Trenchless TECHNOLOGY
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What Happens Under Vegas ...

City, Nor Southwest, No Stranger to Sewer System Rehabilitation

Growth brings with it many responsibilities, as well as opportunities. No one is more aware of this than the City of Las Vegas, which celebrated its 100th birthday in May 2005.

An example of a manhole rehabbed using Sauereisen's epoxy liner.

The casino industry was established in Las Vegas in the early 1900s, but it experienced its first period of great growth in the 1950s, which is when much of the City's existing wastewater infrastructure was built. As is traditionally the case, an influx of small businesses and companies followed to capitalize on and support that industry and the multitudes that came for jobs and entertainment. But nothing can compare to the region's growth in the last 10 to 15 years.

Population Explosion

The 2000 census showed that nearly 2 million people live in Nevada — a 66.3 percent increase since 1990. Most new residents to Nevada settle in Clark County, in which Las Vegas is located. By 2010, it is projected that Clark County will have a population of 1.8 million — nearly as many people who lived in the entire state just 10 short years prior.

Currently, the population of the City of Las Vegas proper is just more than 500,000 people, but more than 5,000 people move into the Las Vegas valley on a monthly basis. And that doesn't include the more than 37 million people who visit the city on an annual basis (based on 2004 numbers)

Market Ripe for Rehabilitation

As a result of the need for increased capacity due to the population explosion and the age of the systems themselves, the entire Southwest wastewater infrastructure as a whole is beginning to explode — as a market that is — in terms of rehabilitation, as well new construction.

"The pace is definitely picking up in this region, especially rehabilitation of wastewater collection systems," said Greg Gould, senior engineer with Brown and Caldwell Environmental Engineers and Consultants. "Portions of the Las Vegas system were installed around 1950, including numerous unlined concrete piping and manhole systems. So a lot of the infrastructure is at a point where it requires assessment to ensure its integrity and continued functionality."

As a result, inspectors are discovering areas throughout the region that require rehabilitation. The sewer infrastructure is already taxed with increased need for capacity and cannot afford community impacts or expense of sewer blockages, sewer overflows or structural collapses.

The Project

One such area within the Las Vegas wastewater infrastructure existed under Bonanza, Pecos and Stewart streets. This $3.57 million project involved numerous sewer improvements, all involving trenchless technologies to reduce downtime. As part of the project, it was determined there were five manholes and two junction structures where rehabilitation could repair the damage done by microbiological-induced corrosion and the general age of the structures, thus avoiding the high cost and increased downtime of new construction.

These areas were located under major roadways and intersections. As such, the work not only needed to be performed quickly so that normal public access could be resumed as soon as possible, but also that public access to these areas remained optimized during the project.

What was needed was a solution that would restore these facilities' structural and functional integrity, have an ease of application to reduce downtime and be an economical solution as well. Considering the size of the overall investment required to address the wastewater infrastructure challenges across the county, this last requirement carried with it considerable weight.

Previous Product Performance

In 1997, the City of Henderson, Nevada, also in Clark County, required some rehabilitation of its wastewater infrastructure. Municipal officials, under a pilot program, decided to rehabilitate selected manholes and a new lift station with an alternative coating system. They decided to use a product systems developed by Sauereisen.

When Brown and Caldwell got the call from the City of Las Vegas for its wastewater rehabilitation needs, Gould, having already recommended Sauereisen products in wastewater work in neighboring Arizona, accompanied city officials and members of Clark County Water Reclamation District to tour and inspect the work done in Henderson eight years prior. They could see for themselves that Sauereisen would be a viable rehabilitation solution that worked.

"They were impressed with the condition of the structures," said Gould. "As a result of the perform-

ance of the Sauereisen solution in Henderson, and because it offered a quality solution in accordance with the economical requirements of the city, it was the product of choice."

The Solution

Rehabilitation of the Bonanza, Pecos and Stewart manholes and junction stations involved applying a system developed by Sauereisen for just such chemically attacked surfaces that involves two of its products: Underlayment No. F-120 and SewerGard Epoxy Lining No. 210T.

Las Vegas manholes exhibited deteriorated mortar joints and corrosion of concrete.

Sauereisen Underlayment No.F-120 is a fast-setting, high early-strength, Portland-based resurfacing material. It was used to restore chemically attacked surfaces of the junction stations and manholes and to provide a uniform surface for application of the epoxy topcoat. While it's available in three formulations — Trowelable, Castable and Gunnite — the trowelable application was preferred in this instance.

"There is definitely a trend toward increased use of hand-troweling," said Gould, "particularly in these types of projects. In this project, we needed to have greater control over the thickness of the application, as well as the attention to detail in preparation and application to both the junction structures, as well as the manholes."

In addition to its fast setting time — key where time is of the essence and/or where other steps, like a topcoat, are called for — another distinct advantage to using F-120 was its ease of application on vertical surfaces and overhead surfaces.

The second component to the Sauereisen solution in this project was the application of SewerGard No. 210, an aggregate filled epoxy. This lining system is specifically designed to protect concrete surfaces of municipal wastewater treatment structures and collection systems from chemical attack and abuse.

"Cleaning and resurfacing only take care of part of the problem," said Karl Sauereisen, vice president of Sauereisen Inc. "Without a proven method of corrosion-resistance, we would be right back out here doing the same thing in a few years due to the chemically-active nature of these environments. SewerGard ensures greater protection and longer life of the system as a whole."

When cured, SewerGard provides an impermeable, high-strength, corrosion-resistant lining to a variety of structures (manholes, lift stations, grit chambers, aeration basins) that are subject to infiltration and attack from hydrogen sulfide and acid generated by microbiological sources.

In addition to its corrosion-resistant properties, SewerGard's nonsagging application properties, like the Underlayment F-120, permit economical repair and protection of vertical, horizontal and overhead surfaces of both new or, as in this instance, rehabilitated substrates.

A Successful Result

From the start, the project required a solution that would restore the integrity of the structures involved, provide a high-quality protection to ensure longevity, have an ease of application to ensure limited downtime of the intersections and roadways and do it all in an economically feasible manner.

The Las Vegas project exhibited corrosion within the vapor zone,similar to this lift station in Louisiana.

While the entire sewer pipeline project required approximately six months to perform, the components involving application of the Sauereisen system needed only one month from start to finish. In terms of cost, even with hand-troweling involved, which often can be more expensive depending on the circumstances, this project came in at approximately one-third of what other methods, including cured-in-place systems, would have cost.

And if the Henderson and Arizona projects are any indication, the solution applied at the Bonanza, Pecos and Stewart facilities was no gamble, but rather a sure thing.

David Snider is western regional manager with Sauereisen, which is headquartered in Pittsburgh.

Project & Principals

Project:	Las Vegas Sewer Pipeline Rehab (Bonanza, Pecos and Stewart streets)
Owner:	City of Las Vegas (*www.lasvegasnevada.gov*)
Engineer:	Brown and Caldwell (*www.brwncald.com*)
General Contractor:	Las Vegas Paving (*www.lasvegaspaving.com*)
Installing Contractor:	Bryan Painting & Sandblasting
Materials Supplier:	Sauereisen Inc. (*www.sauereisen.com*)

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