

APPENDIX D

Pit Lake Eel Passage



Memorandum

19 November 2018

To	Kathy Mason		
Copy to	Malcolm Lane		
From	Sioban Hartwell	Tel	029 3551427
Subject	Pit Lake Eel Passage	Job no.	51/37083/

As requested we have prepared sketch plans of the pit lake overflow pipe, inlet and outlet structures (attached).

These are to assist with informing the Project Martha hearing commissioners on the practicability of constructing passage for eels into and out of the lake. The sketches were prepared with the input of Dr Ian Boothroyd and were further informed by the New Zealand Fish Passage Guidelines (for structures up to 4 metres) issued by the Department of Conservation April 2018.

Key considerations for the design of the pit lake discharge inlet and outlet structures include:

- Debris control is needed at the pipe inlet since there is no other point of discharge for the lake and it is important the pipe does not get blocked. Debris control will be provided by a bar screen – the gap between bars is 120 mm which is adequate for eels.
- The lake will overflow to the pipe inlet via a weir and concrete apron – the apron will extend as far as is practicable to the edge of the RL103 bench in order to minimise the apron gradient and thus velocity of flow across it. This apron will also include roughened sections and edges. Baffles on the sloped part of the weir will give the eels resting spots. Having rough features parallel to the flow going over the flat face of the broad-crested weir will also slow down flow.
- Erosion protection with large rocks/riprap at the pipe outlet will provide the dual purpose of protecting the slope and Mangatoetoe Stream bank when flows out of the pit lake are high, and providing protection and a climbing surface for eels swimming up the pipe to the lake.
- The pipe outlet will also include a grid, likely with an access gate built in to allow maintenance work and to prevent public entry
- The pit lake outlet pipe is not ideal for eels given its length of 150m and slope of 2%. Ian Boothroyd has recommended a fish ladder and/or intermediate baffles be built into the pipe. From a design capacity perspective this is not a problem as the pipe has been conservatively sized to allow for blockage and access.

51/37083/Pit Lake outlet eel passage concept.docx

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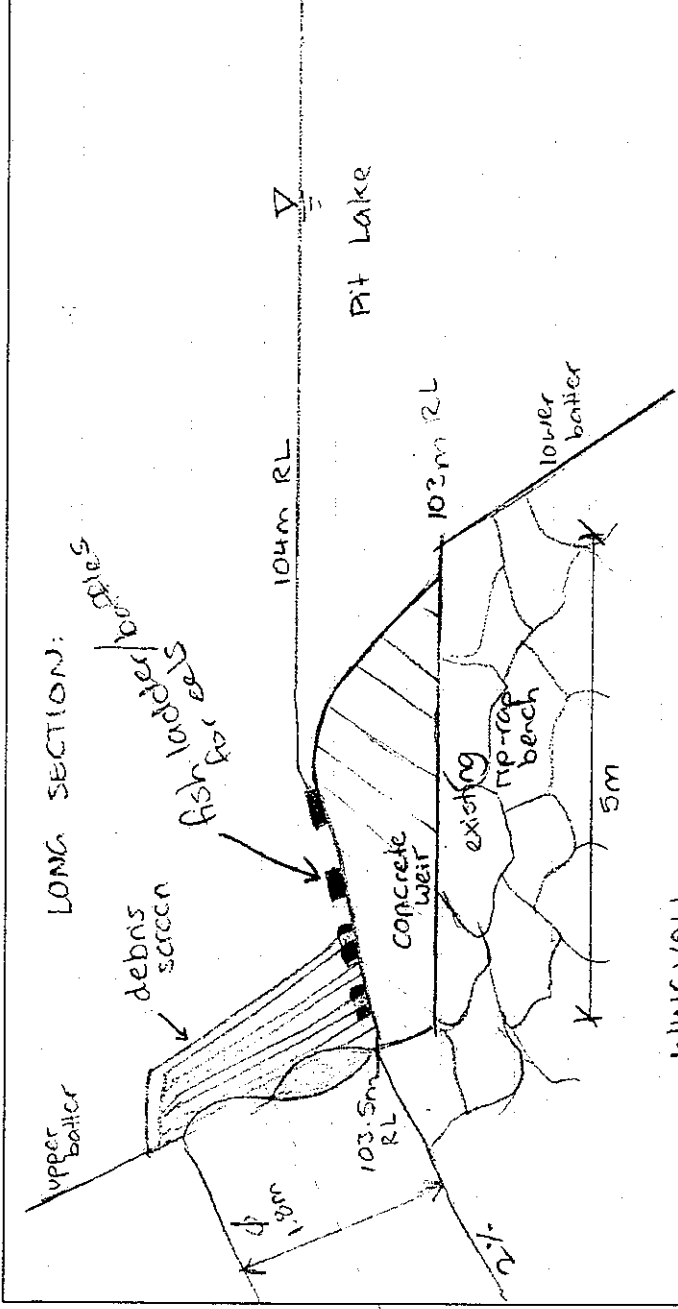


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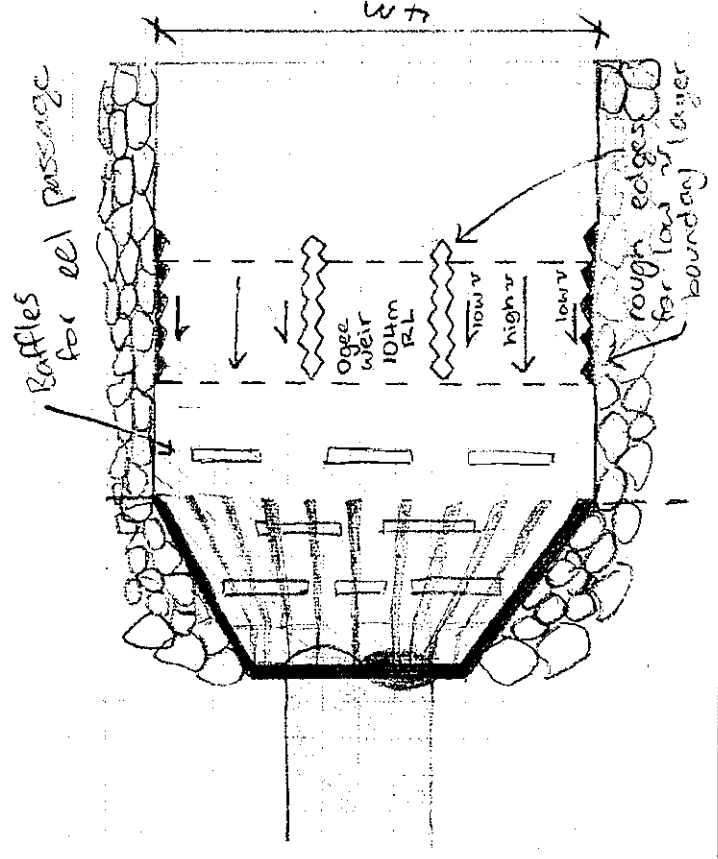
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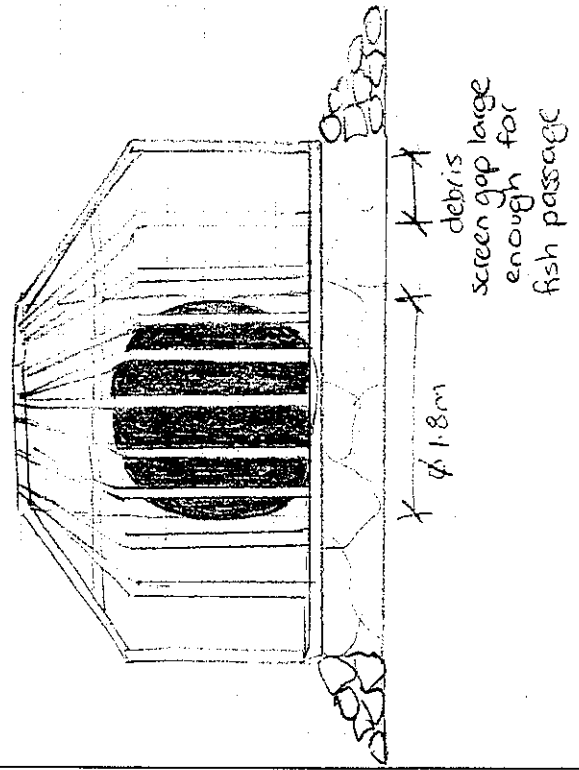
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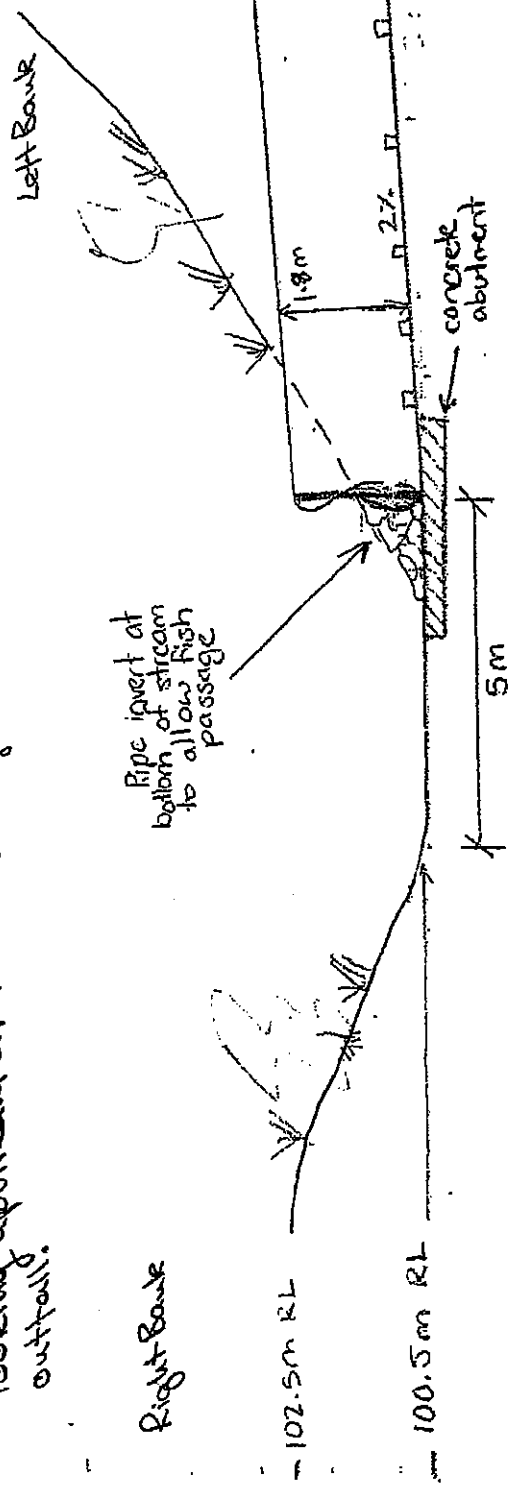
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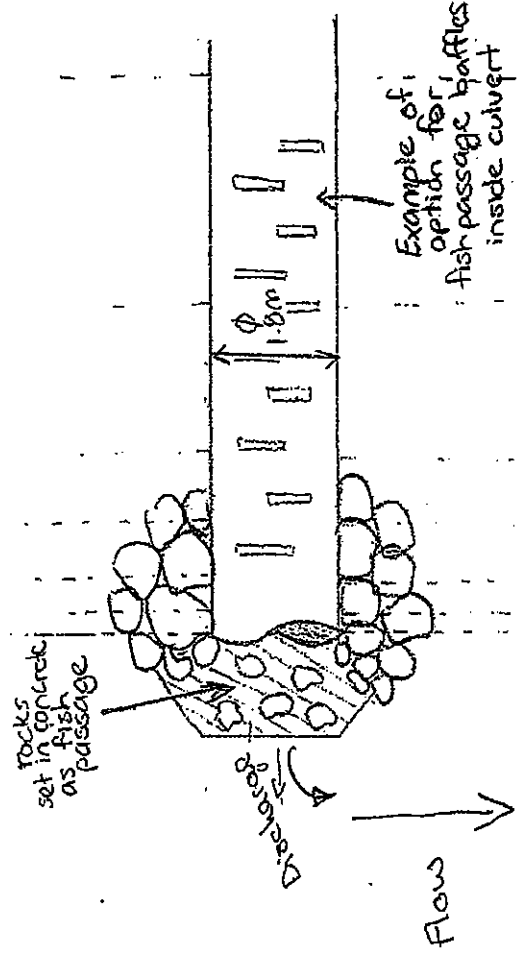
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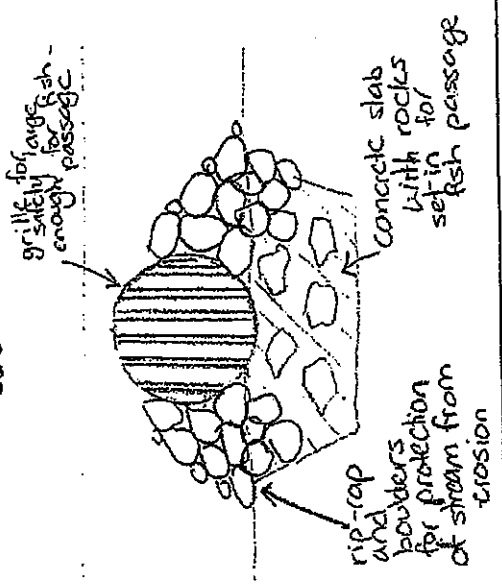
Cross-section of Mangatotoe Stream looking upstream at lane discharge outfall.



PLAN:



PIPE OUTFALL SECTION:



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