

Digging deep

City of Lima, Ohio banks on infrastructure improvements to help reduce critical sewer overflows

The city of Lima, Ohio, has grappled with combined sewer overflow (CSO) issues for decades. The city releases its treated wastewater and CSOs into the Ottawa River. Constructed in 1930, Lima's wastewater treatment plant serves more than 40,000 people within city limits and surrounding communities. Of the city's 251 miles of sewer lines, roughly 130 miles are combined storm and sanitary sewers.

Challenge

The city of Lima was experiencing up to 40-plus heavy rain events per year, causing combined wastewater and stormwater to be released into the Ottawa River untreated. A mixture of untreated sewage and stormwater, CSOs threaten public health and damage the aquatic environment.

In 2014, the city of Lima and the U.S. Environmental Protection Agency (EPA) finalized negotiations for a consent decree to implement the improvements recommended under the city's integrated plan to control CSOs and sanitary sewer overflows (SSOs).

The consent decree required the city to more than double wastewater treatment capacity - from 30 million gallons per (MGD) day to 70 MGD. The EPA also mandated that the city of Lima to get down to no more than five overflows in a typical year of rainfall. The city typically has between 25 and 45 rains heavy enough to trigger the overflows each year.

Solution

As a result, the city of Lima agreed to construct a 13-million gallon CSO storage tank, separate sanitary sewer overflow abatement improvements and upgrades to the wastewater treatment plant. The CSO project, which cost nearly \$40 million, was part of \$147 million in overall improvements required by the consent decree - the largest in the utility department's history.

The city of Lima engaged the engineering consulting firm Stantec to design the solution to meet its CSO reduction goals. Peterson Construction Co. served as the general contractor on the project, and Woolace Electric installed all of the electrical components.

By having a large basin to collect excess overflow, discharges in the river can be prevented, with collected overflow water pumped to the wastewater



The Flygt deep lift mechanism helps simplify installation and maintenance when needed, eliminating the need for personnel to enter the wet well.

CUSTOMER: City of Lima, Ohio

CHALLENGE: The city of Lima, Ohio, was experiencing 40-plus heavy rain events per year, causing wastewater and stormwater to be released into the Ottawa River untreated.

XYLEM SOLUTION: To eliminate combined sewer overflows and protect the Ottawa River, the city of Lima built a CSO storage tank and a pumping station to convey stored combined wastewater and stormwater to the newly upgraded wastewater treatment center.

treatment plant for treatment prior to release into the river. The tank, located more than 45 feet underground, required Peterson Construction to dig through 17 feet of rock to reach the proper depth.

“It’s not a super-deep pump station, but still at a depth which requires a massive amount of civil work,” said Asad Choudry, global product manager for Xylem’s Flygt brand.

The CSO tank stores flow from the collection system for treatment following wet weather events. Situated near an existing CSO outfall, the offline storage tank accepts flow by gravity. Once water levels have reduced and capacity has returned within the collection system, the tank is dewatered via submersible pumps at a rate of up to 30 MGD. Flow is then pumped to the sewer system for treatment at wastewater treatment center. The tank is constructed of 3- to 4-foot thick concrete walls, and includes a flushing gate and odor control system. The project also called for a diversion structure, utility pipe bridge crossing and underground gate structure improvements for improved flow management and control of CSOs.

Built adjacent to Simmons Field, where the collegiate summer league Lima Locos plays, the massive 13 million gallon tank measures 200 feet wide by 400 feet long and 45 feet deep. More than 75,000 cubic yards of rock was excavated and hauled off site, according to Utilities Director Michael Caprella. More than 35,000 cubic yards of concrete was poured to construct the holding tank.

Flygt distributor Buckeye Pumps equipped the pump station with three Flygt NP3531 20” units, each with 130 HP closed-loop cooled motors. The station also was built with a connecting pipe that crosses over the Ottawa River on a utility pipe bridge and connects into the existing main sewer on the other side. As a result, discharges in the river are prevented, with collected overflows pumped to the treatment center prior to release into the river.

At a depth of 55 feet, there are several value-add solutions in play aside from the 30 MGD pumping capacity. Those include sustained efficiency, self-cleaning hydraulics and durability with the high chrome impellers. The Flygt deep lift mechanism does not require a permanently attached lifting chain or cable to the pump. This added feature helps simplify installation and maintenance when needed, eliminating any need for personnel to enter the wet well.

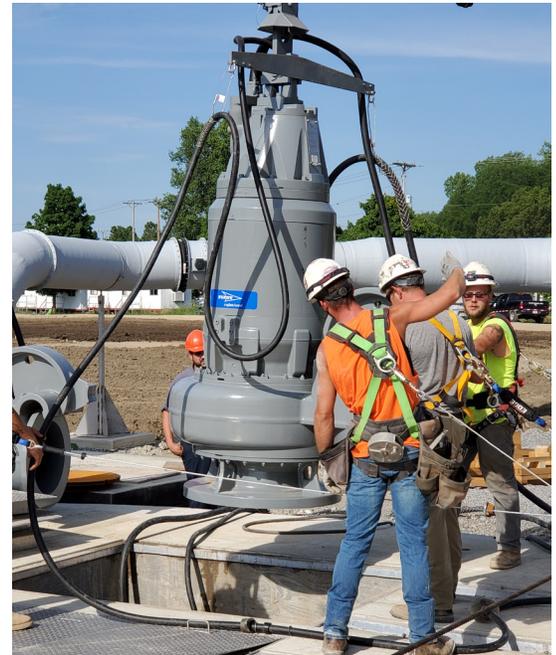
Results

Completed in the fall of 2020, the project was nine months ahead of schedule and under budget. Upon completion of the overflow tank, the site reverted to a green space, which will be used for recreational purposes.

Since going online, the new pump station and CSO tank have helped protect the community and environment by significantly reducing combined sewer overflows to the Ottawa River.



A part of a consent decree, the city of Lima had to double its wastewater treatment capacity from 30 MGD to 70 MGD.



A Flygt NP3531 20” pump that was installed as part of Lima’s wastewater treatment plant upgrades.



Buckeye Pumps equipped the pump station with three Flygt NP3531 20” units, each with 130 HP closed-loop cooled motors.

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