

Culvert Installation Procedures

1. Excavation

Excavate to the elevations and lines shown on the drawings. Isolate the site using berms and pump out the water within the excavation. If a fish salvage is required, perform this work once the site has been isolated. If water is seeping into the excavation, you can use one of the following mitigation measures:

- If pump(s) will remove it, pump it out.
- If the pump(s) can't keep up, try to excavate a trench along one of both sides of the excavation. Fill this trench with washed rock and try pumping out of the trench.
- If this is not enough, you may have to dig a bypass channel.

It does not have to be absolutely dry. Some standing water is okay as long as the backfill is not placed into large amounts of water.

2. Culvert Bed Preparation

Place and compact pit run gravel up to the level of the culvert inverts.

Gravel should not be placed in lifts larger than about 150 mm compacted. Ensure the gravel is not saturated when it is placed and allow for 6-7 passes with small compaction equipment such as jumping jacks, vibratory plate compactors, etc. Minimum compaction should be roughly 95% of standard proctor density.

3. Culvert Installation

Place culvert on the prepared bed and tighten the couplers or joints.

4. Backfill

Place woven geotextile along the outsides of the excavation for additional strength between the Pit Run and adjacent road embankment. Fasten it to the excavation wall to ensure it doesn't blow away.

If the backfill is not tested with a Nuclear Densometer, use the following guidelines:

- Use only gravel that is not wet or saturated.
- Place gravel in lifts not exceeding 150 mm (compacted).
- Allow for 6-7 passes with small compaction equipment such as jumping jacks, vibratory plate compactors, etc.
- Do not neglect the hard-to-reach "haunch" areas directly beside the pipe at the lower levels. As a minimum, fill the haunches with loose gravel and fill in the corrugations using shovels.
- At the ends of the culvert, use clay for the backfill with the same compactive effort as the Pit Run.

The load carrying capacity of culverts is dependent upon the strength of its backfill and thus care should be taken to ensure adequate compaction of the pit run material around the culvert. The above is likely to be sufficient for a compaction standard of approximately 95% of Standard Proctor Density.

5. Road Construction

Build the road and tie in neatly to the existing gradelines.

6. Culvert Ends

Place non-woven geotextile fabric underneath rock riprap on both ends of the culvert. Place the riprap in the streambed for the distance shown on the drawings and along the road embankment to the elevation shown on the drawings.