to detect sewage or wash water (Pitt, IDDE Project Support Material). Conductivity has some

value in detecting industrial discharges that can exhibit extremely high conductivity readings. Conductivity is extremely easy to measure with field probes, so it has the potential to be a useful supplemental indicator in subwatersheds that are dominated by industrial land uses.

Detergents

Most illicit discharges have elevated concentration of detergents. Sewage and washwater discharges contain detergents used to clean clothes or dishes, whereas liquid wastes contain detergents from industrial or commercial cleansers. The nearly universal presence of detergents in illicit discharges, combined with their absence in natural waters or tap water, makes them an excellent indicator. Research has revealed three indicator parameters that measure the level of detergent or its components-- surfactants, fluorescence, and surface tension (Pitt, IDDE Project Support Material). Surfactants have been the most widely applied and transferable of the three indicators. Fluorescence and surface tension show promise, but only limited field testing has been performed on these more experimental parameters. Methods and laboratory protocols for each of the three detergent indicator parameters are reviewed in Appendix F2.

E. coli, Enterococci and Total Coliform

Each of these bacteria is found at very high concentrations in sewage compared to other flow types, and is a good indicator of sewage or septage discharges, unless pet or wildlife sources exist in the subwatershed. Overall, bacteria are good supplemental indicators and can be used to find "problem" streams or outfalls that exceed public health standards. Relatively simple analytical methods are now available to test for bacteria indicators, although they still suffer from two monitoring constraints. The first is the relatively long analysis time (18-24 hours) to get results, and the second is that the waste produced by the tests may be classified as a biohazard and require special disposal techniques.

Fluorescence

Laundry detergents are highly fluorescent because optical brighteners are added to the formula to produce "brighter whites." Optical brighteners are the reason that white clothes appear to have a bluish color when placed under a fluorescent light. Fluorescence is a very sensitive indicator of the presence of detergents in discharges, using a fluorometer to measure fluorescence at specific wavelengths of light. Since no chemicals are needed for testing, fluorometers have minimal safety and waste disposal concerns.

Some technical concerns do limit the utility of fluorescence as an indicator of illicit discharges. The concerns include the presence of fluorescence in non-illicit flow types such as irrigation water, the considerable variation of fluorescence between different detergent brands, and the lack of a readily standard or benchmark concentration for optical brighteners. For example, Pitt (IDDE Project Support Material) measured fluorescence in mg/L of Tide™ brand detergent, and found the degree of fluorescence varied regionally, temporally, and between specific detergent formulations.

Given these current limitations, fluorescence is best combined with other detergent indicators such as surfactants. Appendix F3 should be consulted for more detailed information on analytical methods and experimental field testing using fluorescence as an indicator parameter.

Fluoride

Fluoride is added to drinking water supplies in most communities to improve dental health, and normally found at a concentration of two parts per million in tapwater. Consequently, fluoride is an excellent conservative indicator of tap water discharges or leaks from water supply pipes that end up in the storm drain. Fluoride is obviously not a good indicator in communities that do not fluoridate drinking water, or where individual wells provide drinking water. One key constraint is that the reagent used in the recommended analytical method for fluoride is considered a hazardous waste, and must be disposed of properly.

Hardness

Hardness measures the positive ions dissolved in water and primarily include magnesium and calcium in natural waters, but are sometimes influenced by other metals. Field testing by Pitt (IDDE Project Support Material) suggests that hardness has limited value as an indicator parameter, except when values are extremely high or low (which may signal the presence of some liquid wastes). Hardness may be applicable in communities where hardness levels are elevated in groundwater due to karst or limestone terrain. In these regions, hardness can help distinguish natural groundwater flows present in outfalls from tap water and other flow types.

pH

Most discharge flow types are neutral, having a pH value around 7, although groundwater concentrations can be somewhat variable. pH is a reasonably good indicator for liquid wastes from industries, which can have very high or low pH (ranging from 3 to 12). The pH of residential wash water tends to be rather basic (pH of 8 or 9). The pH of a discharge is very simple to monitor in the field with low cost test strips or probes. Although pH data is often not conclusive by itself, it can identify problem outfalls that merit follow-up investigations using more effective indicators.

Potassium

Potassium is found at relatively high concentrations in sewage, and extremely high concentrations in many industrial process waters. Consequently, potassium can act as a good first screen for industrial wastes, and can also be used in combination with ammonia to distinguish wash waters from sanitary wastes. (See Chapter 12). Simple field probes can detect potassium at relatively high concentrations (5 mg/L), whereas more complex colorimetric tests are needed to detect potassium concentrations lower than 5 mg/L.

Surface Tension

Surfactants remove dirt particles by reducing the surface tension of the bubbles formed in laundry water when it is agitated. Reduced surface tension makes dirt particles less likely to settle on a solid surface (e.g., clothes or dishes) and become suspended instead on the water's surface. The visible manifestation of reduced surface tension is the formation of foam or bubbles on the water surface. Pitt (IDDE Project Support Material) tested a very simple procedure to measure surface tension that quantifies the formation of foam and bubbles in sample bottles. Initial laboratory tests suggest that surface tension is a good indicator of surfactants, but only when they are present at relatively high concentrations. Section F3 provides a more detailed description of the surface tension measurement procedure.

Surfactants

Surfactants are the active ingredient in most commercial detergents, and are typically measured as Methyl Blue Active Substances (or MBAS). They are a synthetic replacement for soap, which builds up deposits on clothing over time. Since surfactants are not found in nature, but are always present in detergents, they are excellent indicators of sewage and wash waters. The presence of surfactants in cleansers, emulsifiers and lubricants also makes them an excellent indicator of industrial or commercial liquid wastes. In fact, research by Pitt (IDDE Project Support Material) found that detergents were an excellent indicator of "contaminated" discharges in Alabama (i.e., discharges that were not tap water or groundwater). Several analytical methods are available to monitor surfactants. Unfortunately, the reagents used involve toluene, chloroform, or benzene, each of which is considered hazardous waste with a potential human health risk. The most common analysis method uses chloroform as a reagent, and is recommended because it is relatively safer when compared to other reagents.

Turbidity

Turbidity is a quantitative measure of cloudiness in water, and is normally measured with a simple field probe. While turbidity itself cannot always distinguish between contaminated flow types, it is a potentially useful screening indicator to determine if the discharge is contaminated (i.e., not composed of tap water or groundwater).

Research Indicators

In recent years, researchers have explored a series of other indicators to identify illicit discharges, including fecal steroids (such as coprostanol), caffeine, specific fragrances associated with detergents and stable isotopes of oxygen. Each of these research indicators is profiled in Pitt (IDDE Project Support Material) and summarized below in Table F1. Most research indicators require sophisticated equipment and specific expertise that limit their utility as a general indicator, given the high sampling cost and long turn-around times needed. To date, field tests of research indicators have yielded mixed results, and they are currently thought to be more appropriate for special research projects than for routine outfall testing. While they are not discussed further in this manual, future research and testing may improve their utility as indicators of illicit discharges.

Table F1: Summary of Research Indicators Used for Identifying Inappropriate Discharges into Storm Drainage		
Parameter Group	**Comments**	**Recommendation**
Coprostanol and other fecal sterol compounds	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analysis with GC/MSD. Not specific to human wastes or recent contamination. Most useful when analyzing particulate fractions of wastewaters or sediments.
Specific detergent compounds (LAS, fabric whiteners, and perfumes)	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analyses with HPLC. A good and sensitive confirmatory method.
Pharmaceuticals (colfibric acid, aspirin, ibuprofen, steroids, illegal drugs, etc.)	Used to indicate presence of sanitary sewage	Possibly useful. Expensive analyses with HPLC. A good and sensitive confirmatory method.
Caffeine	Used to indicate presence of sanitary sewage	Not very useful. Expensive analyses with GC/MSD. Numerous false negatives, as typical analytical methods not suitably sensitive.
DNA profiling of microorganisms	Used to identify sources of microorganisms	Likely useful, but currently requires extensive background information on likely sources in drainage. Could be very useful if method can be simplified, but with less specific results.
UV absorbance at 228 nm	Used to identify presence of sanitary sewage	Possibly useful, if UV spectrophotometer available. Simple and direct analyses. Sensitive to varying levels of sanitary sewage, but may not be useful with dilute solutions. Further testing needed to investigate sensitivity in field trials.
Stable isotopes of oxygen	Used to identify major sources of water	May be useful in area having distant domestic water sources and distant groundwater recharge areas. Expensive and time consuming procedure. Can not distinguish between wastewaters if all have common source.
GC/MSD - Gas Chromatography/Mass Selective Detector HPLC - High Performance Liquid Chromatography		

TABLE 1 WATER QUALITY TEST PARAMETERS AND USES

Water Quality Test	Use of Water Quality Test	Comments
Conductivity	Used as an indicator of dissolved solids	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field with a probe
Ammonia	High levels can be an indicator of the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Used very often and equipment is readily available; Boston, MA uses a field test kit (see case example)
Surfactants	Indicate the presence of detergent (e.g., laundry, car washing)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Boston, MA uses a field test kit (see case example)
pH	Extreme pH values (low or high) may indicate commercial or industrial flows; not useful in determining the presence of sanitary wastewater (which, like uncontaminated baseflows, tends to have a neutral pH, i.e., close to 7)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field or lab with a probe
Temperature	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures. This measurement is most useful during cold weather.	- Pitt et al. 1993 suggested parameter - Measured in the field with a thermometer or probe
Hardness	Used to distinguish between natural and treated waters	- Pitt et al. 1993 suggested parameter
Total Chlorine	Used to indicate inflow from potable water sources; not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long (it will combine with organic compounds)	- Pitt et al. 1993 suggested parameter
Fluoride	Used to indicate potable water sources in areas where water supplies are fluoridated	- Pitt et al. 1993 suggested parameter
Potassium	High levels may indicate the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter
Optical Brighteners (Fluorescence)	Used to indicate presence of laundry detergents (which often contain fabric whiteners, which cause substantial fluorescence)	-Pitt et al. 1993 suggested parameter -Used by City of Winooski, VT (see case example)
Bacteria (fecal coliform, *E. coli,* and/or *enterococci)*	Used to indicate the presence of sanitary wastewater	- Used by NHDES (see case example in chapter 5)

Appendix F
Standard Operating Procedures for IDDE Program

Standard Operating Procedures
City of Bainbridge Island
IDDE Program

To be inserted as developed by the City

Appendix G
IDDE Education and Outreach Program

Memorandum

otak

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To:	Melva Hill, City of Bainbridge Island
From:	Alissa Maxwell, PE
Copies:	
Date:	January 8, 2008
Subject:	IDDE Education and Outreach Program
Project No.:	31044

Background

The City of Bainbridge Island (City) is required by the Washington State Department of Ecology (DOE) to comply with the National Pollutant Discharge Elimination System (NPDES) *Western Washington Phase II Municipal Stormwater Permit* (Phase II Permit). The Phase II Permit outlines program activities and implementation milestones that the City must follow to be in compliance with the federal Clean Water Act. The City's Surface and Stormwater Management (SSWM) Program is responsible for implementing the Phase II Permit requirement and coordinating with other departments to reach compliance milestones.

The Phase II Permit requires that the City conduct outreach activities to educate the public and business community on water quality protection. The City must identify target audiences and tailor the education program to those groups. To date, the City has conducted outreach activities aimed at educating local residents about natural yard care techniques, habitat protection, and their personal impact on the natural environment. These programs have been successful and well received by the general public. As such, the City would now like to expand their education efforts and redirect the focus to the local business community.

Outreach to the local business community will focus on identifying and eliminating illicit connections and illegal discharges to the City's stormwater infrastructure. This outreach is also an important step in the City's overall Illicit Discharge Detection and Elimination (IDDE) Program, which is another requirement in the Phase II Permit. By educating business owners about IDDE, the City is effectively addressing two permit requirements with a single program.

Overall Strategy

The City's IDDE education and outreach program will include two major components. The first will be a business education program focused on informing business owners and employees of their responsibilities related to water quality protection. The second component is a business recognition program aimed at promoting those businesses that are taking active steps to protect water quality and reduce their potential for an illicit discharge.

This memorandum describes the two components of the IDDE education and outreach program and outlines implementation schedules for each component.

Business Education Program

Target Businesses

The goal of this outreach program is to identify those businesses that are most likely to have an adverse impact on water quality through illicit discharges. Potential problem business sectors were identified based on information from the EPA and the Center for Watershed Protection's IDDE Guidance Manual, as well as input from City staff on past polluters and problem businesses.

Initially, a list of Bainbridge Island businesses was obtained from the Bainbridge Island Chamber of Commerce. The business types were grouped into broader sectors. A listing of the business sectors on Bainbridge Island is included as Attachment A. Many of the identified business sectors (i.e. Professional Services, Retail, Health/Wellness, and Community Organizations) work primarily in office buildings or retail shops that have little potential to introduce pollutants into the stormwater system. As such, only a few business sectors need to be targeted for IDDE outreach.

The business sectors selected for IDDE outreach and education are listed below in priority order.

- Food Service – including restaurants and grocers
- Construction Related – particularly concrete contractors, drywall, painting, equipment rentals, and excavation contractors
- Landscaping
- Cleaning Services
- Laundry and Dry Cleaners
- Photography
- Automotive
- Harbor Related

While automotive businesses are typically a high priority for IDDE outreach, those businesses already receive education from the Department of Ecology, local conservation groups, and the local waste district. Harbor related businesses are also already governed by strict water quality protection

laws. Because they are reached though other venues, the urgency to conduct IDDE education for these two business sectors is reduced.

Outreach Strategies

To conduct an effective education campaign, the outreach mechanisms and materials must be tailored to the target business sectors. Some business owners would be best reached through a one-time meeting, others should be targeted with mailers or posted signs, and others still will require individual site visits. Mobile business sectors (construction, landscaping, cleaning services) in particular may require multiple outreach strategies to reach all of the target businesses.

In all cases, the outreach campaign should include printed materials such as brochures, posters, or newsletters that can be distributed to business owners and shared with employees. The reference material serves as a reminder and reinforces the educational message. Table 1 identifies the preferred outreach methodology for each of the prioritized business sectors.

Table 1
Business Sector Outreach Strategies

Priority	Business Sector	Preferred Outreach Methodology	Reasoning
1	Food Service	• Individual visits to distribute educational materials • Follow-up informational meeting • Follow-up site visits to problem businesses	SSWM Program interns can be trained to conduct onsite visits to distribute brochures and identify any problem practices. Follow-up meetings can target business owners who may not be present during onsite visits.
2A	Construction Related	• Materials distributed in with Building Permits and during site inspections • Train City field staff to identify and report problem actions	An ongoing outreach effort is needed to reach this mobile business sector. Most problem activities are performed by subcontractors who may not be based in Bainbridge Island. Direct interaction with the City is limited, and they are unlikely to attend a voluntary meeting.
2B	Landscaping	• Materials distributed during site inspections • Train City field staff to identify and report problem actions	An ongoing outreach effort is needed to reach this mobile business sector. Landscapers are generally sub-contractors or contracted to individual businesses or building complexes. Direct interaction with the City is limited, and they are unlikely to attend a voluntary meeting.
3A	Cleaning Services	• Mail letter or brochure to known businesses	An ongoing outreach effort is needed to reach this mobile business sector.

		• Train City field staff to identify and report problem actions	Some businesses are registered with the Bainbridge Island Chamber, but others will need to be identified based on problem actions.
3B	Laundry and Dry Cleaners	• Mail letter or brochure • Follow-up site visits	Small group of businesses can be visited individually by SSWM Program interns.
4	Photography	• Mail letter or brochure • Follow-up site visits	Small group of businesses can be visited individually by SSWM Program interns.
5A	Automotive	• Mail letter promoting upcoming business recognition program	Automotive businesses are already regulated through other agencies.
5B	Harbor Related	• Mail letter promoting upcoming business recognition program	Harbor related businesses are already regulated through other agencies.

Implementing the outreach strategies will need to be a joint effort among many City staff members. For example, the City's maintenance staff, construction site inspectors, and building inspectors should all be educated on common illicit discharge problems from construction sites. They can then distribute the appropriate brochures during their site inspections or notify the City's IDDE outreach/education coordinator that a site visit is needed.

Educational Resources

Because public education is a requirement of the federal NPDES program, municipalities all over the nation are developing educational materials to teach their residents and business communities about stormwater issues. As such, there are many existing brochures, posters, pamphlets, and other materials available to the public.

A *Stormwater Education and Outreach Resource Inventory* is provided as Attachment B. The resource inventory lists those materials that would be of most use to the City in developing their IDDE outreach program as well as resources for general stormwater education and outreach. Samples of the materials are included in Attachment C.

Some existing materials can be distributed directly to City businesses as part of the outreach efforts. In other cases, the City may wish to utilize the existing materials as a reference in developing their own targeted brochures. The following recommendations are based on developing cost effective IDDE outreach materials for the priority businesses.

- Food Service – Utilize existing resources (National Restaurant Association brochure, City of Portland brochure, City of Los Angeles brochure); Order lids and grease scrapers with City logo; Create checklist of problem practices and water quality protection tips

- Construction Related – Utilize existing resources (EPA poster); Create customized brochure using City of Carlsbad and City of Los Angeles brochures as resources
- Landscaping – Create customized brochure using City of Carlsbad and City of Los Angeles brochures as resources
- Cleaning Services – Utilize existing resources from Illinois EPA and Janitorial Products Pollution Prevention Project or create fact sheet based on local problem actions
- Laundry and Dry Cleaners – Create customized fact sheet based on local problem actions
- Photography – Create customized brochure or fact sheet based on local problem actions
- Automotive – No materials required
- Harbor Related – No materials required

Outreach Schedule

As with all public outreach initiatives, illicit discharge education is an ongoing process. As businesses move into the City or hire new employees, everyone needs to be educated as to their role in protecting water quality and reducing the risk of illicit discharge.

The City has elected to develop a long term outreach program that will target the highest priority businesses first. The program will slowly be expanded to eventually reach all the businesses prioritized in Table 1. Table 2 outlines the general IDDE education and outreach schedule over the next two years. By the end of 2009, the business education program should be fully implemented and the City can refocus their energies on the second outreach component – the business recognition program discussed in the following section.

Table 2
Business Education Program – Preliminary Schedule

Fall 2007	• Develop IDDE Outreach Plan • Prioritize business groups for future outreach activities • Develop business education schedule.
Winter 2007/8	• Assemble educational materials for Priority 1 businesses (Food Service) • Create educational brochure for Priority 2 businesses (Construction Related and Landscaping)
Spring 2008	• Initial site visits to Priority 1 businesses – distribute educational materials, answer questions, and identify practices that need modification or corrective action • Begin distributing brochures to Priority 2 businesses through construction permits, building permits, and site inspections
Summer 2008*	• Conduct follow-up informational meeting with Priority 1 businesses • Continue brochure distribution to Priority 2 businesses during construction site inspections
Fall 2008	• Follow-up with Priority 1 businesses to ensure corrective action has been

	taken on previously identified problems • Prepare informational letter and educational materials for Priority 3 businesses (Cleaning Services and Laundry and Dry Cleaners) and Priority 4 businesses (Photography)
Winter 2008/9	• Develop mailing list for Priority 3 and 4 businesses • Mail letters and brochures to Priority 3 and 4 businesses
Spring 2009	• Ongoing material distribution to Priority 2 businesses during construction and landscaping season • Follow-up site visits to Priority 3 and 4 businesses • Prepare and mail letter and educational materials for Priority 5 businesses (Automotive and Harbor Related)
Summer 2009*	• Ongoing material distribution to Priority 2 businesses during construction and landscaping season • Ongoing material distribution to Priority 3 businesses as problems are reported
Fall 2009	• Follow-up with businesses as needed to ensure corrective action has been taken on previously identified problems
2010-2011	• Follow-up with reported problems as needed • Focus efforts on Business Recognition Program

*Note: IDDE outreach activities are limited in summer months as City staff will generally be focused on stormwater system mapping during that time.

Business Recognition Program

Overview

The second component of the City's IDDE outreach effort is to develop a business recognition program to encourage responsible stormwater management. Rather than taking the enforcement role, the City would like to encourage responsible actions by recognizing those businesses that are following water quality protection and illicit discharge guidelines.

The program would identify and promote businesses that are taking steps to protect water quality and reduce the chance of an illicit discharge. The program would be similar to the "Energy Star" program (www.energystar.gov) used to promote energy efficient consumer products or San Diego's GreenBiz program (www.sdgreenbiz.org), a voluntary recognition and assistance program for businesses that promote environmental stewardship. The City's business recognition program would operate on a smaller scale, focused only on stormwater protection actions.

Recognition Process

The business recognition program would outline a list of stormwater protection criteria specific to different business sectors. Businesses that meet an adequate percentage of the criteria would qualify

for recognition as a "Stormwater Steward" or other name to be determined. Criteria could be both structural and operational. Structural criteria could include:

- Verify that floor drains are connected to the sewer rather than stormwater system
- Post signs to keep dumpster lids closed
- Provide containment for large amounts of liquid supplies
- Adjust irrigation systems for proper coverage of landscape areas and not the sidewalk or parking areas

Operational criteria could include:

- Attend a Stormwater Steward information and training session
- All managers and supervisors review and sign the Stormwater Steward application
- Purchase harmful products such as cleaners and pesticides in small quantities
- Clean private catch basins at least annually
- Do not wash cars, equipment, floor mats, or other items outside where run-off water flows straight to the storm drain

Note: These criteria are only examples. The San Diego Area Green Business Program has environmental checklists available for Food Service, Automotive, and Commercial Buildings. The portions of those checklists pertaining to stormwater management could be used as the basis for developing criteria specific to the business sectors in Bainbridge Island.

In addition to completing the criteria checklist, businesses applying for recognition should receive a site visit from City staff. The visit can be used to verify structural controls, suggest additional measures, and answer any questions pertaining to stormwater protection.

Recognition Methods

To be effective, the business recognition program needs to establish a brand that is recognizable and understood by area residents. When customers know to look for Stormwater Steward certification, more businesses will be motivated to apply for recognition.

The first step in establishing brand recognition is to create a program logo that will identify the program and recognized businesses. Certified businesses could receive a window sticker, certificate, and/or poster for display and the City could list certified businesses on their website. The City could promote the program on the website and in area newsletters and newspapers. In addition, certified businesses could be given brochures or fact sheets to distribute to customers.

Recognition Cycle

The City may want to consider limiting the length of time that the stormwater certification lasts by requesting that businesses re-apply on a periodic basis. A two or three year recognition cycle would

be appropriate, and a streamlined process (perhaps without a site visit or informational meeting) could be developed for renewing applicants.

Recognition Program Schedule

At this time, the businesses recognition program is only in the concept development stage. Additional program details will be determined after the SSWM Program managers receive approval to develop and implement the program. Table 3 outlines a target schedule for developing the business recognition program over the next several years.

Table 3
Business Recognition Program – Preliminary Schedule*

Summer/Fall 2008	• Present program idea to City Council and get initial approval for program development • Begin developing requirements for recognition • Create program logo
Winter 2009	• Finalize recognition requirement • Create recognition application/checklist • Create program website
Spring/Summer 2009	• Advertise the program to local businesses • Conduct informational meetings for business owners • Distribute applications • Advertise the program to the general public
Fall 2009	• Site visits to businesses that have applied for recognition • Begin distributing recognition stickers • Update website with recognized businesses
Winter 2010	• Major marketing of the program to the general public – call attention to the businesses that have been certified
2010-2011	• Conduct informational meetings (recognition requirement) on a quarterly basis • Continue site visits, business certification, and website updates on a quarterly basis • Market the program to the general public at community events

*This schedule assumes that City resources in 2008 would be focused on the business education program (Table 2). The recognition program would be developed after the business education program is established.

Attachments

Attachment A – *Bainbridge Island Business Sectors List*
Attachment B – *Stormwater Education and Outreach Resource Inventory*
Attachment C – *Sample Materials*

Attachment A
Bainbridge Island Business Sectors List

Bainbridge Island Business Sectors

High priority for IDDE Outreach highlighted.

Professional Services
Accounting/Bookkeeping/Tax Prep
Advertising/Promotion/Marketing
Appraisal
Archeological Consulting
Architects
Artists-Visual
Attorneys
Business Consulting/Services
Computer-Networking/Consulting/Sales
Data Processing
Design/Interactive Media
Drafting
Employment/Recruiting/HR
Engineering
Financial Services
Graphic Design
Insurance
Interior Design
Mortgage/Escrow/Title
Photography
Publishing
Travel/Tours
Video/Television/Film Production
Writing/Editing/Research

Personal Services
Banking/Credit Unions
Barbers/Beauty Salons
Cleaning Service
Engraving
Errand Service
Event Management
Funeral Services
Mail Services
Pianos-Repair/Tuning/Rentals
Therapist
Wash and Fold Service/Laundry
Wedding Services

Retail
Apparel/Shoes
Appliances
Art Supplies
Beads/Fabrics/Yarn
Bed and Bath
Bicycles-Sales/Rentals
Books
Consignment and Thrift Store
Electronics
Florists
Fly Fishing Retail
Furniture/Antiques/Home Decor
Hardware
Jewelry
Nutritional Sales
Office Equipment/Supplies
Paint Supplies
Paper Products/Stationery/Gifts
Picture Frames
Rugs
Toys
Travel Accessories & Luggage
Video Rentals

Health/Wellness
Chiropractic
Counseling/Mental Health
Day Spa/Skin Care
Dentistry
Health Care
Holistic Physical Therapy
Massage
Optometry
Spa
Tanning

Construction Related
Building Contractors
Closet Systems
Concrete Contractors
Countertops/Fireplaces
Drywall
Electric Contractors
Equipment Rentals
Excavation Contractors
Floor Covering
General Contractors
Glass
Home Inspections
Home Maintenance/Repair
Home Theater
Kitchen Design
Painting
Plumbing Contractors
Window Coverings
Woodworking

Landscaping
Landscaping/Gardening
Tree Health Evaluations
Tree Services/Landclearing

Community Org/Activities
Arts Organizations/Education
Art Galleries
Community Development
Dance
Entertainment
Environmental/Conservation
Libraries
Martial Arts
Museums
Music Instruction
Political Group
Recreation
Religious Organizations
Schools
Senior Services
Service Organizations

Food Service
Bakery/Cafe
Catering/Personal Chef
Coffee
Confections
Culinary Design
Gourmet Foods
Groceries
Ice Cream Parlor
Restaurants
Wine Shop and Bar

Agriculture
Farms/Ranching
Wineries
Horses-Boarding/Training

Golf/Country Club

Animals
Animal Rescue
Pet Care/Grooming
Veterinarians

Lodging

Real Estate
Apartments
Housing and Rentals
Property Management
Real Estate Development

Personal Care
Child Care/Preschool
Convalescent Care/Assisted Living
Nanny Services

Manufacturing/Industrial
Aircraft Manufacture/Sales
Manufacturing
Medical Products
Scientific Research Products
Refuse/Recycling
Storage

Automotive
Automobile Sales and Service
Automotive
Biodiesel
Parking Management
Taxi Service
Towing
Trucking

Harbor Related
Boat Tours
Boats-Sales/Supplies/Rentals
Fishing-Commercial
Marine Services
Ship Brokers

Public Services
Ambulance Services
Emergency Services
Government Services
Police Department
Social Services
Utilities
Youth Services

Attachment B
Stormwater Education and Outreach Resource Inventory

Stormwater Education & Outreach Resource Inventory

Note: Resources recommended for initial IDDE outreach are highlighted below and samples are included in Attachment C.

Source	Materials	Target Audience	Approximate Cost	Notes
EPA www.epa.gov/npdes/stormwaterrmonth	*After the Storm* brochure	Residential Commercial	Free download	Brief overview could be included in all outreach packets; can be customized
EPA	*Stormwater and the Construction Industry* poster	Construction	Free download	11 x 17 two sided poster
EPA	*Make your Home the Solution to Stormwater Pollution* brochure *Stormwater Pollution Found in your Area* door hanger Plus bookmarks, placemats, and stickers	Residential	Free download	Brochure can be customized
EPA www.epa.gov/owow/nps/toolbox/	*Nonpoint Source Outreach Toolbox* with outreach materials in 6 residential topics: general stormwater awareness, lawn and garden care, pet care, septic systems, motor vehicle care, and household chemicals and waste	Residential	Free download	Focus on residential
Puget Sound Partnership www.psp.wa.gov	*Horses for Clean Water* brochure	Agriculture	Free download	Puget Sound Partnership replaces the Puget Sound Action Team
Puget Sound Partnership	*Smart Development: An Analysis of 10 Common Myths about Development* booklet *Reining in the Rain* report on rain gardens	Developers	Free download	
Puget Sound Partnership	*Pollution at Home, What You Can Do* brochure in multiple languages	Residents	Free download	

Source	Materials	Target Audience	Approximate Cost	Notes
Puget Sound Partnership	*Small Business Stormwater Protection Project* PowerPoint presentation *Environmental Checklist for Automotive Repair Shops* *Summary of Environmental Laws for Automotive Repair Shops*	Automotive Repair Shops	Free download	Materials from the Independent Business Association
Puget Sound Action Team www.psat.wa.gov/Programs/Education.htm	*Water Quality Education Materials: Nonpoint Source Pollution Tools* brochures and videos	General Public	$8.40 for 40 brochures; $5.53 for video	Brochures designed to add City logo and contact information
City of Portland www.portlandonline.com/BES/index.cfm?a=iajcg&c=dbaca	*Handling Fats, Oils, and Grease to Prevent Water Pollution* brochure *Stormwater Best Management Practices – Food Service Industry* brochure	Restaurants	Free download	Need to change contact information to local agency
City of Bellevue www.ci.bellevue.wa.us/preventing_water_pollution.htm	One page fact sheets on Car Care, Household Hazardous Waste, Natural Lawn Care, Swimming Pools, etc	Residential	Free download	
City of Carlsbad www.carlsbadca.gov/stormwater/index.html	Short brochures for target businesses	Automotive Contractors Restaurants Mobile Service Providers Gas Stations	Free download	Would need to modify brochures to reflect local laws/policies
City of Carlsbad	Brochures for residential Education: Car Washing, Concrete Work, Lawn Care, Motor Oil, Pet Waste, Pools and Spas	Residential	Free download	Would need to modify brochures to reflect local laws/policies
City of Los Angeles www.lastormwater.org	*Eliminating Fats, Oils, and Grease from our Sewers* brochure *Good Cleaning Practices* poster Two page fact sheets of best management practices	Restaurants	Free download of brochure and fact sheet	Contact City for poster

Source	Materials	Target Audience	Approximate Cost	Notes
City of Los Angeles	*Good Cleaning Practices* poster Two page fact sheets of best management practices	Automotive	Free download of fact sheet	Contact City for poster
City of Los Angeles	Two page industry specific fact sheets of best management practices for 18 different business types	Manufacturing Other Businesses	Free download of brochures	
Project Clean Water www.projectcleanwater.org	*Stormwater BMP Guide for Eating and Drinking Establishments* brochure	Restaurants	Free download	May need modification to reference local conditions
Project Clean Water	*The Green Wrench: Stormwater Best Management Practices for the Automotive Industry* brochure	Automotive	Free download	May need modification to reference local conditions
Water Education Foundation (WEF) www.water-ed.org	Maps, Brochures, Videos, Games, and Stickers focused on the water cycle and water conservation	Residential Schools	Varies	Videos focus on California, Nevada, and Colorado
GreenBiz.com www.greenbiz.com	*Guidelines for Mixing, Loading, and Storage of Pesticides* *Integrated Pest Management Kit for Building Managers*	Landscapers	Free download	References from the Massachusetts Dept. of Agriculture
GreenBiz.com	*Green Cleaning for Carpet Cleaners* fact sheet *Green Cleaning: How to Select and Use Safe Janitorial Chemicals* *Safe and Effective Janitorial Products Fact Sheet Series*	Cleaning Services	Free download	References from the Illinois EPA and the Janitorial Products Pollution Prevention Project
GreenBiz.com	*Dentistry and the Environment* brochure	Dentists	Free download	References from the Massachusetts Water Resource Authority

Source	Materials	Target Audience	Approximate Cost	Notes
Gigi Goff & Company	Grease Scraper and Can Lid for residential and restaurant outreach Kits used by many Oregon municipalities along with radio adds and brochures	Residents Restaurants	$1.40 each when ordering 250	Can be printed with City logo for additional $80
Association of Clean Water Agencies (ACWA) Oregon www.oracwa.org	*Dentistry – Preventing Water Pollution* brochure *Best Management Practices of Dental Wastes* brochure	Dentists	Free download	Second resource from Oregon Dental Association
ACWA Oregon	*Breweries – Preventing Water Pollution* brochure	Breweries	Free download	
ACWA Oregon	*Print Shops – Preventing Water Pollution* brochure	Print Shops	Free download	
ACWA Oregon	*Auto Shops – Preventing Water Pollution* brochure *Vehicle Washing – Preventing Water Pollution* brochure	Automotive	Free download	
National Restaurant Association www.garestaurants.org/FOG%20ToolKit.pdf	*Fats, Oils, and Grease Control Program Toolkit* brochure	Restaurants	Free download	Posted on Georgia Restaurant Association website

Attachment C
Sample Materials