

CASE STUDY

Phoenix Area Stormwater Tank Restoration

TRENCHLESS TANK REHABILITATION OFFERS COST-EFFECTIVE, NON-DISRUPTIVE SOLUTION TO COMMON REGIONAL CHALLENGE.

VORTEX PRODUCTS USED

- 1 I & I Guard®-MSF
- 2 GeoKrete®

- 3 Quad-Plug®
- 4 Hyperform®



PROJECT SNAPSHOT

PROJECT
Chandler, AZ Stormwater Tank

PROBLEM
96-inch stormwater corrugated metal pipe (CMP) was deteriorating due to corrosion in the invert of the tank. This corrosion allowed movement that led to failures both at the invert and at joints, permitting soil infiltration into the pipe. Consequently, soil ingress caused voids to form above and below the pipe, posing a threat of asphalt collapse and potential catastrophic failure.

GENERAL CONTRACTOR
Integrated Facility & Construction Management, Inc. (IFC)

SUBCONTRACTOR
Vortex Lining Systems (VLS)

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THE CHALLENGE

In the Phoenix area, many developed areas use underground tanks to collect rainwater during monsoon season. While they are intended to last 25-30 years, the soil and alkalinity often halves their service life. Many property owners are unaware of the severely deteriorating assets beneath their feet.

A commercial business used a buried 96" tank made of corrugated metal pipe for stormwater management, but water pooling in the corrugations had rusted the bottom and exfiltrated, leaving voids in the sandy soil beneath. As the tank shifted downward, it created dips in the parking lot above. In extreme cases, similar damage can lead to surface collapse.

Prior to hiring Vortex, two tanks were replaced utilizing the traditional dig-and-replace method. This strategy proved to be prohibitively expensive, time consuming, and disruptive. Parking spaces, awnings, solar panels, and other infrastructure on top of the collection tank further complicated the repair site.



Closeup of the decayed CMP



Pipe deterioration on the invert



CASE STUDY



THE SOLUTION

The general contractor, IFC, selected Vortex to provide a trenchless and cost-effective solution to restore the pipes. First, the Vortex team conducted visual inspections to identify where the tanks were failing. They then used ground penetrating radar (GPR) to measure and pinpoint voids in the soil, so they could quantify how much grout was needed and where to apply it.

The team injected Quadex I & I Guard®-MSF foam around the pipe, encapsulating the tank, filling voids, stabilizing the soil, and forming a solid watertight barrier. With the ground stabilized, they cleaned the inside of the pipe, repaired a deflected joint, and reshaped the pipe to its original form. Carbon fiber lined any deviations, and they applied 1.5" of GeoKrete® geopolymer, eliminating the corrugations and creating a new, structurally-sound pipe/tank. Vortex managed the entire process, and the only surface disruption was a 3/8" access hole in the parking lot, sealed at project completion.



The rehabilitation eliminated the corrugations and created a new, structurally-sound tank

THE RESULTS

Although the tank had deteriorated further between the initial proposal and the project's start, the work was still finished on budget. Rehabilitation of these tanks utilizing GeoKrete versus traditional dig and replace resulted in cost savings of approximately 25% per tank on the construction cost alone. This 25% does not include the front-end work required for replacement such as additional permitting, engineering, compaction and storage.

Not only was this a significant cost savings for the owner, but the project time was much shorter. Replacement of the initial two tanks took approximately six months per tank, or one year to complete both. Rehabilitation with GeoKrete required approximately two weeks per tank, and the owner and general contractor were so pleased with the results they relied on Vortex to use the same rehab method on similar tanks at their other business locations. Vortex's team completed nine tanks total in approximately 18 weeks.

The trenchless method allowed complete rehabilitation of the tank without disruption to the normal flow of traffic. All work was done at night, with only a limited construction footprint in the parking lot remaining during business hours. The restored tank can remain in service for a minimum of 50 years.

IMPACT

1

The tank was restored to full functionality, with a design life of 50+ years.

2

Because the work was completely trenchless, the adjacent business and campus was able to continue normal business operations throughout the project.

3

The client was pleased with the results and hired Vortex to complete additional repair projects on its other properties.