

Seattle Public Utilities

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Dye Testing: a tool in the Source Control Inspection process



Stormwater Code (SMC 22.800-22.808)

- Drivers:
 1. City's Phase I National Pollutant Discharge Elimination System (NPDES)
 2. State Waste Discharge General Permit for Discharges from Municipal Separate Storm Sewer Systems.
 3. Clean Water Act (implemented by the Washington State Department of Ecology)

Conditions of the NPDES permit require Seattle to regulate activities that impact the quality and quantity of stormwater runoff.
- The Code has four joint DPD/SPU Director's' Rules collectively referred to as the Stormwater Manual.
 - [Volume 1: Source Control Manual](#)
 - Volume 2: Construction Manual
 - Volume 3: Flow Control and Water Quality Treatment Manual
 - [Volume 4: Stormwater Code Enforcement Manual](#)

Volume 1: Source Control Technical Requirements Manual

2.1.1 BMP 1: Eliminate Illicit Connections to Storm Drains

For all real properties, responsible parties must examine their plumbing systems to identify any illicit connections. A good place to start is an examination of the site plans. If any toilets, sinks, appliances, showers and bathtubs, floor drains, industrial process waters, or other water-using equipment are connected to the drainage system, these connections must either be permanently plugged or disconnected and rerouted as soon as possible. **If it is not obvious through observation or examination of site plans, one method of determining where a pipe or structure drains is to perform a dye test with a nontoxic dye or a smoke test...**

Authority To Inspect

- **22.802.010 Basically says only rain in the drain**
 - **A. No discharge from a site, real property, or drainage facility, directly or indirectly to a public drainage system, private drainage system, or a receiving water within or contiguous to Seattle city limits, may cause or contribute to a prohibited discharge or a known or likely violation of water quality standards in the receiving water or a known or likely violation of the City's municipal stormwater NPDES permit**
- **22.800.080 Gives us the authority to develop inspection programs and place requirements on businesses that discharge into our MS4.**



Source Control Inspections

- Choose sites to inspect based on geography or by drainage basins plus site activity.
- Drainage basins are prioritized according to:
 - NPDES permit
 - Superfund obligations
 - Source Control Action Plans
 - Land use
- Once we identify the priority basins we conduct “drive bys” and some desktop research of businesses in the area to create our work lists.

Inspection Case Study: Warehouse on Occidental Ave S.



Pre Inspection prep

Field observations

- Large warehouse with many different types of businesses renting out space.
- Drainage is separated with both the sanitary and storm lines originating in line with the north end of the building.
- Visual inspection of drain lines indicate that the storm line has flow, in August after weeks of no rain.

Office Information

- Close look at drainage maps and known site specific drainage.
- Previous inspection cycles at this warehouse document unusual drainage in building.
- Information from King County Industrial Waste that sewage had backed up through roof drains on the north end of the building several years before.

GIS Map of warehouse

***Note it appears that both drainage lines originate at north end of building with very few known connections from the west.**

Yellow lines are combined system

Red lines are sanitary sewer

Blue lines are storm drainage



Conduct inspection

- Identify known drainage structures
- Look for additional drainage structures
- Determine use of all drainage structures-
Sanitary? Industrial Wastewater?
- Keep good notes to update GIS information
and inspection records

Something not adding up?

- Inconsistent locations of drains?
- “aftermarket” appearance of plumbing?
- Cuts in the pavement?
- Simply an uncertain discharge location? No records available to prove discharge location?
- Flow in drain line during dry weather?
- Sample results taken from near (downstream of) this location indicating pollutants similar to possible sources identified during the inspection?

Close up map of the portion of the building inspected



Red - sanitary sewer

Blue – storm drainage

Yellow- combined storm sewer

Internal clues that may lead to dye testing

Cuts in pavement



Internal pits or other floor drains



Time to do a dye test!

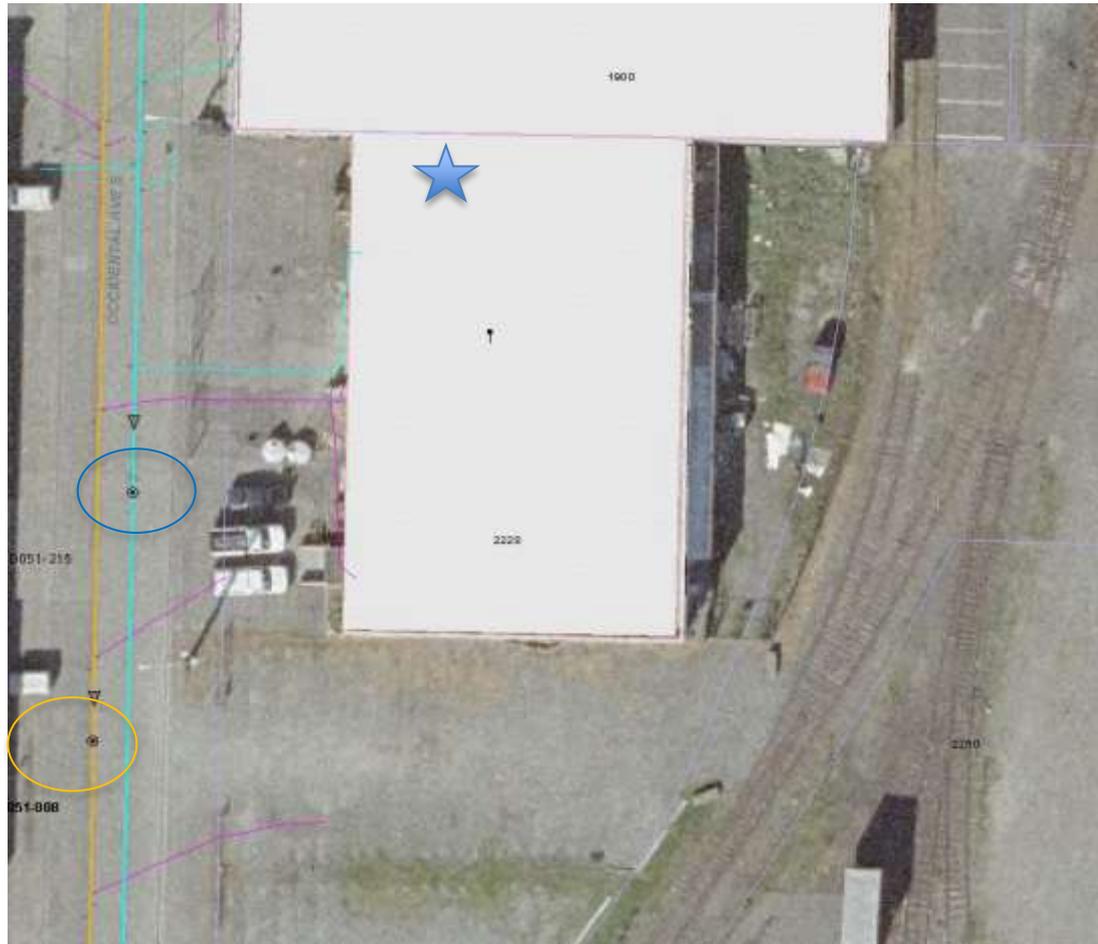


(...Or a smoke test or video inspection)

First steps

- Identify where you expect to see the discharge in both the sanitary sewer line and the alternate location – storm line, creek, ditch etc.
- Be sure you have safe access to both locations
 - Traffic control
 - Additional people
- Access both points and observe conditions prior to starting dye test.
- Note grade of pipe to judge distance/time of dye flow

Expected discharge access points





These are examples of the dye that we use.

It is a good idea to have at least two colors of dye.

Identify a water source

- Hose
- Buckets
- Water truck
- Sink



Call your local response center (if applicable) as well as ERTS to notify that you are conducting a dye test and to let them know the name of the water body that you anticipate that the dye may discharge into.



Set up a safe work area



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Pour dye into drain and start water

- Be patient!
- Be sure to have someone available to monitor the water source.
- Check other nearby structures to determine if the water went somewhere that you least expected.
- Be patient!
- Record very carefully what was determined- take pictures and document thoroughly any illicit connections discovered.
- Many people are absolutely horrified and embarrassed to find out that they have been flushing into the nearest waterway, be sure to convey the message clearly and with sensitivity at the initial discovery.
 - Explain what the findings were
 - Explain what the law (local, state and federal) says in regards to the discovery
 - Explain that they will need to immediately cease using the facility and begin the process of reconnecting the discharge to a legal connection point
 - Explain next steps for your jurisdiction
 - Report to Ecology that an illicit connection was found
 - Begin enforcement/follow up process per your jurisdictions protocols

Next Steps...

- Process for SPU inspectors when an illicit connections is discovered:
 1. File an ERTS
 2. Contact Property Manager and Business owner and verbally explain situation. Ask that any discharge to the illicit connection immediately stop. Suggest interim measures (sani-cans etc.)
 3. Send NOV with an order to immediately cease the discharge and correct the connection
 4. Notify DPD that an illicit connection was found so that they have a heads up on possible permitting needs.