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# A Public Solution to Private Property Infiltration and Inflow

by Beth Pfalzer and Angela M. Horton

Wipes, grease, low lying vents draining yards, improper sump pump and downspout connections. What do all of these have in common? They are all items from private properties that may cause or contribute to sanitary sewer overflows (SSOs) and basement backups. Public sewer systems exist to service private properties, yet system operators everywhere struggle to mitigate the adverse impacts private properties have on their infrastructure.

Many sewer utilities have developed public education programs identifying the problems associated with nonflushable and flushable-labeled products such as wipes, or to address fats, oils and grease (FOG) discharges. Wipes and FOG are introduced into the system by an action of the resident and there is a specific behavior that can be easily changed to address it. But tackling private property infiltration and inflow (I&I) sources such as low-lying vents, sump pumps or downspouts discharging to the sanitary sewer system (Figure 1) present a different type of challenge.

The Erie County Department of Environment and Planning, Division of Sewerage Management (DSM) has a multipronged approach to address the challenges associated with private property I&I, including education, a developer lateral replacement program and a private property inspection program. Of these three methods, the DSM's private property inspection program has been the most impactful.

## Inspection Program Organization and Authority

The DSM has a robust I&I identification program. While the major component of the DSM's program consists of traditional sanitary sewer evaluation survey (SSES) methods such as flow monitoring, smoke testing, dye testing, manhole inspections, and other activities within the public sewer system, a key component of the program also includes inspections on private property. As part of the DSM's I&I program, private property interior and exterior inspections are completed to identify problems such as improper connections and deficiencies.

The DSM is comprised of seven sewer districts, each with its own Board of Managers. Each of the seven sewer districts is split into smaller evaluation areas called mini-systems (MS). An MS in an Erie County Sewer District (ECSD) typically consists of a sewered area in which all flows are conveyed through a single point, allowing for assessment of the magnitude of I&I in the upstream system. In the various sewer districts, an MS is chosen for evaluation based on flow monitoring results showing high wet-weather peaks, areas with a concentration of private property owner complaints, operational history at pumping stations with high wet-well alarms, and/or those areas with other wet weather issues or concerns.

The ECSDs operate under the *Rules and Regulations for Erie County Sewer Districts (Rules and Regulations)*, which were first adopted by the Erie County Legislature in December 1971. The Rules and

Regulations serve as the ECSD "sewer use ordinance" and include key provisions that allow the DSM to inspect properties that are served by the sanitary sewer, issue notices of violations, hold enforcement hearings and issue penalties (i.e., premium assessments or fines).

The DSM performs on average approximately 2,700 private property inspections per year. Property information is retrieved from Erie County's real property database using a geographic information system (GIS) map, and a list of addresses for all parcels in an MS is generated. The DSM does not pick and choose which properties to inspect, but rather takes an areawide approach.

## How the Program Works

Using the address list generated from the county's real property database and GIS, letters are sent to property owners requesting that they schedule an inspection. The letters include information regarding why the inspection is being conducted, educating the recipient what I&I sources are, what the inspection will entail, and cite the authority in which the ECSDs must complete the inspection pursuant to the Rules and Regulations. These letters further advise property owners that failure to allow staff to inspect the property is a violation of the Rules and Regulations

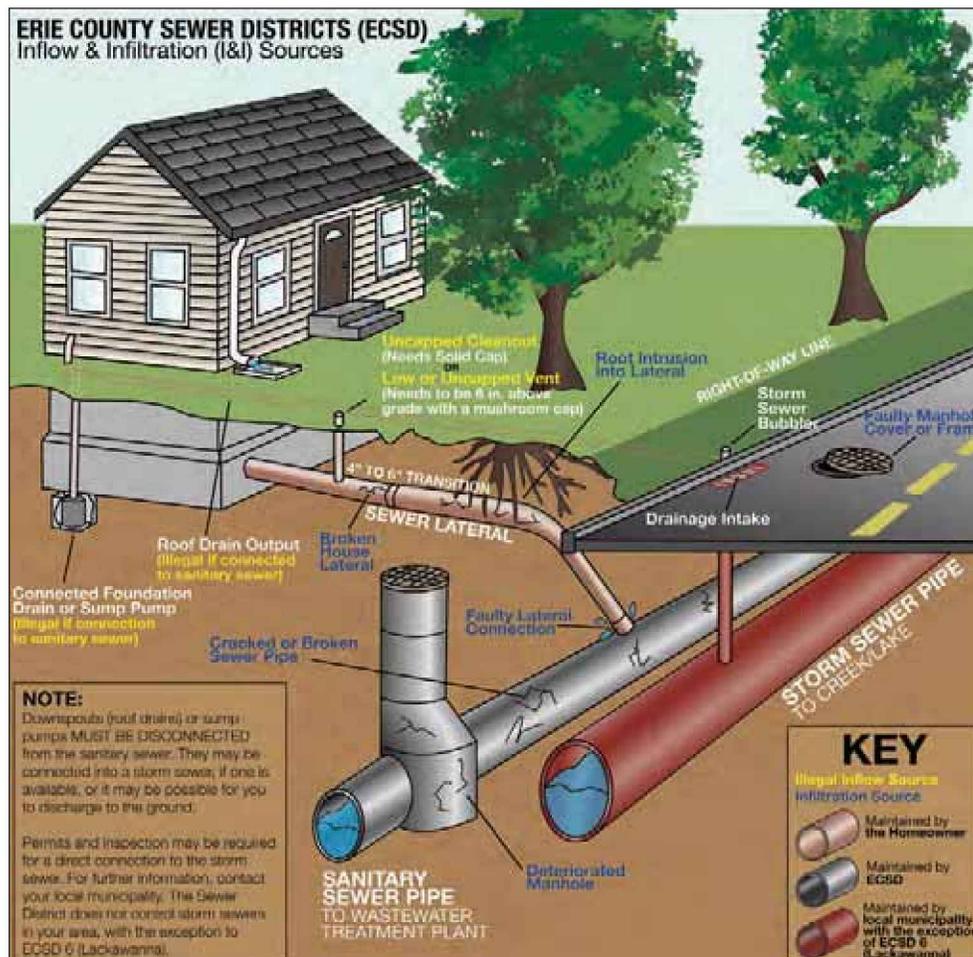


Figure 1. Examples of the I&I sources associated with a private residential property.

Angela M. Horton and Jacqueline Vujec

and if noncompliant could be referred to an enforcement hearing and subject to a premium assessment or fine.

**On-Site Inspections**

After residents contact the ECSD offices in response to the inspection request, a specific appointment time is set and an ECSD employee will meet the resident at their property. The ECSD employee is to arrive on time, in a county vehicle and uniform, and is to present their county identification card. As noted in the inspection request letter, only the below-grade areas of the structure and the exterior of the home will be observed during the visit. The interior portion of the inspection can include:

- The location of where the plumbing exits the home, above or below the basement floor.
- Sump pump discharges, which may need to be dye tested to properly confirm.
- Footing drain discharges, if observed.
- Floor drain discharges.
- Any below-grade plumbing connections such as basement bathrooms.

The exterior portion of the inspection includes:

- Noting low-lying vent risers.
- Finding improper caps or open riser pipes for the vent or clean out.
- Identifying roof downspout discharges, which may need to be dye tested to properly confirm.

The ECSD inspector uses a standard form (Figure 2) that details the items to be viewed to foster consistency in the actual inspection and for the proper population of inspection databases.

Erie County Sewer Districts (ECSD) - House Inspection Form			
ECSD: _____	MS System: _____	Date: _____	Inspector: _____
Property Address: _____		Town: _____	
<input type="checkbox"/> VOP Compliance	<input type="checkbox"/> Other Occupant	Present at Inspection: _____	
<input type="checkbox"/> Lateral/Alford Prop.	<input type="checkbox"/> Rental Property	Phone: _____	
<input type="checkbox"/> Single	<input type="checkbox"/> Condo	<input type="checkbox"/> U.S. L. or R.	<input type="checkbox"/> Apartment
<input type="checkbox"/> Rowset/Block	<input type="checkbox"/> Townhouse	<input type="checkbox"/> Commercial/Industrial	
Interior Inspection			
Basement	<input type="checkbox"/> Yes <input type="checkbox"/> No	Sanitary Wasteline	<input type="checkbox"/> Visible & Attached On Wall (Height above floor): <input type="checkbox"/> < 10 in. <input type="checkbox"/> > 10 in. <input type="checkbox"/> 10 in.-4 ft
Sump Pump	<input type="checkbox"/> Connected to: <input type="checkbox"/> Ground <input type="checkbox"/> Sump	<input type="checkbox"/> Check <input type="checkbox"/> Unknown	Laundry Tray/Tub <input type="checkbox"/> Yes <input type="checkbox"/> No
Washing Machine	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Connected to: <input type="checkbox"/> 1st Floor <input type="checkbox"/> Sump	Floor Drain <input type="checkbox"/> Yes <input type="checkbox"/> No
Basement Bathroom Facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sink <input type="checkbox"/> Shower <input type="checkbox"/> Toilet <input type="checkbox"/> Pump	Footer Drains Observed <input type="checkbox"/> Yes <input type="checkbox"/> No
Exterior Inspection (Items may not be readily apparent, note if smoke testing is needed)			
Down Spouts/Outlets	<input type="checkbox"/> Yes <input type="checkbox"/> No	Total # of Discharges to: _____	# of Discharges to: _____
Wast	<input type="checkbox"/> < 10" above grade with mushroom cap	<input type="checkbox"/> Replace Perforated Cap	<input type="checkbox"/> Else Lying Trap, Visible Above Ground
Clean-out(s) requires solid cap	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Replace Solid Cap	<input type="checkbox"/> Cannot Locate or Buried, Must be Raised
Status	<input type="checkbox"/> Violation <input type="checkbox"/> No Violations Noted at Time of Inspection	<input type="checkbox"/> Install Mushroom Cap	<input type="checkbox"/> Roof Vent Observed Location: _____
Dye Testing	Date: _____ By: _____	<input type="checkbox"/> Cracked/Broken Riser	<input type="checkbox"/> Through Building Wall
Re-inspections	Date: _____ By and Notes: _____	<input type="checkbox"/> Replace Perforated Cap with Solid Cap	<input type="checkbox"/> Replace Mushroom Cap with Solid Cap

Notes: Violations & Unknowns are in bold italics; Unknowns need to be dye tested. This form is not a guarantee of full compliance with Article V of the ECSD Rules and Regulations. Southern Region (ECSD) 1-4-0 684-1234; Central Region (ECSD) 3-8-0 925-8168; Southern Region (ECSD) 2-5-0 3181 www.ecsd.net

Figure 2. An example of an ECSD house inspection form. Angela M. Horton

**Violations**

The primary violations identified, such as sump pump connections to the private lateral, roof leaders connected to the sanitary sewer system, and low-lying vents or improper vent or cleanout caps, require relatively low-cost corrections to bring the property into compliance. The ECSDs have not focused their private property program on lateral deficiencies or footer drains, as the fixes to address those potential I&I sources would cost property owners thousands of dollars.



Proper caps for the vent and cleanout reduce the potential for I&I.

Angela M. Horton



Sump pump and downspout connections below grade may be connected to the sanitary sewer system and should be dye tested to verify where they discharge, as improper connections can expose the property owner to the risk of sewage backup into the home.

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From year to year, the number of violations identified and corrected will vary. In some areas, the age of the housing stock is such that numerous violations will be identified because the structures were constructed before modern plumbing standards were instituted. In other areas, it will be sporadic violations scattered throughout the MS. In 2018, approximately 450 violations were identified and subsequently fixed through the private property inspection program.

If a violation is noted during the inspection or through follow-up

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dye testing, the property owner is sent a notice formally identifying the violation and stating that the owner has 90 days to correct. Once a violation is corrected, another inspection is scheduled to confirm that the cited issue has been addressed. If the violation is not corrected within this timeframe, up to three more reminder letters are sent in 30-day increments. As a last resort, should the violation remain after these repeated attempts, the property owner will be referred to that district's Board of Managers with the recommendation to schedule an enforcement hearing.

### **Enforcement Hearings**

Approximately every year and a half the DSM holds an enforcement hearing for noncompliant properties. A letter is sent advising the property owner they have been referred to the hearing, the items that will be considered during the hearing, the authority in which the hearing is being held, and that if they are found compliant before that date, the hearing will be canceled. By the time a hearing is held, there has been significant outreach by the ECSDs besides the letters, including personally visiting homes and knocking on doors to communicate the need to address the noncompliance. Fortunately, most property owners comply with the program and only a handful of individuals require this step in the process.

During the hearing, the DSM will present information to the hearing officer and the resident may do the same. The hearing officer will issue his or her findings, which are subsequently submitted to each of the ECSD Boards. The ECSD Boards have the authority to levy premium assessments or fines in response to violations of the Rules and Regulations. In limited instances the ECSD Boards have exercised that authority when presented with a private property inspection program violation. The property owners are then given 30 days to comply, after which they will begin accruing premium assessments. While violators may be subject to a premium assessment or fine, the goal is compliance and penalties are a last resort.

### **Lessons Learned**

The private property inspection program is by no means a perfect process. The DSM started the program in ECSD No. 6 (City of Lackawanna) in the 1980s and has over time learned a great deal to improve the program's management and procedures.

### **Property Access**

One of the largest challenges is that some property owners are resistant to having the government enter their private property. There have been instances where residents have sent complaint letters to elected officials stating that they refuse to allow an inspection for various reasons. The DSM's private property inspection program was the topic of discussion during a local talk radio show a few years ago, with people questioning if it violates their constitutional rights.

Throughout the years, a greater level of effort has been spent on educating property owners regarding the purpose of the program, the limited nature of the inspections, and the benefits of compliance. Oftentimes residents are reassured when it is explained that the ECSDs are like a utility such as their gas, electric or phone/internet service provider that may need to enter properties on a limited basis. It is also important that county employees who interact with property owners demonstrate a level of professionalism by being polite, presenting proper county identification and wearing appropriate attire. For those situations where residents simply

refuse to allow an inspection, sometimes the most effective method is for an ECSD supervisor to meet face to face with the person, which oftentimes assuages concerns or mitigates the situation.

### **Program Management**

Management of the program has also improved throughout time. Inaccurate recordkeeping, inconsistent data, staff not following up on items such as dye testing, and the like, have all been issues encountered over the years. The DSM has implemented standardized forms, analyzes information in GIS, and overall is providing better oversight and review of the data to address these problems. The DSM is investigating mobile technologies to further the efficiency and effectiveness of the data management.

### **Public Education**

Recently, ECSD inspectors have begun noting when homes have below-grade facilities such as floor drains, basement toilets, sinks and showers tied into the sanitary sewer system. The DSM now sends letters to property owners informing them that, although these facilities are not a violation of the Rules and Regulations, there are nonetheless risks associated with having these types of below-grade connections that are not otherwise protected. Many property owners are unaware that these facilities provide a pathway for a basement backup. This has become a good public education opportunity regarding the risks.

### **End Goal**

The DSM believes addressing private property I&I is a critical part of managing the ECSDs. Significant effort is put into this program to decrease wet-weather flows, alleviate operational problems and mitigate customer complaints. Many property owners are unaware of I&I sources connected to their sanitary facilities. They do not understand how this I&I can contribute to backups and SSOs, as well as generally impact the ability of the sewer service provider to continue its job of protecting public health and the environment.

Educating the public takes proactive measures on our part and is our best defense in remediating I&I sources. It is important to teach members of the public that their choices, such as not flushing wipes down the toilet or not putting grease down the drain, make a difference. Raising their low-lying vent, eliminating the roof downspout connected to their lateral, and other I&I corrections are all measures residents can take to alleviate the overall stress on the sanitary sewer system.

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