

Lincoln, Nebraska Expands Sewer System Without Odors, Corrosion and Excessive Costs



With more than 100 employees in the Lincoln Wastewater and Solid Waste Division, they are constantly testing, operating, maintaining, and improving Lincoln's wastewater treatment and solid waste handling facilities to protect public health and the aquatic environment.

As the capital and second-most populous city in Nebraska, the City of Lincoln is home to over 250,000 residents, and its population has continued to grow at a steady rate over the past two decades. This growth was the driving force behind the city's new Wastewater Facilities Master Plan, which aims to provide efficient wastewater collection and treatment service for both existing and future residents while providing continued protection of public health and the environment.

Part of Lincoln's new wastewater plan includes a multi-phased Salt Valley Relief Trunk Sewer project that provides relief and additional flow capacity necessary to meet future growth in south and southwest Lincoln. The land surrounding Lincoln is composed of gently rolling hills and varying elevations. In Phase V of the Salt Valley

project, the new sewer extension needed to connect to the existing system, which was located at a higher elevation.

Rather than deploy an extreme slope situation that would have resulted in excessive flow velocities, the City of Lincoln decided to create a vertical drop in the sewer line. Unfortunately,

hydrogen sulfide (H₂S) gas is common in conventional sewer drops due to turbulence, causing odors that generate complaints from

“The Vortex Flow seems very logical to use and works surprisingly well – I believe sewer departments should use this solutions more often.”

Rad Robson, Project Engineer

residents and corrosion within the sewer system that can result in high maintenance costs. Thankfully, the consulting engineer's discovery of the Vortex Flow Insert provided a simple solution for both odor and corrosion control.

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The easy-to-install Vortex Flow Insert was installed in the Salt Valley 14-foot deep manhole in less than two hours, accommodating a drop in elevation.

FINDING A SIMPLE SOLUTION

“We needed to create a drop condition, but also avoid corrosion and gasses that can cause foul odors. This was especially important because the drop is located near residential neighborhoods,” says James Burroughs, PE, a senior project engineer with Olsson Associates, the engineering firm responsible for designing the Salt Valley Relief Trunk Sewer. “Our firm did some research and came across the Vortex Flow Insert. It was my first experience with the solution, and I will consider it again.”

While the Vortex Flow Insert ensured that the Salt Valley sewer drop would smell better, it also saved the City of Lincoln money by extending sewer life and reducing maintenance costs. At the bottom of the Vortex Flow Insert, the flow enters an Energy Dissipation Pool where the air and gases drawn down the air core are forced back into the wastewater. This process aerates the wastewater with a higher dissolved oxygen concentration, intensifying the chemical oxidation process that neutralizes corrosive agents in the flow. The flow exit of the Vortex Flow Insert is submerged in the dissipation pool, and the aerated flow continues the process of oxidation down the line.

GETTING AN EASY ANSWER

IPEX USA LLC custom designs and builds every Vortex Flow Insert depending on each unique application and project. “The Vortex Flow Insert we used for the Salt Valley Phase V project connected to a 48-inch sewer line on both ends, and the peak flow was 8.4 MGD,” says Burroughs. The unit was designed as a gravity sewer with a drop height of 14 feet and a top form of 42”.



Lincoln, NE has over 1,000 miles of sanitary sewer lines and 16 pumping stations that keep the wastewater flowing to two municipal wastewater treatment facilities that treat up to 25 million gallons of water per day.

The Vortex Flow Insert can be easily installed in a standard manhole, a process witnessed by Rad Dobson, project manager for Dobson Brothers Construction Company who was responsible for the installation. “This was a large structure going into a 10-foot diameter manhole, and we installed it in just two hours,” says Dobson. “From a construction standpoint, we would definitely recommend this solution — it was safer and saved on excavation. With traditional drop structures, there can be shoring issues.”