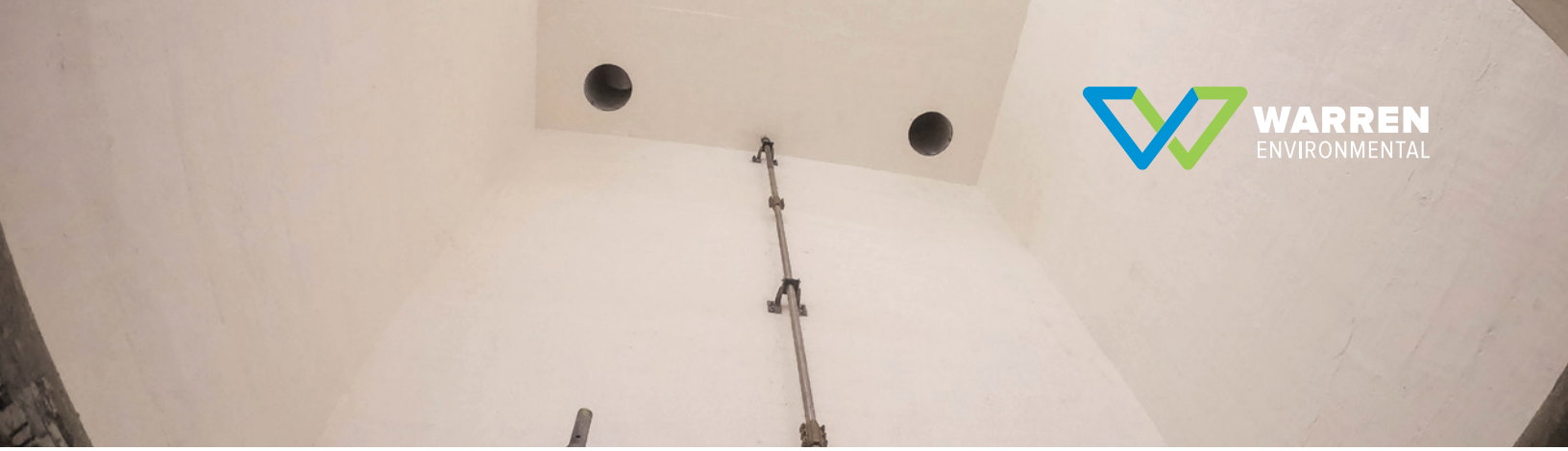


LAKE ARLINGTON LIFT STATION

The Lake Arlington Lift Station project in Fort Worth, TX is a successful case study demonstrating the importance of protecting new concrete assets with high quality epoxy coatings. Within the past few years, the City of Fort Worth, TX (the City) has grown at a steady rate. According to U.S. Census Bureau data, the City is expected to be home to over one million people by 2025, spurring the need for maintenance and updates within their wastewater system including one large wastewater treatment plant (WWTP) and another in the planning stage. The Lake Arlington lift station collects wastewater from a few large transmission lines and pumps the flow downstream towards the existing WWTP.

As part of their series of updates to their wastewater system, the City issued the Lake Arlington Lift Station project. The project consisted of a turn-key lift station including the construction of a trench style wet well with the installation of three submersible pumps with variable frequency drives (VFDs), valves, piping, odor control system, and epoxy application. The owner, a longtime supporter of protective coatings, wanted to ensure long-term corrosion protection and extended service life for their new structures including the concrete lift station and five 60-inch manholes, the deepest measuring 26-feet in depth.

With a wastewater system subjected to high hydrogen sulfide (H2S) gas levels and a low pH, the owner specified only 100% solids, high build epoxy as it had successfully protected their assets from corrosion in the past. Taking this preventative measure early in the project's design and construction would save the owner money in the long run.

Warren Environmental was one of the two epoxy products specified for the project. Taking the applicators' quotes and past experience into consideration, ACE Pipe Cleaning (ACE), a seasoned member of Warren's Approved Applicator Network, was selected for the coatings scope of work. Using Warren's epoxy, ACE would provide the owner with the best value.

CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

LOCATION:
FORT WORTH, TX

PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
SEPTEMBER 2021 - FEBRUARY 2022

AT A GLANCE:
CORROSION
NEW CONCRETE STRUCTURE
DEEP WET WELL
AGGRESSIVE ENVIRONMENT

SCOPE OF WORK

Warren Environmental's 301-14 epoxy is a solvent-free, high build epoxy series capable of extending an asset's service life in highly corrosive environments. The coatings scope included coating the new trench style wet well, 19-foot by 61.5-foot by 48-foot deep with 100% solids, high build epoxy specified at 125 mils.

The concrete wet well was formed in early September 2021. Multi-level scaffolding was installed to facilitate the applicator's coating process. A test patch was applied in the first week of October. The wet well's concrete roof was poured a few weeks later, with all concrete cured 28 days prior to beginning the coating activities in early December. All coating activities, including surface preparation, application, and testing, started on the roof and continued level by level to the bottom of the wet well. Once each 10-foot level was coated with epoxy, it was spark tested and adhesion tested.

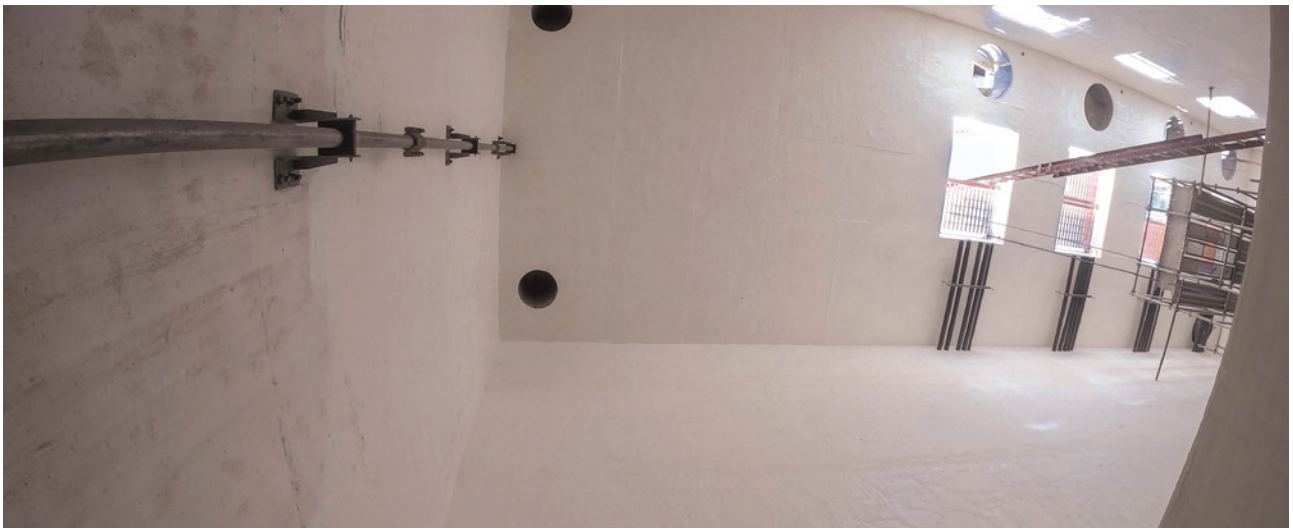
ACE first performed surface preparation. The structure's new concrete was abrasive blasted to achieve the desired surface profile for optimal adhesion. The specification required inspection activities by the manufacturer including the observation of surface preparation by Warren's representative, the owner, and the owner's representative. Additionally, the specification required these groups to observe the following: application techniques and equipment, coating thickness and uniformity testing, visual coating uniformity and texture observation, and coating pull-off adhesion testing. After surface preparation, ACE lined the structure with 125 mils of Warren's 301-14 high performance epoxy.

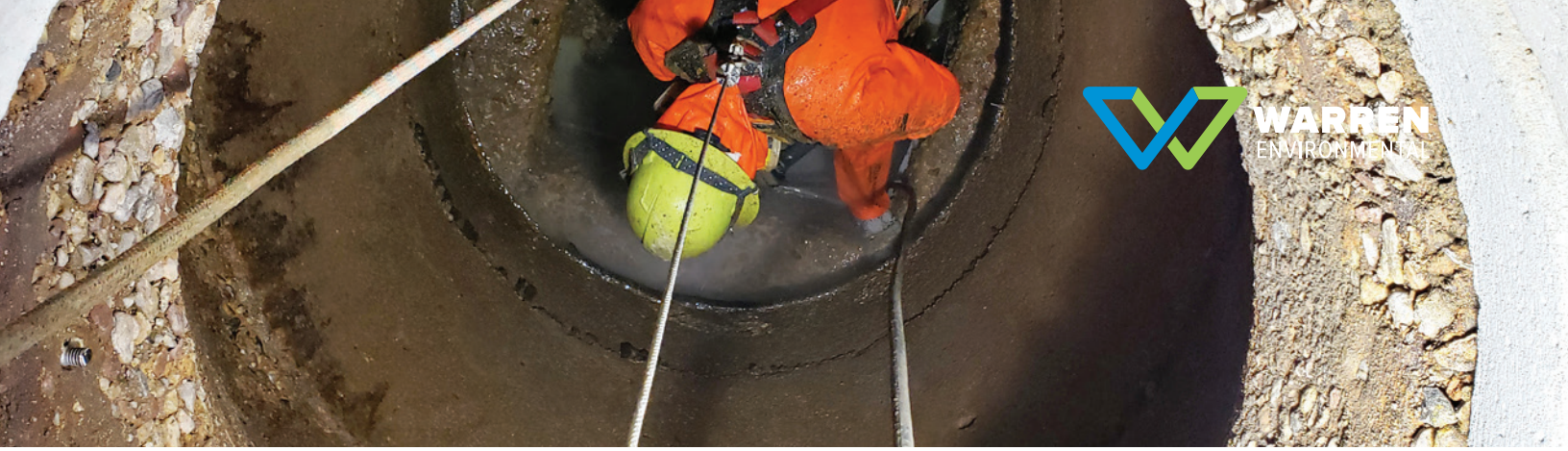
OVERCOMING PROJECT CHALLENGES

Rain events caused high humidity for a few days during the project. At the time, the humidity levels caused the spark testing to give false readings because of some moisture on the cured coating. ACE overcame this challenge by adding warm air blowers to solve the problem. ACE was conscious of the large temperature fluctuations with the changing of the seasons from September to December. Temperatures ranged from 80° F to 30° F through the course of the coating scope. The surface temperature stayed above 40° F in the underground wet well.

ACE and an AMPP/NACE certified coating inspector witnessed testing conducted on-site. The post-application testing required spark testing and 30 total adhesion (pull) tests per ASTM 7234-21 (Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers) across the interior surface of the wet well. In most projects, pull test values that exceed 300 pounds per square inch (psi) are typically required. The average pull test value was greater than 550 psi, highlighting Warren epoxy's superior adhesion.

As one of the top-performing systems on the market, the pull tests demonstrated Warren epoxy's capabilities. This project combined four essential components to deliver a successful coatings project: a well-written specification, Warren's epoxy solutions, ACE as a highly experienced applicator, and post-application inspection and testing. Completed in February 2022, the City of Fort Worth, TX can be assured of a well-applied coating to provide long-term protection for their lift station wet well.





GOOSE CREEK INTERCEPTOR REHABILITATION

WARREN'S 301-14 EPOXY COATING PROVIDES SCHEDULE FLEXIBILITY TO SAVE ON BYPASS PUMPING OPERATION COST

In August 2020, the city of Boulder, CO began the rehabilitation of the city's Goose Creek Sanitary Sewer Interceptor system due to aging infrastructure concerns. In addition to the CIPP and open cut pipe rehabilitation, the project scope included the installation of 16 new 60-inch manholes and rehabilitation of 14 existing 48-inch manholes. A&W Coatings was selected to coat all manhole structures with Warren Environmental's 301-14 high performance epoxy.

Prior to coating application, the crew stopped numerous leaks in the structures to be rehabbed by injecting Warren's 151-HG hydrophobic grout product—a benefit of the diverse product solutions that Warren offers.

For surface preparation, the new manholes were abrasive-blasted and then washed to meet a Concrete Surface Profile (CSP) 5 blast-profile, whereas the existing manholes were only water blasted due to their existing profile. A&W applied 125 mils to the new structures and 250 mils to the rehabbed structures via spray application. Additionally, A&W troweled Warren's 301-14 mastic epoxy into 21 manhole joints to seal several manholes and create a smooth transition between sections.

PROJECT CHALLENGES AND SOLUTIONS

The project's location and site layout presented challenges, including roadway work, greenway work within a bike path, and protected local animal habitat areas. Several of the manholes coated were located within a busy roadway, requiring traffic control efforts that were provided by the general contractor. A large section of the scope of work was located in a public greenway space, including a highly trafficked bike path with manholes running adjacent to it. A&W led the effort in managing pedestrian traffic on the bike path while safely performing work to maintain the project schedule. The A&W crew kept the bike path open throughout the project's entirety. In addition, the crew was able to ensure no negative impacts to the protected native prairie dog colonies in this area due to Warren epoxy's environmentally friendly nature—one of the many benefits of the Warren epoxy product line.

CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

LOCATION:
BOULDER, CO

PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
NOVEMBER 2020 - JANUARY 2021

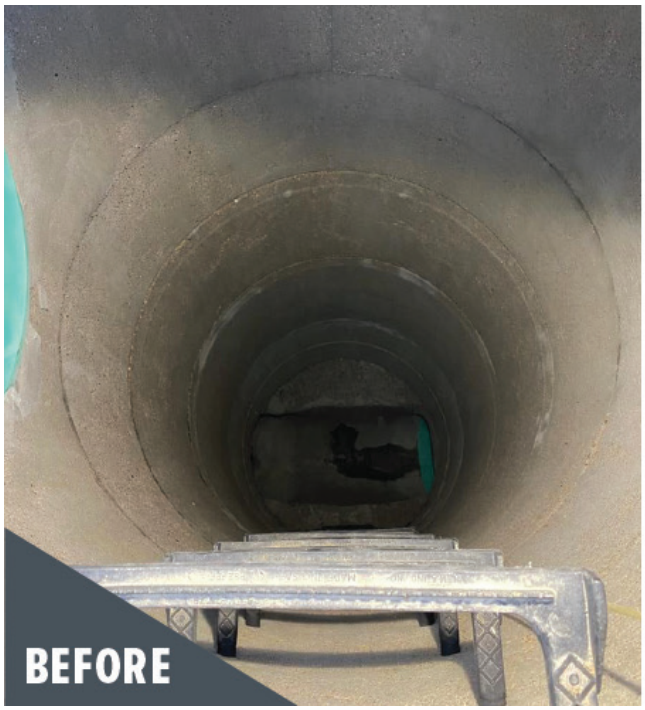
AT A GLANCE:
CIPP
CORROSION
INFLOW/INFILTRATION
JOINT REPAIR
ROADWAYS/GREENWAYS
RE-LINING

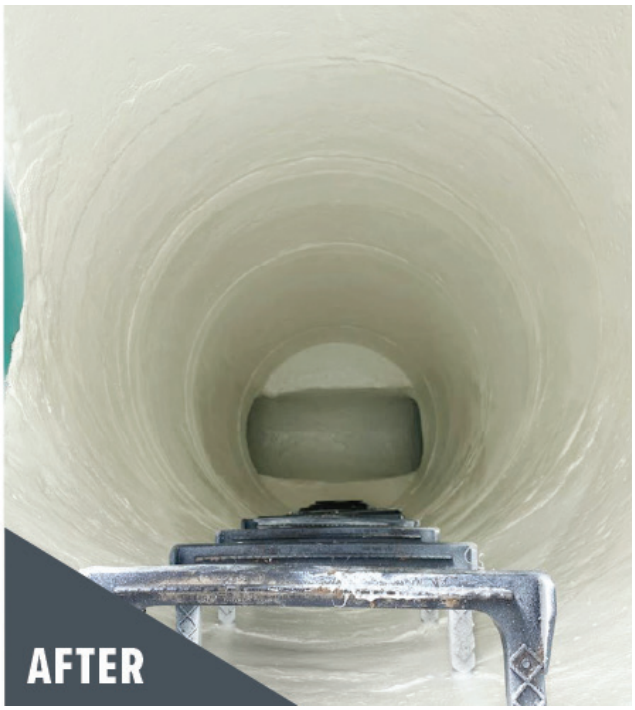
CLIENT CONTACT

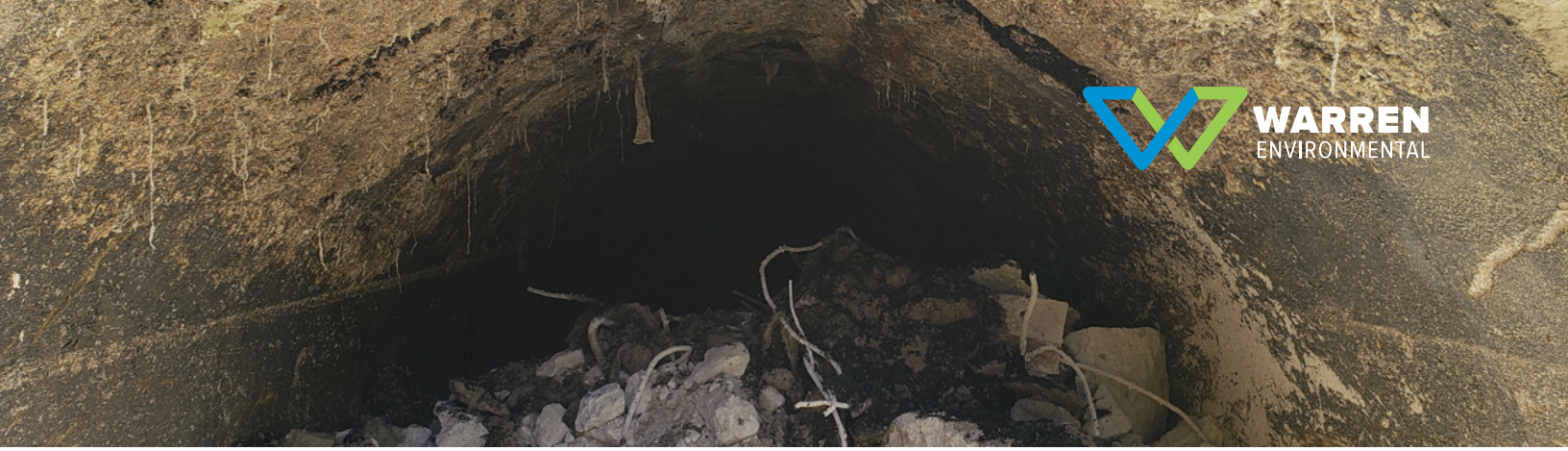
CITY OF BOULDER, CO PUBLIC WORKS
Cristopher Olson
p. 303.441.3293
olsonc@bouldercolorado.gov

Working around the extensive, six million gallons per day (MGD) bypass pumping operation presented a notable challenge. The 301-14 product's quick cure time and non-hazardous attributes provided the general contractor flexibility when coordinating A&W's scope of work with other construction activities. Our epoxy coating system allows for a rapid return to service, with an average cure time ranging between 4-6 hours. This enabled A&W to minimize the amount of bypass required, allowing the crew to line the remaining manholes while other construction activities were taking place.

A&W's expertise and efficiency in the application process, coupled with the unique attributes of our 301-14 epoxy, produced schedule savings for the contractor. The reduced schedule ultimately saved the general contractor three days in bypass pumping and in return a significant cost savings to the owner.







INTERCEPTOR RELOCATION AND EMERGENCY SIPHON CROWN REPAIR

In 2019, a major contract was issued to invest in a national event center's campus with new infrastructure and a substantial amount of utility work to update the facility for the future. The owner awarded the project to a general contractor and lead engineer team including multiple trade subcontractors to update the existing grounds with associated infrastructure and utility improvements with the construction of a new 2.2 million square feet campus.

SCOPE OF WORK

The utility improvements portion of the project included associated pipelines and new precast concrete manholes to support the relocation of an interceptor inlet structure. The third-tier subcontractor, a water/wastewater contractor, was selected to complete the sewer replacement based on qualifications. They selected a trusted coatings contractor with a proven product that had been historically listed in the owner's specification to perform the coatings scope of work—A&W Coatings (A&W), master applicator of Warren Environmental's 100% solids, high build epoxy system.

A&W's scope included lining five 72-inch manholes, three 120-inch manholes, and one 16-foot by 13.6-foot by 12.15-foot siphon structure, along with an emergency change order to repair the crown of a 66-inch siphon. A&W first performed surface preparation to achieve the required surface profile and followed by lining the assets with 125 mils of Warren's 301-14 epoxy. Coating the new manholes with Warren's epoxy would protect the wastewater structures from future corrosion and extend their service life. A&W's scope was successfully completed on time, key to maintaining the overall schedule.

COORDINATION AND LOGISTICAL CHALLENGES

The site presented its fair share of logistical challenges. Located in the city's highly trafficked industrial sector and cornered between a major highway and a river, site access was limited. All trades, site visitors, and material deliveries passed through two entry points each day.

The highly congested site was constantly evolving—with eight different trades and at least half a dozen contractors working simultaneously at any given time, coordinating scopes of work was essential to keep the parent project on schedule.

CLIENT TYPE:
MUNICIPAL

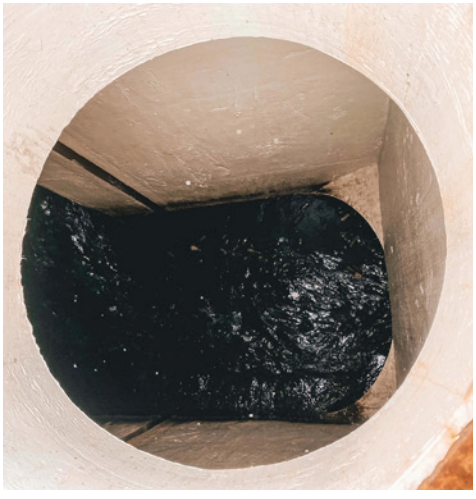
MARKET:
WASTEWATER

LOCATION:
CONFIDENTIAL

PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
MARCH 2021 - MAY 2021

AT A GLANCE:
CORROSION
EMERGENCY WORK
NEW MANHOLES
NIGHT WORK
SEVERE DETERIORATION
STRUCTURAL ENHANCEMENT



PROBLEM-SOLVING EMERGENCY WORK WITH TIMELY SOLUTIONS

While working on the manholes, A&W received a phone call from the owner soliciting their services to perform emergency work on the same site. Having delivered successful projects in their wastewater facilities in the past, the owner was confident in A&W's work with Warren's product, making them the first call when a problem arose. With just three days' notice, the owner issued an emergency change order for A&W to repair a severely deteriorated siphon pipe crown at risk of failure. Due to prior schedule obligations, the section of the 66-inch siphon pipe needed to be made available to A&W no later than the morning of April 23, 2021. To maintain the three-day critical schedule, A&W completed the repairs in two night shifts.

A&W provided the labor, materials, and equipment required to repair a 40-linear foot by 16-inch wide by five-inch-deep section of the concrete crown in the existing 66-inch siphon running under the river. The crew performed surface preparation on the pipe to remove the degraded concrete via water blast, including clearing the heavy solids found in the bottom of the pipe.

A&W repaired the pipe by applying approximately three inches of Warren's 301-14 epoxy mastic with aggregate to the 40-linear foot section of the crown. As Warren's thickest viscosity product, the 301-14 epoxy mastic provided structural enhancement to the pipe crown.

The pipe was top-coated with 250 mils of 301-14 epoxy from the spring line upward, or at approximately nine and three o'clock. By repairing the structure with variations of the same epoxy system, each application was compatible. This created a monolithic interior surface that made the structure stronger while preventing further corrosion or groundwater infiltration.

PROJECT SUCCESSES

The siphon crown emergency repairs were completed successfully due to A&W's high-quality application and the epoxy's performance. An added bonus of the epoxy was its moisture tolerance. This was critical to the project's timeliness because Warren's epoxy could be effectively applied to the surface where moisture and standing water in the bottom of the pipe were still present—a characteristic that is not true with all coatings solutions.

Timely coordination with the owner, engineer, and subcontractors on-site, plus the ease of application of Warren's epoxy system allowed A&W to successfully complete the original scope of work and the unplanned emergency siphon crown repair. Key relationships and the crew's preparedness to problem solve ensured a successful project turnout. As a result, the owner's new and rehabilitated sewer assets will be protected from corrosives for years to come.