

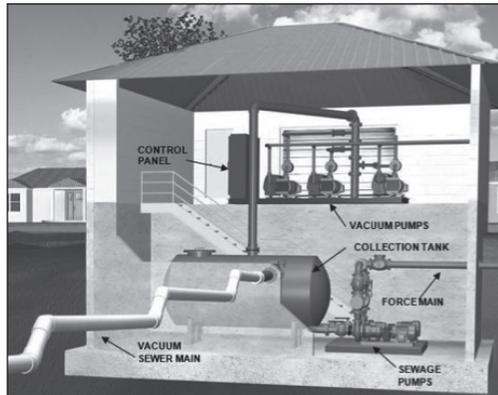
A Review of Advanced Sewer System Designs and Technologies

This project is a review of advanced technologies and sewerage system designs and will serve as a comprehensive desk reference for wastewater professionals, homeowners, and other stakeholders. The report describes different sewer collection system designs and technologies that are in service in the U.S. and around the world. Focus is given on how a particular design or technology operates, its cost, performance, advantages and disadvantages, location where a design or technology is in use, and who is behind a design or manufacturing of a particular component of a sewer collection system. Information found in the 295 references was summarized under the following categories:

- *Advanced Onsite Technologies* include water-efficient toilet designs, source/nutrient control in fixture designs, and onsite wastewater system designs and technologies. The primary technologies are toilet design and septic systems. Graywater separation systems with a variety of end uses are presented in this section.
- *Alternative Wastewater Collection System Designs and Technologies* include pressure, vacuum, small diameter gravity, and hybrid sewer designs and technologies. These systems are effective for highly dispersed populations where the expense of conventional collection systems is impracticable. These systems also may be of use in small towns or in sections of major urban areas.
- *Gravity Sewer System Design and Technology* is divided into Combined Sewer System (CSS) Designs and Separate Sanitary Sewer (SSS) System Designs and Technology.
- *Infiltration Detection and Control Technologies* focuses on sewer infiltration control, inflow reduction, private sewer lateral management, and sediment control or solids control in sewer system designs. Technologies discussed include green infrastructure.
- *Sewer Construction/Rehabilitation Technologies* addresses sewer system repair, rehabilitation, replacement, and construction designs and technologies.
- *Pipe Materials and Joints* in sewer system designs and technologies are reviewed. This includes established sewer pipe materials, innovative proven pipe materials, foreign, and experimental materials.

Within each of these subject areas the information is further categorized as *Established Technologies* and *Innovative/New Technologies*. *Innovative/New Technologies* are further subdivided into *Proven Technologies* and *Experimental & Foreign Technologies*.

The *Established Designs and Technologies* subgroup identifies sewer design and technologies that are fully adopted in the U.S. and are commonly used by many municipalities and sewer utilities. Selection of a design or technology was based on



Components of a Vacuum Station.
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BENEFITS

- Provides a comprehensive review of advanced sewer system designs and technologies.
- Provides a single reference document that water managers, decision makers, and utilities can go to for information on sewer system designs and technologies.
- Presents the latest information available for decision makers and other stakeholders.

RELATED PRODUCTS

An Examination of Innovative Methods Used in the Inspection of Wastewater Systems (O1CTS7)

Best Practices for Treatment of Wet Weather Wastewater Flows (O0CTS6)

Methods for Cost-Effective Rehabilitation of Private Lateral Sewers (O2CTS5)

Case Studies: Methods for Cost-Effective Rehabilitation of Private Lateral Sewers (O2CTS5a)

Development of a Tool to Prioritize Sewer Inspection (97CTS7)

Using Flow Prediction Technologies to Control Sanitary Sewer Overflows (97CTS8)

New Pipes for Old: A Study of Recent Advances in Sewer Pipe Materials and Technology (97CTS3)

Minimization of Odor and Corrosion in Collection Systems: Phase I (O4CTS1)

Optimization of Vortex Separator Removal Efficiencies for CSO Treatment (92TCR2)

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whether the particular innovation has been introduced into the existing sewer systems for the purpose of improving performance, or reducing the cost of sewer operations.

The *Proven Designs and Technologies* subgroup comprises sewer design and technologies that have been introduced into the sewer industry, but have only been adopted on a limited scale in the U.S. These technologies have been proven to work in some areas around the U.S., but their application in other areas around the country is not widespread.

The *Experimental and Foreign Technologies* subgroup summarizes sewer designs and technologies that are either at the experimental stage in the U.S. or outside U.S., and/or are proven to work in other countries, but have not been used much in the U.S. More focus was given to technologies and designs used in Australia, Germany, the UK, and Canada.

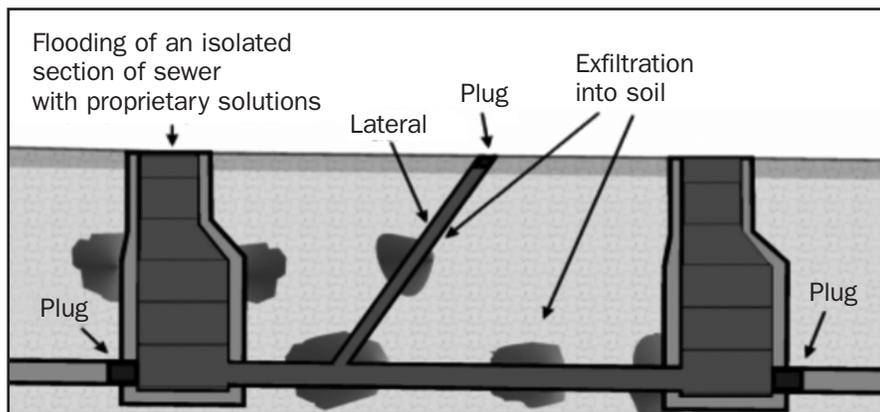


Figure 1. Flood grouting is an effective trenchless rehabilitation method.

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