Appendix C

Fiber Optic Cable Construction Methods

Appendix C

Fiber Optic Cable Construction Methods

A direct burial cable plow or open trenching will be used as primary methods of construction. Two types of plows, described below, will be used. Each type of plow produces a closely confined and temporary disturbance to the ROW.

Direct burial cable plow technology uses a tracked bulldozer that is either pulling trailer-mounted cable reels or is fitted with a cable reel on the front end and a cable plow on the back end. In most areas, only one equipment pass through the area is necessary. The cable plow is a single, straight-shafted blade that opens a narrow trench about 12 inches wide and 5 feet deep. The innerduct is continually placed in the trench and as the plow moves ahead the trench closes in behind the plow. The plow leaves behind a small ridge of material approximately 12 inches above the original ground surface and a small open slot about 6 inches wide and 1 foot deep. As part of the cleanup process, the disturbed soil surface is restored (e.g., regraded to original slope) within two days and revegetated. In stable soils the machines leave a track in the vegetation similar to, but wider than, a road vehicle. In wet or soft conditions, this disturbance may be great enough to require more extensive grading and reseeding to restore the area.

A “spider” plow may be used when wet, soft or restricted areas are anticipated. The spider plow has been specially developed for these types of conditions and causes much less disturbance because it runs on oversize rubber tires and weighs less than a bulldozer. The plowing techniques are the same for the spider plow as for the bulldozer.

Open trench construction involves excavating a width of 12 inches and a cover depth of at least 42 inches. This type of construction is used in areas where soil and geologic conditions preclude the use of a cable plow. Although equipment may vary, it will include track hoes, rubber tire backhoes or chain trenchers. The innerduct is placed in the trench, and as the backhoe excavates ahead, excavated material is backfilled into the trench. Restoration will be completed within two days and includes placement of select, compacted fill utilizing existing excavated material, provided the material is free from rock and debris. The surface will be regraded to conform to surrounding contours and restored as appropriate.

A directional bore will be used to the extent possible to minimize impacts to sensitive environmental areas such as streams, wetland, sensitive species, or cultural resources. Directional boring is a state-of-the-art technology for placing underground cable where a surface-operated drilling device is angled into the ground from the surface and directed to its destination using a radio-controlled mole that contains a cutter head. Personnel, directing the mole on the ground, control the depth and direction of excavation. A plastic or steel sleeve is left in the ground through which the innerduct is later installed. Surfaces will be restored to original or better condition, once the innerduct is installed. Using this method, the innerduct can be directed under or around an obstacle without having to work in the sensitive area. This method can also be used to cross highways, rivers, wetlands, railroads, pipelines, and city streets.

Bentonite clay is mixed with water and is used as a lubricant in the boring process. It is possible for this mixture to seep to the surface through fractures in the ground. If seepage occurs it is most likely to be near the bore entry point, where the drill head is shallow, but it can occur anywhere along the bore alignment. The bores will be monitored by onsite inspectors and if seepage is found, boring will cease and corrective action will be taken. Containment will be accomplished using certified weed-free straw bales, earthen berms, sandbags, or pumps. These containment measures can be used on dry land or in stream channels. If the mixtures reaches a stream or if it surfaces within the stream channel, certified weed-free straw bales or sandbags can be used to contain it so that the material can be pumped back to the bore site or into tanks.

Twenty-eight directional bores were made during construction of the SLO to SJ Segment. Minor seepage was noted at two locations, one near entry penetration of the ground surface and one where the bit exited the boring (also near ground surface). Near-surface soils at the bore hole entry and exit lacked sufficient cohesion to retain the drilling mud within the formation. At both locations, observed seepage occurred far enough away from the riparian zone of the stream being traversed that no drilling mud was discharged to surface waters. At depth, soil overburden is sufficient to prevent drilling mud seepage to the surface, even in soils where near-surface seepage was observed.

On occasion, plowing, trenching and boring may not be possible because of the presence of rock or boulders. On these occasions, the work may be done using excavators. This may include the use of rock saws that cut a slot in the soil and/or rock. This approach requires excavation of a minimum of 18 inches below grade and 10 inches below the rock surface.