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Sharkey Drain Inspection & Cleaning Under I-696

By Anthony V. Marrocco, Macomb County Public Works Commissioner



Keeping Macomb County drains clean has been the mantra for Macomb County Public Works Commissioner Anthony V. Marrocco during his 19 years in office.

“Only Rain in The Drain,” is the slogan Commissioner Marrocco has adopted to remind residents that keeping storm drains clean is important to the environment.

Commissioner Marrocco reached new heights in drain cleaning technology recently when he and the Drain Board for the Sharkey Relief Drain hired the engineering firm of Spalding DeDecker Associates, Inc. (SDA) and Doetsch Environmental Services, Inc. (Doetsch) to inspect and clean the clogged Sharkey Drain Siphons that run under the I-696 freeway just east of Dequindre Road.

The Sharkey Drain is a large enclosed sewer that serves as one of the primary storm water conductors for approximately 1.4 square miles of residential, commercial, and industrial areas in the cities of Warren in Macomb County and Madison Heights in Oakland County.

At Dequindre Road and the I-696 freeway, the drain enters into a chamber upstream of the I-696 freeway. The flow is split into three 72-inch diameter pipes that drop approximately 13 feet to cross under the freeway. At the other end of the freeway, the three-siphon pipes rise back up to the original invert elevation. The three pipes then join at a downstream chamber. This siphon configuration was required to accommodate the construction of the I-696 freeway. Flow from the downstream chamber is discharged through the 114-inch diameter Sharkey Drain.

As part of the County’s maintenance program, Mr. Marrocco authorized SDA personnel to enter the drain to determine the condition of the siphon pipes and the volume of sediment accumulation in each of the three pipes.



The three siphon pipes remain submerged at all times; therefore, SDA sub-contracted with a dewatering sub-contractor to dewater the siphons prior to the physical inspection of the pipes.

The three access manholes into the siphon are located on the edge of the service drive to the I-696 freeway off of Dequindre Road. One lane of the service drive was closed to access the manholes. Since the adjacent ramp is within the Michigan Department of Transportation (MDOT) Right-of-Way, an MDOT permit was required to close the service drive lane.

The drain entry could only take place when rain had not occurred for a minimum of two days and rain was not expected to occur for at least two additional days.

According to Ms. Maria Sedki, the SDA engineer on the project, “Once in the drains, we observed that the northern and southern siphon pipes were full of hard compacted sediment from the start of the siphon at the upstream end to the end of siphon at the downstream end. Within the sediment was trash including plastic bottles and medical syringes. The two pipes were completely blocked and did not allow any water to pass through.”

The central siphon pipe had approximately 2.5 feet of sticky/mucky sediment for about 6 feet (just past the access manhole). The sediment made it extremely difficult to walk through. There were also large chunks of debris including an 8-foot traffic sign, as well as plastic bottles, medical syringes, styrofoam, and grease. Beyond the six feet of sticky/mucky sediment, the remainder of the siphon pipe through to the upstream chamber was in good condition with approximately nine inches of fine silt at the bottom of the pipe.

Upon being notified of the results of the inspection, Mr. Marrocco immediately authorized SDA to prepare bidding

documents for the cleaning of all three-siphon pipes under the freeway.

Doetsch Environmental Services was the lowest bidder and was awarded the contract to clean the drain siphon under the I-696 freeway. The low bid was \$245,994, more than \$100,000 below the engineer's estimate of \$350,000.

Using a HyJector with Grand Volumetric Recycler, Doetsch was able to clean all three siphon pipes in 14 work days. During the cleaning, SDA performed the construction contract administration, as well as the inspection to verify the volume

of sediment being removed on a daily basis.

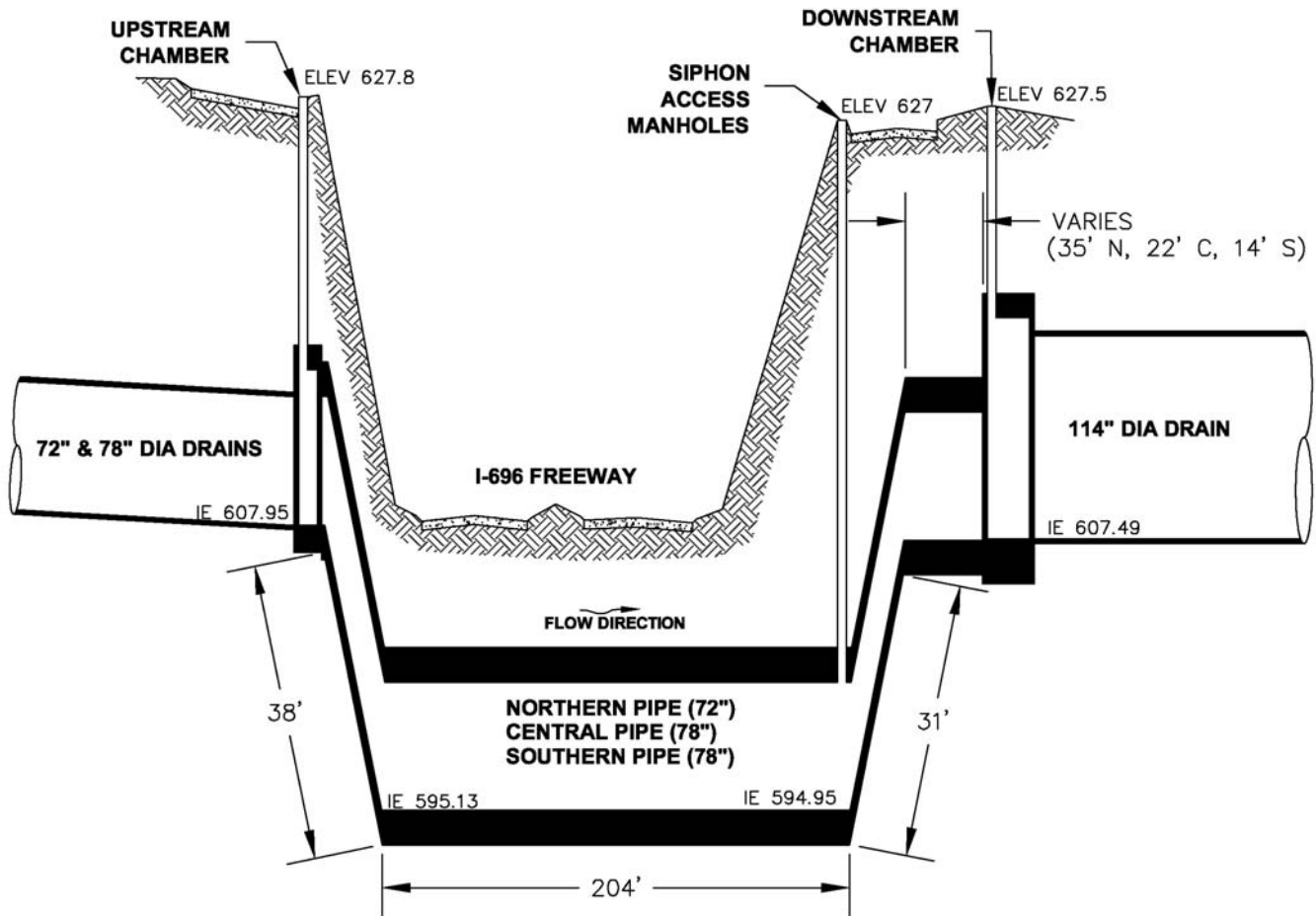
Once Doetsch completed the cleaning of the three-siphon pipes, SDA personnel performed a post-cleaning inspection of the three pipes to verify the removal of the sediment and to determine the condition of the siphons that could not previously be inspected due to the sediment accumulation.

INNOVATIVE APPLICATION OF NEW TECHNOLOGY

The drain siphon cleaning incorporated new and green technology. The typical

method for cleaning a drain requires the use of large amounts of clean drinking water to stir the sediment in the pipe and then vacator the water and sediment out of the pipe.

Doetsch developed a new method for the cleaning of the drain that incorporated a HyJector with Grand Volumetric Recycler. Water from the siphons themselves was used to free up the sediment in the siphon. The sediment and water were then vactor out through the manholes. The water was separated from the sediment using large strainers. The water was passed





through several filter systems parked on-site and then sent back into the drain to be used to remove the sediment from the next segment of the siphon pipe.

“We purify the water so it doesn’t clog the nozzles on the cleaning head,” said Joseph G. Schotthoefter IV, an engineer and vice-president for Doetsch. Schotthoefter invented the HyJecter/Recycler system.

“Because of the filtering process, the water in the drain ends up cleaner than when the process started,” Commissioner Marrocco said.

SOCIAL, ECONOMIC, AND SUSTAINABLE DESIGN CONSIDERATIONS

By using the water in the drain, the project did not add any stress to the local water system. If potable water had been used for the Sharkey Drain Siphon cleaning, approximately 130,000 gallons of water per day would have been needed for approximately 14 work days, totaling approximately 1.8 million gallons of water.

With this amount of high pressure water required, the use of hydrants would have

caused the water in nearby businesses and homes to become brown and would have resulted in noticeable drops in water pressure.

COMPLEXITY

Access to the siphons to perform the original inspection, the drain cleaning, and the post-cleaning inspection was challenging. The Sharkey Drain Siphon is located under the I-696 freeway at Dequindre Road and 11 Mile Road. The access manholes are located near the edge of the freeway service drive. One lane of the service drive was closed to perform the work. A hotel was also located adjacent to the service drive, and work hours and noise were restricted to appease the hotel guests.

SDA performed the original siphon inspection under live conditions. As a result, confined space entry and rescue procedures were implemented and vigorously adhered to.

Weather conditions were monitored for weeks prior to the live inspection in order to select a period when it had not rained for several days and rain was not expected for another few days. Any sign of rain would postpone the project. This resulted in the postponement of the project several times.

During the cleaning period, no equipment could be left in the drain overnight due to the possibility of rain. All equipment was required to be removed at the end of each work day. 🚧

For additional information, please contact Macomb Deputy Public Works Commissioner Gene Schabath at (586) 469-7424 or Maria Sedki, PE at Spalding DeDecker Associates, Inc. (248) 844-5400