PIPE BURSTING WITH "NO-DIG" VITRIFIED CLAY JACKING PIPE CHOSEN FOR CHALLENGING PHOENIX PROJECT

By IPBA

Phoenix, Ariz., has experienced tremendous population growth over the years, which has taxed its collection system. Increased sewer flows from growth required larger diameter pipes to replace the smaller sizes to adequately accommodate these flows. Trenchless pipe bursting was ultimately chosen over open-cut to fulfill the need for upsizing due to lower costs, nearby utilities and concern for traffic disruption. The City undertook a large-scale sanitary sewer static pipe bursting program using no-dig VCP jacking pipe as the replacement pipe material of choice.

With a budget of more than $5 million, the Phoenix project represented one of the most significant uses of the static pipe bursting method with new replacement VCP jacking pipe and demonstrated a high level of cooperation between the equipment manufacturer (TT Technologies, Inc.), product pipe manufacturer (Mission Clay Products), contractor (Kiewit Western, Inc.), engineering firm (Project Engineering Consultants Ltd.) and municipality (City of Phoenix).

Static pipe bursting equipment was used and technical instruction during the design and construction phases was provided by the manufacturer; 15- and 18-in. no-dig VCP was supplied for the project. The total project consisted of upsizing of nearly 6,400 lf of 12- and 15-in. pipe with a 10- to 20-ft depth within major streets with the usual multitude of utilities.

For this particular project, pipe bursting equipment was designed and assembled for the specific purpose of bursting the existing under-sized VCP and towing in the new larger diameter, non-restrained joint VCP. Because the pipe sections are designed to be jacked in place, the bursting system was designed to push each pipe joint home and keep the column of assembled pipe sections in compression during bursting. As the bursting head is pulled forward, fracturing the existing VCP and expanding the fragments into the backfill, the rear cylinder pack, called a "squeezer," with pressure plate keep the assembled pipe sections under compression so the joints remain tight. In this process, you not only have static equipment working in the front end or equipment "pull pit" for bursting the existing pipe but, also have static equipment in the rear or "pipe launch pit."

Using segmented pipe eliminates the need for a long lay-down area on the project site as would be required with welded pipe. This is commonly referred to as the "cartridge loading method" and keeps the jobsite footprint relatively small and compact.

The pipe bursting equipment rods were connected to a special expander for 18-in. VCP (22.14-in. O.D.). The expander O.D. was 24 in. and had a special internal socket arrangement for the lead piece of VCP to butt up against. As sections of pipe were installed, additional rods were added to the trail end of the expander and the new pipe section was slipped over the rods.

The new pipe "launch pit" cylinder pack ("squeezer") with pressure plate was pinned to the rods, then hydraulically energized to push the pipe joint fully home to hold the assembled pipe sections in compression as the pipe bursting expander was pulled forward. The cylinder pack provided 40 tons of force to keep the assembled pipe segments in compression as the bursting head was pulled toward the static pipe bursting machine. A typical 350-lf reach was completed in two to three hours. The cost differential between conventional open-cut and pipe bursting amounted to $2.6 million or a more than 30 percent savings to the City of Phoenix. Again, another example of how pipe bursting saves money with less disruption to the community..

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Information provided in this article by Collins Orton, TT Technologies, Inc., Robert Webb, Project Engineering Consultants, and Jeff Boschert, P.E., National Clay Pipe Institute. To learn more about the latest in pipe bursting technologies, please visit *www.ipbaonline.org*.