CASE STUDY

VORTEX

FEATURING

GeoKrete® BY VORTEX

GEOPOLYMER RELINING AND STRUCTURAL RESTORATION OF AGING SEWER INTERCEPTORS IN QUEENS, NY

Affected by Hurricane Sandy, Approximately 6,600 LF of Large Diameter Box Culvert and Pipe Were Fully Rehabilitated and Structurally Restored by the Quadex Lining System® Using GeoKrete® Geopolymer

PROJECT SNAPSHOT

Project
- Queens, NY Sewer Interceptor Rehabilitation Project

Owner
- NYC Department of Design and Construction (DDC)

Location
- Queens, NYC

Situation
- +/- 6,600 LF of a sewer interceptor built in 1880s in need of structural rehabilitation

Dimensions
- Pipe and box culvert 54″-96″, manholes 48″-60″

Project Challenges
- Severe I&I
- Odd shaped structures
- Severe corrosion
- Highly congested area in NYC neighborhood

Solution
- The Quadex Lining System® featuring GeoKrete® geopolymer

Contractor
- General Contractor: Northeast Remsco
- Utility Divison Manager: Robert Ross
- Resident Engineer: Divirka & Batilucci
- Engineers: Joseph Fioraliso

Sub-Contractor
- Quadex Lining Systems®

Job Completed
- Spring 2017

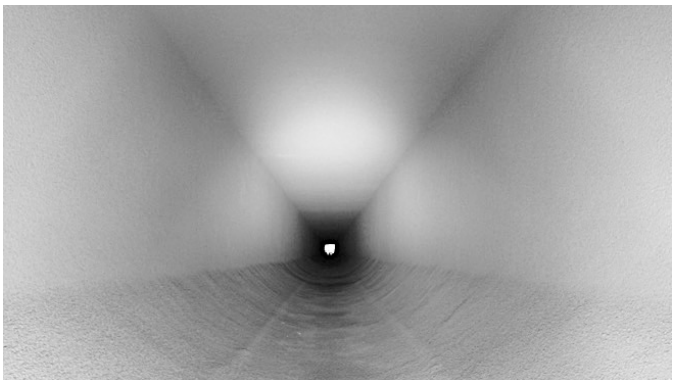
CERTIFIED REDUCED CARBON FOOTPRINT

Compared to Baseline for Trenchless Repair Systems for Structural Rehabilitation of Civil Infrastructure

SITUATION

Hurricane Sandy wreaked havoc up and down the east coast. In addition to the visible surface damage, what was unseen, such as the water and sewer infrastructure were also greatly impacted, especially the aging systems. New York City has nearly 136 miles of intercepter sewers, much of it built in the late 1800s. In many sections, Hurricane Sandy was the last straw as nearly 21,000 LF was identified as needing

Box Culvert prepped for lining.



Box Culvert after GeoKrete Geopolymer lining.

SITUATION (CONTINUED)

structural restoration. Given the location and depth of the sewer lines (in the city, buried 20 feet deep), replacement was out of the question and trenchless rehabilitation methods were called for.

Additional inspections and observations reveal a multitude of other problems and challenges:

- **Severe I&I throughout the system, water was literally pouring in from the sides in many areas**
- **When there are homes and businesses on a busy city street, you also have hundreds of laterals to contend with**
- **Manholes located in odd locations such as the middle of a driveway**
- **Wintery, windy, icy and lake-effect conditions**

SOLUTION

Obviously, with a project of this magnitude the best and most cost effective solutions must be considered. Extensive inspections consisting of visual, sonar sounding and CCTV were undertaken to assess the system's overall structural integrity. Of the 21,000 LF, 11,000 were less than 48″ in diameter and best suited for a fully structural CIPP solution.

Approximately 6,600 LF consisted of RCP pipe, rounded bottom box culvert and manholes ranged from 54″ to 96″ in diameter. The variance in sizes and shapes called for using a much more versatile lining technology. After much research, a spray-applied technology possessing both corrosion resistant and structural properties was selected.

GeoKrete selected for its combination of structural and corrosion resistant properties

While many spray-applied systems were considered, traditional shotcrete (for strength) and polymer and polyurethane based products (for corrosion resistance), the Quadex Lining System featuring GeoKrete Geopolymer was ultimately selected. Geokrete's ability to deliver both the structural properties and corrosion protection without significantly reducing the interceptor sewer ID was important from both a flow capacity and cost perspective.

Small construction footprint minimizes surface disruption and keeps busy streets open

The location of the sewer rehabilitation was in a heavily congested residential section that also included local businesses, and schools. Complicating the project was the location of the sewer interceptor, which ran parallel with, and directly beneath, the street. The small construction footprint of QLS required minimal space, and with the exception of a small section of a center lane closure, the street, sidewalks, driveways and intersections remained open.

QLS/GeoKrete application does not require complete shut down of sewer system

Bypass operations for a project of this magnitude are extremely expensive. However, the nature of applying GeoKrete allows you to start, stop and then start again with no negative impact. Therefore, flow would be restored at night, reducing the cost and reliance of a bypass system during those light usage hours.

RESULTS

When all said and done, +/- 6,600 LF of pipe, box culvert and 28 manholes were structurally restored and protected from corrosion using GeoKrete and the QLS method. Total time on the project lasted approximately 6 months. At times, the infiltration was so bad, bypass operations could not keep up. That did not slow down the process, since GeoKrete can be applied while there is still flow in the line. Cold weather, wind and ice storms also added to the crew's challenges, but they persevered in order to stay on budget and in sync with the agreed project schedule.

Had this been performed with dig and replace methods, it would have taken two to three years and cost millions of dollars more.

An aging sewer infrastructure combined with severe corrosion and the negative impact from Hurricane Sandy led to a major rehabilitation and structural restoration effort.