

Temporary bypass helps city of Auburn, New York, divert stream water safely and efficiently

Leveraging its extensive expertise and product portfolio, Xylem Rental Solutions designs and installs unique solution for vital soil remediation work

Project

The Owasco Outlet in Auburn, New York, is a waterway that flows from the north end of Owasco Lake through five counties before connecting to the Seneca River. Over time, portions of the Owasco Outlet were contaminated with coal tar. A byproduct of burning coal, the coal tar had been buried throughout the grounds of a former manufactured gas plant located along the waterway during the 1800s, eventually leaching into the surrounding sediment.

In 2016, the city of Auburn initiated a soil remediation project to clean up the contaminated portions of the Owasco Outlet along McMaster Street and Clark Street. The selected remedy for the site was excavation of the waterway sediments "in the dry," which is accomplished via construction of a temporary channel to reroute stream flows and facilitate dewatering of the targeted excavation area. Excavated sediments were to be solidified on-site prior to off-site disposal, and the excavation area was to be restored to its original character.

Solution

Although a dry streambed is needed to remediate the soil, Darrin Ruiz, northeast regional applications engineer for Xylem, explained that water flow can't be completely stopped because of the threat to wildlife. As a result, stream diversion projects are typically done in stages, drying out one portion of the streambed at a time.

"We did this project in 1,000-foot increments," Ruiz explained. "The bypass system essentially created two dams - one upside of the stream and one downside."

Working with the contractor Severson Environmental Services, Xylem engineers found a creative way to divert the Owasco Outlet to bypass the work area. The proposed solution included four Flygt rental submersible propeller pumps at two bypass sites that would divert waterway flow through bypass piping and enable dewatering of the waterway for excavation and remediation.

"Xylem's bypass expertise, innovative design and rental pump option helped to win the bid," said Anthony Laurendi, a project engineer for Severson.



Seen here is a temporary bypass system for an extensive soil remediation project along a 10-mile stretch of the Owasco Outlet in Auburn, New York. The Clark Street bypass included four Flygt PL7040 24-inch electric axial flow pumps, which discharged into a 48-inch manifold with seven 30-inch flange ports. From the manifold, approximately 4,400 feet of HDPE pipe diverted the water flow.

CUSTOMER: Severson Environmental Services

CHALLENGE: Deliver a temporary bypass system that would allow city of Auburn to divert stream water for vital soil remediation work.

PRODUCTS: McMaster Street Stream bypass: 4 Flygt PL7040 24-inch electric axial flow pumps, 4 Godwin 150hp VFDs, Godwin Advanced RMC panel, custom manifold 48-inch barrel with (7) 30-inch flange ports, approximately 3,100 feet of 30-inch HDPE pipe

Clark Street Stream bypass - 4 Flygt PL7040 24-inch electric axial flow pumps, 4 Godwin 150hp VFDs, Godwin Advanced RMC panel, custom manifold 48-inch barrel with (7) 30-inch flange ports, approximately 4,400 feet of 30-inch HDPE pipe

RESULT: A successful temporary bypass setup that operated in stages over a three-year period while crews completed extensive soil remediation work.



The temporary bypass setup, which operated in stages over a three-year period, employed 7,500 feet of 30-inch HDPE pipe.



Diverting waterway flow through bypass piping enabled the dewatering of the Owasco Outlet for excavation and remediation. The bypass required four lengths of 30-inch HDPE pipe to handle the flow requirements.

For a bypass like this, a typical solution would involve several diesel-driven Godwin Dri-Prime pumps, each roughly the size of a large sports utility vehicle. Xylem's initial proposal for the Owasco Outlet bypass included 12 Godwin Dri-Prime pumps, which would have been parked along the stream banks.

"That eats up a lot of waterfront real estate," said Ruiz.

When a competitor proposed the same solution but underbid Xylem's original quote, Xylem engineers took a completely different approach, designing an alternate solution that replaced the standard Godwin Dri-Prime diesel pumps with Flygt submersible propeller pumps. Normally used in applications like artificial wild water and surf rides for amusement parks, the submersible pumps take up significantly less space.

"This is the first time these pumps have been used in a soil remediation project," Ruiz said.

To accommodate the soil remediation work, Xylem designed a temporary bypass system that used four Flygt PL 7040 24-inch electric axial flow pumps at each bypass site. Laurendi noted several advantages to using submersible pump technology over standard diesel dewatering pumps.

"The ability to have the pumps consistently powered electrically is helpful as a crew member did not have to shut down the pumps to fuel," he explained. "Also, with this being an environmental clean-up site, any time you can limit the amount of fuel consumption and opportunities for spills to previously remediated areas is a bonus."

Using the submersible pumps proved particularly beneficial at the Clark Street bypass site, which is located adjacent to a residential area.

"The submersible pumps are much quieter than a standard diesel pump," said Laurendi. "This allowed us to run the pumps 24/7 to keep our excavation area dry and not disturb our neighbors."

To better handle the Owasco Outlet's varied flow, Xylem enhanced the temporary bypass system with four remote Godwin variable frequency drives (VFDs).

Laurendi said the VFDs proved especially valuable during inclement weather. The Owasco Outlet drains Owasco Lake, one of the Finger Lakes, into the Seneca River. The Owasco Lake Outlet Dam, operated by the city of Auburn, is used to control the outflow of the lake and to prevent shoreline flooding. The bypass setup at both sites could handle a maximum flow rate of 100 cubic feet per second (CFS). During the summer months, the outlet typically runs at a minimum flow of 30 CFS. However, during large rain

events or steady periods of inclement weather, the city is forced to increase flow in order to maintain the lake level and prevent flooding.

"At times, the flow increased to over 700 CFS – more than our system could handle," said Laurendi. "That being said, our most difficult challenge was dealing with mother nature and consistently hoping for stretches of dry weather so we could run our system to its capabilities and ensure a dry excavation."

Ultimately, the VFD technology helped Severson work through the inclement weather periods to complete the soil remediation project safely and on time.

Along with VFDs, each bypass system was equipped with a custom, engineered controls solution to alert Severson crew members about potential pump issues via any smart device, giving remote visibility to pump activity in real time. Although Severson had at least two crew members on site at all times while the pumps were running, Laurendi said the remote monitoring capability still came in handy and saved an estimated \$90,000 in man hours.

"We were able to monitor the pumps from our phones and computers away from the site," Laurendi explained. "This allowed us to identify possible issues with different pumps before it was too late."

If a pump went down and the remaining pumps could not keep up with the flow, the Remote Monitoring and Control panel alerted Severson to the situation, enabling crew members to fix the issues and prevent an overtopping of the dam.

"Remote monitoring allows you to be proactive rather than reactive and when dealing with environmental clean-up sites that is always the preferred method of operation," said Laurendi.

Results

The system started bypassing in May 2017 through December 2017 and resumed operation again from June through October 2018.

The decision to use Flygt submersible propeller pumps reduced the number of overall pumps at each bypass site from 12 to four. Along with the ability to submerge the pumps in the stream rather than having them sit along the stream bank, the Flygt submersibles substantially reduced the overall footprint of the project, resulting in cost savings of \$40,000.

Xylem Rental Solutions engineered a successful temporary bypass setup that provided a reliable, cost-effective solution to divert stream water in order to effectively remediate contaminated soil while keeping local fish and wildlife habitats safe from negative environmental impact.



To contain the threat to wildlife during the soil remediation project, the stream bed was dried out in 1,000-foot increments, with the bypass system essentially creating two manmade dams – one upside of the stream and one downside.



Four variable frequency drives helped maintain operation and efficiency throughout the bypass project. A Godwin Advanced RMC panel (right) provided remote monitoring capabilities, alerting crew members to potential pump issues via any smart device.

Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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