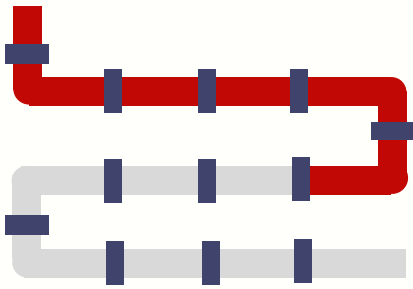


How Little Rock Water Reclamation Authority Moved from a Time-based to a Condition-based Sewer Cleaning Strategy using Acoustic Technology

BEFORE ACOUSTIC INSPECTION

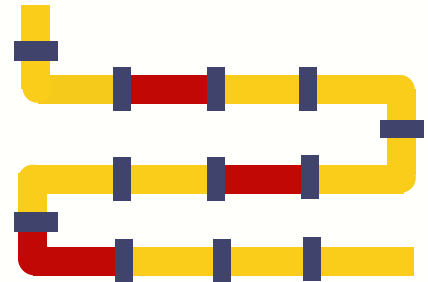
Time-based Cleaning Strategy



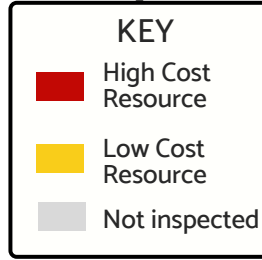
40% of total small diameter system serviced annually using high cost resources.

WITH ACOUSTIC INSPECTION

Condition-based Cleaning Strategy



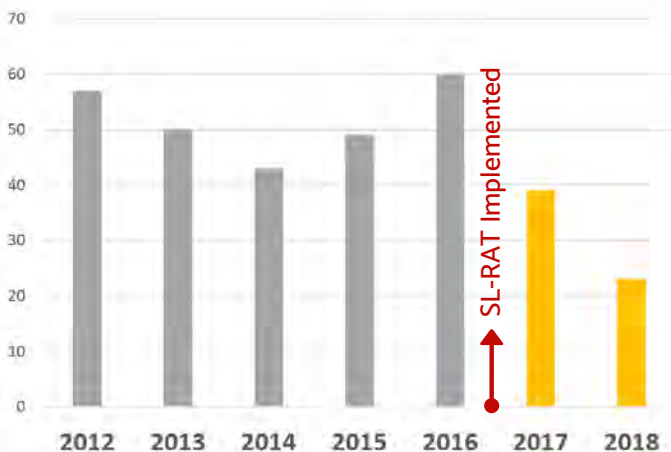
100% of total small diameter system acoustically inspected annually, with only **20%** requiring high cost resources.



With a time-based maintenance program, Little Rock annually serviced 40% of their small diameter collection system using high-cost resources such as CCTV or cleaning. Some of these serviced segments had plenty of flow capacity, while blockages in other parts of the system were being missed and causing overflows. Little Rock looked to enhance their program by inspecting more and reducing overflow count.

In January 2017, Little Rock launched their acoustic program to rapidly screen 100% of their small diameter pipes for blockages at very low cost. They focused high cost resources such as cleaning and CCTV on the 20% of the system that received poor acoustic scores. By deploying resources based on condition, rather than time, Little Rock reduced time spent cleaning clean pipes. While the crews spent less time cleaning, they removed more debris and significantly reduced SSO's.

Sanitary Sewer Overflow Count at LRWRA Before and After Implementing Acoustic Technology



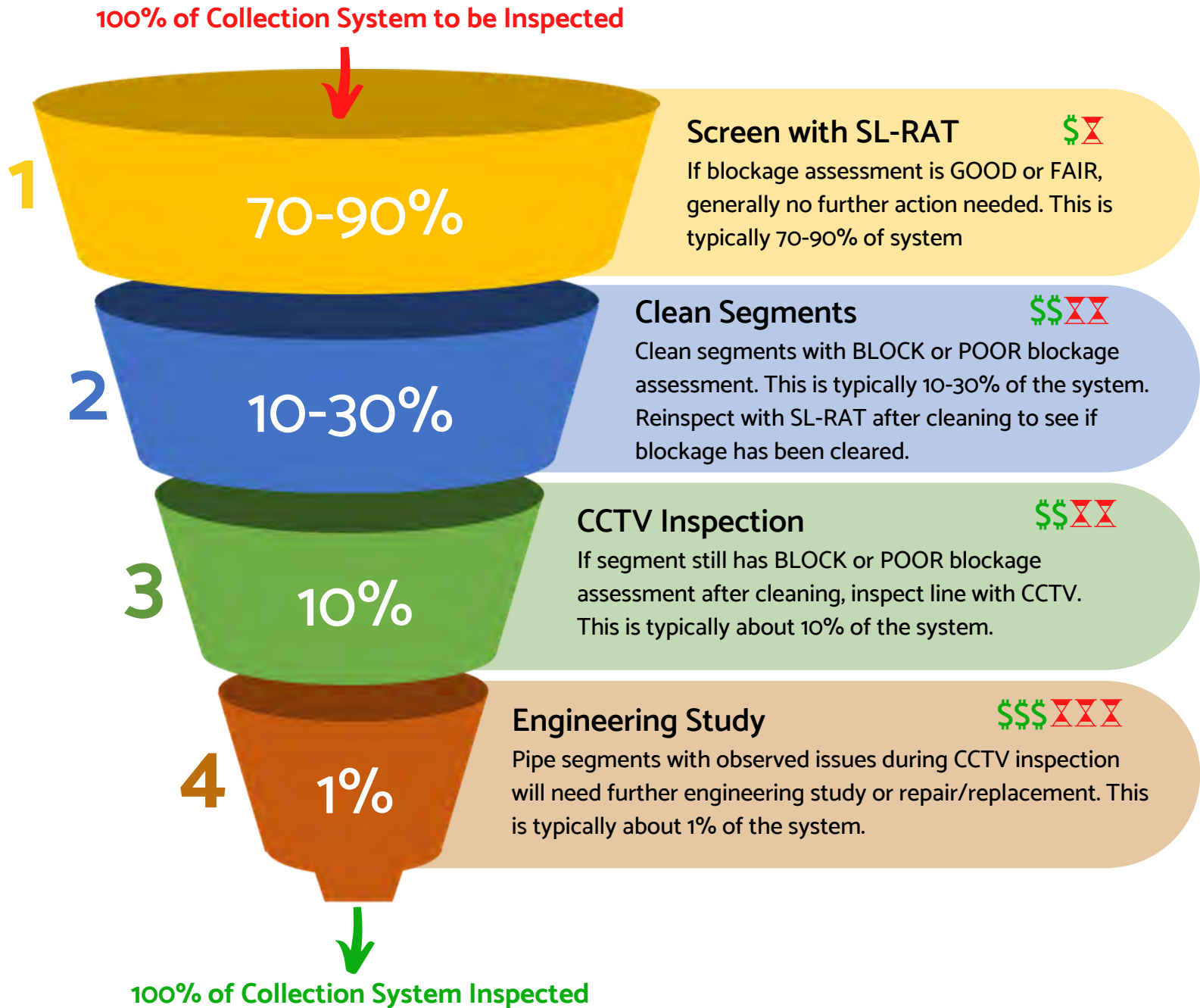
Does it work?

Comparing Little Rock's maintenance program performance from 2016 to 2017

- 35%** Reduction in SSO's (64% reduction in 2018)
- 32%** Reduction in linear feet cleaned
- 116%** Increase in cubic yards of debris removed
- 0%** Change in number of personnel

Using Acoustics to Enable a New Collection System Maintenance Strategy

The SL-RAT inspection should become the first step in a utility's maintenance process. With its use, the entire collection system can be practically and economically screened on a 12-36 month cycle. The information obtained helps intelligently size the capacity and deployment of cleaning and CCTV assets. SSOs and system risks go down, along with the cost of maintenance - an improvement for community ratepayers and the environment.



Using acoustics to screen your system frequently, means catching more SSOs in the making while simultaneously reducing risk, improving cleaning effectiveness & enhancing system performance. Changing your strategy also means saving time, money, CO2 emissions and frequently Non-Revenue Water.

Cost & Time Requirements

- \$ - Least Expensive
- \$\$ - More Expensive
- \$\$\$ - Most Expensive
- X - Quickest Method
- XX - More time consuming
- XXX - Most time consuming