Blackpool Stormwater Improvements Stage One

Fish Management Plan

Prepared for Auckland Council
Prepared by Beca Limited

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Contents

Appendices

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Revision History

Revision N°	Prepared By	Description	Date
1	Kimberley D'Souza	Draft for Client Review	2/12/2024
2	Kimberley D'Souza	Final	2/12/2024

Document Acceptance

Action	Name	Signed	Date
Prepared by	Kimberley D'Souza		2/12/2024
Reviewed by	Connor Whiteley		2/12/2024
Approved by	Jenny Vince		2/12/2024
on behalf of	Beca Limited		

1 Introduction

Beca Limited (Beca) has been engaged by Auckland Council Healthy Waters and Flood Resilience (Healthy Waters) to prepare a Fish Management Plan (FMP) to support the construction works associated with the Blackpool Stormwater Improvements Stage 1.

The proposed works involves improving the existing stormwater network in the Blackpool area, on Waiheke Island, by widening and deepening existing stream channels, installing several box culverts into the channel, tree removal, and replanting the banks with suitable riparian vegetation.

1.1 Stormwater Network Improvement Works

In total, five watercourses (excluding one artificial watercourse) have been identified that may be impacted during the stormwater improvement works (Figure 1). A majority of these watercourses, with the exception of P1, has been assessed as having Low ecological value[1].

To improve stormwater drainage and minimise flooding during heavy rainfall periods the floodplain of several channels identified as P1, 2, 3, and 6 will be widened and the stream banks trimmed to reduce bank height. Instream works including diversion of flow and dewatering will occur at channels P2 and P3. Channels P1, P5, and 6 will not be modified (refer to Figure 1), therefore fish management is not required here. An overview of the channel modifications at each section can be found in the project design drawings, and are briefly outlined below:

- P1 and P2 – floodplain to be lowered and stream banks trimmed to improve connectivity. Banks and floodplain to be replanted with suitable native species. Channel width is not proposed to be altered. The concrete lined channel with P2 will also be removed.
- P3 – floodplain to be lowered by ~ 1.4 m and the stream channel will be moved approximately 1 m west to reduce side batter slopes. The channel will be widened to approximately 1 m wider than the existing channel (0.75 m). Banks and floodplain to be replanted with suitable native species.
- P6 – floodplain to be lowered by ~ 1.2 m and replanted with low growing native species. Channel width is not proposed to be altered.

A full description of the network improvement works is detailed within the Project's Assessment of Environmental Effects[2] and an overview of the construction methodology (in relation to instream works) is outlined below.

1.2 Construction Methodology

A preliminary construction methodology has been prepared[3] and is summarised below in relation to instream works:

[1] Beca Limited. (2024). Blackpool Stormwater Improvements Stage One – Ecological Impact Assessment. Prepared for Auckland Council.

[2] Beca Limited. (2024). Blackpool Stormwater Improvements Stage One – Assessment of Effects on the Environment. Prepared for Auckland Council.

[3] Auckland Council. (2024). Blackpool Stormwater Improvements Stage 1 – (Preliminary) Construction Methodology.

- Instream works to upgrade/install culverts, lower floodplains, and widen channels will require open channels to be isolated. This is proposed to be undertaken through bunding off open channels with sandbags and diverting water through a nova coil pipe.
- Watercourse excavations are proposed to be undertaken with a digger, with spoil material taken offsite.

The programme for the entirety of Stage 1, excluding revegetation planting, is estimated to take a total of 12 months. Works within the open waterways will be staged and are anticipated to take between 2 – 8 weeks.

1.3 Permit Requirements

The fish salvage operations and freshwater ecologists undertaking the salvage works will be working under the special permit (SP798) and native fish transfer (NFT353), which have been obtained from the Ministry for Primary Industries (MPI). Electric fishing activities will also require approval from Fish and Game.

Due to the nature of the works, some flexibility and changes in the methodology may be expected, and any changes will be undertaken with discussion with Healthy Waters, who are responsible for undertaking the works.

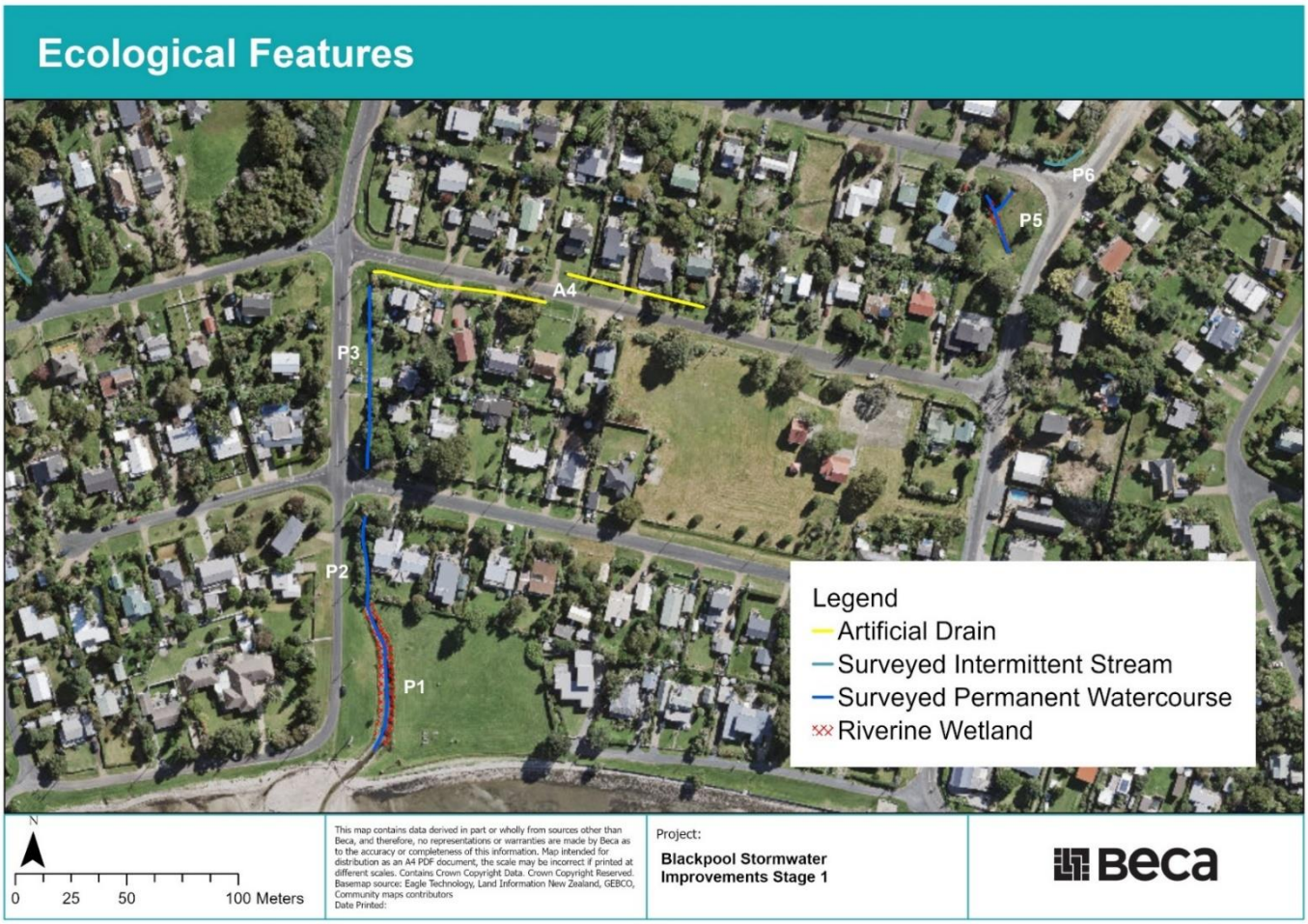

Figure 1. Fish management will only be required at P1, 2, 3, and 6. No fish salvage will be undertaken in A4 and P5.

2 Freshwater Fauna

Two eDNA samples were collected from P1 and P5 during the May 2024 site survey which indicated the presence of shortfin eel (*Anguilla australis*) and banded kōkopu (*Galaxias fasciatus*). P1 is lowland estuarine stream system that provides fish passage and (limited) habitat for these species as well as longfin eel (*Anguilla dieffenbachii*) and īnanga (*Galaxias maculatus*), both At Risk – Declining). P5 and P6 are considered to be completely inaccessible to īnanga given the piped nature of the stormwater network, and the perched culverts. Longfin eel juveniles, however, have excellent climbing and are likely to access upstream habitat.

A review of NZFFD also identified only banded kōkopu and shortfin eel from 2003 near the modified stream channel along Te Huruhi Bay Reserve. A 2003 record of giant bully (*Gobiomorphus gobioides;* At Risk – Naturally Uncommon) is also available from near Oneroa Bay. There is potential for giant bully to reside here, and there is some instream habitat in P2. However, given they are not strong climbers, it is unlikely that they will be able to access further upstream habitat.

3 Fish Management Plan

Due to the relatively limited extent of stream reach that is being modified (approximately 100 m across P2 and P3), as well as the limited habitat present which is expected to support a low diversity of freshwater fish, passive fish trapping methods are recommended.

Fish management will only be required in reaches where instream works are occurring including channel isolation, diverting of water, and dewatering. At this stage it is understood, that that this will occur at channels P2 and P3 as per conversations with Healthy Waters.

Following the implementation of fish salvage, the lead Project Ecologist will provide an “all clear” for works to continue. Instream works should be undertaken immediately following the completion of fish salvage.

3.1 Fish Exclusion

To prevent the movement of freshwater fish between the upstream and downstream stream reaches during the works, fish exclusion barriers will be installed at the channels where diversion and dewatering will occur. If water levels are shallow and low flowing, barrier can comprise stacked sandbags, however, should water levels be moderate flowing and > 30 cm in depth, the barriers will comprise fine mesh cable tied to metal waratahs which will be staked into each side of the bank. The base of the mesh will be weighed down by rocks or sandbags to prevent fish from travelling under the barrier.

3.2 Fish Salvage Methodologies

3.2.1 Gee Minnow Trapping

Gee minnow traps are small fish traps that typically consist of two funnel shaped entrances at either end of a mesh box or cylinder. This method of trapping is considered passive trapping as it relies on fish encountering and willingly entering the trap. The size of fish trapped is limited by the entrance hole, which is between 20 – 30 mm in diameter. Gee minnow traps are effective at collecting small individuals of the various New Zealand native freshwater fauna, as well as small sized eels.

3.2.1.1 Methodology

In general, the methodology will follow the guidance laid out within the DOC Gee Minnow Document (Lake, 2013) and includes:

- Gee minnow traps will be placed every 5 - 7 m along the edge of the pond, partially submerged, and may potentially be baited.
- Traps will be fixed in a location by attaching them to a standard garden stake. In addition, traps will also have a floating marked to ensure all traps will be retrieved, should any move during the night.
- Traps will be left overnight and checked the following morning, with any individuals caught to be identified and relocated.
- Due to the small extent of stream reach, a minimum of one night of trapping will be undertaken. Should no fish be caught during the first night of trapping, then electric fishing or the works can commence.
- Should At Risk species be caught and exceed the number of traps deployed, then a second night of trapping will be required.
- Where there is a risk of low oxygen levels (e.g., slow flowing water/high water temperatures) gee minnow traps will not be fully submerged to allow fish to breathe atmospheric air and thus prevent mortality.

- Where water levels are too low (< 15 cm) traps will be dug into the sediment base (if possible) to allow for deployment. Where this is not possible, salvage efforts will focus on electric fishing only.

3.2.2 Fyke Trapping

Fyke nets are large cylindrical fish traps which contain a series of funnel-shaped openings, these opening make it easier for fish to enter but difficult to exit. Vertical sections of netting, called leaders, extend out from the mouth of the trap, and are used to guide fish into the net. Fyke net catches tend to be biased towards mobile bottom-dwelling species, but a wide range of species can be caught when they are set in shallow water.

Fyke nets are highly effective for capturing adult eels and will be deployed where the habitat presents a deeper water depth and larger wetted width.

3.2.2.1 Methodology

Where the habitat type is deemed suitable for the deployment of fyke nets the following methodology will be implemented.

This methodology has been developed in general accordance with the approaches laid out within the DOC Fyke Net Document (Lake, 2013):

- Fyke nets will be deployed every 25 linear metres along the edge of any freshwater features along bank.
- Fyke nets will be staked in using standard garden stakes and the tops of stakes will be identified with neon flagging tape to prevent the loss of traps.
- Traps will be left overnight and checked the following morning, with any individuals caught to be identified and relocated.
- Due to the small extent of stream reach, a minimum of one night of trapping will be undertaken. Should no fish be caught during the first night of trapping, then electric fishing can commence.
- Should At Risk species be caught and exceed the number of traps deployed, then a second night of trapping will be required.

3.2.3 Electric Fishing

Electro-fishing is a methodology used to capture freshwater fauna by stimulating neurological response, through the conduction of electrical current through the water column. This stimulation can result in a forced swimming behaviour and/or stunning of freshwater fauna, making them easier to capture with hand nets. When undertaken by a certified and suitable experienced operator, the majority of individuals caught will recover quickly after removal from the electrified water.

The primary benefits of electro fishing are that there is a higher certainty of fish capture in applying the method, and multiple-day visits are typically not required.

Electro-fishing is limited by the habitat type and should only be used where the habitat is suitable. The primary limitations on use can include dense macrophyte (aquatic weed) and deep, soft sediments, which is not present within this reach. Electric fishing will mostly be used in channel P2, which is hard bottomed and concrete lined.

3.2.3.1 Methodology

The use of electro fishing methodology will include:

- Electric fishing will occur for a minimum of three passes along the fishing reach.

- After three passes, if the number of captured fish has decreased by > 60% between each of the three passes, then it will be considered adequate salvage of fauna.
- If native fish with a conservation status of 'At Risk – Declining' are captured, then further electric fishing passes will be undertaken until no further species with these conservation statuses are captured.
- For native freshwater fish without the above conservation status, if the number of fish captured between any two consecutive passes decreases by < 60% then further electric fishing passes will be undertaken until the decrease is > 60% or < 10 individuals are captured.

4 Biosecurity Management

4.1 Pest Fish

No pest fish were identified through eDNA samples and fish surveying, however, should pest fish be caught they will be humanely euthanised using either clove oil (50 mL per 10 L of water) or placing them on the grassy bank and away from the stream.

4.2 Gear Sterilisation

To reduce the risk of transferring freshwater pest plants into new locations, the nets/traps and other equipment required for this operation will be adequately cleaned prior to use. Furthermore, traps will be cleaned prior to being transferred from one site to be used at the next site. Following the completion of works, all equipment used during the fish survey will be adequately cleaned and sanitised.

5 Transfer and Relocation

5.1 Release Site Selection

Ideally, the release site should be within the same Blackpool stormwater network, however in this instance the upstream environment is also being impacted by the works and requires management, and the remainder of the network (Stage Two areas) has limited suitable habitat. Therefore, it would not be appropriate to release fish into the upstream catchment.

Given this, fish will be relocated into the permanent stream system adjacent to Te Huruhi Bay Reserve along Tahatai Road. This stream system is also conveying stormwater into the marine environment through a modified drain-like system and is expected to provide similar habitat values as the channels being impacted as part of these works.

5.2 Holding and Transfer of Fish

Following the capture of any freshwater fish, they will be placed within a bucket with an appropriate volume of stream water. Fish will be held for a limited amount of time (< 30 minutes) before being released at the release site.

Whilst contained, fish will be monitored regularly and if any individuals show any sign of stress (e.g., gulping air, gaping, loss of righting response, fighting), they will be transferred immediately, and water changed. Other key items to implement include:

- Handling of fish will be minimised in order to reduce stress. Where handling is required, it will be undertaken with wet hands;

- Large eels (< 500 mm) will be placed in a separate container and numbers contained at one time will be kept to less than 5.
- Very large eels (> 500 mm) will be released immediately following capture; and
- Smaller fish species (galaxiids or bullies) will be placed in a separate container to eels and released away from the release location of any eels.

6 Completion Report

Following the completion of fish salvage works, a Fish Salvage Summary Report will be prepared. This Report will detail:

- The total quantity and types of species salvaged.
- Any site specific challenges and issues that occurred.
- Any adaptations to the methodology that were required.
- The confirmed location of the release site.

7 References

Lake, M. (2013). *Freshwater fish : passive nets — minnow traps*. 1–24.

McEwen, W. M. (1987). *Ecological Regions and Districts of New Zealand*. Department of Conservation.