Water Crossing Methods

**FLUME METHOD**

Used to cross small to intermediate flowing waterbodies that support cold water or other significant fisheries.

- Temporarily divert the flow of water through one or more large-diameter, steel flume pipes.
- Allows trenching to occur in a relatively dry riverbed (beneath the flume pipes).
- Keeps excess sediment from entering the waterbody.

**DAM AND PUMP METHOD**

Generally used on smaller waterbodies where mechanical pumps can keep up with stream flows.

- Pumps and hoses used instead of flume pipes to isolate and transport the stream flow around the construction area.
- Creates a relatively dry work area.
- Keeps excess sediment from entering the waterbody.

**OPEN CUT OR WET TRENCH METHOD**

In-stream construction activities are limited to 24 hours on waterbodies 10 feet wide or less and 48 hours on waterbodies 10 to 100 feet wide.

- Trench is constructed while water continues to flow.
- Pipe is pre-fabricated before trenching begins.
- Backhoes typically work from one or both streambanks to excavate trench.
- If the stream is too wide to excavate the entire trench from the banks, equipment may operate from within the waterbody with prior approval from appropriate regulating agencies.
Road and Trail Crossing Methods

OPEN CUT METHOD

Unpaved roads, trails and driveways as well as roads in areas with a high water table will be crossed using the open cut method and then restored to preconstruction condition.

- May require temporary road closure
- If no reasonable detour feasible, at least one lane will be kept open to traffic except for a brief period when the pipe is installed into the trench
- Most open cut crossings completed and the road restored within a few days

SUBSURFACE BORING METHOD

Most paved roads and highways will be crossed by conventional subsurface boring beneath the roadbed.

- Excavate boring pits on each side of the road; use boring equipment to bore a hole under the roadbed then pull the section of pipe (or series of pipe sections) through the hole
- Results in little to no disruption of traffic on road
Horizontal Directional Drill Sequence

**PILOT HOLE**

**PREREAM**

**PULLBACK**