

PROJECT OVERVIEW

As part of the 13 Mile Road rehabilitation from Haggerty Road to Halsted Road, twin parallel 78" CMP culverts were to be relined with geopolymer mortar. Each of the twin culverts are approximately 200 linear feet. The culverts are used carry the flow of Seeley Drain under 13 Mile Road immediately east of Haggerty Road.

The project involved the use of state funds in a cost sharing situation with the city of Farmington Hills. To use state funds, the design requirements had to follow Michigan Department of Transportation (MDOT) standards and be bid through the MDOT letting process.

SOLUTION

The design consultant, HRC, evaluated and selected a geopolymer lining solution after evaluating other rehabilitation options. The CMP culverts were experiencing moderate to severe deterioration with a 95% loss of steel in some sections. A benefit of the site was the twin culverts allowed for diversion pumping of the active flowing Seeley Drain so that one pipe could be repaired while the other was used for complete flow diversion. GeoSpray geopolymer mortar was the selected material for repair. The geopolymer mortar was hand-sprayed by Inland Pipe Rehabilitation in Detroit working as a subcontractor to Dan's Excavating. An advantage of the GeoSpray system is the flexibility in application, which allows the contractor to optimize the process to meet client expectations. Centrifugally casting, hand spraying, troweling and pouring are all options. In this project, hand spraying was chosen by the contractor to improve efficiency of the daily work based on site conditions and access.

RESULTS

The twin culverts were successfully relined and replaced into full service within ten working days. The engineering design called for a minimum of 1.5 inches of GeoSpray to be used as the lining based on the physical properties of the geopolymer and the site load conditions. Personnel from the MDOT Bridge Office inspected the lining process and the final culvert repair.

PROJECT DETAILS

Application: Culvert Rehabilitation

Client: City of Farmington Hills/
Michigan DOT

Location: Farmington Hills, MI

Installation: July 2016

Installer: IPR

General Contractor: Dan's
Excavating



Twin culverts in use after GeoSpray mortar rehabilitation.



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Geopolymer Mortar



CASE STUDY: Farmington Hills, MI Culvert Rehabilitation



Deteriorating existing culverts.



Debris and deterioration within culvert.



Installation of diversion pumping system.



Hand spraying placement of geopolymer lining.



Inspection of lining by MDOT bridge personnel.



Completed geopolymer lining.



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