

MEMO

Project : Delmore

To: Nick Hazard, Auckland Council

Date: 12/06/25

Re: Delmore – Methodology for Culvert Works within stream

1. Overview

The Delmore Project involves the removal and/or construction of culverts in or near existing watercourses. All works in a watercourse are to follow GD05 guidelines in section G4.0 Works in a Watercourse and good construction practices.

Refer to Appendix A for culvert works and diversion locations.

Three distinct construction methodologies apply based on the presence or absence of stream flow at the time of works:

2. Dry Weather Methodology (No Flow Present) – Culvert Removal

This method applies to existing culverts to be removed and only when stream flow is absent, typically during dry summer months and on smaller contributing catchments.

Key Conditions:

- Stream channel is completely dry.
- Forecast confirms no imminent rainfall or flow events.
- Work is limited to 3 days.

Methodology:

- Monitor weather conditions and stream baseflow leading up to construction.
- Schedule work during verified periods of dry weather and no forecast rain.
- Consult with project Ecologist prior to works on any specific requirements (eg fish recovery and relocation) plus final channel form and shape.
- Ensure stabilisation materials for bed or banks as applicable are on site (eg Biojute).
- Remove culvert in accordance with engineering plans and GD01 Section G4.0 Works in Watercourse .
- Follow standard sediment control and safety practices.

- Ensure any residual water or dampness is contained and not discharged.
- On completion, restore ground conditions and apply erosion protection (e.g., Biojute) where required.

3. Dry Weather Methodology (No Flow Present) – Culvert Installation

This method applies to new culverts to be installed and only when stream flow is absent, typically during dry summer months and on smaller contributing catchments.

Key Conditions:

- Stream channel is completely dry.
- Forecast confirms no imminent rainfall or flow events.
- Work is limited to 5 days for primary culvert install.

Methodology:

- Monitor weather conditions and stream baseflow leading up to construction.
- Schedule work during verified periods of dry weather and no forecast rain.
- Consult with project Ecologist prior to works on any specific requirements (eg fish recovery and relocation).
- Have all materials and equipment on site at location before commencing any works to minimise duration of works.
- Ensure stabilisation materials for bed or banks as applicable are on site (eg Biojute).
- Excavate and remove culvert in accordance with engineering plans and GD01 Section G4.0 Works in Watercourse.
- Follow standard sediment control and safety practices.
- Ensure any residual water or dampness is contained and not discharged.
- On completion, restore ground conditions and apply erosion protection (e.g., Biojute) where required.

4. Diversion Channel Methodology (Flow Present) – Culvert Installation

This method is used when flow is present or expected, and a temporary diversion is necessary to isolate the work area.

Estimated Duration:

- Temporary diversion may remain active for up to 1 month, depending on construction requirements but where possible, duration of works is to be minimised

Key Conditions:

- Schedule works for a period when stream flows are low.
- Monitor stream in lead up to works to establish typical channel flows and levels
- Plan diversion works when forecast confirms no imminent rainfall or flow events.
- Liaise with ecologist on required ecological requirements of temporary channel (eg fish passage etc)
- Have all materials and equipment on site at location before commencing any works to minimise duration of works.

Diversion Setup:

1. Temporary channel:

- Install a temporary channel to the required dimensions
- Line the channel with geofabric to avoid erosion. Place temporary rip rap at channel outlet to reduce velocities and erosion.
- Install outlet into existing channel and stabilise

2. Channel Isolation:

- For low flows: Construct a sandbag wall across the channel (up to 500mm high)
- For moderate/high flows: Install a steel plate or sheet pile sealed with sandbags.
- For larger/wide streams where a steel plate isn't practical, construct an earth bund with erosion protection.
- Breach flow into diversion channel
- Isolate Downstream section of channel to be culverted with sandbags/steel plates

3. Ecological Management:

- Ensure ecologist monitor works.
- Salvage and relocate aquatic species if required from isolated channel before excavation.
- Ensure dewatering of the site is controlled and sediment is captured.

4. Culvert Installation:

- Proceed with excavation and culvert construction in accordance with approved engineering plans.
- Ensure all spoil is stored away from the watercourse above stream bank
- Implement standard safety and contamination prevention measures.

5. Culvert Redirection

- Once culvert, wingwalls and approaches completed to sufficient standard to accept flows identify period of low flow.

- Open downstream end of culvert to existing channel while maintaining temp diversion channel.
- Divert inlet end of channel into upstream end of culvert and simultaneously isolate temporary diversion channel at upstream end then downstream end once majority of water has exited temporary channel.
- Have ecologist review temporary channel and action as required (eg de-fish)

6. Site Rehabilitation

- Removed temp channel material sand commence backfill progressively as directed leaving site in stable condition at end of each day.
- Stabilise embankments or similar erosion control materials.

5. Environmental and Regulatory Compliance

All works must comply with the following:

- Auckland Unitary Plan – Earthworks and Watercourse Modification (Chapters E11 & E12)
- National Environmental Standards for Freshwater (NES-FW) 2020
- Auckland Council Guidelines:
 - GD05 – Erosion and Sediment control Guide for Land Disturbing Activities in the Auckland Region –
- Resource Management Act 1991

6. Maintenance of Existing Flow Characteristics and Effects Assessment

The temporary diversion channels have been designed to replicate the existing flow conditions as closely as practicable. Its alignment, cross-section, and base profile are intended to maintain flow continuity, velocity, and depth similar to current stream conditions to avoid introducing additional hydraulic or ecological effects.

Diversion flows will be managed in a controlled manner, with flow conveyance through the temporary channel matching existing low-flow regimes observed during pre-construction monitoring. These measures, along with planned erosion and sediment controls and ecological oversight, are expected to ensure that the effects of diversion remain consistent with those assessed in the AEE and associated technical reports.

Accordingly, the methodology avoids generating additional adverse effects beyond those already identified, and the diversion strategy is considered appropriate in advance of the final Streamworks Management Plan (SMP) to be submitted under proposed Condition 86.

7. Erosion Risk and Site-Specific Measures – Culvert 9

Site observations have identified a significant drop in stream bed elevation downstream of existing Culvert 9, making this location particularly susceptible to erosion and scour, and making fish passage impossible through the culvert.

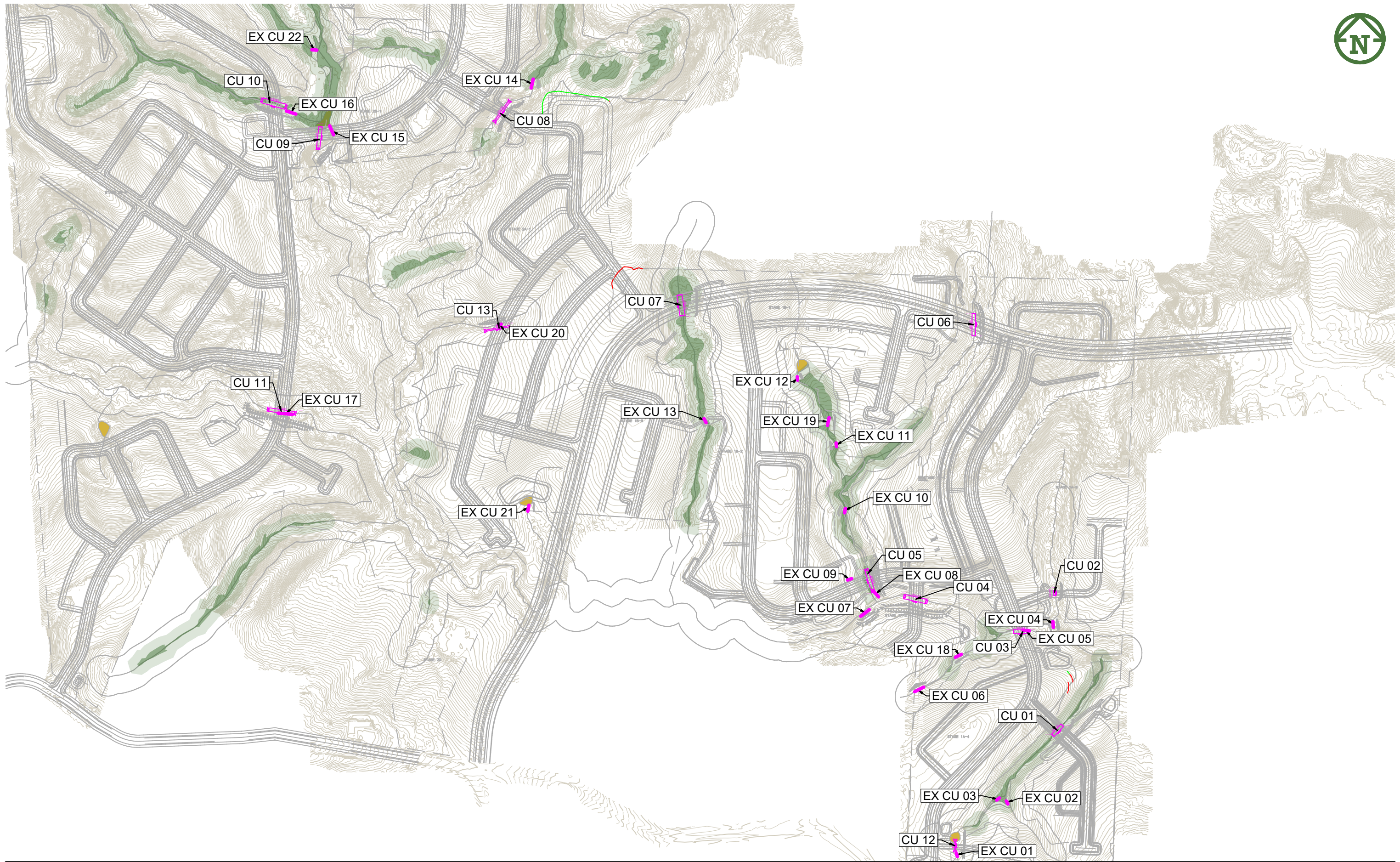
It is noted that the full embankment may breach if the existing culvert is not replaced, and the wetland may be compromised if the culvert fails. The proposed culvert design sets the culvert and diversion channel inlet levels at the same level as the existing failing culvert, to mimic the natural standing water level in the wetland. The proposed culvert has a gentle grade, and does not have a drop at the end, as the existing culvert does, which enables fish passage. So the new culvert arrangement will stabilise the wetland and enable fish passage. The proposed diversion channel will also will not drop at the end, which will also facilitate fish passage and minimise erosion.

To address erosion risk, the following site-specific erosion mitigation measures will be implemented:

- Ensuring channel grade does not result in a drop at the end.
- Setting the diversion channel inlet at a similar level to the existing culvert.
- Temporary energy dissipation structures such as rip rap aprons or rock-lined basins will be installed downstream of the temporary diversion outlet and future culvert outlet to control flow velocities and reduce the risk of scour.
- Where feasible, grade control measures (e.g. stepped rock chutes or geotextile-reinforced pads) will be incorporated into the channel profile to stabilise bed levels in this sensitive reach, likely at the exit of the channel.
- The temporary diversion channel will be lined with geofabric and include rip rap armouring at inlet and outlet points to prevent undercutting and lateral erosion.
- Upon completion of culvert installation, the receiving bed will be stabilised with permanent erosion control measures as outlined in the engineering plans, including Riprap, Biojute matting, topsoiling, and revegetation as appropriate.

These additional erosion control measures are intended to ensure that the temporary diversion does not exacerbate erosion downstream of Culvert 9 and that the site remains stable both during and after construction.

Appendix A – Culvert diversion locations



CLIENT:

PROJECT:

TITLE:

PURPOSE OF ISSUE:

VINEWAY LIMITED

DELMORE
STAGE 1 & 2
53A, 53B & 55 RUSSELL ROAD
OREWA

STORMWATER
TEMPORARY STREAM DIVERSION
PLAN

FOR CONSENT

SCALE:
1:4000 @A3
DO NOT SCALE

DRAWING NO:
3725-0-4950

REV:
A



A	FIRST ISSUE	SH	JK	JK	29/05/2025
REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE

PLOT DATE Tue Jun 3 17:11:14 2025 WWW.MCKENZIEANDCO.CO.NZ THIS DRAWING IS SOLELY FOR USE BY THE CLIENT ON THIS PROJECT ONLY. NO LIABILITY IS ACCEPTED IN ITS USE BY ANY OTHER ENTITY OR FOR ANY OTHER PURPOSE

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