

Microtunneling in the Houston Area

Two Gravity Sewer Projects at Depth

By: Ray Post and Harsha Reddy, Huxted Trenchless

BACKGROUND: HUXTED TRENCHLESS

Huxted’s history extends back to the late 1970s when Dwayne Huxted moved from British Columbia, Canada to Palmetto, Florida. Family members owned a company named Kerr Construction, an underground utility and tunneling business and Dwayne joined as a partner. Over time his role evolved, and he became the exclusive owner of the company, bringing his wife and daughter on board to help him lead the way. At that time Dwayne changed the company’s name to Huxted Tunneling.

Dwayne had the vision to grow the business to one of the largest microtunneling and jack-and-boring companies on the east coast. In the 1990s the company grew dramatically and shifted its efforts to predominantly microtunneling projects. However, due to health issues with the Huxted family, they were forced to sell the company to JAG Companies in 2010.

JAG Companies maintained the Huxted name and legacy. Huxted Tunneling’s

headquarters were relocated in 2020 from Palmetto, FL (near Sarasota) to Conroe, Texas (about 40 miles north of Houston, TX) where sister company ECI Drilling was based. The move was initiated by ownership to better align its overall trenchless services with ECI Drilling. Additionally, the relocation allowed Huxted Tunneling to expand its microtunneling footprint.

In 2022, after working in the same location for one year, Huxted Tunneling and ECI consolidated into one company, forming Huxted Trenchless. See *Trenchless Technology’s August 2023* issue for a more detailed article on the merger of the two companies.

Huxted has performed microtunneling across the southeast, mid-Atlantic and mid-western portions of the US since the early 1990s. This local, regional, and multi-state experience of actual work performed and its management, allows Huxted to bid and perform across a large portion of the United States. Huxted’s Senior Vice President, Ray Post, was involved in some of the projects constructed

with microtunneling machines in the Houston area wastewater program during throughout the late 1980s and early 1990s.

The Houston metropolitan area is the fifth largest in the US, slightly behind the Dallas – Ft. Worth area, preceded by Chicago, Los Angeles, and New York. Houston was and is the first and likely the only major metropolitan area in the United States to consistently design, bid, and build projects using the microtunneling and GBM methods of new construction pipe installation. Houston, for all practical purposes, has adopted microtunneling and guided boring as its primary new trenchless installation method for the deep portions of its sewer project needs since the late 1980s. There is still a significant volume of open-cut work, but given the geotechnical conditions combined with Houston’s population and traffic, these new installation trenchless methods make sense.

Following its relocation to Conroe, Huxted’s tunneling operations shifted their focus towards initiating and closing out work it had bid and won while located in Florida and in other locations that were outside Texas. However, about a year after



Lowering the MTBM into jacking shaft MH-T12 on Talton St.



These two projects show the true benefits of direct sewer gravity pipe installation by trenchless methods.

moving. Huxted started to pursue work in Texas, specifically the Houston area. What follows are summaries of two of our most recent projects in the Houston area:

FWSD #23

In the summer 2021, nearly a year after Huxted's relocation to Conroe, the City of Houston advertised the FWSD #23 Wastewater Treatment Plant and Improvements project. This project consisted of the construction of approximately 692 LF of 60-inch fiberglass reinforced pipe (FRP) gravity sewer by microtunneling, approximately 36 LF of 48-inch FRP gravity sewer connection to an existing lift station; installation of two polymer concrete manholes, construction of stub-outs for

connection to future and current projects, one junction structure with associated diversion pipe, and installation of an IPEX vortex unit. The scope also included the abandonment of existing sewers, re-routing of an 8-inch sludge force main, installation of erosion and sediment control devices, and site restoration.

Local contractor Reytec Construction Resources, a heavy civil contractor working in Houston since 1996 was the low bidder and selected Huxted to perform the microtunneling portion of the work based on our experience with these types of terrain.

The subsurface soil conditions along the project alignment generally consist of firm to hard lean/fat clay (CL/CH). Layers of soft to hard silty clay (CL-ML), including

dense to very dense silt (ML), and medium-dense clayey sand (SC/SC-SM). Groundwater in the borings was initially encountered at a depth of 10 to 28 feet below grade during drilling and subsequently rose to a depth between 5.6 and 15.9 feet approximately 15 minutes after the initial encounter. When



Launching the MTBM on the first 30-inch FRP tunnel drive from MH-T12 to MH-T13 on Talton St.



Huxted Trenchless has a long and rich history in the **Microtunneling** and **HDD** industries as a full-service trenchless provider. We have proudly served the South Central region of the United States and beyond for over half a century as a trenchless specialist.

Under the JAG Companies umbrella, Huxted Trenchless is built on a foundation of **REPUTATION, WORK ETHIC, and TEAM ACCOMPLISHMENT**. Let Huxted Trenchless be your infrastructure solutions partner for all things trenchless.

Contact Huxted Trenchless for your microtunneling and horizontal directional drilling needs.

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Microtunneling equipment set-up at jacking shaft MH-T12 on Talton St.

encountered, the groundwater could be pressurized.

The microtunnel was approximately 48-feet deep to invert. Thus, the microtunnel was installed with a water head greater than 30 feet.

Reytec opted to install a 36-foot diameter liner plate jacking shaft and a 16-foot liner plate retrieval shaft. Shaft construction started in May of 2023 and Huxted fully mobilized in early June of 2023.

Huxted uses Iseki microtunneling machines and elected to use its Iseki TCC 1350 Unclemole for this project. Perfectly sized for 60-inch RFP, jacking forces never exceeded 225 tons. A conventional laser active targeting system was used, and tunnel line and grade were completed well within the specified tolerances.

The only issue associated with the tunneling occurred with the shaft work. Reytec made the appropriate one-call utility locate and potholed as required, but, after starting excavation of the shaft, an unmarked, unknown 60-inch sewer was found in the jacking shaft location. After a series of discussions with the City and Engineer, it was decided to move the shaft and avoid the existing line.

This FWSD project was a classic single-run microtunnel, no adverse ground conditions were encountered, and the tunnel work was completed without issue and within schedule.

THE GREEN RIVER DRIVE AND CHATWOOD LIFT STATION DIVERSION

Reytec was constructing another project (which actually tied into the FWSD project) that bid in late 2021 with over 10,000 lf of microtunnel or guided boring work. Over multiple planning meetings between Huxted and Reytec on the FWSD project and the strong relationship that was being forged between the two companies, it became apparent Huxted should assist Reytec on this project as well.

The Green River Drive and Chatwood Lift Station Diversion project consists of the demolition of two lift stations, Green River and Chatwood, and construction by trenchless methods of over 10,000 lf of 24-inch and 30-inch gravity sewer line at a depth between 24 and 40 feet that conveys flow under Las Cruces St., Chatwood Dr., and Talton Dr. towards the FWSD#23 Wastewater Treatment Plant.

The subsurface soils consist of cohesive and cohesive intermittent by cohesionless soils. The cohesive soils consist of soft to hard gray, brown, yellowish brown and reddish-brown fat clay, fat clay with sand, sandy fat clay, lean clay, lean clay with sand, sandy lean clay, and sandy silty clay. Cohesionless soils consisting of loose to very dense gray, brown, yellowish brown and gray silty sand, clayey sand, silty

clayey sand, poorly graded sand with silt, and sandy silt were encountered between depths ranging from 9 to 28 feet. Fill material consisting of gray fat clay, lean clay, lean clay with sand, and sandy lean clay with sand pockets and grassroots was encountered to depths ranging from 2 to 16 feet below the existing grade.

Groundwater was first encountered at depths ranging from 14 feet to 23 feet in all the borings. The water level measured 15 to 20 minutes after water was first encountered and was at depths ranging from 6.0 feet to 17.5 feet in these borings.

Ultimately, Huxted contracted with Reytec Construction Resources to install over 3,700-lf of 30-inch x 10-foot long FRP gravity sewer in eight tunnel drives. A challenging contract, but one Huxted was quite familiar with from past projects.

Reytec has elected to install 26-foot liner plate jacking shafts and 12-foot liner plate retrieval shafts. Huxted could have installed the 10-foot FRP joints in a Shaft as small as 18 feet diameter, but, Reytec has already designed the jacking shafts at 26 feet diameter and procured the liner plate material per the approved submittals.

The microtunnel work on the Green River project was constructed in older subdivisions, with narrow streets and small lots, so Reytec had to work closely with the city and community to manage work locations and traffic control. As part of the project, Huxted was required to set up our



Separation plant set-up at jacking shaft MH-T12 on Talton St.

cleaning plant at a location over 450 feet away from the jacking shaft. Although the microtunnel was just over 550 feet, we had to manage slurry for nearly 1,000 feet.

Huxted mobilized to the site in December 2022. Unfortunately, the first drive ran into a significant delay. Shortly after launching the machine, it began to over torque and slurry flow became difficult to maintain. Keeping a keen eye on the shaker screens, shards of PVC pipe were seen. After lengthy discussions with Reytec and other stakeholders, it was discovered that PVC pipe had been left in the ground by a previous contractor. Huxted and Reytec were unable to confirm the amount of PVC left in place and decided to continue to microtunnel as long as possible hoping to either excavate all the PVC pipe and allow time to prepare and mobilize for the construction of a 911 (rescue) shaft.

After installing 16 joints after hitting the PVC, the machine's slurry chamber became choked with PVC pipe, and it could no longer be advanced and the 911 shaft had to be constructed. A challenge the team was prepared to resolve. Upon rescue shaft construction, the machine was returned to our shop for inspection and repair and then returned to the site.

Instead of re-mining the already constructed tunnel, Huxted assisted Reytec

in preparing a base in the rescue shaft to set the machine. The machine was lowered into the shaft, set to the proper line and grade, and reconnected to the tunnel utilities and the already installed pipe. A layer of sand was placed around and over the pipe, then the shaft was backfilled with clay. The sand was placed around the machine to allow lubrication to penetrate the area after tunneling started. The clay layer was an impervious layer to assist with the potential of slurry migration. The relaunch was successful, and the tunnel was completed without issue.

At the time this article was written, Huxted was mobilizing to complete the last two drives. To date, six of the eight tunnel runs have been completed all within specified lines and grade without any major issues.

These two projects as well as other projects the City of Houston has put out for bid both recently and since the late 1980s show the true benefits of direct sewer gravity pipe installation by trenchless methods. Open cut at these depths and locations would be extremely difficult and more importantly, is not practical. In addition, the elimination of pump stations and the management of a gravity flow sanitary system provides a

cheaper lifelong cost for the sanitary sewer system, plus it's environmentally friendly.

Huxted appreciates the support that Reytec Construction Resources has provided in helping it complete its first work in the Houston area. We look forward to working in Texas and the Houston area in the future. With eight machines ranging in size from 24 inches to 101.5 inches, we are prepared to support microtunnels of multiple diameters and drive lengths.

Huxted Trenchless has the experience, knowledge, and fleet of equipment to tackle any microtunneling or trenchless project. †

ABOUT THE AUTHORS:



Ray Post has over 32 years of experience in the microtunneling and tunneling industry. He has worked in all phases of the tunneling industry

including executive management, project management, estimating, design and inspection services and sales. Experience in the construction of EPB segmental tunnels, microtunnels, rib and board tunnels, pipe jacking, and jack and bore operations and various shaft construction technics. Ray has worked across the U.S. and Canada in various geotechnical conditions as a general contractor, subcontractor, and joint venture contractor.



Harsha Reddy MSCE, MBA has over 11 years of construction industry experience in various engineering and management roles. His

experience includes, but is not limited to, engineering & preconstruction services, estimating, scheduling, safety & procedural planning and execution, site management, and overall project management. He has experience with heavy civil, trenchless, and open-cut projects both as a general contractor, and subcontractor in various geotechnical conditions. He believes that commitment to work is key to producing quality infrastructure that makes the company remarkable.