

The recent amendment to the City's Consent Order with the Nebraska Department of Environment and Energy provides an additional 10 years (until 2037) to complete the Long Term Control Plan (LTCP) and formalizes the expectation for final CSO level of control: capture of 85% of wet weather volume of combined sewage in the representative year. The LTCP currently includes 59 CSO control projects scheduled to be delivered through 84 individual construction contracts. When projects that are currently in design or under construction are complete, it is estimated that a volume capture of approximately 70% will be achieved. To achieve the 85% capture requirement, additional facilities will be required. This is particularly relevant to the portion of the combined sewer system that serves as a tributary to the Missouri River Water Resource Recovery Facility. The current LTCP includes a deep tunnel system and two storage tanks that have an estimated capital cost of more than \$600M.

The time extension provides the City with the opportunity to re-evaluate final CSO controls and make sure they are the most cost effective and beneficial. This re-evaluation is currently underway through an Optimization Study. It is estimated that the re-evaluation will result in additional CSO Program cost reductions in excess of the \$300 million that has already been identified through eliminating or reducing scopes of planned CSO projects.



Optimization Task To Future Course for Pro

Optimization is focused on finding the best, or most cost-effective way to achieve a desired outcome. We optimize personal travel routes based on factors like time and cost, we optimize our time to achieve short- and long-term goals, and we seek ways to optimize the value we get from purchases we make.

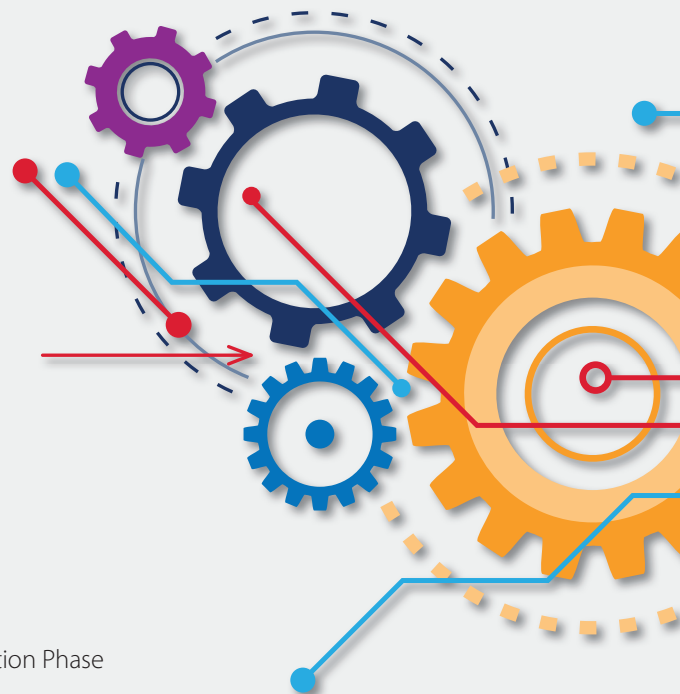
In an engineering context, optimization has this same overall meaning and includes a suite of methods to find the most beneficial ways to achieve a desired goal. In the case of the CSO Program, optimization means searching for solutions to reach 85% wet-weather volume capture in the most cost-effective way, and in a manner that is most beneficial to the community and other stakeholders.

The Optimization Evaluation is following a structured process that uses powerful software, coupled with the Program's existing sewer collection system model, to explore how potential site-specific projects could be combined into thousands of solutions to meet

desired goals. Using the power of cloud computing, the optimization software learns from each evaluation and hones in on better and better solutions for CSO control.

WHAT ARE THE GOALS OF THE OPTIMIZATION STUDY?

The overall objective is to provide a comprehensive understanding of the benefits and cost effectiveness of a range of CSO controls that would achieve 85% CSO volume capture (and thus, regulatory compliance),



so that a final control alternative can be selected. Specific objectives include:

- Identify alternatives that include tunnel and non-tunnel solutions, thus providing cost-effective alternatives to the planned deep tunnel system
- Evaluate a broad range of wet-weather control strategies to define trade-offs between cost and CSO volume reduction
- Identify high-performing alternatives that best meet cost and regulatory requirements for further evaluation, selection and incorporation into the Long Term Control Plan Update expected to be completed by March 2021
- Maximize the use of existing collection and treatment system

Set gram

The Optimization Study is focused on the portion of the combined sewer system tributary to the Missouri River Water Resource Recovery Facility, where most of the remaining volume capture needs to be accomplished. While the capital cost to achieve required volume capture is the primary consideration, additional considerations such as number of overflows, operational requirements, costs, reliability, community acceptance, and adaptability to future system needs or regulations, will all be considered.

WHAT ARE THE NEXT STEPS?

Over 150 control components have been identified for potential projects that would contribute to meeting the remaining CSO level of control. Ideas range from small, non-structural projects such as maximizing storage within existing sewers during wet weather, to variations of a deep tunnel system. In a hydraulically connected sewer system like Omaha's, the impact of one project ultimately affects the performance of others. For this reason, it is important to evaluate projects holistically, which results in a large number of potential solutions. The computing power of optimization software, coupled with engineering knowledge and perspective, helps narrow the search for solutions.

The Optimization Study has greatly improved the understanding of options to meet CSO Program goals. Five high performing alternatives have been identified from over 100,000 options. Alternatives range from solutions without a tunnel, to a less-costly variation of the planned deep tunnel system. Alternatives will be further evaluated over the coming months by the City and Program Management Team, with final solutions incorporated into the Long Term Control Plan Update in 2021.

(Continued on page 12)

