

**SECTION 02635
HORIZONTAL DIRECTIONAL DRILLING**

PART 1: GENERAL

1.1 **DESCRIPTION**

- A) Section includes requirements for Horizontal Directional Drilling (HDD) of crossings and related work for the construction of the designated pipeline and other incidental work.
- B) The work shall include, but is not limited to, the following:
 - 1) Furnish all materials to construct work according to drawings and specifications.
 - 2) Permits, bonds, insurance and other as required by regulating authorities.
 - 3) Coordination with regulating authorities.
 - 4) Protective fence, berms and/or guard rails as required by regulating authorities.
 - 5) Temporary traffic control as required by regulating authorities and by Specification Section 01505.

1.2 **QUALITY ASSURANCE**

- A) Experience: Actively engaged in horizontal directional drilling for minimum of 3 years.
- B) Field supervisory personnel: Experienced in the performance of work and tasks as stated herein for minimum of 3 years.

1.3 **SUBMITTALS**

- A) Submit for information only.
 - 1) Presentation of similar experience in the last 3 years.
 - 2) Include, but not limited to, owner name, address, telephone number, contact person, date and duration of work, location, pertinent project information, and contents handled by pipeline.

- 3) Supervisory field personnel and historical information of HDD experience.
 - a) At least one field supervisor listed must be at site when HDD operations are in progress.
- B) Submit following Section 01300.
 - 1) Working Drawings and written procedure describing in detail proposed means, method, techniques and sequences, procedures and entire operation for information only including, but not limited to:
 - a) Size, capacity and arrangement of equipment.
 - b) Location and size of drilling and receiving pits.
 - c) Dewatering and methods of removing spoils material.
 - d) Method of installing pipe and tracer wire.
 - e) Type and size of cutting head(s).
 - f) Method of monitoring and controlling line and grade.
 - g) Detection of surface movement.
 - h) Bentonite drilling product information, specifications, and procedures.

1.4 PROJECT CONDITIONS

- A) Complete HDD so as not to interfere with, interrupt, or endanger surface and activity thereon.
- B) Do not use HDD in rock stratum or subsoil consisting of boulders and underground obstructions that impede the process.
- C) Follow applicable ordinances, codes, statutes, rules, and regulations.

PART 2: PRODUCTS

2.1 MATERIALS

- A) PVC Pressure Pipe

- 1) Integrally restrained joint PCV pipe or fusible PVC pipe in accordance with Section 02667
 - a) Mechanical couplings are not permitted for joining of directional drilled pipe sections.
 - 2) Connect to Other Pipe Materials: See Section 02667.
- B) Drilling Fluid:
- 1) Bentonite drilling product compatible with environment.
 - 2) Waste oil or environmentally non-compatible polymers cannot be part of composition.
- C) Tracer Wire: 45-mil, high-density, high molecular weight polyethylene (HDPE) insulation otherwise meeting the minimum requirements of Section 02667.

PART 3: EXECUTION

3.1 PREPARATION

- A) Excavate pits according to drawings and Section 02226.
- B) Provide equipment to guard against electrocution and alarm system on drilling equipment capable of detecting electrical current as it approaches electric lines.
- C) Verify depth and location of underground utility crossings before HDD operation.

3.2 OPERATION

- A) General.
 - 1) Determine drilling length and equipment pull strength for type of soil encountered.
 - 2) Provide method to control line and grade.
 - a) Provide and maintain instrumentation that accurately locates pilot hole.

- b) Drill pilot hole along path following Drawings to these tolerances:
 - (1) Vertical alignment ± 0.5 feet. Vertical path of pilot hole must not establish new high points not shown on Drawings.
 - (2) Horizontal alignment ± 1.0 feet.
 - c) Include electronic monitoring of horizontal and vertical drilling head location. Obtain accuracy range within 1 inch of actual position of pipeline. Record position readings at maximum of 10 foot intervals.
 - d) At completion of pilot hole drilling, furnish bore log which should include at a minimum, tabulations of horizontal and vertical alignment to Engineer for approval prior to reaming and pipe installation.
- 3) When water is encountered.
- a) Provide and maintain dewatering system of sufficient capacity to remove water below the invert of the pipe.
 - b) Keep excavation free of water until backfill operation is in progress.
 - c) Perform dewatering in manner that removal of soils particles are held to minimum.
 - d) Dewater into sediment trap.
- 4) Maintain close observation to detect settlement or displacement of surface and adjacent facilities.
- a) Notify Engineer immediately if settlement or displacement is detected.
 - b) Maintain safe conditions and prevent damage.
- B) Drilling Operation.
- 1) Drilling Fluids.
- a) Maintain drilling fluid in bore hole to increase stability of surrounding soil and reduce drag on pulled pipe.
 - b) Dispose of drilling fluid and other spoils at location following laws, ordinances, rules, and regulations of local jurisdiction.

- c) Transport excess fluids and other spoils to disposal site, at no additional cost to the District.
 - d) Minimize drilling fluid at locations other than entry and exit points. Immediately clean up any drilling fluids that inadvertently surface.
 - e) Provide clean water for drilling, at no cost to the District, at Engineer's requirement.
- 2) Pilot Hole Drilling.
- a) Angle entry hole so that curvature of pilot hole does not exceed 75% of the manufacturer's allowable bending radius for PVC pipe.
 - b) Alignment Adjustment and Restarts.
 - (1) Follow pipeline alignment on Drawings within tolerances specified herein. Before adjustments, notify Engineer for approval.
 - (2) Notify Engineer when forward motion of operation is stopped by an obstruction.
 - (a) Abandon in place with drilling fluid, unless Engineer directs otherwise.
 - (b) Upon Engineer's approval, attempt second installation at approved location or excavate at point of difficulty and install PVC pipe by trench method following Section 02226.
 - (3) Withdrawals, abandonments, and restarts are at no additional cost.
 - (4) Exercise caution including, but not limited to, locating utilities, drilling downholes (test pits) to observe drill stems or reamer assembly to clear other existing utilities at locations following Drawings.
 - (5) Keep the number of boring pits to a minimum, unless otherwise approved by Engineer.

3.3 INSTALLATION

A) Installing PVC Pipe.

- 1) Provide a swivel to reaming assembly and pull section of pipe to minimize torsional stress on pull section after drilling pilot hole.
- 2) Hold reaming diameter to 1.5 times outside diameter of PVC pipe being installed.
- 3) Protect pull section as it proceeds during pull back so it moves freely and is not damaged.
- 4) Pull tracer wire per Section 02667 along with PVC pipe.
 - a) Securely connect tracer wire to the top of pipe at intervals to prevent movement or separation from the pipe tracer wire.
 - b) Connect at each end of PVC pipe without unnecessary splices.
 - c) Consider installing tracer wire in redundancy or other methods to assure continuity of assembled tracer wire.
 - d) Test tracer wire installation to ensure successful continuity of signal.
- 5) When connecting to adjacent pulled or non-pulled section of PVC pipe, allow pull section of pipe to extend past termination point. Make tie-ins after pullback of PVC pipe has had an opportunity to expand or contract.
- 6) Test pit pipe installation to verify horizontal and vertical alignment at Engineer's direction.
 - a) One test pit for every 500 feet along length of pipeline.
 - b) Engineer may order additional test pit for each test pit that reveals pipeline installation is not in compliance with Contract Documents at no additional cost to the District.
- 7) Replace portions of pipeline not in compliance with Contract Documents at Engineer's direction and at no additional cost.

3.4 FIELD QUALITY ASSURANCE

- A) Perform field testing (disinfection and hydrostatic pressure testing) of PVC pipe following Section 02667.

PART 4: SPECIAL PROVISIONS

4.1 **MEASUREMENT AND PAYMENT**

- A) When listed in the Proposal, payment for work specified under this section will be made at the prices named in the Proposal complete and acceptable to the Engineer.

END OF SECTION