BRICK ARCH SEWER REHABILITATION

The city of Effingham, Illinois had a severely deteriorated large-diameter arch brick sewer over 100 years old. The shape and size of the brick arch changed approximately 25 times throughout the 2,100-foot alignment.

Initial inspection revealed the portions underneath two residential structures and one commercial structure needed structural reinforcement due to missing bricks and the condition of those remaining. Also, the sewer was a source of infiltration and contributed to combined sewer overflows for the city.

Due to the fluctuating dimensions and cross-sections of the sewer, specific rehabilitation methods were not feasible. Replacement or relocation was too costly. The team selected Warren Environmental's epoxy coating system as the preferred option. The system's ability to improve the structural integrity of the brick arch, encapsulate the interior to eliminate infiltration, and provide a barrier against further corrosion, made it the perfect solution for the city.

In the course of inspecting the sewer, the team determined that a large portion of the tunnel floor was missing and had to be rebuilt. Warren's approved applicator created the new floor by laying a foundation of stone and rebar embedded with Warren's epoxy.

CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

LOCATION:
EFFINGHAM, IL

PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
MAY 2011 - OCTOBER 2011

AT A GLANCE:
CORROSION
INFLOW/INFILTRATION
RESIDENTIAL & COMMERCIAL AREAS
SEWER OVERFLOW
STRUCTURAL ENHANCEMENT
FLOOR REBUILD
VARYING SEWER DIMENSIONS

CLIENT CONTACT

CITY OF EFFINGHAM, IL
Michelle Wilkins, City Engineer
(207) 342-5303

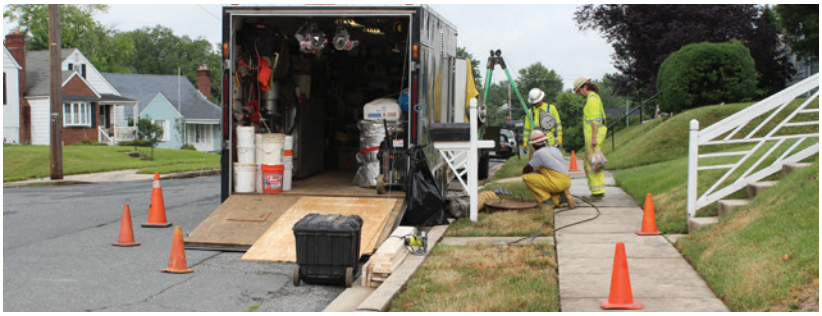
GUNPOWDER OUTFALL SEWER TRANSITIONS STRUCTURE AND MANHOLE REHABILITATION

Our master applicator, A&W Coatings, used Warren Environmental's epoxy coating system to line sewer structures and manholes, including lining 15 feet up and downstream of the invert of the outfall structure. The concrete and brick surfaces were extremely deteriorated, especially within the manhole chamber where rebar and wire mesh were exposed. Large sections of the brick wall were replaced with new bricks and then lined with our epoxy. The outfall structure required 500 mils of Warren's epoxy, which was applied in a single coat.

The project involved a variety of challenges that A&W Coatings had to overcome, including minimizing the disruption to the surrounding residential neighborhood. The team accomplished this by implementing overnight shifts when necessary. Another challenge involved the acceptable downtime of the system. The flow could only be stopped for 40 minutes at a time, which required unique methods to prep, coat, and inspect the application within those intervals.

The project was completed in 2015 and both the outfall structure and manholes were re-inspected in 2018 by a NACE II inspector. Results showed that the structures were in great condition and had no defects.

ORIGINAL CONDITIONS



CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

LOCATION:
BALTIMORE, MD

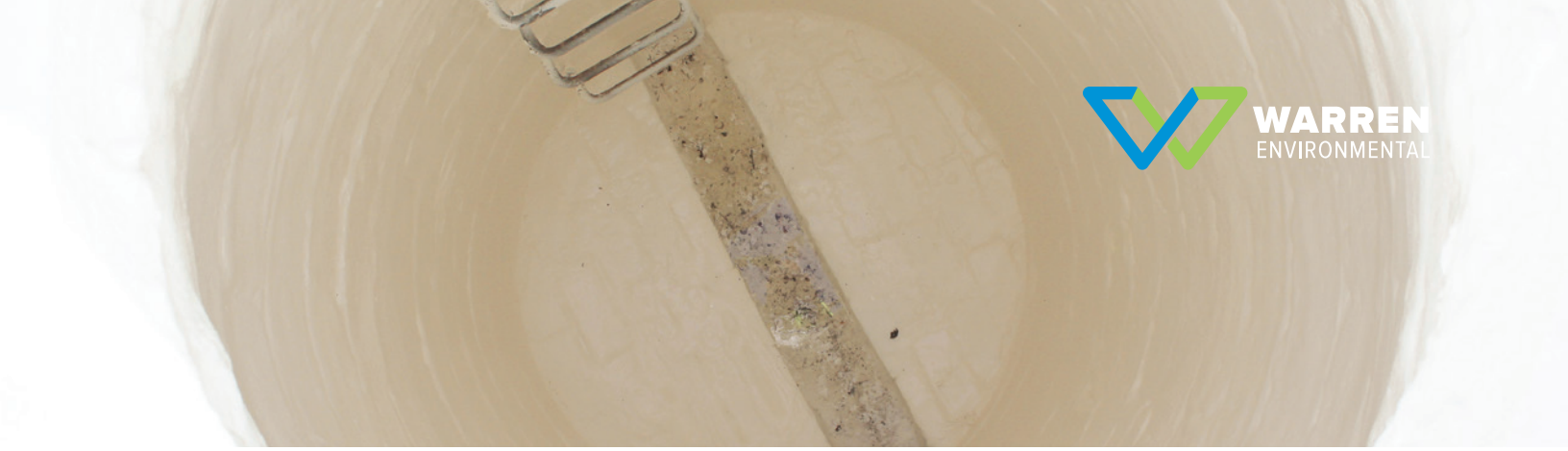
PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
JUNE 2016 - JULY 2016

AT A GLANCE:
AGGRESSIVE SCHEDULE
CONCRETE & BRICK MANHOLES
CORROSION
INVERT LINING
RESIDENTIAL NEIGHBORHOOD
SURFACE REPLACEMENT

ENGINEER CONTACT

RK&K
Keith Eysaman, Sr. Manager/
Municipal Engineer
p. 757.306.6878



MANHOLE RESTORATION PROGRAM

18-YEAR INSPECTION REVEALS PROVEN RESULTS FOR MANHOLE REHAB WITH WARREN'S EPOXY COATINGS

Based on tests done in the early 1990s, the Water and Sewer Division selected Warren Environmental's epoxy coating to rehabilitate failing portions of the sewer system. Out of six methods tested, the Warren system was one of two that met performance criteria established by the County. In addition, when Warren's sample manhole was tested seven years later, it was found to be in excellent condition with no loss of integrity and no leaks.

Throughout the program, Warren's epoxy products were used in the County's most aggressive environments – high levels of hydrogen sulfide and low pH were typical where the epoxy was to be installed. Over a ten-year span, Warren's epoxy system rehabilitated more than 900 manholes, preventing billions of gallons of groundwater from entering the County's sewer system.

A handful of the first manholes coated were inspected 18 years later, in September of 2019. The results were tremendous. Warren's epoxy coating was found to be in excellent condition. The pull tests provided results of 910 psi with the test glue (between the dollie and the epoxy) failing instead of the coating. This implies that the epoxy and the substrate were bonded higher than the force that caused the glue failure.

"A&W has worked in DeKalb County for the past 15 years, installing Warren epoxy liners in manholes and pump stations. DeKalb County is very pleased with the quality of the Warren system, and the expert installations over the years. The Warren epoxy lining system has prevented billions of gallons of groundwater from entering our sewer system, saving the County a great amount of money over the years."

ROY O. BARNES
FORMER DEPUTY DIRECTOR - DEKALB COUNTY, GA

CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

LOCATION:
DEKALB COUNTY, GA

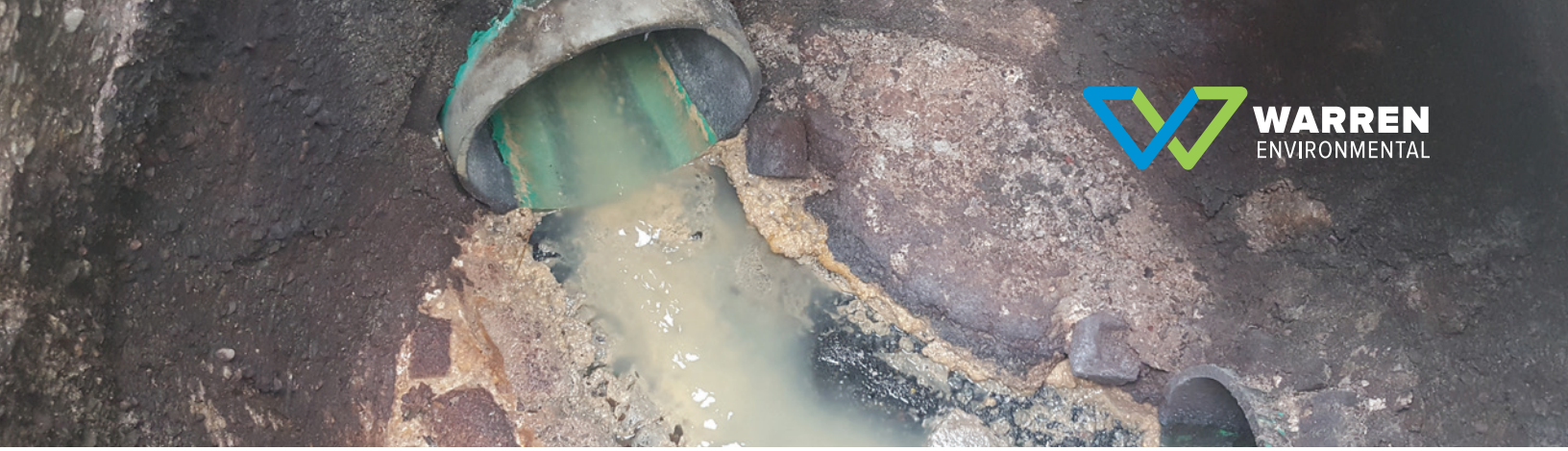
PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
1996 - 2009

AT A GLANCE:
BRICK & CONCRETE MANHOLES
INFLOW/INFILTRATION
INVERT CHANNEL LINING
BARRIER COATING

CLIENT CONTACT

DEKALB COUNTY, GA
Ben Thornton
(770) 621-7212



TOLL GATE SEWER REPAIR

ONE-YEAR INSPECTION REVEALS EXCELLENT RESULTS IN MANHOLE REHABILITATION PROJECT

In Warwick, Rhode Island, the public school district identified a need to rehabilitate 13 concrete and brick sewer structures. The manholes needed to be repaired while continuing to stay in operation.

Warren Environmental's 100% solids epoxy coating system was specified, and our approved applicator, A&W Coatings, was awarded the job. The manholes remained in operation while the project was completed. A&W internally bypassed the system utilizing flow-through plugs and was able to work in live-flow conditions. After the team prepared the surface (high-pressure water blasting, muriatic acid wash and rinse, and bleach wash and rinse), they coated the structures with a minimum of 250 mils of epoxy, with some requiring as much as 375 mils based on the deterioration. Our approved applicators coated all interior surfaces, including the bench and the invert.

The project was completed in April of 2019 and was inspected a year later. The inspection team pressure washed the structures and then performed pull tests. All of the manholes were in great condition with pull test results ranging from 730 to 1,422 psi.

CLIENT TYPE:
MUNICIPAL

MARKET:
WASTEWATER

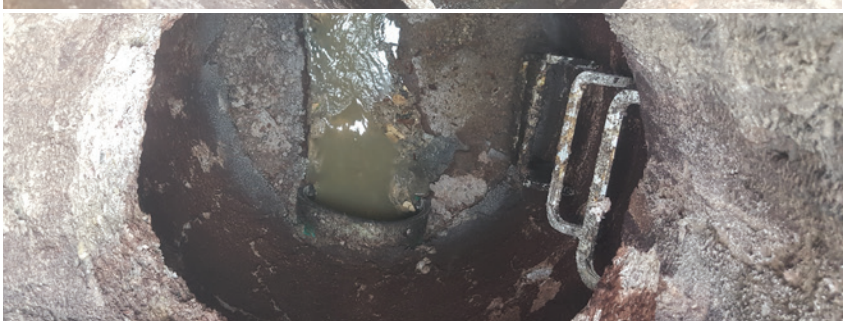
LOCATION:
WARWICK, RI

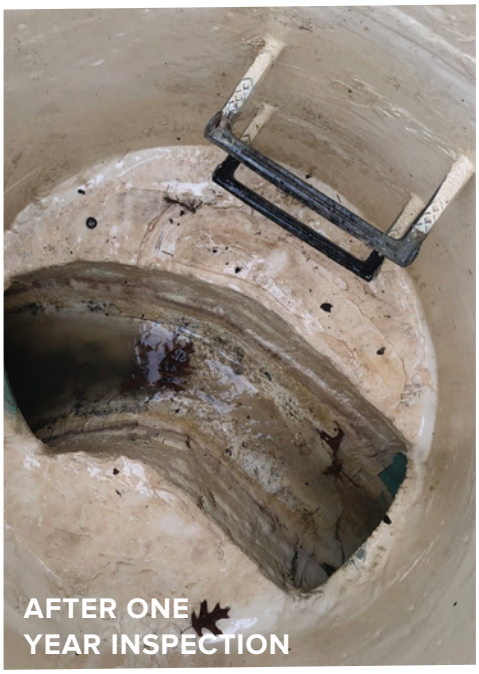
PRODUCTS USED:
ENTER PRODUCTS HERE

PRODUCTS USED:
301-14 HIGH PERFORMANCE EPOXY

START DATE - COMPLETION DATE:
APRIL 2019 - APRIL 2019


ORIGINAL CONDITIONS




AFTER ONE YEAR INSPECTION