OHIO CITY DEVELOPS MANHOLE Rehabilitation Program

Upper Arlington, Ohio, is a first ring suburb located northwest of downtown Columbus. The population is just under 34,000, and it was incorporated as a village in 1918, and as a city in 1941. Key municipal personnel charged with providing public service to the community include Mayor Clark P. Pritchett, City Manager Virginia Barney, Public Service Director Larry Helscel, and Utilities Superintendent Jim Severance.

Not uncommonly, Upper Arlington's sewage collection system has deteriorated both from age and lack of adequate funding and resources. Maintenance has traditionally been reactive, dealing with current problems rather than addressing the basic causes. One of the most pressing problems has been system inflow/infiltration (I/I), which increases the chance of system overload during rain events.

CITY FORMS UTILITY DIVISION

In 1990, the city formed a Utility Division to dedicate more time and resources to maintaining the sanitary sewer system. Under the direction of Jim Severance, the division has taken a proactive stance toward system maintenance. Visual inspection of the 3,400 manholes in the system confirmed that the manholes were a significant source of I/I and manhole rehabilitation had to be an important part of the comprehensive system restoration plan.

The first step was to develop a proposed Manhole Rehabilitation Program. The proposal initially targets 712 manholes to be rehabilitated over a six years. These 712 manholes are in the oldest parts of the system and represent just under 21 percent of the total inventory. Throughout the planning stages it was imperative to receive approval from many individuals. Larry Helscel, Virginia Barney, former mayor David Varda, former city manager Richard King, and members of city council all provided their endorsement. These key personnel continue to be very supportive.

The next step was an exhaustive

Crew members wear safety equipment to protect themselves from the hazards of confined spaces.

Top: A corroded brick manhole before the cementitious rehabilitation. Bottom: The manhole after rehabilitation with the Strong-Seal® MS-2A liner material. Because many of the manholes were located in difficult-to-access rear easements, the application equipment had to be able to pump materials long distances.

search of available equipment and technology, including attendance at trade and technical shows, private and association educational sessions, demonstrations, and visits to job sites. Ultimately, spray-applied, fiber-reinforced cementitious liner material was chosen as the best combination of cost-effectiveness, ease of application, and long service life. One of the primary requirements of the application equipment was the ability to pump materials long distances as the majority of the manholes were in rear easements that were difficult to access. After the bid process, The Strong Company's (Pine Bluff, Arkansas) Strong-Seal® MS-2A liner material and Strong Manufacturing's application equipment was accepted as the lowest and best bid on both the materials and equipment.

FLEXIBLE SEALANT SELECTED

Another important manhole rehabilitation component requiring a decision was the flexible sealant used to seal between the cast iron ring and the manhole wall. This point accounts for a significant amount of I/I and the seal would be required to withstand freeze/thaw cycles as well as traffic loads. After witnessing demonstrations of several brands of flexible sealant, FlexSeal Kits from Sealing Systems, Inc. (Loretto, Minnesota), with its ease of application and 800 percent elongation factor appeared to be their best option.

Upper Arlington crews received thorough training from D.A. Van Dam and Associates (Hubbard, Ohio), the local Strong Company distributor. This training demonstrated the proper methods of applying the materials to ensure the manhole rehabilitation would last for years to come. The crews average three to four manholes per eight-hour work day, including power-washing, removing steps, repairing bench and invert when necessary, and applying mortar to walls and bench. Divisional records indicate that it takes an average of 12.67 labor hours to completely rehabilitate a manhole (including installation of chimney kit). The average cost to rehab a 10-ft deep manhole is just under $750. This includes materials, labor/benefits, safety equipment, and vehicle/equipment depreciation.

A SIGNIFICANT IMPACT

Because Upper Arlington sewage is treated by Columbus the full effect of the reduced I/I cannot be known. However, Columbus has accepted a consent decree that deals with overflows. There is no doubt, as the requirements of this consent decree are developed and enforced, that there will be significant impact on the surrounding communities sending sewage to Columbus' treatment facilities. Upper Arlington will be well ahead of the curve in this respect.

In review, this division has made a significant contribution to the goal of restoring Upper Arlington's aging sewage collection system to its original design flow. The annual preventive maintenance program consists of 40,000 linear ft of video inspection, 150,000 linear ft of line cleaning, 18 point repairs, visual inspection of 3,400 manholes, elimination of yard drains, roof leaders, perforated lids, and other sources of I/I. The manhole rehabilitation program has recently become a key part of this effort. To date, approximately 160 manholes have been rehabilitated. **PW**