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Private Sewer Laterals

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Portions excerpted from [State of Technology for Rehabilitation of Wastewater Collection Systems](#) (EPA/600/R-10/078)

Private sewer laterals are the portion of the sewer network connecting individual and private properties to the public sewer system. Laterals are often in poor condition, and can have a significant impact on the performance of the sewer system and treatment plant. Cracked or broken laterals can allow groundwater and infiltrating rainwater (clean water) to enter into the sewer system which, at high levels, can cause problems at the treatment facility or overload the sewers and cause sanitary sewer overflows (SSOs).

The condition of sewer laterals can affect the results of sewer system rehabilitation programs, particularly those programs investigating and addressing capacity and inflow and infiltration (I&I) issues. For example, after infiltration in a main sewer line has been corrected through rehabilitation, the groundwater level can rise and cause infiltration problems in adjacent sewer laterals (and can also result in water infiltration into nearby basements). This means that repairing or replacing sewer mains to remove infiltration may be less effective in reducing I&I than predicted until the laterals also are fixed.

Typically, private laterals make up about half of the total length of a sewer system. Even when the system-wide impact of infiltration is not an issue, defective laterals can cause sewer backups, and can be an important issue of concern in public works agencies. The owners of the laterals may be unaware of these problems or unwilling to fix them if the consequences do not directly affect them.

Figure shows a typical layout for a residential sewer lateral connecting to a mainline in a street, together with illegal drain connections and some of the conditions that can contribute to high I&I.



Courtesy King County
Dept. Natural Resources and Parks

Clean water can be directed into the sanitary sewer system through other private connections. The need to remove sources of non-wastewater “inflow” into the sanitary sewer system from private property is another concern for wastewater managers. These inflow sources can include connections from roof and driveway drains and from basement sump pumps. These inflows were once permitted in many communities, but are now typically prohibited. In general, removal of inflow sources represents one of the more cost-effective ways of removing unwanted water from a wastewater collection system.

Newer laterals are generally installed with polyvinyl chloride (PVC) pipe, but according to a Water Environment Research Foundation survey over fifty percent of private laterals are vitrified clay pipe (VCP). VCP is prone to root intrusion, cracks, joint misalignment and general leakage, and private laterals are estimated to contribute about 40 percent of a system’s infiltration and inflow.

Lateral Renewal Decision-Making. After identifying problems related to the condition of sewer laterals, a sewer department will need to determine how or whether to address these problems. Criteria may include the direct cost-effectiveness of sewer lateral renewal (avoided cost versus incurred cost), but may also need to include more general considerations affecting public health, the environment, and quality of life.

Even when looking at only the direct cost-effectiveness of lateral renewal, it is important to see it in the broader context of “where, how and when” the I&I affects the system and treatment plant. Repairing the laterals in one small basin may not *appear* to be cost-effective if the savings are calculated only by multiplying the reduction in total quantity of sewage conveyed annually by the average cost of conveyance/treatment per 1,000 gallons of sewage. However, the same repair may be cost-effective if it prevents peak flows from exceeding maximum design flows at lift stations or at the wastewater treatment plant (WWTP), or if it eliminates the need to upsize parts of the collection system.

Because of the large investments required to bring most sewer systems up to standards, rehabilitation and capacity-building efforts may take many years; therefore, repair and renewal efforts must be prioritized over time. System needs and prioritization will then guide development of a strategy to deal with sewer laterals (i.e., whether it is necessary to address the condition of laterals; the approach; how to finance; access issues; and public awareness). The use of pilot projects for lateral rehabilitation has proved useful in many cities that have identified problem I&I. Pilot projects can provide area-specific as well as system-wide data.

Private Property Issues. Even when a municipality has concluded that their sewer laterals present a problem they are still often reluctant to move ahead. Frequently it is because the buried sewer laterals that are presenting a problem to the municipality are not causing an obvious problem to the owners of the laterals. This makes dealing with private property owners over sewer lateral repairs a difficult issue.

Most private property owners have no idea of the condition of their sewer laterals and they will see little or no direct personal benefit from the cost to repair their lateral. Linked to the legal issues of ownership, who should pay, etc., are also questions of legal right of access to the

private property for inspection and repair work, as well as legal liability for accidents during inspection or repair work. Some key issues/options regarding legal and liability matters are:

- > Some states prohibit spending public money for private gain (i.e., improving private property by paying for rehabilitation of private laterals). This issue has been addressed successfully in the courts by arguing that the private gain is only incidental to a larger public gain, resulting from fewer sewer overflows and decreased sewage treatment costs.
- > Procedures for entering private property to conduct inspection and repair work vary widely across the U.S. Local ordinances can be checked and modified if necessary.
- > Many municipalities regard taking any additional responsibility for private sewer laterals as a major concern in terms of additional work and public liaison. Other municipalities are more proactive, seeing themselves as being in the best position to do something about lateral problems by providing homeowner-friendly programs, even if they do not take financial responsibility for the work.
- > Having the political will to force homeowner compliance is often an issue with elected officials who have to approve the program. Outreach can educate officials of the costs and benefits of action.

Financing Issues. Programs to address issues with private laterals can be much more successful with less public resistance if the financial aspects, as well as the legal aspects, are carefully considered. Some considerations include:

- > For wealthier neighborhoods, financing options can make it easy for the homeowner to agree to and proceed with the repair. For low-income neighborhoods, some kind of financial assistance or deferral of payment until property sale may be essential to pursuing a program.
- > Sewer lateral repair may provide enough public good that a community may decide to pay for it. A few cities have decided to put up all of the money for the program.
- > Financing repairs with insurance - a warranty program approach where the homeowner essentially pays an insurance premium against the cost of a malfunctioning sewer system has been adopted by some cities.
- > Using a mandatory inspection at the time of sale and a requirement to have the lateral in proper condition before the property is transferred allows the cost of lateral repair to be paid at a time that money is available from the property sale.
- > A city can use its program size to bid or negotiate uniform and low costs for lateral repairs. A homeowner can opt to bid the work themselves, but a quick check on an individual price can often convince them that joining the city program is an opportunity to take care of the problem at a lower price and with less effort.

Inspection Technologies. Table 2 lists the common methods used for laterals inspection. More detailed discussions of these methods can be found in EPA’s [Condition Assessment of Wastewater Collection Systems](#).

Table 2: Methods for Inspection of Sewer Laterals

Method	Description
Building inspections	Identifies uncapped cleanouts and various connections to the laterals.
Smoke testing	Identifies various connections and defective service laterals.
Dye water flooding	Identifies defective laterals and various connections to the sewer lateral.
Mainline CCTV	Identifies “suspect” laterals and may be able to inspect first few feet of the lateral.
Lateral CCTV	Identifies location and size of active leaks and some inactive leaks (water stains); also identifies change in pipe material/diameter along the lateral, sags, bends, etc.
Pressure testing	Identifies existence of both active and passive leaks.
Electro scanning	Identifies existence of both active and passive leaks in non-conductive pipes.

Condition Assessment and Recordkeeping. The inspection data from a few sewer laterals may be representative of the condition of other laterals in the same sewer basin of the same material and date of construction. Decisions about whether the rehabilitation or replacement of a particular lateral is necessary can be made on the basis of this assessment, or may be made based on other system criteria. For example, laterals may be rehabilitated at the same time as mainline segments, as was done in Nashville and Davidson County, TN, or, all non-PVC laterals may be renewed in a sub-basin being rehabilitated, as was done in Sarasota, FL. However, in many agencies’ programs, only laterals proven to be defective qualify for repair.

The condition assessment will normally be based both on infiltration conditions in the lateral and on the lateral’s structural condition. The assessment will document any evidence of the presence of infiltration along with any structural defects. Table 3 indicates the typical data sources and assessment parameters used for different aspects of condition assessment.

Table 3: Basis for Condition Assessment

Assessment Type	Data Source	Basis of Assessment
Infiltration assessment	CCTV	Visible joint infiltration
	Visible joint infiltration	Evidence of periodic leaking
	Digital scanning	Evidence of periodic leaking
	Pressure testing	Exfiltration rates
Structural assessment	CCTV/digital scanning	Qualitative descriptions
		Quantitative scoring of individual defects and aggregated scores for pipe sections
Operating conditions	CCTV/digital scanning	Qualitative descriptions (e.g., tree roots, debris, blockages)
Other defects	CCTV/digital scanning	Qualitative descriptions (e.g., construction defects such as hammer tap lateral connections)

Standardization of defect codes is just as important for sewer laterals as for mainline condition assessments. NAASCO's Pipeline Assessment Certification Program (PACP) observation codes are useful in describing and cataloging lateral conditions.

Summary. One of the long-term goals for managing wastewater collection systems is to understand the most effective rehabilitation procedures with the lowest life-cycle cost. Determining if excessive infiltration and/or inflow are significantly impacting your collection or treatment system is a task that stands on its own. If infiltration is a significant issue within your system, it is almost guaranteed that private laterals are a part of the problem. An issue for most municipalities when considering developing a lateral rehabilitation program is whether the cost and effort of the program can be justified by the potential public benefit (e.g., reduced treatment costs, reclaiming capacity, and avoiding sewage overflows). There are numerous examples of municipalities that have implemented an infiltration reduction program and many of them have included private laterals. Not addressing private laterals would be an incomplete investigation. Fortunately, municipalities throughout the country have begun to address these issues and have developed some innovative models and financing arrangements to move beyond the barriers.

EPA's [Guide for Estimating Infiltration and Inflow](#) provides further information on estimating I&I in your sewer system.

Further information and References

EPA [State of Technology for Rehabilitation of Wastewater Collection Systems](#) (EPA/600/R-10/078) July 2010

EPA [Condition Assessment of Wastewater Collection Systems](#) (EPA/600/R-09/049) May 2009

King County [Storm Water & Ground Water in Sewers is a Regional Problem](#)

Vancouver [An Approach Towards Private Sewer Lateral Certification in Real Estate Transactions](#)
February 2013

Water Environment Federation [WEF Private Property Virtual Library](#)