SECTION 815

PIPE BURSTING

I. GENERAL

1.1 DESCRIPTION OF WORK

The Work covered in this section specifies the method or process to include all labor, materials, tools, equipment and incidentals necessary to provide for the complete rehabilitation of deteriorated sanitary gravity sewer by pipe bursting.

Pipe bursting is the construction technique of replacing an existing, underground pipe system in situ by fracturing a pipe and displacing the fragments outwards into the surrounding soil while a new pipe is drawn in to the annulus left by the expanding operation to replace the old pipe. The process can be either by pneumatic, hydraulic or static pull methods, using a conically shaped bursting head to break out the old pipe. The rear of the bursting head is connected to the new pipe, while its front is connected to a cable or pulling rod. The bursting head and the new pipe are launched from the insertion pit, and the cable or pulling rod is pulled from the reception pit. The replacement pipe is either pulled or pushed into the bore. The replacement pipe shall not be greater than 25% larger in diameter than the existing pipe.

1.2 SUBMITTALS

The Contractor shall provide qualifications to the Owner as evidence of competency and authority to perform the method of pipe bursting to be utilized and restoration of existing services. The qualifications and submittals shall include the following:

A. The Contractor shall be trained by the pipe bursting equipment manufacturer in the use of the equipment for pipe bursting. Certification by the particular pipe bursting system manufacturer shall be provided to the Owner. The Contractor shall hold the Owner and its agents harmless in any legal action resulting from patent infringement.

B. The Contractor shall be trained by the thermal fusion equipment manufacturer in the use of the equipment for thermal butt-fusion of high density polyethylene (HDPE) pipe. The butt-fusion method for pipe jointing shall be carried out in the field by certified operators with prior experience in fusing HDPE pipe with similar equipment using proper jigs and tools per standard procedures outlined by the pipe manufacturer. HDPE pipe shall conform to the requirements of Section 200.

C. All pipe bursting Contractors must have a minimum of 25,000 feet of pipe bursting experience as a prequalification for this project. Documentation to substantiate the Contractor's experience shall be provided.

D. Prior to commencement of the construction, the Contractor shall submit to the Owner a pipe bursting plan which shall include:

1. Methodology statement that describes the operation of the bursting tool and the winching equipment

2. Site layout plan, including storage areas, equipment set up areas, construction staging areas and locations of all major supporting equipment
3. Pit locations
4. Service line replacement
5. Bursting distances and directions of the bursts to be performed
6. Bypass pumping plan per Section 812, including continuous service provisions
7. Service outage and reinstatement schedule
8. Safety plan
9. Type of lubricants and MSDS (if used)

The plan shall be carefully followed during installation. Any proposed changes in installation procedures shall require submittal of revised procedures and acceptance by the Owner.

E. Contractors using pneumatically operated equipment will provide Owner with data measuring vibrations from bursting head during installation.

F. The bursting head shall not pass within 8 feet of a sensitive surface structure; or, within 3 feet from buried pipes or three pipe diameters of the new pipe, whichever is greater; unless special measures are taken to protect the existing structures and are approved by the Owner. Additional approval(s) from natural gas companies may be required by the Contractor.

G. The Contractor shall carry out operations under this section in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving Work with entry into a confined space. It shall be the Contractor's responsibility to comply with OSHA Standards and Regulations pertaining to all aspects of the Work.

II. EXECUTION

2.1 PRE-INSTALLATION PREPARATIONS

A. Site investigation information

The Contractor shall carefully review the existing underground network of utilities as shown on the Drawings, surface structures, and geotechnical conditions to provide an installation consistent with existing and probable soil conditions. See Section 110 - Special Provisions for additional project monitoring requirements.

B. Pre-Installation Television Inspection

It shall be the responsibility of the Contractor to video (CCTV), inspect the pipe immediately before pipe bursting to assure that existing pipe conditions are acceptable for pipe bursting, and to locate all active service line connections in accordance with Section 811 – Television Inspection.

C. Sags

If pre-installation video (CCTV) inspection reveals a sag in the existing pipeline that is greater than one-half the diameter of the existing pipe, it shall be the Owner's responsibility to determine the method to remedy the existing conditions. The Contractor shall take necessary measures to eliminate these sags, as directed by the Owner including:

1. Replacing the pipe by digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with existing pipe invert, or

2. By other measures acceptable to the Owner.

D. Bypass Pumping

When required for acceptable completion of the pipe bursting, the Contractor shall provide for continuous sewage flow around the section (s) of pipe designated for the installation of replacement pipe. Bypass Pumping shall be performed in accordance with Section 812 – Bypass Pumping.

E. Pipe Jointing

1. Sections of polyethylene replacement pipe shall be assembled and joined on the job site above the ground. Jointing shall be accomplished by the heating and butt-fusion method in strict conformance with the manufacturer's printed instructions and with Section 200.

2. These joints shall have a smooth, uniform, double rolled back bead made while applying the proper melt, pressure, and alignment. It shall be the sole responsibility of the Contractor to provide an acceptable butt-fusion joint. All joints shall be made available for inspecting by the Owner before the insertion. The replacement pipe shall be joined on the site in appropriate working lengths near the insertion pit.

3. Data loggers shall be used to record length of heating, fusing and cooling time, temperature, and pressure of each joint. The resultant data shall be submitted to the Owner upon request.

F. Manhole Preparation

Entry and exit holes from manholes must be enlarged to accept the new pipe as required. Large upsizing shall not be performed in an existing manhole.

2.2 PIPE BURSTING

In general, the bursting operation shall be as follows, unless otherwise approved by the Owner prior to construction:

A. Isolate the existing system and excavate insertion, reception and service lateral pits.

1. Pits shall be strategically located along the alignment of the pipe to be burst to minimize the quantity of pits.

2. The duration that pits are open shall be kept to a minimum.

3. Pit locations shall consider locations of existing and proposed valves, fittings, services, and isolating sections of the existing system to minimize service interruption.

4. Service pits shall be required to install service connections, fittings and reconnect the newly installed pipe to the existing system.

5. All pits shall be prepared and shored in an OSHA-approved manner.

6. The equipment shall have sufficient force to burst the existing pipeline, but not excessive to deform the replacement pipe.

B. Equipment Installation.

1. The static rod and cable pull machines shall be properly braced to resist the horizontal force necessary for bursting operations, including proper structural capabilities.

2. The insertion pit must be large enough to allow the pipe to be inserted without overstressing the new pipe in bending. Pipe manufacturer's bending radius limitations must be adhered to.

3. When the winch and pulling cables are used to pull the bursting tool through the pipe, place the winch into the reception pit and pull the cable through the existing pipe and attach to the front of the bursting unit in the insertion pit.

4. When rigid pulling rods are use, the rods shall be threaded from the reception pit through the existing pipe to the pipe insertion pit and attach to the bursting head.

C. Bursting Operation

1. Bursting head shall be remotely controlled.

2. Winch and Cable Method

a. Bursting of the old pipe shall be performed as a continuous action providing constant tension to the bursting head when the winch and cable method is used.

b. The Contractor shall provide a system of guide pulleys and bracing at the exit pit to minimize cable contact with the existing pipeline between the insertion and reception pits.

c. Trench shoring supports in the insertion pits shall remain completely separate from the winch boom support system and shall be designed that neither the winch support cable shall be in contact with therm.

3. Rigid Rod Method

When rigid rods are used as a pulling unit, the bursting operation may be temporarily halted to unthread and remove each rod section from the pit.

4. Continue this process until the bursting head is pulled completely back into the reception pit.

5. Do not drag the replacement pipe over the ground surface. Pipe shall move over rollers or slings for insertion and transportation. Pipe ends shall be capped.

6. If any obstruction is encountered that can not be burst through, the Contractor shall immediately excavate the location of the obstruction to allow the bursting to continue with the Owner's approval. This Work shall be performed in accordance with Section 818 – Point Repair by Excavation.

7. If the Contractor damages any existing utility, the Contractor shall immediately inform the utility owner of the location and the nature of the damage. The Contractor shall allow the utility owner time to conduct the necessary repairs prior to continuing the bursting operation. Damages to properly marked utilities will be the financial responsibility of the Contractor.

8. If surface heave or subsidence occurs, the Contractor shall repair the impacted area(s) to the satisfaction of VDOT or the locality, as appropriate.

D. Sewer Service Laterals and Reconnections

1. Existing service connections shall be located before initiating sewer main replacement operations. Service laterals shall not be reconnected to the new sewer line until replacement and testing are completed, and not less than 4 hours after completion of the pipe bursting procedure. Any services remaining off line for an extended period of time, or any connections as deemed necessary by the Owner to protect the customer, shall be bypass pumped until such time that they can be reconnected.

2. Connection of the new service lateral (ASTM D-3034 SDR 26 PVC Pipe) to the new sewer main shall be accomplished by use of the watertight compression –fit service connection. The service connection shall be specifically designed for connection to the HDPE sewer main being installed, and shall be INSERTA TEE as manufactured by Insert Tee Fittings, Inc., or approved equal.

2.3 SEALING AND BENCHES IN MANHOLES

A. Following the minimum 4-hour relaxation period identified above, the annular space in the manhole wall shall be sealed.

B. The replacement pipe shall be installed with a tight fitting seal with the existing or new manhole. A Fernco CMA Water Stop Gasket or approved equal shall be placed circumferentially on the replacement pipe and encased with cementitious non-shrink grout to prevent inflow at the manhole.

C. The top half of the pipe within the manhole shall be neatly cut off and not broken or sheared off, at least four inches away from the manhole walls.

D. The channel in the manhole shall be a smooth continuation of the pipe (s) and shall be merged

with other lines or channels, if any in accordance with Manhole Shaping Detail SS_07.

E. The replacement pipe in the manhole shall be sealed as specified above before proceeding on to the next manhole section and all manholes shall be individually inspected for replacement pipe cutoffs, benches and sealing.

2.4 TESTING AND INSPECTION

A. Low Pressure Air Testing
After a manhole-to-manhole section of sanitary sewer main has been pipe burst and prior to any service lines being connected to the replacement pipe, the pipe shall be plugged at each manhole with pneumatic plugs and a Low Pressure Air Test shall be conducted in accordance with Section 802.

B. Post Televising of Completed Sections
It shall be the responsibility of the Contractor to video (CCTV), inspect the pipe immediately following reinstatement of service laterals to provide a close up view showing the completed Work, including the condition of the restored service connections. The Contractor shall provide the Owner the CCTV inspection on a storage media specified by the Owner [Compact Disc (CD) or Digital Video Disc (DVD] in accordance with Section 811- Television Inspection.

2.5 PAVEMENT REPLACEMENT

A. The Contractor shall provide permanent pavement replacement in accordance with the Contract Documents for all areas disturbed by insertion/reception pits, service connection pits, and pipe bursting operations.

B. The depths shown on the Contract Documents for pavement restoration are minimum thicknesses. The depth of asphalt surface to be laid will be the greater of the minimum thickness or the depth required to match the existing.

C. All pavement replacement shall be done by a licensed and qualified paving contractor approved by the Owner and VDOT (if applicable).

D. Where the pipe bursting operations are located in a paved area, the Contractor shall saw-cut pavement in the area to be removed. Permanent pavement shall be laid as detailed in the Contract Documents, without exception. The Contractor may be required to re-cut pavement after pavement removal if edges of existing pavement are not straight.

E. All areas shall be backfilled with compacted material and paved at the completion of Work for each day, unless otherwise directed by the Owner. Pavement patches shall be in accordance with Section 317.

2.6 CLEANUP

The Contractor shall replace all curb/curb and gutter, sidewalk and driveway sections (section defined as joint to joint) directly over areas where point repairs have taken place. In unpaved areas, bring surface to grade with topsoil, grade surrounding excavation, seed and fertilize, and restore to pre-construction conditions.

III. MEASUREMENT FOR PAYMENT

3.1. Measurement for payment shall be from center of manhole to center of manhole.

3.2. Elimination of sags shall performed and be paid for in accordance with Section 818 – Point Repair By Excavation.

3.3. Sealing and benching manholes shall be incidental to the other Work. However, a separate payment shall be made if no line or manhole is rehabilitated but benches are required to be improved.

3.4. The price per linear foot of pipe bursting shall include all:

A. By-pass pumping (up to 2 mgd),
B. Clearing and grubbing,
C. Cost of potable water from the Owner,
D. Debris collection and disposal,
E. Dewatering,
F. Equipment,
G. Erosion and sediment control,
H. Excavation pits,
I. Fittings,
J. Ingress and egress procedures,
K. Labor,
L. Materials,
M. Permits,
N. Pipeline cleaning,
O. Pre- and post-television inspection,
P. Re-instatement of service connections,
Q. Removal and replacement of manhole frames and covers as necessary,
R. Removal of protruding service connections,
S. Replacement of pavement and restoration of areas damaged by pipe bursting activities, such as heaves, sags, etc.,
T. Resident notification,
U. Root removal,
V. Testing,
W. Traffic control,
X. Required compliance tests,
Y. Site cleanup and restoration, and
Z. Other Work, not included under other items, necessary to complete the rehabilitation per the Contract Documents.

End of Section