

Little Rock District US Army Corps of Engineers
Regulatory Division
Guidelines for Non-Bridged Stream Crossings

These guidelines were developed to reasonably ensure that the proposed work will not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality.

Type 1. Slab structure on creek bed.

The existing bottom elevation of the stream must be matched. Excess material must be removed from the stream.

Type 2. Culverted crossing, generally on a perennial stream designed to be overtopped several times per year and not designed to pass floodwaters.

Culverts must be placed at or slightly below the existing bottom elevation of the stream, with smooth gradients both upstream and downstream. Fill material over the culverts must be of a depth no greater than $\frac{1}{2}$ the diameter (the radius) of the culverts. (Army Design Standards recommend a minimum of $\frac{1}{2}$ diameter cover for trafficability). A minimum of 10% of the channel cross-section must remain open (based on Little Rock District Hydraulics and Hydrology Section practice). The crossing must not direct flow toward either bank and both banks shall be properly stabilized to prevent erosion during high flows.

The crossing must meet the following criteria to prevent overbank flooding impacts:

The maximum height of the crossing must not exceed 50% of the channel depth; for example, a crossing fill could not be more than a total of 4 feet deep in a stream where the channel depth to top bank is 8 feet.

Type 3. Culverted crossing, generally on an intermittent stream, not topped often, passing reasonable flows, and providing dry access majority of time.

Use a quick method of sizing culverts with a nomograph based on Talbot's empirical formula. Size culverts to pass the flow computed for 1.5 inches of rainfall per hour. This is about the 1-year, 60-minute duration storm event for most areas in the Little Rock District (based on data from NOAA).

Any backwater flooding must be contained on the applicant's property and not impact neighboring properties.

General Guidelines applicable to all crossings:

1. The minimum diameter culvert to be used in any crossing is 24 inches, except on a case-by-case basis where 18-inch culverts may be allowed. This restriction is based on the difficulty of maintaining small culverts to preserve flow.
2. The activity must, to the maximum extent practicable, minimize adverse effects such as flooding upstream or erosion downstream of the project site. If appropriate, disturbed areas will be protected with seeding, sod, riprap, or similar measures to prevent erosion. Construction of the structure will not create any obstructions to the flow path in the upstream channel that will prevent the free flow of water through the structure.
3. Culverts must be maintained and kept free of gravel and debris.
4. To the maximum extent practicable, the structure must not permanently restrict or impede the passage of expected high flows or cause the relocation of the channel.
5. The lowest point of the road crossing must coincide with the flow line of the stream.
6. In order to provide aquatic organism passage during low flow conditions, the culverts must span the active channel and simulate the channel bottom through the culvert. Total culvert width should equal at least 20% of the wetted channel width at low flow conditions.
7. The center culvert must be set slightly lower to concentrate low flows for the passage of aquatic organisms.

Coordination Guidelines:

When an application for a low-water crossing is received in Regulatory Division, and the crossing does not obviously meet the screening criteria above or if it is of a questionable nature, the Project Manager will send a copy of the request and drawings to Hydrology and Hydraulics Section for their review, with a two-week suspense.

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