

PROJECT OVERVIEW

DC Water's engineering group implemented a pipe entry inspection after receiving an alert from the District Department of Transportation (DDOT) to verify the integrity of a 72" diameter brick sewer. This was located at the F Street NW block between 11th and 12th streets. DDOT had done a bore-hole inspection at a street depression, which revealed a 20-inch deep void under the pavement.

Prior to entering the sewer, DC Water evaluated its records and noted the Metro subway tunnel runs below the length of 12th Street and the 72" brick sewer runs above the tunnel. In addition, in the 1970s, a 188-foot section of the 72" brick sewer was offset and replaced with 205 feet of 72" reinforced concrete pipe (RCP). The entry inspection showed the replaced 72" RCP was in great shape, but the original brick sewer was not. Starting at the interface with the RCP, the brick crown was cracked and propagating east toward 11th Street and west toward 13th Street. It was considered that the cracking likely developed after the construction of the Metro Subway system.

The most severe damage was located between 11th and 12th Streets, where the crown was cracked and missing bricks. Fortunately, there was no significant oval deformation, and there were not many open mortar joints, which would be typical of an impending pre-sink-hole collapse scenario.

SOLUTION

DC Water evaluated several repair options, including CIPP and tunnel plate. The CIPP option was eliminated because of the need to remove manholes in a busy intersection and issues with reinstating flow daily. The tunnel plate was eliminated due to cost considerations. In the end, the city specified two spray-applied applications and awarded the project to Inland Pipe Rehab (IPR) to line with GeoSpray geopolymer mortar.

The rehabilitation required a 50-foot full structural repair section that was missing bricks and showing signs of advanced crown deterioration and a 125-foot long partially deteriorated section that needed to stop inflow and infiltration and provide some structural support to the bricks and missing mortar. After further inspection, DC Water requested a change order for a full structural repair of the entire 175-foot.

PROJECT DETAILS

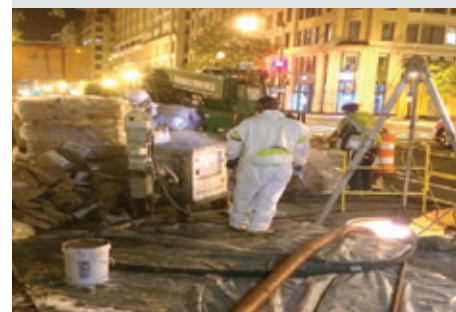
Application: 72" Brick Sewer

Client: DC Water

Location: Washington, D.C.

Installation: July 2016

Contractor: Inland Pipe Rehab, LLC



All work on the sewer was completed at night to minimize traffic disturbances.



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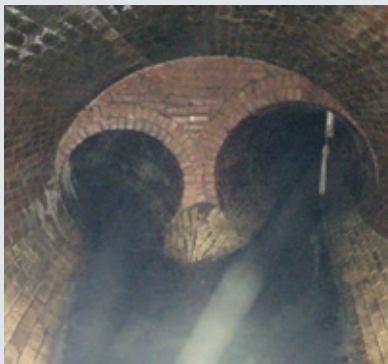


CASE STUDY:

72" Brick Sewer Washington, D.C.

RESULTS

Because the F Street thoroughfare is a heavily trafficked business and tourist district, all work was completed at night to minimize traffic disturbances and bypass was released during the day. The fully deteriorated design developed by the district required a 2.5" minimum thickness of the geopolymer mortar with 4"x4" welded wire reinforcement (type W2xW2) as an added safety factor to stabilize the crack at the crown. Specifications for the other sprayon technology also included rebar that was not required with GeoSpray. The cover over the reinforcement was 1.5." The work was completed over a two week period with no interruption of service during the day in the downtown business district. An inspection by DC water was conducted nearly eight months later and no issues were observed. DC Water is currently pursuing other opportunities to install geopolymer linings within its system.



Initial brick sewer condition.



Close up of damaged brick crown.



Minimal construction footprint.



Grouted repair of cracked crown.



Welded wire mesh placed across crown of pipe after initial GeoSpray application.



Completed project.



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