

**County of Santa Cruz**  
**Draft Installation Requirements – Conduit for Fiber Optic Cable**  
**28 January 2014**

**Fiber Optic Cable Conduit**

Cables shall be run in conduit, except overhead and temporary installations, and where cables are run inside poles. Conduit and conduit fittings shall be Underwriter's Laboratory Inc. (UL) or Electrical Testing Laboratory (ETL) listed, and shall be UV-rated where located aboveground. Conduit shall be used to protect the cable from the top of the conduit riser to the span messenger where the cable is to be lashed. Ensure that the conduit fill ratio (outer cable diameter to inner conduit/duct diameter) does not exceed 50%. Install the conduit system so the fiber optic cable maintains a minimum bend radius of 20 times the cable diameter.

Conduit shall be laid to a depth of not less than 18 inches below grade in concrete sidewalk areas and not less than 30 inches below finished grade in all other areas. Excavation and backfill within the roadway shall conform to Figure EP-1 of the Design Criteria. New conduit shall not pass through foundations for standards. Existing substructure may require fiber placement in roadway.

Installation of conduit shall be as shown in the plans and in conformance with the National Electric Code (NEC). Provide all fittings and incidental materials necessary to construct a complete installation. Use approved methods for connecting inner duct or conduit within or between plowed portions, trenched portions, and bored portions.

**Fiber Optic Cable**

Locate Wire: Locate wire shall be installed in the trench or bore with all underground conduits. Locate wire shall be installed above the conduit but not more than 3 inches. Do not install locate wire within a conduit containing fiber optic cable.

Terminate locate wires at the first and last pull boxes in the conduit run. Ensure that wire termination occurs only at the top of a pull box. Core-drill the access point wall at the conduit diameter and at the location indicated in the plans. After placement, apply a non-shrink grout or other acceptable material around the conduit/locate wire to seal the hole.

Make locate wire splices in a flush grade-level pull box. Ensure that locate wire splices at the pull box meet NEC requirements. Ensure that locate wire splices include a mechanical crimp connection with a butt sleeve, an oxide-preventing aerosol lacquer, mastic electrical splicing tape, and standard electrical tape using methods and materials approved by

the Engineer. Perform continuity tests and insulation resistance tests on all locate wires. At the completion of the installation, provide the Engineer with as-built drawings that document all conduit and splice locations.

### **Payment and Measurement**

Payment for conduit placed in the ground or used on bridge decks will be based on the horizontal path of the installed conduit as measured in a straight line between the centers of pull boxes, cabinets, poles, etc. No allowance will be made for sweeps or vertical distances above or below the ground or the bridge deck.

The contract price paid per foot for furnishing and placing Conduit shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing and constructing the fiber optic cable conduit complete in place to the dimensions shown, including hardware, locate wire, testing, trenching, backfilling, and restoration as shown on the plans, as specified in the Standard Specifications, these special provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.