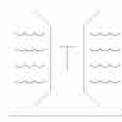


Temporary Stream Crossing

Plan Symbol



Description

A temporary stream crossing is a bridge or culvert across a stream or watercourse for short-term use by construction vehicles and heavy equipment. A stream crossing provides a means for construction vehicles to cross streams or watercourses without moving sediment to streams, damaging the stream bed or channel, or causing flooding. Prior to constructing a temporary stream crossing, the owner/person financially responsible for the project must submit an Application for Permit to construct across or along a stream to South Carolina Department of Environmental Services (SCDES). Temporary stream crossings require authorization. Refer to the US Army Corps of Engineers and SCDES nationwide 401 and 404 regulations for information on permitting requirements.

When and Where to Use It

When feasible, attempt to minimize or eliminate the need to cross streams. Temporary stream crossings are a direct source of pollution; therefore, every effort should be made to use an alternate method (e.g., longer detour), when feasible. When it becomes necessary to cross a stream, a well-planned approach minimizes damage to streambanks and reduces erosion. The design of temporary stream crossings requires knowledge of the design flows.

Temporary Bridge Crossing Design Criteria

- Structures are designed in various configurations. Select construction materials capable of withstanding the anticipated heavy loading of the construction traffic.
- Crossing Alignment. Design temporary waterway crossing at right angles to the stream. Where approach conditions dictate, the crossing may vary 15° from a line drawn perpendicular to the centerline of the stream at the intended crossing location.
- Design a water diverting structure such as a dike or swale across the roadway on both roadway approaches 50-feet (maximum) on either side of the waterway crossing. This prevents roadway surface runoff from directly entering the waterway. Measure the 50-feet from the top of the waterway bank. Direct the flow captured in these dikes and swales to a sediment trapping structure. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.
- Design appropriate perimeter controls such as silt fences, along stream banks.
- Design crossings with one traffic lane with a minimum width of 12-feet and a maximum width of 20-feet.

Temporary Culvert Crossing Design Criteria

- Limit the width of fill to that only necessary for the actual crossing.
- Use coarse aggregate of clean shot limestone rock and riprap with a 6-inch D₅₀ or greater.
- Use clean shot rock and/or riprap as fill for crossings that will be in place for 6 to 12 months. Install a concrete cap over the rock for crossings that will be in place for more than 12 months.
- Design the stone cover over the culvert equal to ½ the diameter of the culvert or 12-inches, whichever is greater, but no greater than 18-inches.
- Design the culvert crossing to convey the flow from a two-year frequency storm without appreciably altering the stream flow characteristics.
- Place the maximum possible number of pipes within the streambanks with a maximum spacing of 12-inches between pipes.
- The minimum-sized pipe culvert used is 24-inches.
- Design culverts strong enough to support their cross-sectional area under the maximum expected heavy equipment loads.
- Design an adequate culvert length to extend the full width of the crossing, including side slopes.
- Design the minimum culvert slope to 3-inches per foot.
- Crossing Alignment. Design temporary culvert crossing at right angles to the stream. Where approach conditions dictate, the crossing may vary 15° from a line drawn perpendicular to the centerline of the stream at the intended crossing location.
- Design approaches to meet the following specifications:
 1. Clean stone or concrete fill only
 2. Minimum thickness: 6-inches
 3. Minimum width: equal to the width of the structure
 4. 20-foot minimum approach length
- Design a water diverting structure such as a dike or swale across the roadway on both roadway approaches 50-feet (maximum) on either side of the waterway crossing. This prevents roadway surface runoff from directly entering the waterway. Measure the 50-feet from the top of the waterway bank. Direct the flow captured in these dikes and swales to a sediment trapping structure. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.
- The maximum design life of temporary culvert crossings is 24 months.

Installation

Install crossings prior to any other activities. Install and maintain pump-around diversions prior to any excavation and during the installation of the crossing. Place crossings in temporary construction easements only.

Minimize streambank clearing. Do not excavate rock bottom streambeds to install the crossing. Lay the culvert pipes on the streambed “as is” when applicable. Place as many pipes as possible within the low area of the stream. Place remaining pipes required to cross the stream on the existing stream bottom.

Install pipes with a maximum spacing of 12-inches between pipes. The minimum sized pipe culvert that may be used is 24-inches.

Install culverts with a length that extend the full width of the crossing, including side slopes.

Use coarse aggregate of clean limestone riprap with a 6-inch D_{50} or greater to form the crossing. Install the stone cover over the culvert equal to $\frac{1}{2}$ the diameter of the culvert or 12-inches, whichever is greater, but no greater than 18-inches.

Limit all fill materials associated with the roadway approach to a maximum height of 2-feet above the existing flood plain elevation.

Inspection and Maintenance

- Inspect crossings every 7 calendar days and within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation. Check the structure integrity and for excessive sediment deposition and replace fill stone as needed.
- Clean mud and/or sediment from the roadway and prevent it from entering the stream.
- The structure shall be removed when it is no longer required to provide access to the construction area. During removal, leave stone and geotextile fabric for approaches in place. Place fill over the approaches as part of the streambank restoration operation. A temporary culvert crossing should be in place no longer than 24 months.



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Preventive Measures and Troubleshooting Guide

Field Condition	Common Solutions
Slopes of temporary earthen crossing erodes.	Place rock layer on slope sides. Stabilize roadway at crossing.
Sediment and debris block culvert inlet.	Remove sediment and debris as necessary to keep pipe open.
Pipe outlet causes erosion.	Stabilize outlet with riprap or flared end section.
Overtopping occurs.	Incorrect design. Redesign crossing and obtain approval (stamp) of registered civil and/or structural engineer.