AS OF MAY 2025 CHAPTER 1.8 CONTAINS THE PREVIOUS EDITION OF THIS STANDARD. IT WILL BE UPDATED AT A LATER DATE.

5.4 Stream Utility Crossing

Description

Stream Utility Crossings include pipeline, power line, or road construction projects that cross creeks or rivers. Measures used to minimize damage from the construction of utilities across streams start in the planning stages of a project and continue through site restoration. They include: determining the location of the utility, timing construction, construction techniques to reduce sediment pollution, and recreating favorable riparian conditions.

Conditions Where Practice Applies

Stream Utility Crossing apply to the following:

- Pipelines including but not limited to gas pipelines, electrical transmission lines, sanitary sewers, water lines, and etc.
- Overhead electric transmission lines,
- Road and bridge construction.

For temporary access of construction traffic across stream channels, see the specification for *Temporary Stream Crossings.*

Planning Considerations

Siting Stream Crossings – The first priority for minimizing the impacts of utility construction across streams is to minimize the length of channel disturbed. This often requires the values of the stream be acknowledged and carefully weighted through a stream assessment.

Routinely, the easiest and most inexpensive location of utilities, particularly sanitary sewers, is right down the stream channel itself. Unfortunately, this method of locating utilities causes long-term negative impacts to the stream and may necessitate higher maintenance costs to protect the utility.

Minimize the length of channel disturbed by:

- Routing utility lines well away from the stream channel and adjacent riparian area. Doing this may require more earthwork through irregular terrain and more bends in the utility.
- Crossing the stream as few times as possible.
- Crossing perpendicular to the Stream, where crossings do occur. Crossings deviating up to 30 degrees from perpendicular shall be considered perpendicular.
- Concentrate crossings of multiple utilities in one location, and/or encase into one conduit. This is most feasible where utilities are serving an individual housing development.

Within stream channels, there are areas, which are more sensitive to the work required for a utility crossing. Crossings should be located along the stream channel where they will cause the least impact. Crossings should occur where the streambanks are most stable such as the crossovers between bends where the curve of the stream changes direction or along fairly straight sections of channel. Sharp bends and steep banks, especially where showing signs of instability, should be avoided. Deep pools within the channel also should be avoided. These are locations where, during high flows, natural scour is occurring, opposed to riffle areas where deposition occurs. Generally, uniform stretches of stream will be least impacted by a utility crossing.

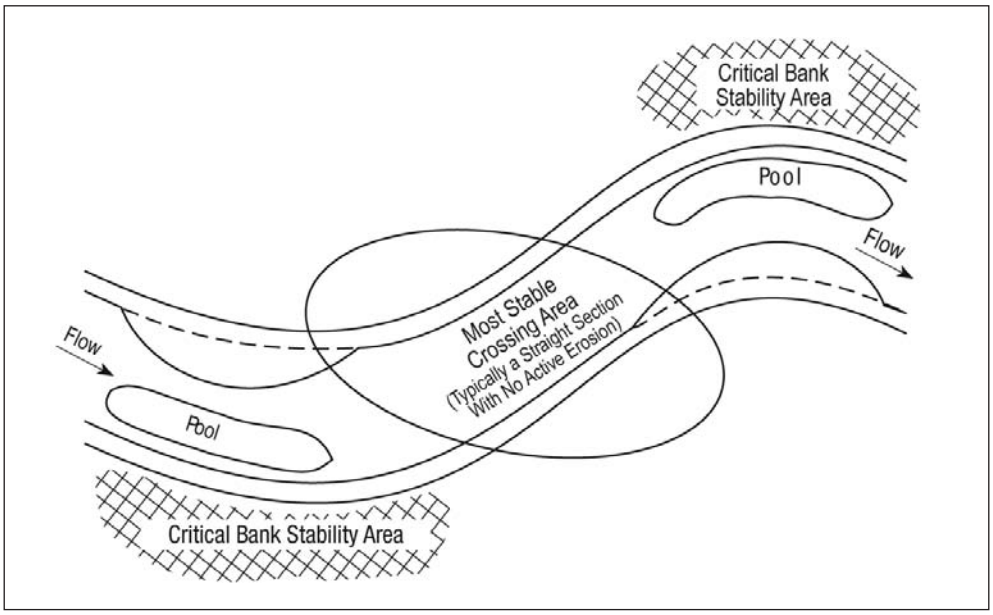


Figure 5.4.1 Stable location for utility crossing

Design Criteria

The following provide general criteria applicable to utility installations. Additional guidance is provided in the specifications that follow.

Construction Season -Utility stream crossing construction is best done during periods of low flow; generally July, August, and September. For perennial streams or important spawning streams, the worst time for construction may be during fish spawning and migration season from March 15 through June 15 or as determined for a particular stream or fish species. This should be taken into consideration along with other construction timing constraints.

Construction Method -In critical crossing situations, the method of construction may be specified. Drilling and boring utility lines under a stream channel cause much less impact than plow-in and trenching methods. Drilling and boring reduce the likelihood of erosion, as well as disturbance of the banks and bottom substrates which typically occurs with both the plow-in and trenching methods. Drilling and boring are usually more expensive and may be unreasonable for certain situations. If a utility line cannot be bored or drilled under the watercourse, the plow-in method should be used where possible. When crossing streams with the plow, a "dry run" is usually recommended prior to attaching the cable or pipe to clear out any possible stumps, logs or other obstructions.

Stream Flow Control -Stream flow should be diverted away from areas where intensive construction will occur.

Confining the Work Area -In large streams with limited areas of disturbance such as along one bank or around a bridge piling, a cofferdam or barricade can be constructed to keep the stream from continually flowing through the disturbed areas. Types of barricades include sheet pilings, sandbags, or turbidity curtains. Sheet pilings are the most durable. Sandbags can be constructed quickly in areas with shallow flow. Turbidity curtains are a geotextile material suspended from floats which hang down to the channel bottom. Unlike sheet pilings and sandbags, turbidity curtains cannot be specified for areas with strong currents or if the work area will be pumped dry.

Sediment Control: Stock piles of material shall be surrounded by silt fence or runoff routed to a sediment pond. Stabilized working pads shall be provided for the equipment in association with the construction of the crossing. Additional sediment control devices shall be implemented (ie. silt fence, sediment traps) when the trench falls within 100 feet of the stream.

Staged Construction -A cofferdam of sheet pilings or sand bags also can be used to confine, one-half of the channel until work there is completed and stabilized, then moved to the other side to complete the crossing without ever having the stream flow through the active work area.

Temporary Rerouting -When extensive or prolonged work will be done to the channel, the stream should be routed around the work area if permitted by terrain and the size of stream. Flow may be pumped around the work area or a temporary channel may be constructed. Temporary channels must be stabilized. A geotextile completely lining the channel bottom and side slopes is suitable temporary stabilization.

Limits on Each Crossing

Crossing Width -The limits of disturbance should be as narrow as possible where utilities cross streams. This includes not only construction operations within the channel itself, but also clearing done through the vegetation growing on the streambanks. The width of clearing should be minimized through the entire riparian area. To ensure minimal width of disturbance through the riparian area, materials excavated from trench construction should be placed well back from the streambanks. The width necessary for the crossing should also be clearly specified on the plans as well as the construction and clearing limits.

Duration of Construction -The time between initial disturbance of the stream and final stabilization should be kept to a minimum. The time necessary for an individual utility stream crossing varies significantly, depending on the specific project. Individual projects should be designed to encourage minimum duration of construction activity within the stream channel. Specific time limits may be specified or the crossing construction may be made dependent on other operations. For example, it could be specified that construction could not begin on the crossing until the utility line was in place to within 10 ft. of the streambanks on each side of the stream.

Fill Placed Within the Channel -The only fill permitted in the channel should be clean aggregate, stone or rock. No soil or other fine erodible material shall be placed in the channel. This restriction includes all fill for temporary crossings, diversions, and trench backfill when placed in flowing water. If the stream flow is diverted away from construction activity the material originally excavated from the trench may be used to back fill the trench.

Streambank Stabilization and Restoration - Streambanks should be restored to their original line and grade. Restoration must not result in a narrower channel or flow restriction. Stabilization of the area shall be conducted immediately upon completion of the stream crossing.

Plan specifications should define the type of stabilization, ideally woody vegetation, as described in the Stream Stabilization section of this book. Vegetation mats or Erosion Control Matting shall stabilize areas within 50’ of either streambank. Some bank areas may need to be stabilized with riprap or stone in addition to matting and woody vegetation. Trees should be planted on the entire riparian area, especially the streambanks, to the extent permitted by the type of utility crossing. See the specifications for Streambank Stabilization.

Site Work Associated with Utility Stream Crossing

Runoff Control Along the Right-of-Way – Runoff and sediment controls should be used for the access road or utility easement approaching the stream crossing to prevent sediment-laden runoff from being routed directly to the stream. At a minimum distance of 50 ft. from the stream, runoff should be diverted with water bar or swales to a sediment trapping practice.

Dewatering – Trenches and excavations associated with stream crossings frequently require dewatering. Dewatering or pumping operations must not discharge turbid water directly to the stream. See the Dewatering Measures practice contained in this book for more guidance.

Permits – The specifications contained in this practice pertain primarily to the environmental impacts of stream utility crossings. The designer must also be aware that such structures are subject to the rules and regulations of the U.S. Army Corps of Engineers for instream modifications (404 permits) and Ohio Environmental Protection Agency's State Water Quality Certification (401 permits).

Maintenance

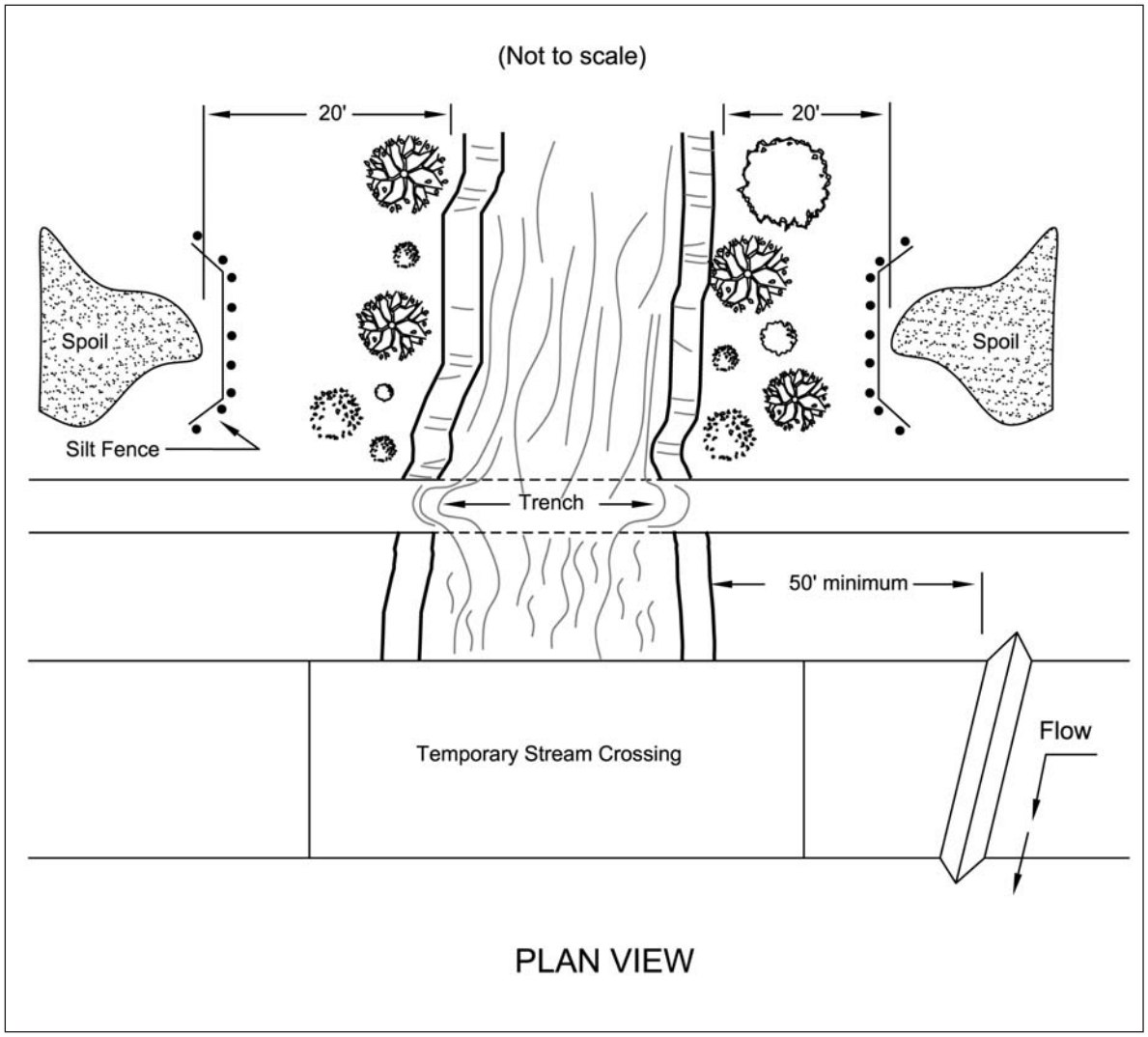
- Maintenance is essential to make sure that all items are functioning properly. This includes making sure only the areas that need to be exposed are exposed, and all other BMP practices are in good working order.
- The designated diversions should maintain the clean water through the site until the project has been completed.
- All desilting devices shall be maintained so that proper filtering occurs to the muddy water before it reenters the stream system.
- Dewatering devices shall be maintained at all times so that proper schedules can be kept for the utility crossing.

Common Problems/Concerns

- Improper staging and construction causes sediment damage because diversions, erosion control devices and dewatering does not occur in the proper order.
- Starting project during bad weather conditions so that a timely construction can occur.
- More area is opened up than for one day's construction to be completed in the stream crossing.

Specifications
for

Large Stream Utility Crossing



Specifications
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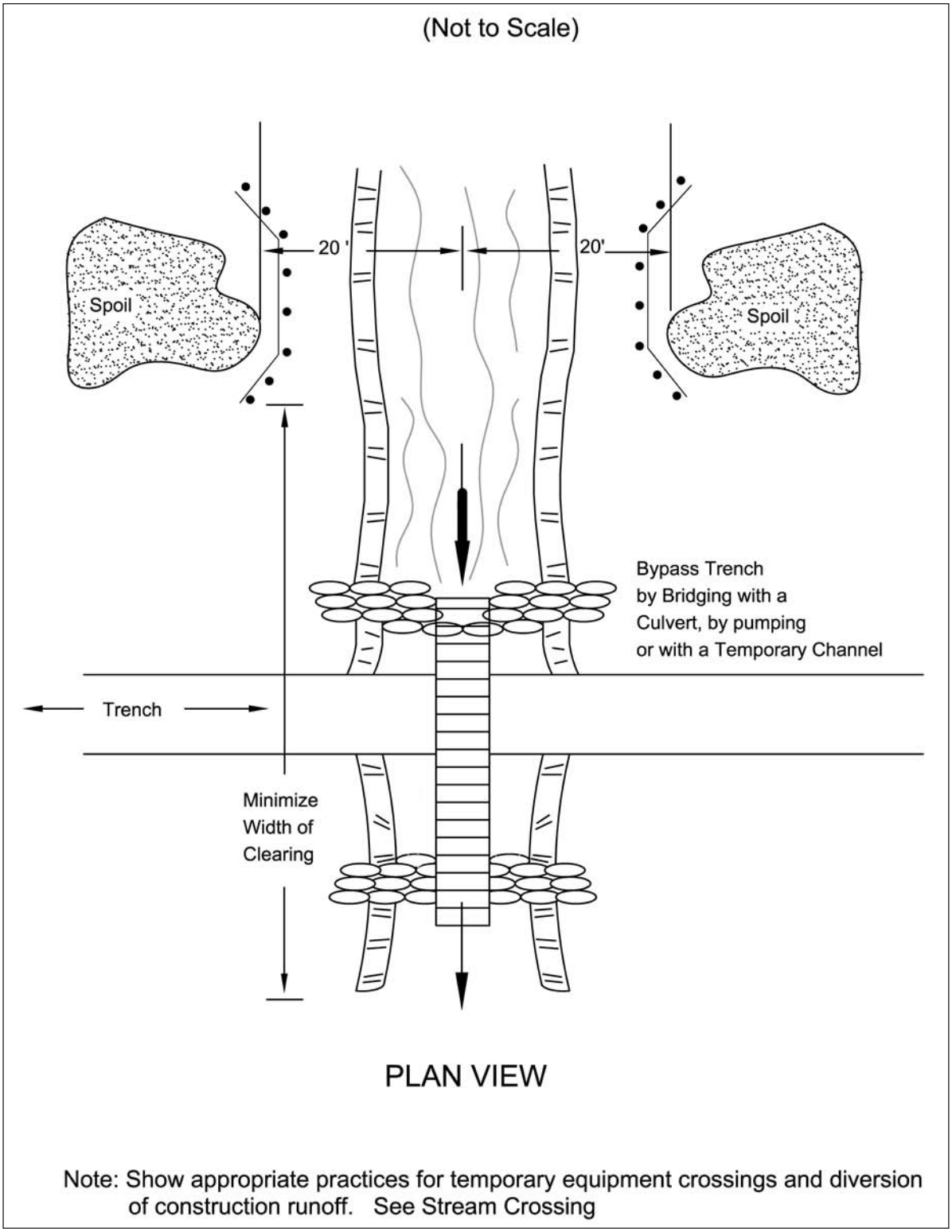
Small Stream Utility Crossing



Specifications
for

Stream Utility Crossing

1. When site conditions allow, one of the following shall be used to divert stream flow or keep the flow away from construction activity.

- Drill or bore the utility lines under the stream channel.
- Construct a cofferdam or barricade of sheet pilings, sandbags or a turbidity curtain to keep flow from moving through the disturbed area. Turbidity curtains shall be a pre-assembled system and used only parallel to flow.
- Stage construction by confining first one-half of the channel until work there is completed and stabilized, then move to the other side to complete the crossing.
- Route the stream flow around the work area by bridging the trench with a rigid culvert, pumping, or constructing a temporary channel. Temporary channels shall be stabilized by rock or a geotextile completely lining the channel bottom and side slopes.

2. Crossing Width -The width of clearing shall be minimized through the riparian area. The limits of disturbance shall be as narrow as possible including not only construction operations within the channel itself but also clearing done through the vegetation growing on the streambanks.
3. Clearing shall be done by cutting NOT grubbing. The roots and stumps shall be left in place to help stabilize the banks and accelerate revegetation.
4. Material excavated from the trench shall be placed at least 20 ft. from the streambanks.
5. To the extent other constraints allow, stream shall be crossed during periods of low flow.
6. Duration of Construction -The time between initial disturbance of the stream and final stabilization shall be kept to a minimum. Construction shall not begin on the crossing until the utility line is in place to within 10 ft. of the streambank.
7. Fill Placed Within the Channel -The only fill permitted in the channel should be clean aggregate, stone or rock. No soil or other fine erodible material shall be placed in the channel. This restriction includes all fill for temporary crossings, diversions, and trench backfill when placed in flowing water. If the stream flow is diverted away from construction activity the material originally excavated from the trench may be used to backfill the trench.
8. Streambank Restorations -Streambanks shall be restored to their original line and grade and stabilized with riprap or vegetative bank stabilization.
9. Runoff Control Along the Right-of-Way -To prevent sediment-laden runoff from flowing to the stream, runoff shall be diverted with water bar or swales to a sediment trapping practice a minimum of 50 ft. from the stream.
10. Sediment laden water from pumping or dewatering or pumping shall not be discharged directly to a stream. Flow shall be routed through a settling pond, dewatering sump or a flat, well-vegetated area adequate for removing sediment before the pumped water reaches the stream.
11. Dewatering operations shall not cause significant reductions in stream temperatures. If groundwater is to be discharged in high volumes during summer months, it shall first be routed through a settling pond or overland though a flat well-vegetated area.
12. Permits -In addition to these specifications, stream crossings shall conform to the rules and regulations of the U.S. Army Corps of Engineers for in-stream modifications (404 permits) and Ohio Environmental Protection Agency's State Water Quality Certification (401 permits).