

Culvert Installation Guide

New Zealand has more than 50 species of native freshwater and introduced sports fish.

It's important that instream structures such as culverts and weirs are designed to allow for fish passage, so that fish can move upstream and downstream between different river and stream habitats and complete their lifecycles.

Migrations of native fish can be blocked by barriers in rivers and streams. Some of these barriers are natural like waterfalls and large rapids.

However, artificial structures such as flood gates, weirs and dams can prevent native fish from completing the migration phase of their lifecycles needed for successful reproduction.

Even small artificial structures such as culverts can act as barriers to fish; they can prevent fish from moving between habitats, affecting their abundance and distribution.

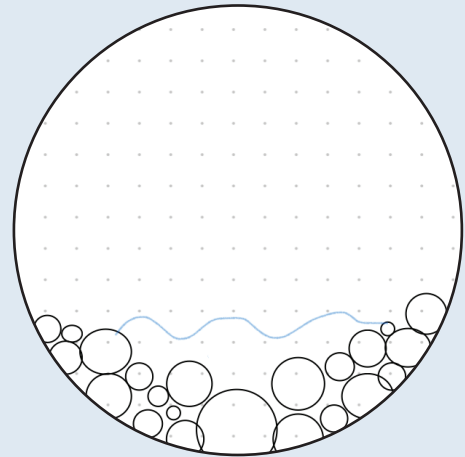
The aim of this guide is to help you understand the rules and regulations about culvert installation, and ensure that they are providing fish passage for all of our native species.



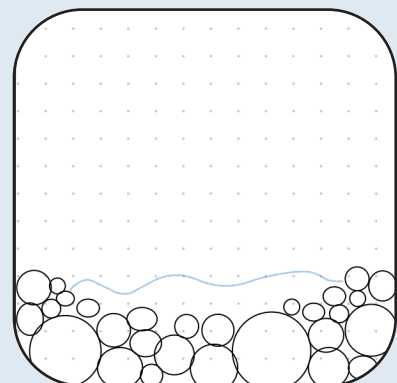
The above culvert has been installed very poorly. The edge is perched, which results in no possible fish passage into the upper catchment.



This culvert is the ideal stream simulation scenario. The culvert is larger than the stream width. There is substrate covering at least 25% of the culvert. The culvert has been placed at the same slope of the existing stream bed.



A pipe culvert that shows the ideal cross section, with 25% of the culvert space covered with substrate, and the water of the stream simulates a natural stream bed.

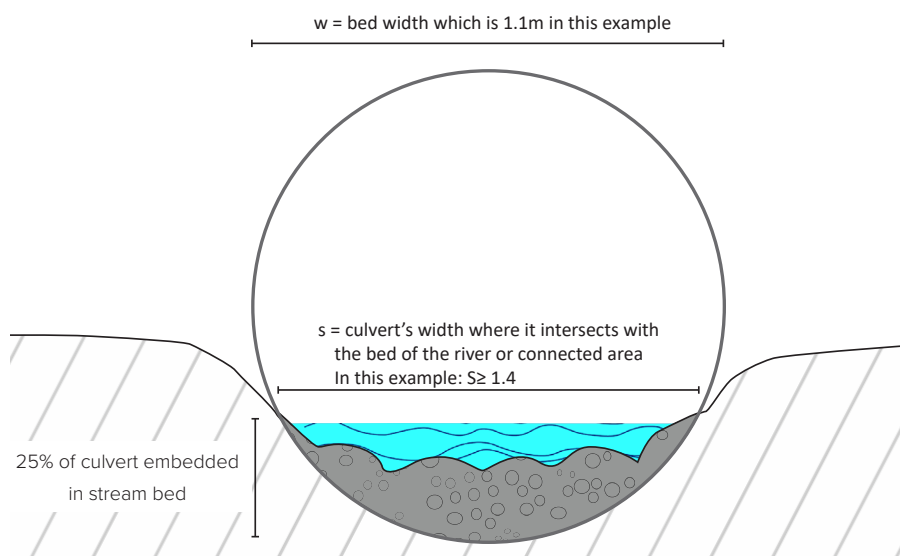


Cross section of a square culvert that shows the ideal substrate cover, 25% of the culvert area is covered, and the water simulates a natural stream path.

A summary of the National Environmental Standard for Freshwater:

- (1) Installation of a culvert is a permitted activity if it complies with the conditions listed below.
- (2) The conditions are that -
 - (a) The culvert must provide for the same passage of fish upstream and downstream as would exist without the culvert; and
 - (b) The culvert must be laid parallel to the slope of the bed of the river or connected area; and
 - (c) The water velocity in the culvert must be no greater than immediately upstream of the culvert; and
 - (d) The culverts width where it intersects with the bed of the river (s) and the width of the bed at the location (w), must compare as follows:
 - (i) Where the width of the bed is less than 3m use the equation $S \geq 1.3 \times w$
 - (ii) Where the width of the bed is more than 3m use the equation $S \geq (1.2 \times W) + 0.6$
 - (e) The culvert must be open bottomed, or its base must be placed so at least 25% of the culvert's diameter is below the level of the bed; and
 - (f) The bed substrate must be present over the full length of the culvert.

Size determination equation example



As per the equation above d(i)
 $W \leq 3$, $S \geq 1.3 \times W$
 If the stream width (w) is 1.1m
 $1.1 \leq 3$, $S \geq 1.3 \times 1.1$

Therefore, S must be greater than or equal to 1.4m. In this case a 15000mm culvert would be suggested.

If you would like more information about the National Environmental Standard you can find it at

www.legislation.govt.nz/regulation/public/2020/0174/latest/LMS364099.html

If you have any questions or would like to discuss things further you can contact Council's Environmental Scientist— Freshwater Ecosystems
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Fish to protect



Kaharore Bully



Giant Kokopu



Giant Bully



Longfin Eel



Banded Kokopu



Bluegill Bully



Inanga



Kōaro



Redfin Bully



Torrentfish