Bureau of Engineering

Special Order

November 18, 2002 Special Order No. 015-1102

To All: Deputy City Engineers
Senior Managers
Division/ District Managers
Group Managers

Subject: **DIRECTIONAL DRILLING POLICY**

Directional Drilling is a new construction method for installing utility lines (such as fiber optics) in lieu of trenching. Its use has resulted in damage to sewer house connections and other improvements in some cases. As a result, the following Horizontal Directional Drilling (HDD) guidelines are established to ensure public safety and protect public and private property from damage that can be caused by poor planning and construction practices. Proposed HDD methods shall be approved by the City Engineer in advance of construction. An Excavation Permit is required for any HDD. Prior to beginning any HDD operations, applicants must satisfy the requirements of this policy, comply with all appropriate State and Federal requirements, and obtain all necessary permits. The most restrictive requirements shall always apply. These requirements and conditions are in addition to the latest edition of the "Standard Specifications for Public Works Construction" adopted by the Board of Public Works and "Additions and Amendments to the SSPWC" (Standard Plan S-610) of the Bureau of Engineering.

1. **SUBMITTALS**

The applicant shall submit two copies of each of the following to the appropriate Bureau of Engineering Office:

A. Plan and profile drawing of the drill path alignment, signed and stamped by a State of California Registered Civil Engineer, which shows the following:

   a. Existing ground surface.

   b. Location, depth, diameter, and material type of the proposed pipe.

   c. Location, elevation, and clearances of all crossing and adjacent utilities, substructures, and surface structures (See Section 3.0 A. for specific requirements).

   d. Location and boundaries of entry and exit points.

   e. Property lines and public easements.

B. Calculations, sketches and reports, signed and stamped by a California Registered Civil Engineer:

   a. Shoring (pits, trenches, etc.).

b. Pipe strength.

c. Geotechnical report (required for pipes larger than six inches in diameter and recommended for pipes smaller than six inches in diameter).

C. Within 90 days after completion of work, accurate electronic as-built drawings shall be submitted. These drawings shall be in AutoCAD format or a similar format approved by the City Engineer. If the as-built drawings are not received within 90 days, no additional permits will be issued to the applicant until completed drawings are submitted.

2. INFORMATION REQUIRED ON-SITE

The following information shall be retained at the job site at all times and shall be made available to City of Los Angeles personnel.

A. Geotechnical report

a. A geotechnical report is required for all HDD operations and must be available on site where the pipe is greater than six inches in diameter. For all other HDD operations, a geotechnical report is not required, but is recommended in which case a copy should be available on site.

b. The geotechnical report shall be prepared and signed by a State of California Registered Civil Engineer with documented expertise in the field of geotechnical engineering.

c. The report shall provide drilling fluid recommendations as well as general reaming operation recommendations and limitations.

d. The report shall also include recommendations of methods to avoid ground heave and escape of drilling fluid to the ground surface, and a contingency plan should they occur.

e. Boreholes or test pits should be located at approximately 250 to 400 feet intervals where a proposed installation is greater than 1000 feet in length. Additional boreholes or test pits should be considered if substantial variation in soil conditions are encountered, or at the discretion of the Civil Engineer.

B. Pipe information (See Section 3.0 B. for specific requirements.)

a. Material (HDPE, steel, etc.), length, diameter, wall thickness, joint system.

b. Detailed pipe calculations, confirming ability of product pipe to withstand installation loads and long term operational loads, including hydrostatic pressures.

c. Reamer diameter.

d. Minimum radius of curvature.

e. Maximum entry angles.

C. Drilling fluid information

a. Drilling fluid viscosity and density (based on Geotechnical Report recommendations).

b. Material Safety Data Sheet (MSDS) for drilling fluid.

c. Drilling fluid pumping capacity, pressures, and proposed flow rate.

d. Method of slurry containment.

e. Method of recycling drilling fluid and spoils (if applicable).

f. Method of transporting drilling fluids and spoils off site

D. Type of locating / tracking method (See Section 3.0 C. for specific requirements.).

E. HDD equipment to be used, its capability, and tolerances (Equipment and methods shall conform to the Geotechnical Report conclusions and recommendations.).

F. Ground surface movement monitoring plan (settlement or heave).

G. Contingency and/or emergency plan for inadvertently boring into a live power line, natural gas line, water line, sewer line, storm drain, fiber optic cables, or any other substructure.

H. Storm Water Pollution Prevention Plan (if applicable).

I. Traffic control plan approved by the City of Los Angeles Department of Transportation

3. **SPECIFICATIONS**

A. Protection of pavement and other utilities

a. All crossing utilities, including sewer laterals, shall be exposed using vacuum excavation, hand excavation, or other approved potholing method to confirm depth. If the size of the substructure is unknown, or if the substructure is larger than 6-inches, the depth to the bottom shall also be determined. All parallel utilities within five feet of the proposed drill path shall also be exposed.

b. Damage to other substructures.

1. If a substructure is damaged by any portion of the HDD operation by puncture or direct contact, the permittee will be responsible for repairing the damage to the satisfaction of the utility owner, without regard to the amount of time elapsed since the drilling operation was conducted.

2. The permittee will be responsible for repairing any other damage attributed to the HDD operation for a period of one year from completion of the work.

3. All repairs shall commence within 24 hours of the notification of the damage and be completed within a reasonable time. The cost of all repair work, including permit fees, will be borne by the permittee.

4. All emergency repairs shall commence immediately.

5. If the owner of the damaged utility chooses to do the repair work, the permittee shall reimburse the utility owner for all associated costs.

c. All surfaces affected by the work shall be restored using the same standards that are required for traditional open excavation work. All pavement markings in the project area showing locations of crossing or adjacent utilities shall be removed by sandblasting.

d. Unless otherwise approved in writing, construction materials or other debris may not be stockpiled on the street. All drilling fluids, slurries, and spoils shall be removed before they become a nuisance, stain the pavement, enter any private property or enter the storm drain system, or sewer system.

e. See table below for minimum depth of cover and substructure clearances.

Minimum Depth Of Cover And Clearances		
Pipe Diameter (in)	Minimum Depth of Cover (ft)	Minimum Clearance from Substructures (ft) (horizontal and vertical)
<6	4	3
6-14	6	4
14-24	10	5
>24	12	6

B. Pipe design criteria.

a. General: When conveying sanitary sewage or storm/urban runoff, only High Density Polyethylene (HDPE) may be used. For all pipes, show details for joining the newly installed pipe to existing junction, structures, accesses, maintenance holes etcetera.

b. HDPE pipe.

1. Resins shall be City-approved structural rated resins as listed in Figure H211.41A of the Bureau of Engineering's Structural Design Manual.

2. For calculation purposes, soil loads shall be considered as dead loads and a minimum factor of safety of two shall be applied to allowable stresses.

3. Only full-strength butt-fused joints shall be used.

c. Steel pipe.

1. The reactivity of the soil and conveyed flow shall be assessed. An appropriate corrosion protection system shall be provided to satisfy the required service life without maintenance.

2. Steel pipe shall only be used if the pipe will be kept under full pressure head.

3. The joints used shall be capable of developing the full strength of the pipe.

C. Monitoring and tracking.

a. Monitoring shall be accomplished by plotting based on location and depth readings provided by the locating/tracking system or by computer generated bore logs which map the bore path based on information provided by the locating/tracking system. Readings or plot points shall be undertaken on every drill rod.

b. The tracking operator shall have a minimum of one year experience in HDD tracking.

D. Contractor and Operator Experience.

a. The drilling contractor must have a minimum of three years experience in HDD operations.

b. The operator must have a minimum of one-year experience as an HDD rig operator. The contractor shall have proof of training from the manufacturer of the HDD equipment which proves completion of the minimum course in the operations and safety of HDD equipment as contained in the HDD Equipment Manufacturer's Operator's Manual. This training shall be provided by the HDD equipment manufacturer or an authorized dealer or trainer.

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