



ADVANTAGES OF MICROTUNNELING IN WET SANDS & CLAYS

Successes in the Hampton Roads VA Area

By: Doug Piper, Bradshaw Construction Corporation, Eldersburg, MD

Bradshaw Construction Corporation (Bradshaw) has recently subcontracted three microtunneling projects in the Hampton Roads area of Virginia:

1. East Princess Anne Trunk Force Main Reinforcement Project;
2. College Drive Waterline Project;
3. Hampton Roads Sanitation District (HRSD) Division C Sewerage System Improvements.

The first two projects are completed, and Bradshaw is currently mobilizing on to the third project. This article will discuss each project individually and highlight how mi-

cro-tunneling is becoming a valuable trenchless tool for utility owners in the Hampton Roads area, with demonstrated success in mining through difficult ground.

East Princess Anne

In the summer of 2013, Bradshaw installed 352 feet of 60-inch OD Permalok casing under the intersection of Nimmo Parkway and General Booth Boulevard in Virginia Beach VA as part of the East Princess Anne Trunk Force Main Reinforcement Project. The tunnel was mined in sandy soils (SP-SM) below the water table, at a depth of 15 feet below the existing grade. Inside of the casing, Bradshaw installed a 42-inch restrained joint DIP sanitary force main. The Project

Owner was Hampton Roads Sanitation District (HRSD) and the general contractor was Branscome Incorporated.

The General Booth/Nimmo Parkway Intersection is prominent in the area. Both roads have two travel lanes in each direction and expand to accommodate additional turn lanes. The surrounding community includes residential and commercial buildings. The drive shaft was located on the southern edge of Nimmo Parkway adjacent to a residential neighborhood. The receiving shaft was situated in the grass median of Nimmo parkway on the opposite side of the intersection with General Booth Boulevard. The main challenges included the limited work space, noise restrictions,

and traffic which could be heavy at times. Fortunately, Nimmo Parkway ends in a dead end approximately one-half mile beyond the work shaft area. Traffic was lighter along the work area, and significant portions of the median were available for material staging and parking.

Bradshaw set up its microtunneling equipment linearly along the Nimmo Parkway right of way and was able to maintain enough room to allow the operation to be serviced with a rubber tired loader. The mining was performed on a 24/7 basis as specified and was completed in 4 days. The sand mined easily with the only challenge being balancing the microtunnel advance rate with the capacity of the sand screens on the separation plant without overwhelming them. In the end, the tunnel was installed on line and grade without impact to the critical highways above. The 42-inch DIP was installed on casing spacers and the annulus left unfilled as specified.



Sand coming off the shakers @ East Princess Anne



MTBM launch @ College Drive Waterline Project

College Drive

In April 2015, Bradshaw completed its second microtunnel in the Hampton Roads area, the College Drive Waterline Project. The owner was the City of Suffolk, whose waterline was connecting to an HRSD treatment plant. Once again, Branscome Incorporated was the general contractor.

For this project, 370 feet of 30-inch Permalok casing was installed under I-664 near the College Drive interchange. The line ran from the west side of the I-664 right of way, and under I-664, which has three travel lanes in each direction, to the HRSD plant just beyond the eastern right of way. The tunnel conditions were predominantly sands and clays (SC) below the water table at a depth of 18 feet below the interstate highway. Again, mining was performed on a 24/7 basis as specified.

Mining was completed in 6 days, which included some lost time due to equipment

issues. Despite those interruptions, the tunnel was installed on line and grade, with no impact to I-664. Bradshaw installed the 16-inch DIP carrier pipe before moving to its next project in the area.

HRSD Division C Improvements

After the College Drive project, Bradshaw's crew relocated to Portsmouth, VA to microtunnel 110 feet of 43-inch casing under a CSX railroad spur line as part of the HRSD Division C Sewerage System Improvements project. The general contractor was Tidewater Utility Construction, Inc. (TUC). The tunnel was installed at a depth of 15 feet below grade in predominantly silty sand (SP-SM) below the water table. 24/7 mining was specified under the CSX rail road. The rail road was crossed in 1 shift, with the entire run requiring two shifts. The line was installed on line and grade with no surface settlement. Bradshaw is now preparing to install the



MTBM hole out in wet sand & clay @ College Drive Waterline


30-inch HDPE carrier pipe, which will be welded by TUC.

Advantages of Microtunneling

During the preconstruction meeting for the East Princess Anne project, the HRSD representative expressed some frustration with previous trenchless operations in their region. Apparently, the main concern was the multiple instances of surface settlement along the tunnel alignments. Bradshaw made further inquiries to HRSD and to some local engineering firms about the trenchless efforts up to that time and received some anecdotal evidence. It is likely that equipment issues have played a significant role in the poor results on some auger bore projects. Likewise, it is common knowledge that trenchless techniques such as auger boring, guided auger boring (pilot tube microtunneling), and conventional pipe jacking have trouble controlling

the running to flowing ground conditions which are often encountered in this region.


Most likely, the 24/7 requirement that Bradshaw has seen on all of its projects in the area came about as a reaction to poor results from auger boring. Continuous mining offers the best hope for a successful auger bore because one is attempting to jack the casing pipe faster than the ground can run through the augers. In contrast, microtunneling machines are designed to deal with these exact conditions and are equipped with valves at the front of the machine which can be closed by the operator on the surface to completely seal off soil and water. Therefore, overnight downtime or delays for equipment maintenance and repairs generally do not result in surface settlement or any other adverse effects to the final product. In the case of microtunneling operations, owners and engineers can safely remove the continuous mining requirement.

One local design engineer offered the insight that design firms may shy away from specifying microtunneling due to their lack of familiarity with the method. Hopefully Bradshaw's recent successes mining through running to flowing sands in the HRSD region will raise awareness and spark other owners and engineers to consider microtunneling as the preferred tunneling method whenever difficult ground conditions are expected. 

ABOUT THE AUTHOR:










Doug Piper is an estimator/project manager with 20 years of experience in heavy/civil construction, including 6 years at Bradshaw. Bradshaw Construction Corporation is a tunneling contractor with over 50 years of experience covering a wide range of trenchless techniques.



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