

Resource Consents

# Practice and Guidance note

## National Environmental Standards for Freshwater – Fish Passage design criteria (guidance for council engineers)

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# 1 Introduction

The [Resource Management \(National Environmental Standards for Freshwater\) Regulations 2020](#) (NES-F) include regulations in Part 3 Subpart 3 that relate to the passage of fish affected by structures. These regulations apply to the placement, use alteration, extension or reconstruction of culverts, weirs, flap gates, dams or fords, in, on, over, or under the bed of any river or connected area.

This subpart does not apply to any of the following structures in, on, over or under the bed of any river or connected area<sup>1</sup>:

- (a) an existing structure, meaning a structure that was in the river or connected area at the close of 2 September 2020, and including any later alterations or extensions of that structure:
- (b) a customary weir, meaning a weir that is used for the purpose of practising tikanga Māori, including customary fishing practices.

This Practice and Guidance note (PGN) provides clarification and guidance for regulatory engineers reviewing structures in intermittent or permanent streams, mostly at Engineering Plan Approval (EPA) stage or vesting process to ensure that they are aware of the relevant fish passage structure design criteria for permitted activities, information requirements and other relevant details under these regulations.

Many of these structures may not require a resource consent and so will not have gone through specialist review, however, structures which do not comply with the relevant design standards in the NES-F 2020 will require resource consent. If a structure is assessed as not compliant with the NES-F 2020 permitted conditions during engineering review, the applicant can

- (a) amend the design to comply with the NES-F 2020 permitted standards, or
- (b) apply for resource consent.

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<sup>1</sup> [Practice and Guidance note National Environmental Standards for Freshwater - Identifying the connected area of a river when applying the fish passage regulations](#)

## 2 NES-F requirements for fish passage

### 2.1 Design criteria and processes

In order to be undertaken as a permitted activity, structures must comply with the permitted activity conditions within the NES-F, otherwise the structure will require a resource consent.

#### Permitted Activities under the NES-F 2020

- Culverts that comply with the permitted conditions in regulation 70(2) (NES-F)
- Weirs that comply with the permitted conditions in regulation 72(2) (NES-F)

The permitted activity design criteria for culverts and weirs, regulations 70(2) and 72(2), are outlined in the checklist (section 4 of this document).

#### Consented activities under NES-F 2020

- Culverts or weirs which do not comply with the relevant permitted activity conditions are discretionary activities that will require a resource consent.
- Passive flap gates are a non-complying activity.

#### Notes:

- The structure may be a permitted activity under the NES-F but may still require a resource consent under the AUP(OP) such as if the structure is within certain overlays or doesn't meet AUP(OP) permitted activity criteria.
- Any design changes to consented structures must be reviewed by the relevant specialists to ensure that design structures do not affect the fish passage requirements of the structure.
- The Stormwater Code of Practice, Transport Design Manual and Waka Kotahi NZ Transport Agency require structures to be compliant with the NES-F fish passage requirements, and so EPA Approval should only be given when the structure complies with the permitted activity standards (called conditions in the NES-F) or has a resource consent.

### 2.2 Information requirement

Upon completion of construction, the NES-F requires specific information to be provided within 20 working days to the council. This applies for the following structures:

- culverts
- weirs
- flap gates (passive and non-passive)
- dams
- river or stream fords
- aprons and ramps.

This information is required irrespective of whether the structure is a permitted activity or requires a resource consent, whether under the NES-F or otherwise.

The specific information required differs depending on the structure, and is outlined in regulations 61-68 of the NES-F. Information forms for permitted activities can be found on Auckland Council's website, [here](#). For further guidance, please refer to the "Freshwater management policy and standards" section of the [Ministry for the Environment website](#).

### 2.3 Monitoring and maintenance condition

Where consent is required (whether under the NES-F or otherwise) for any of the structures controlled by Subpart 3, Regulation 69 of the NES-F requires that Council must impose lifetime monitoring and maintenance conditions. The condition must require:

- that the structure's provision for fish passage does not reduce over its lifetime;
- a monitoring and maintenance plan that covers the matters in Regulation 69(2)(b);
- information about the structure to be provided to the consent authority at times specified by the monitoring and maintenance plan, and after each time a significant natural hazard affects the structure.

## 3 Permitted activity condition explanations

The following section provides clarification regarding some common questions around these permitted activity standards. The purpose of the permitted activity standards are to provide for the same passage of fish upstream and downstream as would exist without the structure. The following also clarifies that the definitions of "culvert" and "weir" under the NES-F are more broad than the common uses of these terms and apply to wider a number of structures with similar characteristics that may have different names in the industry.

### Culverts:

- The definition of **culvert** in the NES-F is broader than the definition of culvert in the AUP(OP), i.e. not exclusive to those designed to enable access across a river:
  - AUP(OP) – **culvert** is a structure with an inlet from and an outlet to a lake, river, stream or the coastal marine area, designed to enable access across a river, such as a road or stock crossing

- NES-F - **culvert** means a pipe, box structure, or covered or arched channel that has an inlet and outlet that is in, and that connects the water or bed of, the same river or connected area.
- The culvert span (width) is:
  - 1.3 x stream bankfull width for streams ≤ 3m wide
  - 1.2 x stream bankfull width + 0.6m for streams > 3m wide.
  - The culvert span refers to the span of the individual culverts – multiple culverts cannot be used in parallel to achieve the width requirement i.e., two 1200mm culverts laid in parallel will have a culvert span of 1200mm – not 2400mm.
- Open bottom culverts are used or the culvert invert must be placed so that at least 25% of the culvert's diameter is below the level of the bed
- Well-graded substrate is present throughout the full length of the culvert bed.
- The substrate does not have to be the same as what is in the adjoining stream but instead must be stable at or below the flow rate at which the water flows 80% of the time. In Auckland, many streams have clay bases and placing clay through the culverts is unlikely to meet the stability requirements, so another substrate should be used. Care should be taken with concrete or cement dust – as this may cause pH changes in the stream.
- The purpose of the permitted activity conditions are to achieve uninterrupted continuation of the stream through the culvert (eg. the bed and bank lines are retained through the culvert, velocity and depth match the adjoining natural stream) as per the examples shown below.

### Weirs:

The definition of weir in the NES-F is:

*“weir means an open-topped structure across the full width of any river or connected area that–*

*(a) alters the water level and the flow characteristics of the water; and*

*(b) allows water to flow passively through or over the top”*

The weir definition in the NES-F can apply to a number of common types of structures that may be known by other names, such as:

- Check dam
- Dam
- Rock vane
- Slot weir
- Backwater
- Other stormwater devices

There are many common stormwater devices that may also meet this definition – a good rule of thumb is that if a device or structure is placed across the stream bed in order to passively alter the flow characteristics, velocity or depth of the water, it is likely to be classed as a weir under the NES-F definition.

More guidance on Fish Passage design is found in the [New Zealand Fish Passage Guidelines](#).

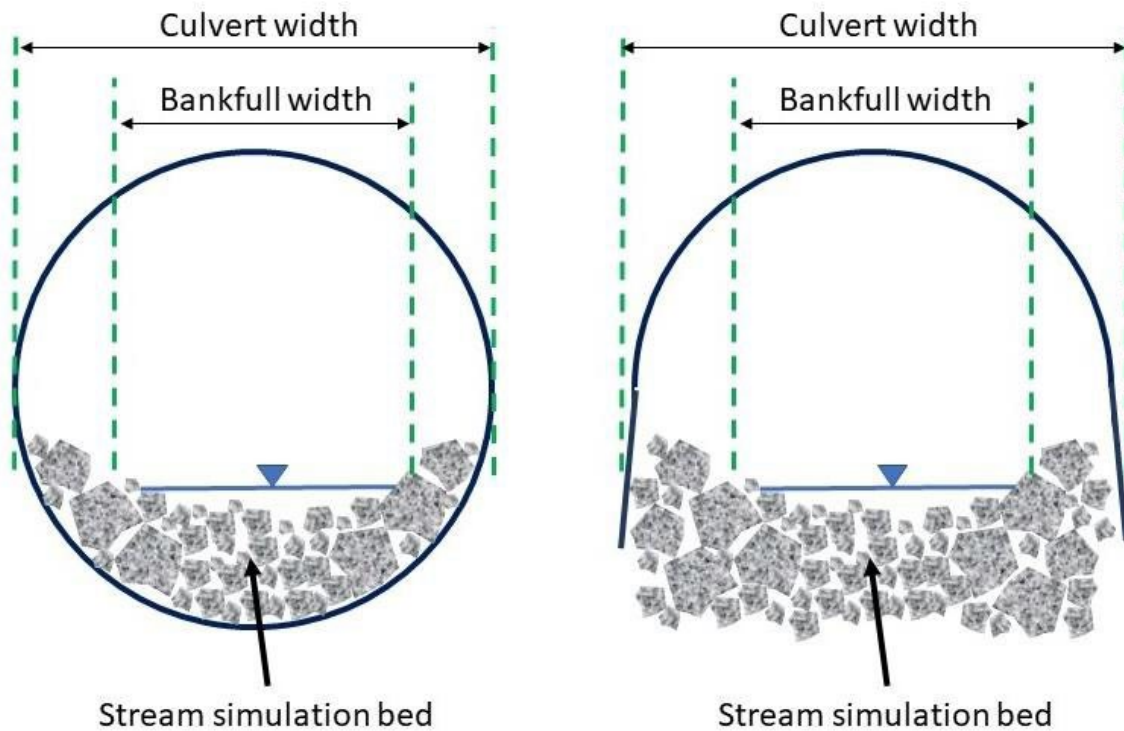


Figure 1 – Illustration of indicative culvert sizing relative to bankfull width for a stream simulation design using an embedded round culvert or arch culvert (Sourced from [NZ Fish Passage Guidelines](#))



Figure 2 – An example of a stream simulation culvert design (Sourced from [NZ Fish Passage Guidelines](#))

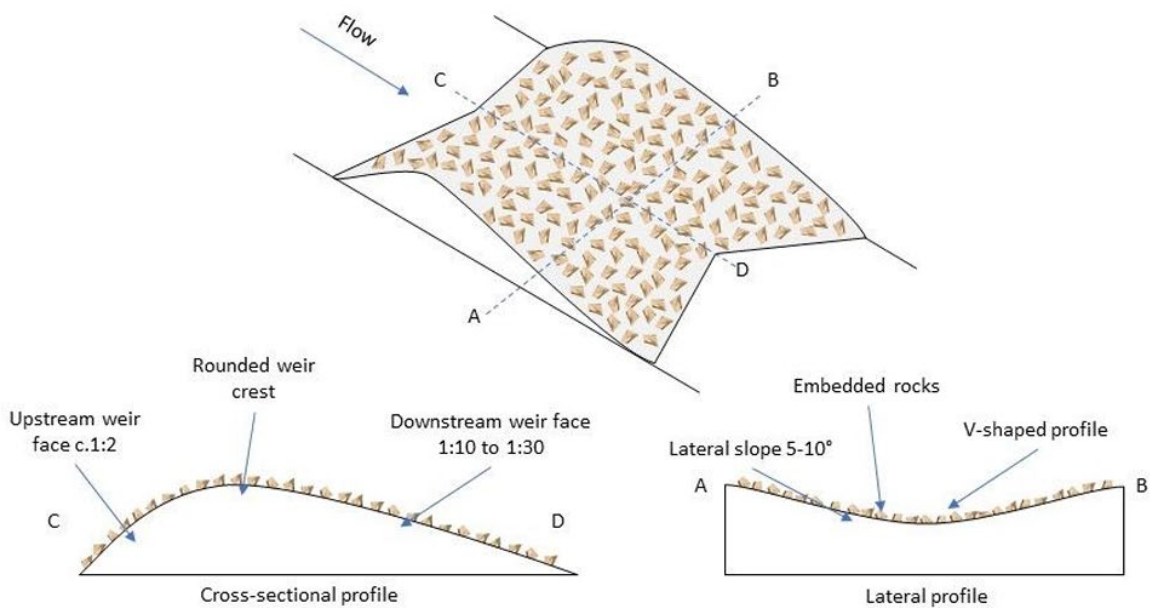


Figure 3 – Key features of a conventional weir design for fish passage. (Sourced from [NZ Fish Passage Guidelines](#))

## 4 Permitted Activity Checklist NES-F 2020 (culverts and weirs)

### CULVERTS

Permitted Activity Design Criteria - Regulation 70(2)	Complies?
(a) the culvert must provide for the same passage of fish upstream and downstream as would exist without the culvert, except as required to carry out the works to place, alter, extend, or reconstruct the culvert; and	Y( ) N( )
(b) the culvert must be laid parallel to the slope of the bed of the river or connected area; and	Y( ) N( )
(c) the mean cross-sectional water velocity in the culvert must be no greater than that in all immediately adjoining river reaches; and	Y( ) N( )
(d) the culvert's width where it intersects with the bed of the river or connected area ( <b>s</b> ) and the width of the bed at that location ( <b>w</b> ), both measured in metres, must compare as follows: (i) where $w \leq 3$ , $s \geq 1.3 \times w$ : (ii) where $w > 3$ , $s \geq (1.2 \times w) + 0.6$ ; and	Y( ) N( )
(e) the culvert must be open-bottomed or its invert must be placed so that at least 25% of the culvert's diameter is below the level of the bed; and	Y( ) N( )
(f) the bed substrate must be present over the full length of the culvert and stable at the flow rate at or below which the water flows for 80% of the time; and	Y( ) N( )
(g) the culvert provides for continuity of geomorphic processes (such as the movement of sediment and debris).	Y( ) N( )



## WEIRS

Permitted Activity Design Criteria - Regulation 72(2)	Complies?
(a) the weir must provide for the same passage of fish upstream and downstream as would exist without the weir, except as required to carry out the works to place, alter, extend, or reconstruct the weir; and	Y( ) N( )
(b) the fall height of the weir must be no more than 0.5 m; and	Y( ) N( )
(c) the slope of the weir must be no steeper than 1:30; and	Y( ) N( )
(d) the face of the weir must have roughness elements that are mixed grade rocks of 150 to 200 mm diameter and irregularly spaced no more than 90 mm apart to create a hydraulically diverse flow structure across the weir (including any wetted margins); and	Y( ) N( )
(e) the weir's lateral profile must be V-shaped, sloping up at the banks, and with a low-flow channel in the centre, with the lateral cross-section slope between 5° to 10°.	Y( ) N( )