Who's the Boss -- You or Your Infrastructure?

By Robert Klavoon, PE, Town Engineer, and Jamie L. Johnson, PE, Project Manager, Wendel

It can be difficult for towns to move beyond a fix-it-as-you-go mentality. They get stuck in the rut of not being able to foresee infrastructure failures, not knowing what to do to fix them, and not knowing how to pay for them.

But a sudden waterline break or a pump station failure shouldn't define your town's approach to dealing with infrastructure repairs. There is a better way.

A few years ago, the Town of Lockport in Niagara County found itself responding to more frequent emergency repairs for its aging sanitary sewage collection and pumping systems, and could never seem to get ahead of the curve with operations and maintenance (O&M). Economic development and population growth placed additional stress on the sewer system, and yet the size of the town's workforce remained the same. They knew the way to manage the infrastructure was not through unexpected fixes and repairs, so they decided to get serious about proactively managing the system, which includes 106 miles of gravity sewers and forcemains, as well as 41 major pump stations.

To take charge of its own future, the town embarked on the development of a long-term, multi-year Capital Improvement Program (CIP). This CIP will allow the town to ensure the integrity of its sanitary sewer system for the next 20 to 30 years by leveraging bonding capacity to pay for the implementation of extensive upgrades and capital investments, and avoiding the imposition of new burdens on ratepayers.

SMART Objectives

First, the town and its consultant, Wendel Companies (Wendel), met to develop a list of specific, measureable, achievable, realistic and timely (SMART) objectives for the CIP, as follows:

- Upgrade and rehabilitate aging infrastructure
- Identify and eliminate sources of inflow and infiltration (I/I)
- Reduce operational and maintenance (O&M) related issues for the town's sewer department.

The SMART objectives provided a consistent, cohesive guideline as the CIP progressed.

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From Page 20: Thanks to Great Planning, Lockport Infrastructure Project Increases Sewer Capacity for Residents under Budget

Data Collection

The next step in the development of the CIP was to collect background information on the town's sanitary sewer system to get a better understanding of what types of problems the town was having, where those problems occurred, and how frequently they were happening. These historical issues were identified:

1. Not surprisingly, the older sections of the town's sewer system required more O&M when compared to newer sections. There were more breaks in these areas, frequent disruption to the residents, costly emergency repairs and other issues.
2. Inflow and infiltration (I/I) was a consistent issue in certain areas in the town; in particular, along a road near a large creek that was especially problematic following heavy storms. The town provided evidence of increased operating costs associated with the pump stations in this area due in part to longer pump run hours, as well as a higher-than-expected level of wear and tear on the pumps.

The data collection allowed the town to focus the CIP on addressing areas within the collection system most prone to breaks and emergency callouts, as well as locations targeted for future growth. It quickly became apparent that the CIP would need to be broken down into multiple phases.

Phase 1

The scope of the Phase 1 preliminary investigation included CCTV inspection and smoke testing, as well as pump draw down tests to assess the existing condition and capacity of the pump stations. In general, the investigation indicated the majority of the town's mainline sewer pipes were in good condition, with noted signs of deterioration appropriate with age. However, a variety of defects were also identified including:

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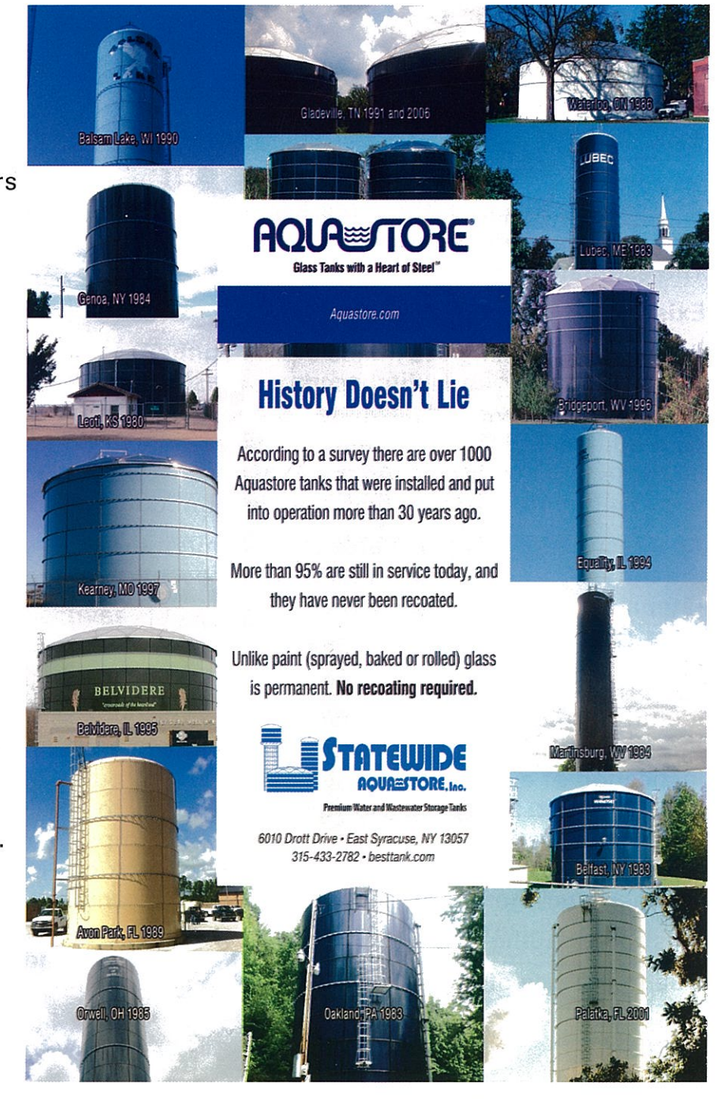
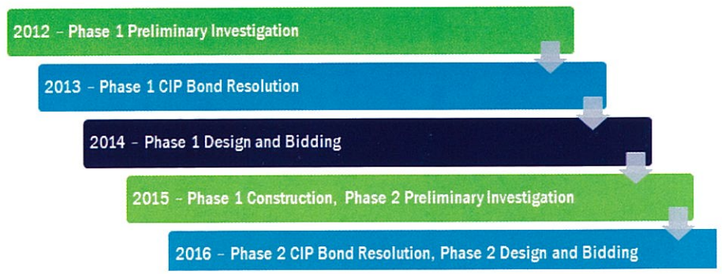


- Reduced capacities due to grit, debris, mineral deposits and root intrusion
- Broken sections of pipe, damaged pipe, and defective pipe joints

In addition to the issues identified in the mainline sewer, defects were found in the sanitary manholes as well, including offset and damaged manhole frames, leaking manholes, manholes in low-lying areas and buried manholes.



Phase 1 CIP Timeline

Armed with the results of the Phase 1 preliminary investigation, Wendel provided the town with recommendations for improvements. Ultimately, the Phase 1 CIP consisted of three critical pump station rehabilitations, mainline sewer rehabilitation using cured-in-place pipe repairs, and additional investigation in problem areas using CCTV and mainline flushing. The estimated cost for all of the Phase 1 CIP scope of work was $2.8 million.

Existing Bond Payments

Prior to undertaking the Phase 1 project, the Town of Lockport conducted a review of its existing bonding capacity based upon commitments to previous capital improvement projects. This review determined that approximately 60 percent of its existing debt had been paid off, leaving the town with the capacity to undertake the Phase 1 project without a rate increase to its residents. As the Phase 1 CIP was comprised of only $2.8 million worth of improvements, the town had adequate bonding capacity to carry these payments.

As a result, the town was able to implement three diverse scopes of work focused on meeting the SMART objectives identified at the inception of the capital plan with no impact to the ratepayers of the town.

Phase 2 Preliminary Investigation

By early 2015, the work identified in the Phase 1 CIP was in construction. As such, steps to identify additional improvements — what became the Phase 2 CIP — began. Building on the results of Phase 1 investigations, the town and Wendel also performed an inventory and inspection of all 41 town-owned and operated pump stations and made recommendations for improvement. Everything from pump capacity to the condition of the panel boards was taken into consideration. The nature of the needed improvements included complete pump station replacement and rehabilitation, as well as electrical, piping, valving, sewer lining, installation of emergency generators and other improvements.

Existing Bonding Capacity Revisited

Due to the size of the project, and with consideration for the impact it would have on

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ratepayers, Phase 2 of the project was completed in two sub-phases. The pump stations that were identified as high priority (high flows, large service area, equipment beyond repair, etc.) at the time of the analysis were included in Phase 2A, with the balance to be completed in Phase 2B.

ITEM	DESCRIPTION	COST
1	Sewer System Improvements	
	Phase 2A Sewer System Improvements	$5,210,000
	Phase 2B Sewer System Improvements	$2,350,000
	TOTAL CAPITAL IMPROVEMENTS	$7,560,000

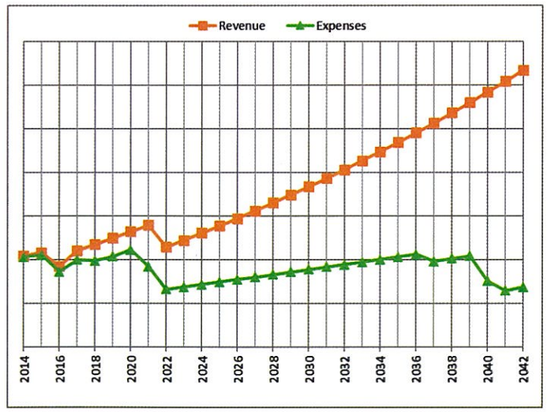
The town was fortunate to receive favorable bid pricing for the Phase 1 project, resulting in the project coming in approximately $1 million under budget. Even as new bond payments were necessary to accomplish the Phase 1 CIP, the town had remaining capacity after more original bonds were paid off to accomplish Phase 2 and still be under its pre-2014 bonding level.

Implementation of Phase 2 CIP

The figure to the immediate right depicts the future financial status for the town's sewer budget following implementation of the Phase 1 and Phase 2 Sewer CIP projects.

Town of Lockport Sewer Budget Projection Following Implementation Phase 1 and 2 Sewer CIP Projects

The town will be able to implement both Phase 2A and 2B focused on meeting the SMART objectives identified at the inception of the capital plan with no negative impacts to the ratepayers of the town.



Results

The Town of Lockport's CIP has been an evolutionary project, developed and implemented over a multi-year period. Overall, the project has been a successful reinvestment for the town, having met the SMART objectives identified at the project's onset. The town has been able to successfully implement millions of dollars in improvements to its sanitary sewer system with no impacts to the ratepayers. This has provided the residents with a heightened level of confidence in the town, recognizing their efforts to remain fiscally conservative while also reinvesting in the collection system.

To date, the town has received favorable bid results for the Phase 1 and Phase 2A projects, with construction of the Phase 2B project planned for 2020. These favorable results, combined with a $325,000 grant received for this project have resulted in lower long-term costs to the town and its ratepayers. ❐