



Kaipara te Oranganui

**KAIPARA**  
**DISTRICT**

Two Oceans Two Harbours

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## Taharoa Domain Governance Committee Agenda

**Date:** Thursday 28 May 2020  
**Time:** 2:00 p.m.  
**Location:** Northern Wairoa War Memorial Hall  
37 Hokianga Road  
Dargaville

**Committee members:** Councillor Jonathan Larsen (Chair)  
Councillor Karen Joyce-Paki  
Ric Parore (Te Kuihi)  
Sonny Nesbit (Te Roroa)

*For any queries regarding this meeting please contact  
the Kaipara District Council on (09) 439 7059*



Thursday, 28 May, 2020

2:00 pm

Conference Room, Northern Wairoa Memorial Hall, Dargaville

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**Taharoa Domain Governance Board Meeting  
Thursday 28 May 2020**

**Freshwater Improvement Fund Dune Lakes Project  
Sediment Mitigation Workstream  
Kai Iwi Lakes**

The purpose of this report is to:

- Seek your views on sediment and nutrient issues facing the Kai Iwi Lakes
- Provide background on the Freshwater Improvement Fund Dune Lakes Project Sediment Mitigation Workstream and an overview of the suggested mitigation measures.
- Request feedback on the sites identified for possible sediment mitigation earthworks and the proposed earthworks.
- Request contacts for ongoing dialogue, site visit and approvals for the project.

**1) Kai Iwi Lakes Management Plan**

The Kai Iwi Lakes Taharoa Domain Reserve Management Plan was adopted in 2016. The plan notes that the lakes' water quality is amongst the highest of any dune lakes in New Zealand.

The plan also identifies threats to water quality from the wider catchment that influences the lakes. *Reducing the risks and the likelihood of damage to water quality and aquatic ecology requires proactive management and will involve a number of organisations.*<sup>1</sup>

One of the objectives from the Kai Iwi Lakes Reserve Management Plan is: *to strengthen the integrity and resilience of the natural ecologies and water quality, and engage neighbours to minimise the risk of potentially harmful groundwater reaching Kai Iwi Lakes*

**2) Introduction to the Freshwater Improvement Fund Project**

The Freshwater Improvement Fund (FIF) Dune Lakes project is a 5-year project jointly funded by Northland Regional Council (NRC) and the Ministry for the Environment (MFE). The goal of the project is to improve the water quality of up to 26 of Northland's dune lakes, including the Kai Iwi Lakes, through a range of work streams that specifically target the threats to dune lakes. We will work with mana whenua, agencies, landowners and stakeholders who have an interest or own or live around the lakes identified in the project to find shared goals and undertake actions to improve water quality.

Different threats and issues are being addressed at each lake. There are several workstreams to the project, such as pest fish and weed removal, , mātauranga Māori, stopping the spread of aquatic weeds, education, fencing lakes and sediment mitigation.

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<sup>1</sup> Reserve Management Plan Kai Iwi Lakes (Taharoa Domain) 2016 Kaipara District Council

Different workstreams are suggested for five lakes in this area:

	Sediment mitigation	Education Day	Fencing	Reticulation
Taharoa	✓	✓		
Kai-Iwi	✓			
Waikare	✓			
Shag			✓	✓
Midgley			✓	✓

The fencing and reticulation at Shag and Midgley Lakes is completed and the Get to know your dune lake education day was held in March 2020 at Lake Taharoa.

### 3) FIF Sediment Mitigation Work Stream

The FIF sediment mitigation work stream supports the Kai Iwi Lakes Reserve Management plan as it aims to work with mana whenua, kaitiaki, Councils, Department of Conservation and landowners in the lake catchments to reduce sediment and bound phosphorus from reaching Kai Iwi lakes.

With reduced nutrients entering the lakes, water clarity is maintained, weed and cyanobacteria growth are limited and low-nutrient-need native submerged plants (macrophytes) will thrive.

Sediment is an issue because phosphorus binds to sediment. Too much phosphorus causes enrichment and algal blooms in dune lakes.

### 4) Sites of interest for sediment mitigation

Two sites have been identified for investigation for sediment mitigation measures around two lakes. They are shown in the table and images below:

Lake Name	Site name	Potential earthworks
Waikare	Boat ramp	Swale
Taharoa	Promenade Point	Wetland

In addition to the sediment mitigation measures, fencing of streams and wetlands on farmland in the catchment, if they are not fenced already, is also recommended, along with riparian planting.

Lake Waikare boat ramp drain from farm land west of the boat ramp –  
swale?



**Lake Taharoa** Promenade Point drain – draining farm land west of the lake – wetland?





## 5) Sediment Reduction and Mitigation Options

Best practice sediment reduction and mitigation takes a two-pronged approach - **in-field** mitigations and **edge-of-field** mitigations.:

- 1) **In-field** mitigations aim to **prevent** erosion occurring in the first place by binding soil to prevent its mobilisation and reduce rainfall impacts. These include:
  - increased pasture density,
  - spaced tree planting on pasture,
  - good land use practices to reduce erosion such as well-maintained races
  - conversion to forestry, native or exotic of highly erodible land.
- 2) **Edge-of-field** mitigations aim to **mitigate** erosion that does occur by reducing run-off velocity and trapping suspended sediment. These include:
  - riparian fencing and planting,
  - sediment retention infrastructure such as swales, traps and bunds,
  - wetlands.

Co-benefits of sediment mitigation include mitigation of nitrogen, phosphorus and *E. coli*, maintaining soil health and fertility, and other ecosystem services on site and off site such as flood mitigation and habitat for native and endangered plants and wildlife.

The FIF Sediment Mitigation workstream principles are to:

- ✓ Consider the entire catchment in a holistic way
- ✓ Look at land use around the lakes to prevent sediment loss in the first place
- ✓ Protect and / or expand existing wetlands and riparian margins
- ✓ Find critical sources of sediment and reduce these first

NRC staff are working with landowners around lakes to prepare Farm Environment Plans. These plans recommend best practice actions on farms to minimise erosion potential and to mitigate sediment and other nutrients where they occur on site. Several landowners have been actively working to improve water quality on their farms. Ideally NRC would like to engage with all landowners in the lake catchments.

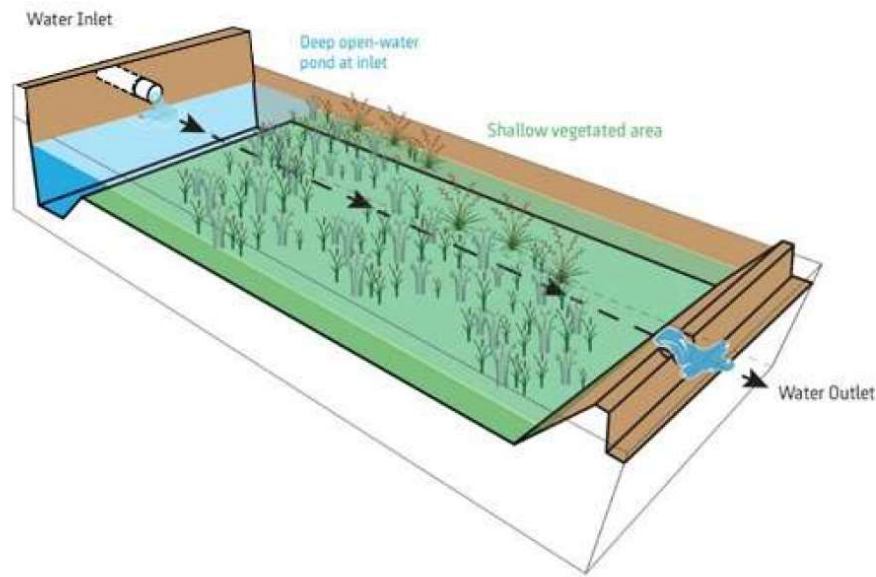
## 6) Natural, constructed and reconstructed wetlands

Wetlands work in four ways to mitigate nutrients and sediment arising from pasture to improve water quality:

- Denitrification – removing nitrogen by microbial production of nitric oxide (NO), nitrous oxide (N<sub>2</sub>O) and N<sub>2</sub> from nitrate
- Nutrient uptake by plants – wetland plants taking in N and P from the surrounding water column and sediment. Aquatic plants such as raupo and sedges have reported nutrient uptake rates of 13-263 gN/m<sup>2</sup> /y and 2-40 gP/m<sup>2</sup> /y<sup>2</sup>
- Deposition - settling of nutrient containing sediment, flocs, detritus, phytoplankton from the water column e.g., floodplains, soil deposits

- Adsorption - physical or chemical bonding of molecules to the surface of solids

A broad array of wetland options are available, with the relative suitability of each form dependent on flow path, primary contaminant type, size, slope, and soil type. A typical constructed wetland for sites with potentially high sediment loads is shown in Figure 1.



**Figure 1: Elongated wetland with open water deep zones receiving surface flow. In the wetland area, there is an initial deep zone to aid spreading of flow across the full width of the wetland followed by alternating shallow vegetated (~70% of area) and deeper open-water zones where microbial processes, plant uptake and sorption processes reduce nutrients <sup>3</sup>.**

Wetlands occupying 1% to 5% of their catchment area should, on average, remove between 24% to 52% of their long-term average total nitrogen (TN) inputs. Wetlands occupying 1% to 5% of their catchment area should, on average, remove between 26% to 48% of the long-term average total phosphorus (TP) input <sup>3</sup>.

The most cost-effective option is to retain existing wetlands, or secondly, to restore and improve degraded wetlands. Extending existing wetlands is also an option, as well as construction of new wetlands.

Wetlands are a preferred mitigation measure as they have multiple benefits, those listed above, as well as habitat for native flora and fauna.

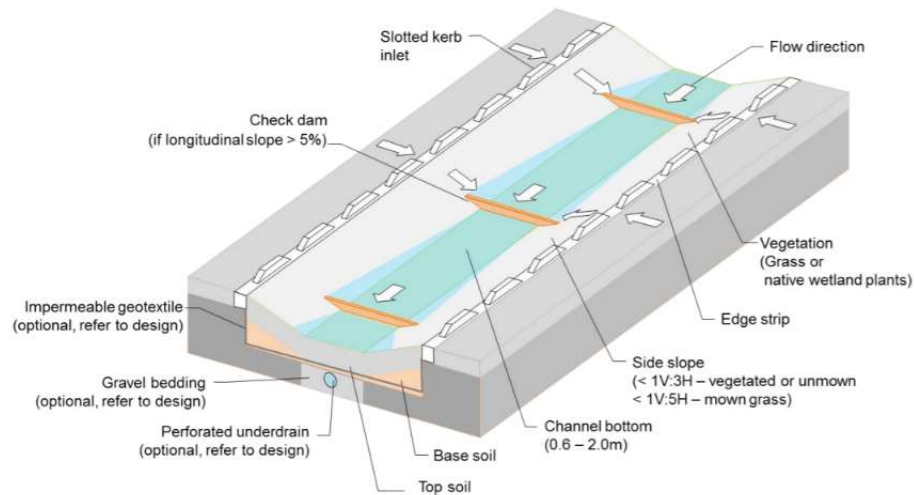
The recommendation is to treat water coming to the lake via a wetland to increase the amount of sediment that falls out of suspension and the increase the amount of nutrients absorbed by wetland plants before the water reaches the lake.

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<sup>3</sup> Provisional guidelines for constructed wetlands treatment of pastoral farm runoff - Dairy NZ and NIWA – Chris Tanner 2020

## 7) Swales

A swale (either grassed or vegetated) provides water quality treatment, primarily via interception by vegetation, as runoff flows along the surface of the swale (Figure 2)<sup>4</sup>. Swales are good at stopping large volumes of water building up. The more velocity water has the more it can erode. The proposal is to build a vegetated swale, similar to that in figure 3 below, planted with native reeds such as wiwi and oioi.



**Figure 2: Schematic of a typical swale cross section.**



**Figure 3: This image shows a swale planted with native plants.**

<sup>4</sup> GD01 Stormwater Management Devices in the Auckland Region. Auckland Council 2017

## **8) Feedback on the possible sediment mitigation earthworks**

Please provide feedback and questions on the suggested sediment mitigation sites and measures outlined in this report. Are there other sites you feel would benefit from treatment?

This report provides a high-level outline of proposed works only, and if permission is given to go ahead and continue with the proposal more detailed information will be provided once it is available, for example detailed construction plans. A site visit with mana whenua, Kaipara District Council and the Department of Conservation is requested to look at the sites identified in detail.

## **9) Contacts for ongoing dialogue about the project**

Permission, confirmation of land ownership, ongoing dialogue and negotiation with mana whenua, landowners, kaitiaki, the Department of Conservation and Kaipara District Council is required for this work to go ahead, along with resource consents. Please provide a list of contacts you recommend I liaise with to progress this project and confirm who would give formal approval to work on this land.

## **10) The sediment issue**

It is estimated that 192 million tonnes of soil are lost in New Zealand every year, 44 percent of this is from areas in pasture. Erosion and sedimentation are natural processes driven by climate and geology but these processes have been accelerated by human activities such as: housing and roads, clearing forest and scrub, mainly to make way for the development of housing and farm land. This results in increased levels of hillslope and surface erosion (Appendix 1).

Land use intensification, draining wetlands and inappropriate land management have increased erosion. The suspended and deposited sediment results in economic, cultural and environmental effects on land, floodplains and freshwater such as

- reduced soil fertility
- increased impacts from flooding
- infrastructure damage
- diminished aesthetic values
- algal growth from increased phosphorus
- water turbidity
- smothering of shell fish beds in lakes, estuarine and coastal environments.

## **11) Monitoring**

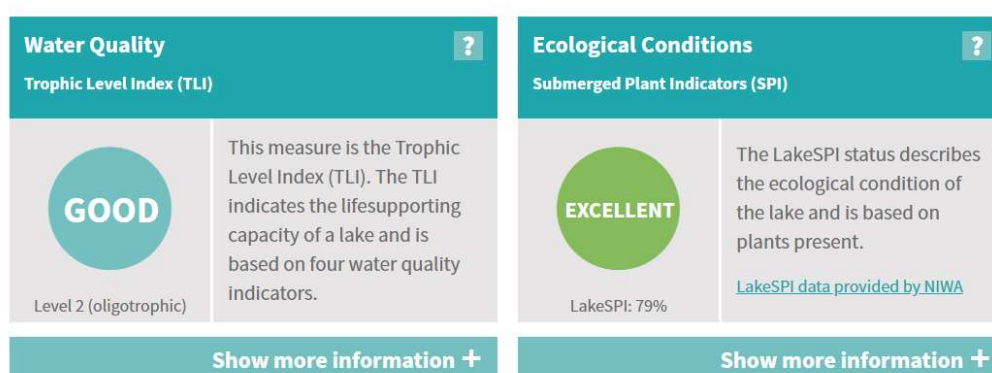
The Northland Regional Council (NRC) State of the Environment (SOE) monitoring team currently monitor water quality in 27 lakes, including Kai Iwi, Taharoa and Waikare Lakes. The data collected includes water clarity, chlorophyll content, total phosphorus and total nitrogen. From these parameters a Trophic Level Index (TLI) value is calculated. This SOE monitoring provides a base line of data to measure progress against.

Following these sediment reduction actions, we expect to see a reduction in nitrogen and phosphorus in lakes which will result in improvement or no further decline in TLI scores over several years. The data are available to the public on the LAWA website ([www.lawa.org.nz](http://www.lawa.org.nz)). Data are available from 2008 in most cases.

The three Kai Iwi Lakes all have good water quality and excellent ecological conditions according to the LAWA data (Figure 4)

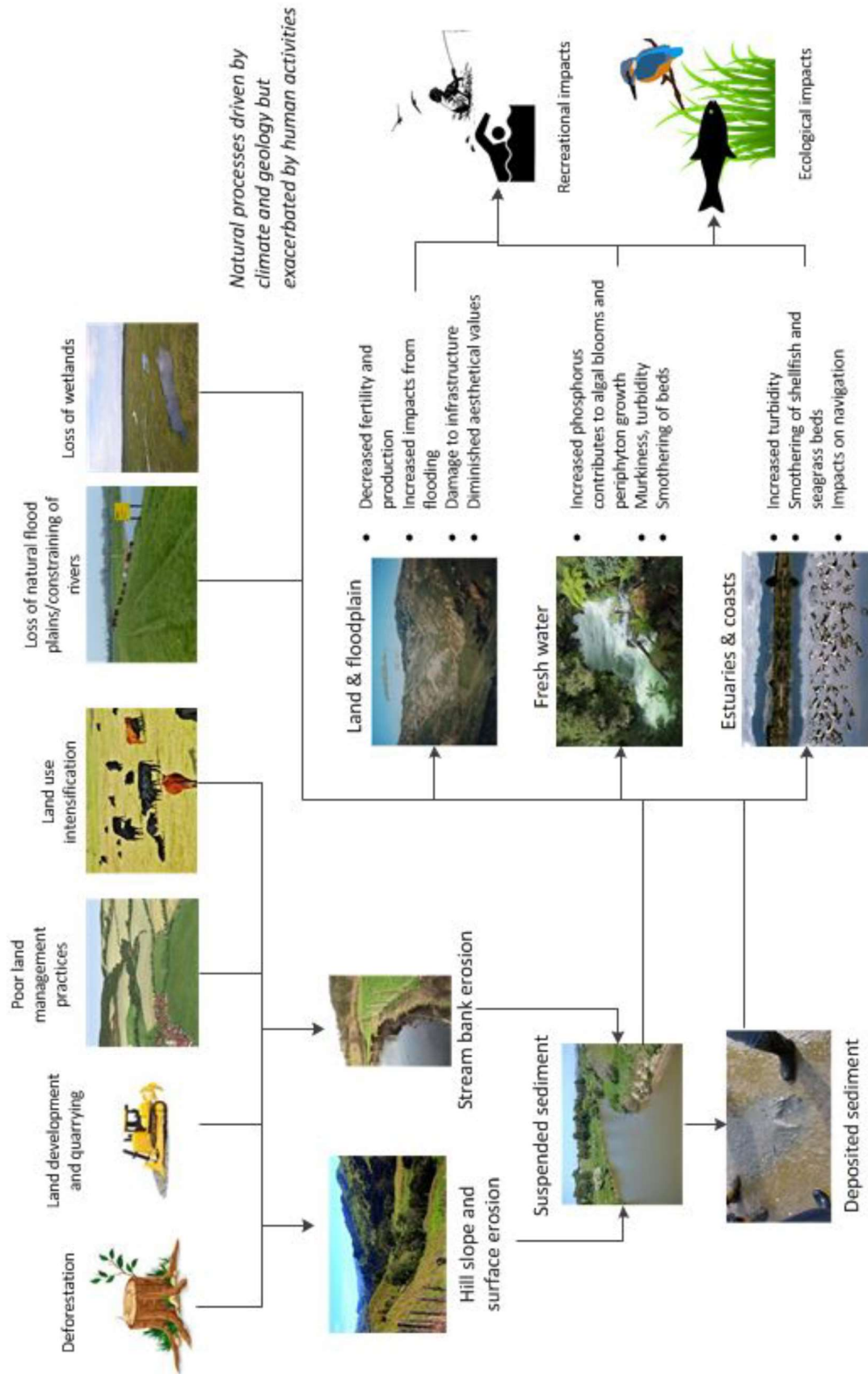
### Scientific data for this lake

This dashboard shows information on the data collected by the regional councils for two lake water quality and ecological condition measurements. [Lake SPI](#) (Lake Submerged Plant Indicators) and TLI ([Trophic Level](#)):



**Figure 4: screen shot of the LAWA website showing results from one of the three Kai Iwi Lakes. All three Kai Iwi Lakes have the same overall results.**

## Appendix 1 – Overview of erosion and sedimentation issues





Proposal for:

### **Taharoa Research Partnership**

Prepared by Taoho Patuawa, Te Roroa Science Advisor

#### **Purpose:**

To create a collective partnership which champions the essential research service to the outstanding cultural, social and ecological values of Taharoa.

#### **Context:**

- Taharoa is a taonga renowned for significant cultural, environmental and social value to the tangata whenua and wider communities of the northern Kaipara district, and it is also renowned for its outstanding natural beauty featuring pristine blue waters and thriving native aquatic flora and fauna populations.
- But in recent decades human activity has increased significantly on the lakes which offer the potential introduction of specific threats which could upset the natural balance of this unique ecosystem.
- Therefore, Taharoa demands a strategy to guide decision making and investment to deliver targeted research outcomes which consider these known and unknown threats to water quality and the ecological functions of the native aquatic flora and fauna populations.

#### **Critical issues:**

1. The long term impacts of the introduction of rainbow trout (since 1968) remain unknown. The research that has been conducted does not provide the necessary robust science to inform the impacts on the populations of native fishes and invertebrates, including a species only found in the Taharoa lake system - *Galaxias gracilis*, the dune lake galaxid.
2. The monitoring of recreational watercraft for invasive aquatic weed species is poor in relation to the impacts certain weed species could have on the native population.
3. There is an absence of a baseline understanding of aquatic vegetation, fish and invertebrate populations for the Taharoa lake system.
4. Threats from human impacts can be considered constant due to the establishment of recreational camping facilities and largely unchecked access.
5. There is no systematic monitoring or research investment procedure in place which identifies the tangata whenua and community values of Taharoa the known and unknown threats to these core values.

#### **Requirements of the Taharoa Research Partnership:**

- Activates the partnership principles of the Mana Enhancing Agreement between Te Roroa and Kaipara District Council.
- Offers a place of leadership which is inclusive of the values of tangata whenua and the wider community of the northern Kaipara.
- Provides a process to activate scientific and mātāuranga-based knowledge systems to inform future decision making for the Taharoa Domain Governance Group.
- Creates a platform to share our research and transfer the knowledge gained to our schools, marae and the wider community.





# Taharoa Domain Fish and Game Trout Release May 2020

Meeting: Taharoa Domain Governance Committee  
Date of meeting: 28 May 2020  
Reporting officer: Mark Schreurs, Policy Analyst

## Purpose/Ngā whāinga

To seek approval from the Taharoa Domain Governance Committee for the Northland Fish and Game Council (Fish and Game) to proceed with the annual release of trout into Lakes Taharoa and Waikare in 2020.

## Executive summary/Whakarāpopototanga

The Taharoa Domain Governance Committee (the Committee) has received a letter from the Northland Fish and Game Council (Fish and Game) dated April 21, 2020 (**Attachment 1**). In this letter, Fish and Game requests permission to release young trout into Lake Taharoa and Lake Waikare in 2020. This proposed release is part of a programme of annual releases which sustains the trout population in these Lakes. As trout cannot breed in the lakes, without these annual releases of young trout, the trout population would gradually die out within about three years.

A decision of the Committee is now sought to allow this proposed release of trout.

As these releases are an annual occurrence, the Committee faced a similar decision at its 10 May 2018 meeting and the year prior at its 23 June 2017 meeting. At these meetings, the Committee resolved to allow the release to proceed. This was because of the uncertainty remaining over what effect removing trout from the Lakes would have on the native species that reside there. In particular, there are concerns over a small native fish; the Dune Lakes Galaxias (DLG). While efforts are underway to better understand the effects of trout on this and other species, the recommendation derived from a review of the scientific literature (Gee and Franklin, 2017) is that the present balance that exists between species in the lakes should not be altered by removing trout until more is known about how this will affect the DLG.

It is therefore recommended that the Committee takes a similar approach this year to last year and the year before. It is noted that the Kai Iwi Lakes Dune Lakes Galaxias Working Group (Working Group) is working to make more information available. This information is anticipated to be available by the end of 2020.

## Recommendation/Ngā tūtohunga

That the Taharoa Domain Governance Committee:

- a) Approves the release of trout into Lake Taharoa and Lake Waikare in 2020.

## Context/Horopaki

The Dune Lakes Galaxias (*Galaxias sp.*) (here after referred to as the DLG) is a small native fish. It is a subset of inanga (*Galaxias gracilis*) that is found only in the Kai Iwi Lakes.

Rainbow Trout (*Oncorhynchus mykiss*) were introduced to the Kai Iwi Lakes in 1968 by the then Acclimatization Society; now the Northland Fish and Game Council (Fish and Game). Regrettably, within a few years of trout being released, an unauthorised individual released the pest fish Gambusia (*Gambusia affinis*) into the Lakes as well.

Since then, concerns have emerged for the survival of the DLG. It has become extinct in Lake Kai Iwi and there are concerns over its remaining populations in Lakes Taharoa and Waikare.

In response to this problem, the Kai Iwi Lakes (Taharoa Domain) Reserve Management Plan (RMP) included the direction that trout releases cease from 2018. As trout are a predator of DLG it was hoped that removing the trout would result in an increase in the population of DLG.

However, the *Gambusia* are a complicating factor. They are known to compete with the DLG for habitat and food and are suspected to predate the DLG's young. Hence while some studies have hypothesised that removing trout will result in an increase in the DLG population through removal of a predator (e.g. Rowe and Chisnall 1995 and Allen and Turner 1971), others (e.g. Rowe 1998 and Rowe, Champion & de Winton 1999) have argued that the trout are also keeping the *Gambusia* population in check through interactive segregation (i.e. *Gambusia* do not use the full range of habitats for fear of predation by trout). This leads to the competing hypotheses that exclusion of trout could result in an increase in *Gambusia* and a consequent decline in the population of DLG. For instance, the extinction of DLG in Lake Kai Iwi occurred following trout being removed from that lake.

Because of this uncertainty, a recent literature review by Gee & Franklin (2017) suggested that the wholesale exclusion of trout from the Lakes, beginning in 2018 as was directed by the RMP, should not be undertaken until more information were available on what effect this would have. It was instead suggested that a detailed study be designed and undertaken which recognises these competing hypotheses.

In response, Te Kūihi, Te Roroa, Kaipara District Council, Northland Fish and Game Council, Northland Regional Council and the Department of Conservation have formed a Kai Iwi Lakes Dune Lakes Galaxias Working Group (Working Group). This Working Group is working to undertake a study to identify what actions can be taken to save this species. NorthTec is also heavily involved in this work.

The Working Group is making good progress however have yet to identify if excluding trout from the lakes would be beneficial or detrimental to the DLG. Their work is focused on progressing a series of actions agreed under the Dune Lakes Galaxias Monitoring Strategy which was endorsed by the Committee on 10 August 2017. The Monitoring Strategy is the fulfilment of an action under the RMP. It contributes to Aim 3 of the RMP: *"Complete knowledge about Kai Iwi Lakes will enable effective protection and enhancement of its natural environment and pristine waters."*

## Discussion/Ngā kōrerorero

The Committee has received a letter from Fish and Game dated April 21, 2020 (**Attachment 1**). In this letter, Fish and Game request permission to release approximately 2,000 trout fingerlings into Lake Taharoa and 300 into Lake Waikare (the same numbers as last year). If approved these releases will take place in May-June 2020. This proposed release for 2020 is part of a regular programme of annual releases which sustains the trout population in these Lakes. As trout cannot breed in the Lakes, the trout population would decline and disappear from the Lakes without these annual releases.

A decision of the Committee is now sought to allow this proposed release of trout.

As we have seen from the background information provided above, it is currently unknown if the presence of trout in the Lakes is beneficial or detrimental to the DLG population. However, it has been observed that the DLG have survived alongside trout and *Gambusia* in reasonable numbers for some 50 years. It is therefore recommended that whatever balance currently exists between DLG, trout and *Gambusia* not be disturbed until more is known about what effect such management interventions would have. This is an interim measure until sufficient information is available.

## Options

The Committee has the following options:

*Option A:* Grant permission for trout to be released into Lakes Taharoa and Waikare in 2020.

*Option B:* Refuse to grant permission for trout to be released into Lakes Taharoa and Waikare in 2020.

## Assessment of options

*Option A:* would be consistent with the approach taken by the Committee in previous years. It would allow for the existing balance between trout, DLG and Gambusia to continue unchanged until more information is available.

*Option B:* would be consistent with the direction previously set out in the RMP. However, ceasing trout releases while Gambusia are present in the lakes will have unknown effects on the survival of the DLG, and could potentially lead to their extinction.

## Policy and planning implications

Departure from the direction in the RMP is considered warranted, because new evidence has been provided (the Gee & Franklin 2017 report) and further investigation is ongoing (the work of the Working Group under the Dune Lakes Galaxias Monitoring Strategy).

## Financial implications

There are no financial implications for Kaipara District Council.

## Risks and mitigations

It should be noted that, following the adoption of the RMP which included the direction that trout releases cease from 2018; Fish and Game presented Council with a draft Statement of Claim regarding a judicial review of the RMP process and outcome that would stop the release of trout by 2018. This Claim, however, was not lodged with the Courts. Rather a meeting was held with representatives of Fish and Game and the Committee on 02 May 2017. The outcome of that meeting was:

- Agreement by both parties of the importance of the abundance and long term survival of DLG;
- That a research monitoring programme needed to be designed and funded, which included input from Fish and Game, Te Roroa, Te Kuihi, Kaipara District Council, Northland Regional Council and the Department of Conservation, and that a working group be set up for this purpose; and
- That cessation of trout stocking in Lakes Waikare and Taharoa from 2018 would be deferred in light of new information received from NIWA (Gee & Franklin 2017 report), and provided the Committee was satisfied with progress with the research monitoring programme.

## Significance and engagement/Hirahira me ngā whakapāpā

The decisions or matters of this report do not trigger the significance criteria outlined in Council's Significance and Engagement Policy, and the public will be informed via agenda on the website.

## Next steps/E whaiake nei

Staff will write to Fish and Game informing them of what decision the Committee reached.

## Attachments/Ngā tapiritanga

	Title
A	Letter from the Northland Fish and Game Council dated April 21, 2020.





**April 21, 2020**

Taharoa Domain Governance Committee  
Private Bag 1001  
Dargaville 0340

Dear Sir/Madam,

**Re: Request to liberate trout into Lake Taharoa and Lake Waikare 2020**

Under the terms agreed to between the Kaipara District Council, Taharoa Domain Governance Committee and with Northland Fish & Game Council in May 2017, the Northland Fish and Game Council is seeking the support and approval of the Taharoa Domain Governance Committee to carry out the annual Rainbow trout liberations into Lakes Taharoa and Waikare.

Northland Fish & Game requests your approval to release approximately 2,300 trout fingerlings in Lakes Taharoa (2000) and Waikare (300). These trout have been reared at the Ngongotaha Trout Hatchery since the order was placed in May 2019.

Once approved, these releases will take effect in either May – June 2020 or as soon as the current covid19 travel restrictions have been lifted.

Northland Fish & Game is required to order the Rainbow trout fingerlings 12 months in advance of their annual fish releases. The trout are all reared at the Ngongotaha Trout Hatchery in a restricted water source coming from a large spring which has no risks of contamination.

The trout are transported in plastic tanks on trailers for release at the Kai Iwi Lakes and other manmade reservoirs in the Northland region.

Your assistance in this matter to continue the Kai Iwi Lakes recreational fishery is appreciated.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Rudi Hoetjes", with a stylized flourish at the end.

**Rudi Hoetjes**  
**Regional Manager**

*Statutory managers of freshwater sports fish, game birds and their habitats*

**Northland Region**  
Unit A5, 7-11 Nell Place, PO Box 25003, Whangarei Mail Centre, Whangarei 0148.  
Telephone (09) 438 4135  
[www.fishandgame.org.nz](http://www.fishandgame.org.nz)



# Taharoa Domain Work Plan 2020/2021

**Meeting:** Taharoa Domain Governance Committee  
**Date of meeting:** 28 May 2020  
**Reporting officer:** Hamish Watson, Parks and Recreation Manager

## Purpose/Ngā whāinga

To seek the committees' approval for the 2020/2021 work plan.

## Summary/Whakarāpopototanga

Staff have identified projects as per the Infrastructure Improvement Plan adopted in 2017 and have included in the work plan for the 20/21 financial year.

The Taharoa Domain Governance Committee are delegated with approving the works plan and budgets, this report outlines options for the committee to review and decide what work they want to be completed in the 20/21 financial year.

## Recommendation/Ngā tūtohunga

That the Taharoa Domain Governance Committee:

- a) Approves the 2020/2021 work plan as below **[table to be completed at the meeting]**:

Project	Budget

- b) Requests the Chief Executive to implement the works as agreed.

## Context/Horopaki

The Reserve Management Plan (RMP) for Taharoa Domain identified the need for an Infrastructure Improvement Plan, this was developed in 2017. Staff are prioritizing these works and implementing as budgets allow.

As per the Terms of Reference it is the Committees' responsibility to approve the work plan for the Taharoa Domain.

## Discussion/Ngā kōrerorero

The implementation of Kai Iwi Lakes (Taharoa Domain) RMP 2016 includes a number of capital works improvements to be undertaken over the 10-year life of the plan. Staff are looking to prioritize these works and itemise the work allocated to the 20/21 financial year.

These projects have been developed after reviewing the actions and visions from the RMP.

The projects identified and indicative budgets are outlined in the table below.

<b>Taharoa Domain Reserve Management Plan</b>	<b>\$100,000</b>	<b>Officer recommendation</b>
Mountain Bike Trails	\$20,000	
New Toilet (boat ramp)	\$80,000	
Bollards along road entrance to Lake Waikare	\$15,000	\$15,000
Small decks/platforms around lakes for swimming	\$20,000	
Electronic gates	\$40,000	
Day visitor toilet Pine Beach (refit of old changing rooms)	\$85,000	\$85,000
<b>TOTAL</b>		<b>\$100,000</b>

### Options

Option 1: Approve 2020-21 work plan.

Approving the work plan will allow staff to carry on implementing the RMP.

Option 2: Not approve 20/21 work plan.

Not approving the 20/21 work plan will mean staff are delayed in making a start on delivering the work plan as they will need to reassess the work requested and report back to the committee.

The recommended option is **option 1**.

### Financial implications

Budgets are allocated as part of the LTP 2018-2021.

### Significance and engagement/Hirahira me ngā whakapāpā

The decisions or matters of this report do not trigger the significance criteria outlined in Council's Significance and Engagement Policy, and the public will be informed via agenda on the website.

### Next steps/E whaiake nei

Staff will deliver the work plan as agreed.



# **Taharoa Domain Forward Works Plan for Long Term Plan 2021-2031**

**Meeting:** Taharoa Domain Governance Committee  
**Date of meeting:** 28 May 2020  
**Reporting officer:** Hamish Watson, Parks and Recreation Manager

## **Purpose/Ngā whāinga**

To seek the committees' approval for the forwards work programme for the 2021-2031 Long Term Plan (LTP).

## **Executive summary/Whakarāpopototanga**

Council is currently developing the draft 2021-2031 Long Term Plan (LTP) ready for public consultation early next year. The draft LTP will determine what projects will be completed and how they can be funded to implement the Reserve Management Plan (RMP) objectives.

This report seeks to identify all the capital projects from the RMP so that sufficient funds are set aside in the 2021-2031 LTP to enable the continued implementation of the RMP over the next 10 years. This is based on the 10-year Infrastructure Development Plan.

## **Recommendation/Ngā tūtohunga**

That the Taharoa Domain Governance Committee:

- a) Recommends the works in Attachment B of the report be included in the draft Long Term Plan for Council's consideration, noting that the final decision will be made by Council and depend on the budget available.

## **Context/Horopaki**

The Reserve Management Plan (RMP) for Taharoa Domain identified the need for an Infrastructure Improvement Plan, this was developed in 2017. Staff are prioritizing these works and implementing as budgets allow.

Staff are now looking at adding these projects to the next LTP, and as per the Terms of Reference it is the Committees' responsibility to approve the work plan for the Taharoa Domain.

## **Discussion/Ngā kōrerorero**

Council are required to develop LTP's on a regular basis, part of this process requires input from the Governance Committee.

A workshop with the Governance Committee was held in February outlining the process and asking for input from the committee.

The implementation of Kai Iwi Lakes (Taharoa Domain) RMP 2016 includes a number of capital works improvements to be undertaken over the 10-year life of the plan Staff are looking to prioritize these works and look at funding options.

The intent of the RMP is to enable Kai Iwi Lakes and its environment to be enjoyed by all visitors while simultaneously enhancing the area and reducing risks through knowledge and active management.

Some projects such as toilets are required to protect the environment from visitors using the lakes tracks and picnic areas.

Some projects are designed to improve visitor experience and create repeat visitors to district outside the peak season.

The need for a Domain Manager house is required for security and protection of the facilities and to reduce vandalism.

This report seeks to identify all the capital projects from the RMP so that sufficient funds are set aside in the LTP to enable the continued implementation of the RMP over the next 10 years.

There will be one more opportunity after this part to get projects in to the draft LTP when the draft goes out for submissions.

Attached is a process diagram showing the timeframes required to have a draft LTP (**Attachment A**). A list of projects and estimated budgets is attached (**Attachment B**)

### **Options**

Option 1: Approve the projects as identified.

This will give staff guidance for the LTP process and provide information to council for direction.

Option 2: Not approve projects.

This will delay the process and may mean staff are unable to provide input in to the draft LTP document.

The recommended option is **option 1**.

### **Policy and planning implications**

This needs to be part of council's planning for the LTP.

### **Financial implications**

If we are unable to get this included as part of the LTP funding may not be available from council for these projects.

### **Risks and mitigations**

If we don't include these projects in the LTP we may not be able to progress these projects through Council funding, partnerships or access other external funding.

## **Significance and engagement/Hirahira me ngā whakapāpā**

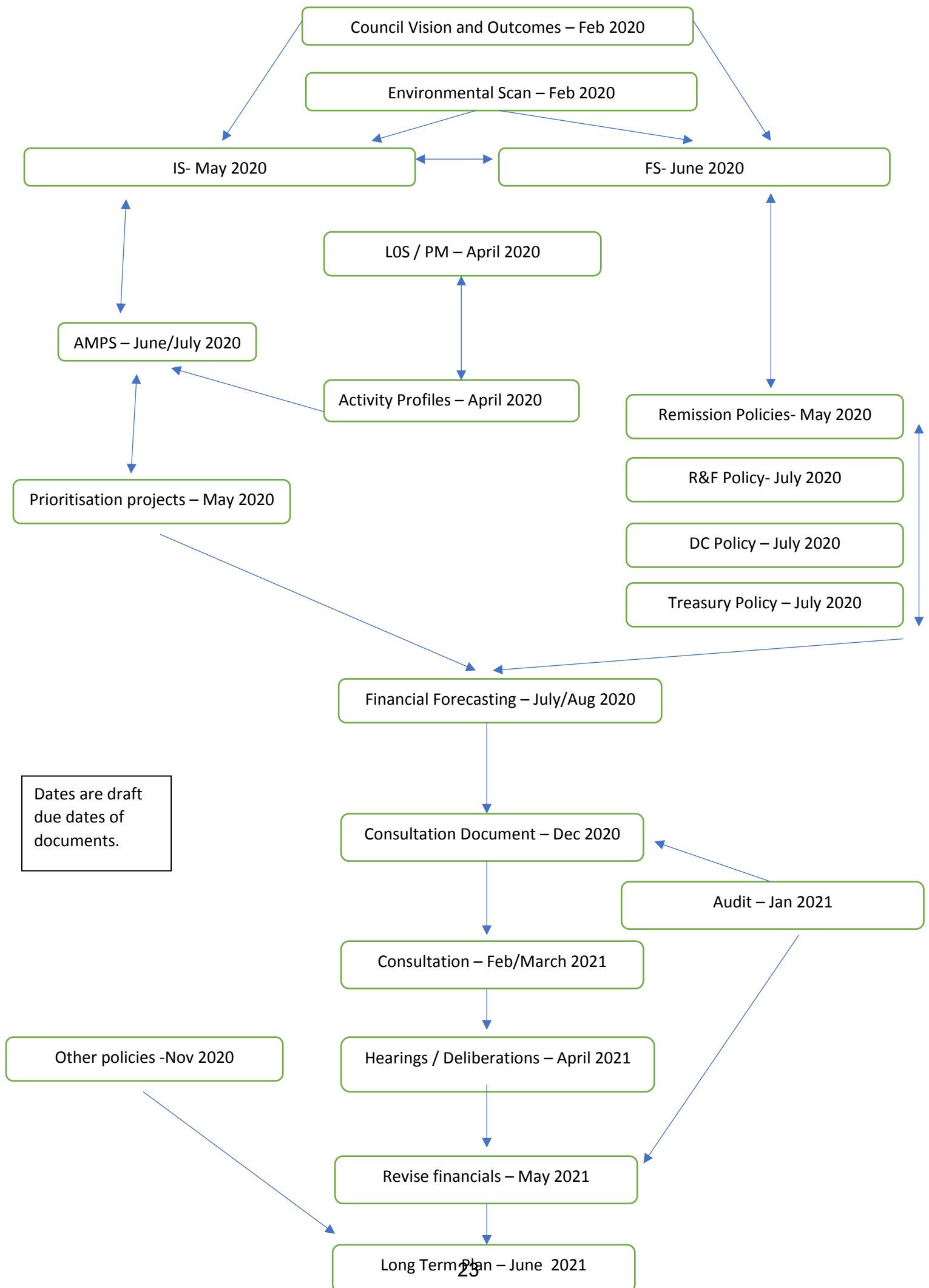
This report does trigger Council's significance and engagement policy; this work will be consulted on as part of the LTP process.

## **Next steps/E whaiake nei**

Include the agreed works in the draft LTP. Governance Committee to provide any additional projects to staff by 11 June 2020.

## **Attachments/Ngā tapiritanga**

	Title
A	LTP process diagram
B	Draft LTP projects





## Attachment B

YR	1	2	3	4	5	6	7	8	9	10
Projects	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Tracks per annum	\$ 10,000									
Investigate and obtain boat ramp consents			\$20,000							
Upgrade boat launching facilities at Marina Bay				\$150,000	\$100,000					
Improved signage to inform day visitors/interpretation			\$10,000	\$10,000	\$10,000		\$10,000			
Restoration Plants	\$ 10,000		\$20,000	\$20,000	\$20,000	\$20,000	\$30,000	\$30,000	\$30,000	\$30,000
Business Plan, Resource & Building Consent Rangers house	\$ 10,000									
Ranger's house to provide 24 hour staff presence	\$150,000	\$150,000								
Kitchen facility					\$60,000					
Laundry facility						\$40,000				
Obtain Resource consents bio security inspection area Marina Bay	\$ 20,000									
Development of a biosecurity inspection area at Marina Bay		\$200,000	\$200,000							
New signage SH12/Omamari, north Dargaville and Brynderwyns			\$5,000	\$10,000						
Day Visitor toilets - Sandy Bay (Dry Vault)			\$100,000		\$60,000					
Day Visitor toilets -Pine Beach/Lake Kai Iwi (Dry Vault)	\$ 85,000				\$60,000					
Pedestrian boardwalk access Promenade Point	\$ 20,000									
Lookouts on ridges						\$10,000	\$10,000			
Bird Hide near west of Lake Kai Iwi					\$10,000					
Small decks/platforms around lakes for swimming (each)					\$10,000	\$10,000	\$10,000			
Power up-grade				\$25,000						
Interpretation Shelter/ Interpretation panels						\$20,000				
Nursery to grow restoration plants						\$20,000				
Extend powered sites				\$20,000						
Mountain Bike trails (5km trails)				\$70,000		\$50,000				
Development of Visitor accomadation (cabins)						\$100,000				
Future Domain projects							\$40,000	\$70,000	\$70,000	\$70,000
Non elected committee member remuneration	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Bollards along road entrance to Lake Waikare										
<b>Total Expenditure</b>	<b>\$306,000</b>	<b>\$351,000</b>	<b>\$356,000</b>	<b>\$306,000</b>	<b>\$331,000</b>	<b>\$271,000</b>	<b>\$101,000</b>	<b>\$101,000</b>	<b>\$101,000</b>	<b>\$101,000</b>



# **Taharoa Domain operations update for August 2019 to March 2020**

**Meeting:** Taharoa Domain Governance Committee  
**Date of meeting:** 28 May 2020  
**Reporting officer:** Hamish Watson, Parks and Recreation Manager

## **Purpose/Ngā whāinga**

To report the operational report for the Taharoa Domain (Kai Iwi Lakes) for the August 2019 to March 2020 period to keep the Committee well informed.

## **Executive summary/Whakarāpopototanga**

Below is a summary of activities, operations and maintenance work carried out over the months of August 2019 to March 2020.

## **Recommendation/Ngā tūtohunga**

That the Taharoa Domain Governance Committee:

- a) Notes the Taharoa Domain operations update report for August 2019 to March 2020.

## **Context/Horopaki**

The Kai Iwi Lakes are among the best-known dune lakes in New Zealand. It is the intent of the Kai Iwi Lakes (Taharoa Domain) Reserve Management Plan (RMP) to enable the Lakes and its surrounds to be enjoyed by all visitors while simultaneously enhancing the area and reducing risks through knowledge and active management.

## **Discussion/Ngā kōrerorero**

- Installed 16 new powered sites in the camping block behind the current powered sites. These were well used over the holiday season.
- New shade sails were installed over the playground.
- New signage and wayfinding markers have been installed on the walking/cycling tracks.
- 3 new recycling stations have been installed with 2 at Pine Beach and 1 at Promenade Point to encourage Domain users to recycle. These have worked well over the summer season.
- The rubbish collection area has been given a tidy up with a concrete floor and trellising erected to make this area tidy and helps contain loose material from being blown around the campground.
- Solar lights have been installed up by the main toilet block, this has helped campers at night to find their way to the toilets and has also helped with crime prevention through environmental design principles.
- Unfortunately, on Christmas day there was a drowning at Pine Beach, this was well handled by all involved. The family involved were well looked after and supported by campers and staff. Iwi responded and blessed the site and decided against a Rahui due to the number of people and the time it happened. As a result of this incident and other potential incidents that happened we have installed life rings at Pine Beach, Promenade Point and Lake Waikare
- Campground was fully booked from the start of Christmas to the end of Waitangi weekend, in general most campers were very well behaved and enjoyed their stay.

- The Whitebait Connection Educational Open Day has been postponed due to COVID-19.
- Staff are continuing to deal with dogs being brought to site, majority of these incidents are locals who should know better, although this is starting to get better and having in house Animal Management Officers has given staff better support also.
- Some boat and jet ski owners continue to break the rules, however staff have been busy educating these people on the rules, once spoken with most of them adhere, this will be an ongoing process. Jordan Soole has been appointed a Harbour Warden which gives him more authority to enforce the rules. Still working with NRC to get more support for this.
- Cash handling procedures have been implemented for all sales.
- The final review for the biosecurity area at the boat ramp has been received (**Attachment A**).
- Waste water resource consent parameters have been compliant; Resource consent allows for a discharge of 37.5m<sup>3</sup>/day. This year there is a notable difference in discharge volumes to previous years, previously we had a flows around 34m<sup>3</sup>/day, 2020 maximum flow was 25m<sup>3</sup>/day.
- Improved water take resource consent compliance; Consent requirements max daily take of 50m<sup>3</sup>/day, we had one exceedance on 25 December with a take of 52m<sup>3</sup>/day
- Water meters for online monitoring have been ordered, waiting on installation.
- NRC and KDC are working to together to develop a pest plant control plan and update the planting plan.
- General maintenance to keep newly planted trees clear of weeds has continued.
- Approximately 17,000 native plants were planted last season, unfortunately there was about a 30% loss ratio due to the drought.
- Opus were engaged to do a traffic study, below is a summary of the results.

### Kai Iwi Lakes Vehicle Movements Summer 2019

Table showing the average vehicle counts *per day*:

	Domain Road	Promenade Point	Kai Iwi Lakes Road
<b>Week 1 (19 Dec - 26 Dec)</b>	523	122	no data
<b>Week 2 (26 Dec - 2 Jan)</b>	1167	140	233
<b>Week 3 (2 Jan - 9 Jan)</b>	798	121	234
<b>Average</b>	829	128	233

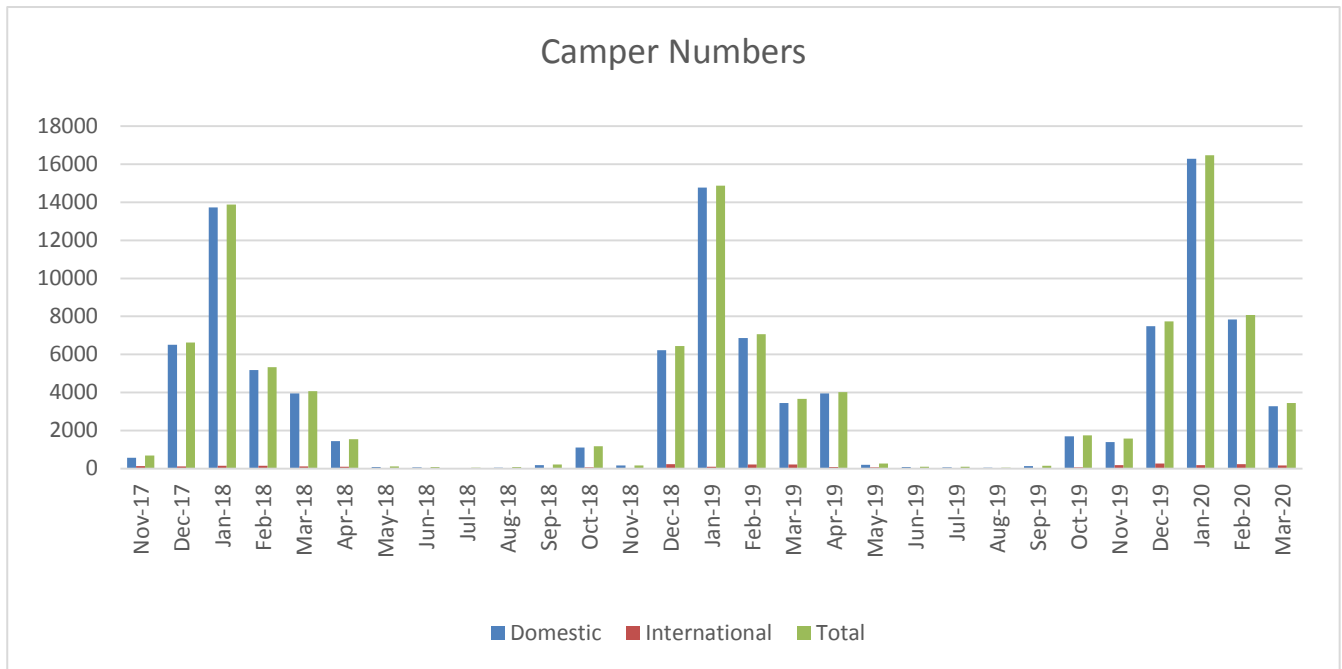
Table showing vehicle speeds on Domain Road (speeding over posted speed limit of 30km/h):

Domain Road Vehicle Speeds	Speeding	Not speeding	Average Speed	Maximum
<b>Week 1</b>	89%	12%	42.3km/h	112.4km/h
<b>Week 2</b>	84%	16%	40.4km/h	94.6km/h
<b>Week 3</b>	87%	13%	41.7km/h	86.7km/h
<b>Average</b>	87%	13%	41.5km/h	n/a

Peak vehicle movements for all sites were observed between 11am-6pm.



## Camper Numbers:



Month	Total visitors	Domestic visitors	International visitors
March 2020	3451	3284	167
February 2020	8081	7843	238
January 2020	16391	16209	182
December 2019	7744	7479	265
November 2019	1574	1397	177
October 2019	1752	1690	62
September 2019	141	138	3
August 2019	40	40	0
July 2019	90	66	24
June 2019	103	85	18
May 2019	269	201	68
April 2019	4,026	3,949	77
March 2019	3,658	3,451	207
February 2019	7,072	6,856	216
January 2019	14,880	14,778	102
December 2018	6,448	6,216	232
November 2018	170	160	10
October 2018	1,170	1,099	71
September 2018	209	175	34
August 2018	85	50	35
July 2018	43	31	12
June 2018	73	59	14
May 2018	109	78	31
April 2018	1,544	1,446	98
March 2018	4,066	3,953	113
February 2018	5,331	5,188	143
January 2018	13,884	13,739	145
December 2017	6,626	6,514	112
November 2017	689	561	128

### **Policy and planning implications**

It is the Park and Recreation Manager's responsibility to ensure all operations are conducted within budget.

### **Financial implications**

The financial budgets are set within the Long Term Plan and respective Annual Plan.

### **Risks and mitigations**

The RMP was developed using a public process and reflects the views of the community and other stakeholders at the time of its development.

### **Significance and engagement/Hirahira me ngā whakapāpā**

The decisions or matters of this report do not trigger the significance criteria outlined in Council's Significance and Engagement Policy, and the public will be informed via agenda on the website.

### **Next steps/E whaiake nei**

Council staff will continue to implement the RMP.

### **Attachments/Ngā tapiritanga**

	Title
A	Bio Security options report



## **KAI IWI LAKES BOAT BIOSECURITY WASHDOWN**

DOMAIN ROAD, OMAMARI

### **ENGINEERING DESIGN MEMORANDUM DETAILED DESIGN REPORT**

## COOK COSTELLO


### DOCUMENT CONTROL RECORD

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Client:	Kaipara District Council
Address:	Domain Road, Omamari
CCL Reference:	14576
Project description:	Kai Iwi Lakes Boat Biosecurity Washdown
Document Name:	Kai Iwi Lakes Boat Biosecurity Washdown Detailed Design
Date of issue:	Monday, 24 February 2020
Status:	For issue

---

Originator:

  
**Anamika Nampoothiry, Graduate Civil Engineer**  
BEngTech

Reviewed:

  
**Adrian Tonks, Engineer**  
**BE(ESc), MEngNZ, IQP**

Approved for issue:

  
**Adrian Tonks, Engineer**  
**BE(ESc), MEngNZ, IQP**

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Version	Date	Comment	
1.0	18 February 2020	For issue	Anamika Nampoothiry
2.0	24 February 2020	Rev 1 - Detail changes	Anamika Nampoothiry

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## 1 Introduction

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### Background

In line with Aim 3 and 4 outlined within the Kaipara District Council Reserve Management Plan for Kai Iwi Lakes (Taharoa Domain) 2016, the Council is committed to protecting the natural environment and pristine waters within the District through imposing biosecurity controls on activities. Cook Costello have been engaged to design a boat biosecurity washdown facility at Kai Iwi Lakes to facilitate with the removal of biological contaminants (aquatic weeds, fish eggs etc.) from recreational boats and trailers.

### Project description

The objective of this work is to design a practical and pragmatic washdown facility incorporating a water reclamation system with minimal operational and maintenance cost, along with overflow risk management during extreme storm events.

This design report covers the following detailed design information:

- The existing site conditions and proposed site layout
- The proposed equipment configuration
- The proposed wash water reclamation system
- The existing power supply/distribution

## Site Description

The site is located adjacent to Lake Taharoa, one of the three natural freshwater lakes within the Kai Iwi Lakes vicinity. The only access to the site is via Domain Road running from west to east, leading to the camping ground. The existing site aerial photograph is shown in Figure 1.



**Figure 1: Site Location**

The proposed wash down facility is located at the existing access entrance to the only boat launching site on Lake Taharoa. The area on the northern side of Domain Road available for facility is approximately 650m<sup>2</sup>. The existing ground is covered by soil and grass (greenfield). A Scala Penetrometer test indicates well in excess of 100kPa allowable bearing strength is available. The complete Scala Penetrometer test plot is provided in Appendix A. This section of land is situated on a relatively higher, gently sloped ground with approximately 2 to 3% fall towards the west. The unpaved track on the west is the only traffic access way leading down to Lake Taharoa boat launching bay.

To the south of Domain Road is a grassed site that gently slopes west down towards a wetland catchment, as seen in Figure 1 Google Earth imagery, indicates that a small part of this grassed area is used as an informal car and boat trailer parking area.





*Figure 2: Existing Wetland*

## Relevant documents

The following documents have been used or referenced in the preparation of this report.

- BeforeUDig: Services Location
- Kaipara District Council: Reserve Management Plan: Kai Iwi Lakes (Taharoa Domain) 2016
- Kaipara District Council: Engineering Standards 2011
- MBIE: New Zealand Building Code Clause E1 Surface Water
- NIWA: HIRDSv4
- NIWA – The Climate and Weather of Northland, 3<sup>rd</sup> Edition
- Northland Regional Council: River and Rainfall Data – Kai Iwi Lakes Road
- NZWERF: On-Site Stormwater Management Guideline 2004

## Scope of the report

This report aims to develop the preliminary design of the proposed boat washdown system to provide a detailed design, including engineering drawings and indicative cost estimates.

The treatment system is required and designed to remove both the biological contaminants of concern along with suspended solids and hydrocarbons.

## 2 WATER RECLAMATION SYSTEM DESIGN

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### Washdown Facility



*Figure 3: Proposed facility location. View to East. Wash pad proposed location on left of image, Get Ready and Trailer Parking on right of image. See drawing sheet C02 for the general arrangement of the boat wash area.*

### Design Specifications

#### DEMAND

Boat launching figures have not been available for this study and projections are based on anecdotal evidence that gives an estimated peak season 50 boats/day and a low season estimate of 20 boats/day. It is anticipated that the wash time per boat is 10 minutes and the proposed power wash nozzles deliver 21L/min. During periods where both power washers are in use the flow rate through the treatment system is 0.7L/s.

#### RAINFALL

The monthly mean rainfall depths compiled by Northland Regional Council for the Kai Iwi Lakes Road recording station have been utilised to assess the system water input gains. The monthly rainfall figures include small events that would not produce runoff. To account for this a factor of 85% has been applied to the monthly rainfall depth when calculating the runoff gain.

Water losses from the system are primarily from evaporation and wetting. Uncertainty exists in the evaporation loss figures as the only available source is the evapotranspiration potential from the NIWA Northland Climate Report. The selected values are the mean values from the Kaitaia Observatory. An element of conservatism has been incorporated by applying the losses to the

entire pad area and it has been assumed wetted for the whole day during the peak period. During the off-peak winter period it is assumed to be wetted for half of the day.

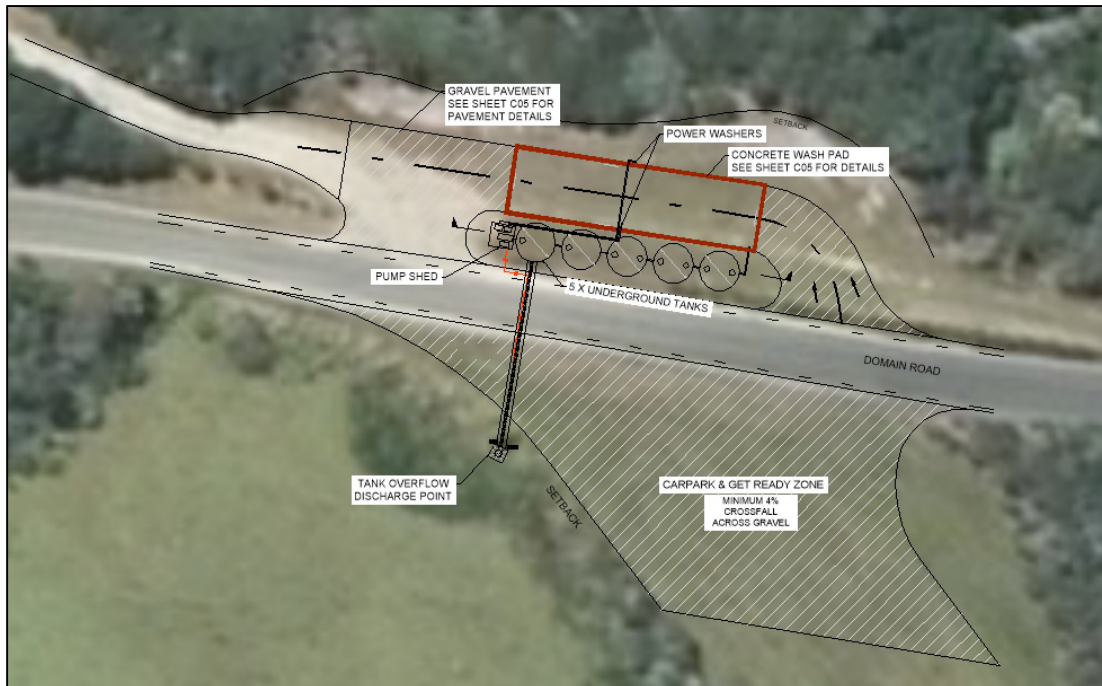
	Rainfall	Gain	Evaporation	Losses	Net
Month	mm/month	m <sup>3</sup>	mm/month	m <sup>3</sup>	m <sup>3</sup>
Jan	63	5.00	145	13.5	-8.48
Feb	86	6.78	120	11.2	-4.38
Mar	70	5.56	105	9.8	-4.21
Apr	80	6.29	67	3.1	3.18
May	105	8.29	46	2.1	6.16
Jun	119	9.43	32	1.5	7.94
Jul	123	9.69	38	1.8	7.93
Aug	122	9.67	52	2.4	7.25
Sep	117	9.24	70	3.3	5.99
Oct	67	5.30	98	9.1	-3.82
Nov	67	5.27	116	10.8	-5.51
Dec	76	6.02	136	12.6	-6.63

**Table 1: Storage tank water balance**

Between October and March, the expected mean loss from the system is 33m<sup>3</sup>, and between April and September the system has a mean gain of 38m<sup>3</sup>. The proposed minimum storage is 25m<sup>3</sup> and it is expected this would need to be topped up once each summer. To reduce this top up frequency a storage volume totalling 50m<sup>3</sup> would be sufficient to buffer the gains and losses and also minimise the overflow event frequency.

For initial filling and periodic top up it is proposed clean water be transported to the facility by water cart or water extracted from the closest water body of Lake Taharoa (if permitted).

## PROPOSED SYSTEM



**Figure 4: Proposed washdown facility - general arrangement. See sheet C02 of the drawing set in Appendix B.**

The proposed wash down facility in the above figure consists of two power washers and a concrete pad, surrounded by a trafficable kerb, which allows multiple boat trailers to be washed simultaneously. Wash water is recycled through the system with gross pollutants and sediments removed prior to the water being reused. The bunded wash pad is open to the weather with rainfall in part compensating for wash water losses. Being open to the weather, the facility caters for overflow during high rainfall events.

The proposed wash pad location is on the section of land to the north of Domain Road. On the northern edge of this generally flat area the ground drops away steeply and the pad will be setback for safety to prevent fall from height and to mitigate potential slope stability issues. To allow for vehicle with trailer tracking curves the facility will be accessed from the southern side of Domain Road. This area also serves as a location for the boats to get ready prior to launching during busy periods. Vehicle sightlines have been checked on site and are sufficient subject to some minor vegetation clearance at the eastern side of the road frontage.

## **Wash Pad Design**

The proposed wash pad is approximately 23.4m in length and 6.2m in width, with an included 5m vehicle overhang area. The bunded wash pad will be constructed with minimum slope of 2% to facilitate wash water recollection through grated field sump. The wash pad details can be found in drawing C05.

## **Treatment System Components and Sizing**

The proposed development consists of a 145m<sup>2</sup> concrete wash pad and a series of underground storage tanks of approximately 12,500 and 25,000L in capacity.

The proposed wash pad is designed to drain the boat wash water into the field sump by gravity and subsequently into the underground treatment system as shown in drawing C03. The wash water after treatment, ultimately returned to the storage tank for reuse.

### **2.1.1 Field Sump**

The field sump is a standard 675 x 450mm flat top cess pit and will be as per KDC standards as shown in drawing sheet C05.

#### ***LittaTrap***

LittaTrap is a pre-treatment device that will be installed in the 675 x 450mm field sump in order to screen the debris, litter and gross pollutants larger than 5mm from the wash water before releasing this water into the clarifier tanks for treatment. The filter basket can be easily removed to dispose trapped debris and the frequency of cleaning shall be reviewed and determined by on-site operators.

### **2.1.2 Underground Tank System**

The underground tank system configuration is detailed in drawing C04.

The underground water tanks have roofs that are designed for light vehicle loading (<2500kg) only. The underground tanks have been placed ensuring sufficient clearance from Domain Road pavement seal to comply with the minimum distance of 1.5m from the road, as recommended by the manufacturer to prevent any lateral loading damage to the tanks from the Domain Road traffic. The tanks have been placed at 0.6m from each other as per standard practice.

The maximum allowable cover on the proposed tank system is 300mm of topsoil as shown in drawing sheet C04. The lids are non-trafficable.



### **Concrete Tanks and Lids**

Three 12,500 L circular concrete tanks in series are proposed as clarifiers. Following these will be two 25,000L tanks for the estimated 50m<sup>3</sup> water storage.

All tanks will have double lids to provide access to the inlets and outlets and the spreader bars.

### **Spreader Bars**

Spreader bars will be installed inside at the inlet and outlet of each tank to reduce short circuiting and eddying in the tank. This will slow the flow down and prevent settled sediments from getting disturbed.

### **Floating Outtake**

The final tank in the treatment system, Tank 5 in C04, will have a 50mm floating outtake connected to the 40mm pressure pipe outlet using a reducing bush. The floating outtake ensures that the cleanest portion of the water column is pumped out for reuse, avoiding any remaining dirt that may be accumulated at the water surface.

## **2.1.3 Pumps and Filtration**

### **Pump Shed**

The pump shed shown in drawing C03 houses a surface mount feed pump, two super filters, two HP pumps and the necessary power connection components.

The pump housing will be 2.2 x 2.2m as suggested by the pump supplier.

The surface mount centrifugal pump is required to lift water up from the underground tank and pass it through the screen filters. Given that the pump has efficiency of at least 50%, the pump size is determined as summarised in Table 2 below.

<b>Head Difference (m)</b>	2.0
<b>Pressure/Suction Head (Bar)</b>	0.22
<b>Allowance To Avoid Cavitation (Bar)</b>	2
<b>Minimum Flow Required (L/s)</b>	0.7
<b>Minimum Power Required (kW)</b>	0.31
<b>Next Available Pump Size (kW)</b>	0.55

*Table 2: Surface mount feed pump sizing*

Recycled water from the underground storage will be drawn up by the 1.5kW surface mounted centrifugal pump before feeding into the inline 50µ screen filters with the flow then distributed to the spray nozzles by two 5.5kW HP pumps.

For the two HP (High Pressure) pumps, a few alternatives were recommended by Spray Pump Services. From them, the 140 bar, 21L/min, 5.5 kW each option was chosen. The pumps will be placed on a single skid and located within a shed for security and weather proofing.

### ***Filters***

Spray Pump Services have recommended the following criteria shown in Table 3 as basic requirements for reclaimed water.

Particle Size (micron)	50
TSS (ppm)	50
pH	5 to 9

***Table 3: Reclaimed water quality requirements***

The two Amiad 50mm T super filters in parallel on a manifold with two 50 $\mu$  screen filters, with a screen area of 750cm<sup>2</sup> each, achieves the water quality requirements given above. The screen filters shall be cleaned, maintained or replaced regularly according to manufacturers' recommendation.

### ***Power Supply***

Power for the pump components will be harnessed by a connection from the existing underground power supply (11kV) across the road as shown in C03.

### ***Float switch and Pump inhibiting circuit***

A floating switch element and a low-level pump inhibiting circuit is suggested so that the pump stops pumping out water when the final storage tank water level, from which the reuse water is drawn out, is below 25% of the tank's total capacity. In addition, indicator lights will be installed to signal when the tank water level is at its 50% capacity and 30% capacity.

#### **2.1.4 Possible further treatment**

UV treatment of the wash water is not presently proposed. Should the biological contaminants of concern be less than 50 $\mu$  this additional treatment step could be located downstream of the screen filters.

### **Controlled Discharge Point**

The overflow from the last storage tank in the treatment train i.e. Tank 5, is piped to a controlled discharge point across Domain Road as can be seen from drawing sheet C02 in Appendix B. The sole objective of this discharge point is to allow storage tank water to overflow and prevent backflow in the treatment train following an extreme storm event.

The controlled discharge point is designed to be a manhole with a scruffy dome at the top. The overflow point details are given in C05 of the drawing set.

### **Operation and Maintenance**

All components in the treatment system including the Littatrap, tanks, pumps and filters will follow the will follow suppliers' operation and maintenance manuals and/or guidelines. A complete set of operation and maintenance guide will be provided at commissioning.



### 3 Cost Estimates

COOK COSTELLO LTD			REFERENCE: 14576		
PROJECT: KDC Biosecurity Boat Wash			DATE: 18/02/2020		
SITE: Kai Iwi Lakes					
Indicative construction cost estimate					
				ESTIMATE	
ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
100 ESTABLISHMENT					
101	Preliminary & General	LS	1	\$ 45,000.00	\$45,000
200 EROSION AND SEDIMENTATION CONTROL					
201	Erosion and Sediment Control	LS	1	\$ 5,000.00	\$5,000
300 EARTHWORKS					
301	All clearing as necessary to carry out the works of all vegetation & trees and other deleterious material, hedges, farm fences, gates, old concrete slabs etc within the works area.	LS	1	\$ 1,000.00	\$1,000
302	Strip topsoil and deposit on temporary stockpile	m²	1000	\$ 5.50	\$5,500
303	Cut to fill	m³	204	\$ 22.00	\$4,488
304	Excavate for clarifier and tanks (1.5 - 3m)	m³	500	\$ 20.00	\$10,000
305	Cart surplus material from site to disposal	m³	250	\$ 20.00	\$5,000
306	Backfill, spread and consolidate with excavated material	m³	250	\$ 45.00	\$11,250
307	Supply, place, compact and trim 250mm thick tank bedding	m²	150	\$ 24.00	\$3,600
308	Supply, place, compact 25mm thick sand bedding	m²	150	\$ 10.00	\$1,500
400 PAVEMENT CONSTRUCTION					
401	Gravel surface (get ready, tracking entrance & exit) (150mm)	m²	1251	\$ 18.70	\$23,394
402	Wash bay concrete pad	m²	145	\$ 200.00	\$29,000
403	Trafficable kerb to pad perimeter	m	60	\$ 42.00	\$2,520
500 DRAINAGE, TREATMENT AND STORAGE					
501	Pad channel with grate	m	6	\$ 400.00	\$2,400
502	Cesspit (675 x 450 x 1200)	each	1	\$ 1,790.00	\$1,790
503	Cast iron grate and frame	each	1	\$ 750.00	\$750
504	Littatrap (675 x 450)	each	1	\$ 575.00	\$575
505	Clarifier and storage tanks with lid (12.5m³ x 3 + 25m³ x 2)	each	1	\$ 25,520.00	\$25,520
506	Transport of tank, etc to site	LS	1	\$ 3,500.00	\$3,500

507	Overflow discharge pipe	m	20	\$	35.00	\$700
508	Overflow outlet	LS	1	\$	500.00	\$500
509	Floating Outtake Kit (50mm)	each	1	\$	329.99	\$330
510	Manhole pipe (Ø600) with scruffy dome Type 2	each	1	\$	750.00	\$750
512	Drainage plumbing and fittings	LS	1	\$	2,000.00	\$2,000
<b>600 PUMP, FILTRATION AND WASH</b>						
601	Feed pump unit with small pressure tank, pressure and flow control 0.55kW, Single phase supply	each	1	\$	1,000.00	\$1,000
602	HP Pump units – pump/motor/unloader valve/control 140 Bar 21L/m, 5.5kW	each	2	\$	3,000.00	\$6,000
603	Skid mount for pump	LS	1	\$	500.00	\$500
604	Main pump frame	LS	1	\$	2,200.00	\$2,200
605	Manual HP reel	each	2	\$	390.00	\$780
606	Heavy duty reel stands	each	2	\$	450.00	\$900
607	Float switch with low-level pump inhibiting circuit with light indicators	each	1	\$	2,500.00	\$2,500
608	Filters	each	2	\$	680.60	\$1,361
609	Transport of pumps, shed, etc to site	LS	1	\$	1,000.00	\$1,000
610	Pump / Wash plumbing	LS	1	\$	2,000.00	\$2,000
611	Pump shed with concrete floor	each	1	\$	5,000.00	\$5,000
612	Commissioning	LS	1	\$	3,000.00	\$3,000
<b>700 ELECTRICAL</b>						
701	Northpower proposed electrical connection works	LS	1	\$	40,000.00	\$40,000
702	Underground service main, conduit, trench, backfill, reinstate	m	25	\$	25.50	\$638
703	Switchboard	each	1	\$	2,500.00	\$2,500
<b>800 CONSENT</b>						
801	Building Consent		1	\$	5,000.00	\$5,000
802	Resource Consent		1	\$	1,200.00	\$1,200
<b>900 CONTINGENCY</b>						
901	20% contingency	LS	1			\$52,329
<b>Total excl. GST</b>						<b>\$313,974.47</b>

## 4 LIMITATIONS

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This report has been prepared for the benefit of Kaipara District Council as our client with respect to providing an engineering assessment of the proposed boat biosecurity washdown facility. It shall not be relied upon for any other purpose. The reliance by other parties on the information or opinions contained in this report shall, without our prior review and agreement in writing, be at such parties' sole risk.

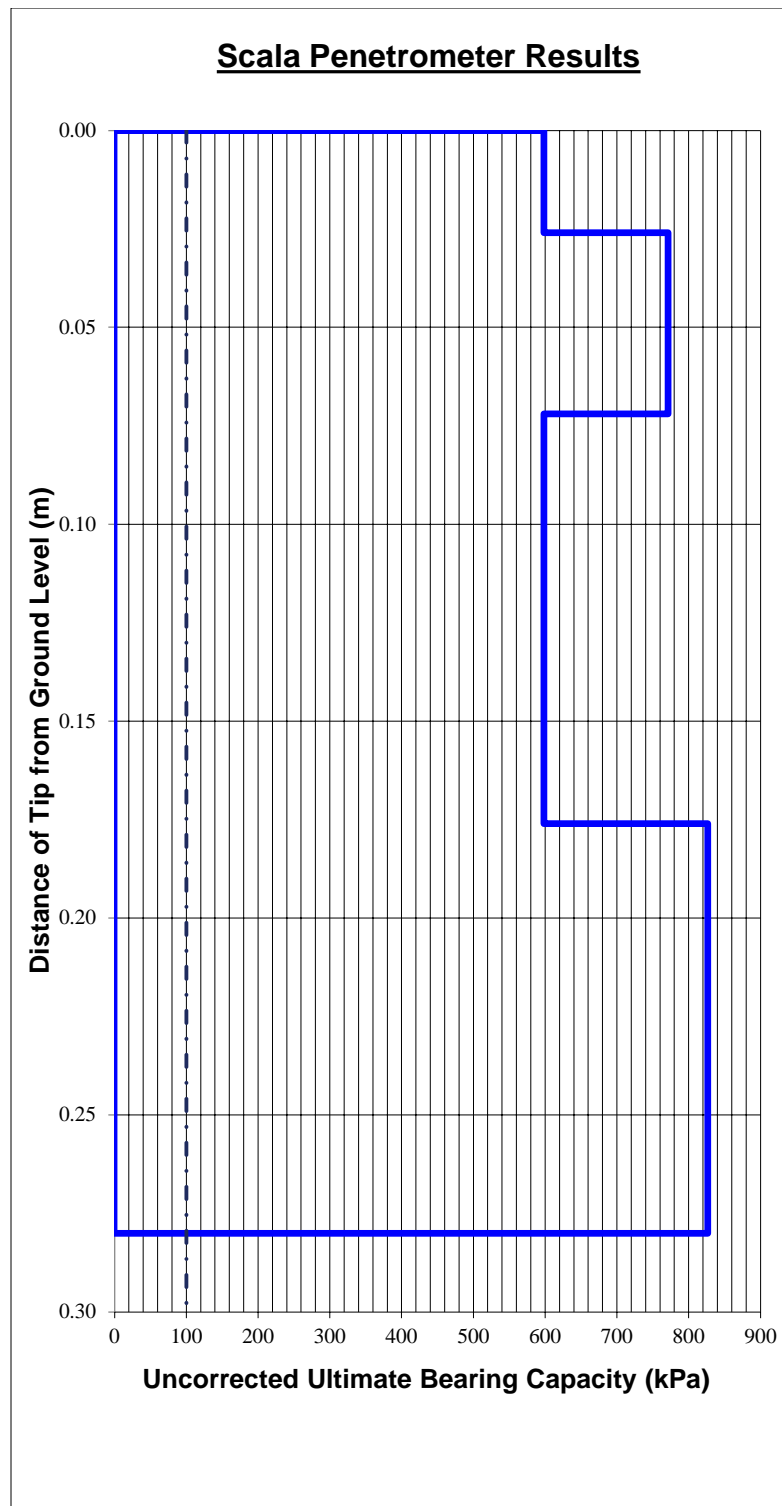
Opinions and judgments expressed herein are based on our understanding and interpretation of existing council GIS information, current regulatory standards, and should not be construed as legal opinions. Where opinions or judgments are to be relied on, they should be independently verified with appropriate legal advice.

CCL 2015 Ltd. would be pleased to provide further service to Kaipara District Council for construction coordination and believe that the project would benefit from such continuity.

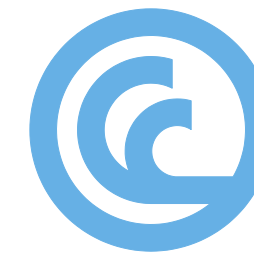
CCL 2015 Ltd. have performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for this assessment. No guarantees are either expressed or implied.

## 5 Appendices

### Appendix A – Scala Penetrometer Tests



## **Appendix B – Design Drawings**



FOR CONSENT

SIGNED

24/02/2020  
DATE

## PROPOSED CIVIL DETAIL DESIGN PLANS

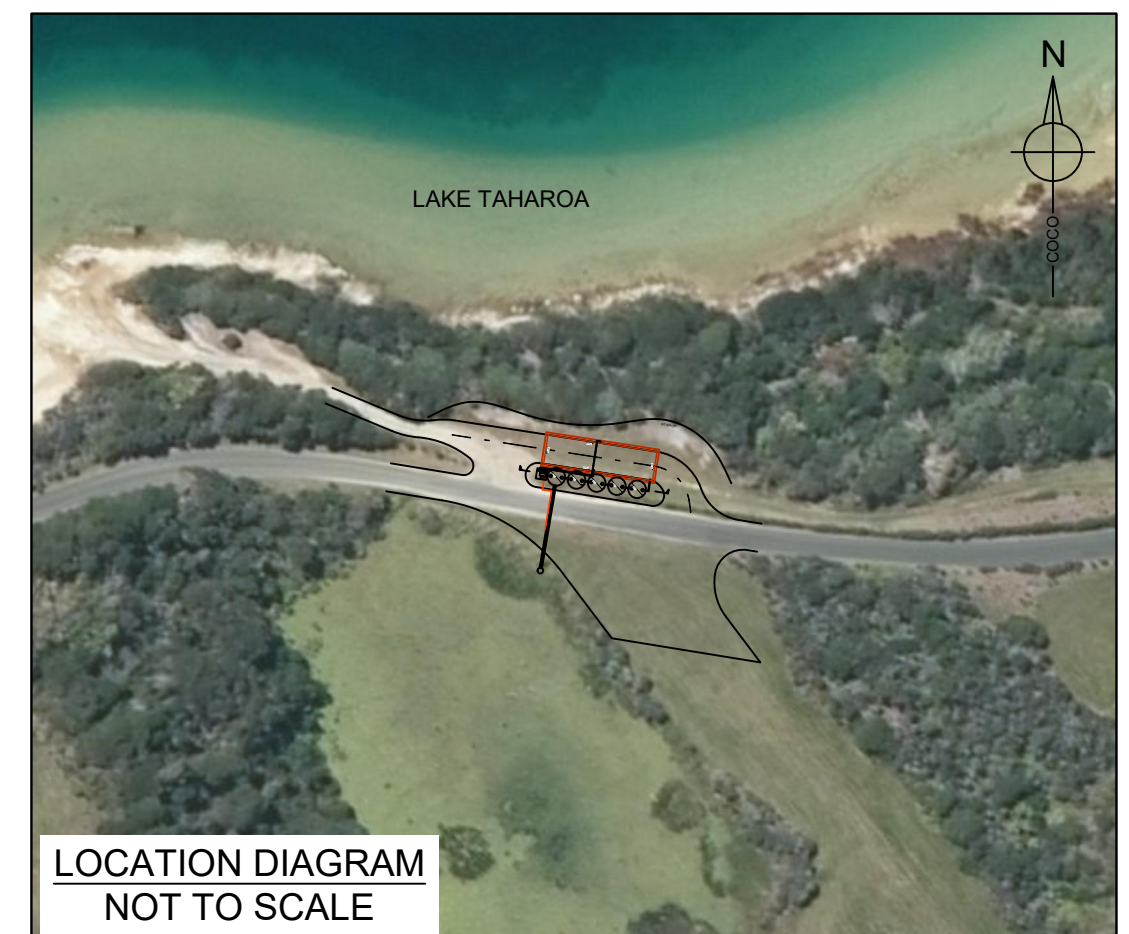
FOR KAIPARA DISTRICT COUNCIL,  
KAI IWI LAKES BOAT BIOSECURITY  
WASHDOWN,  
DOMAIN RD, OMAMARI

JOB NO:14576  
DATE: 24 FEBRUARY 2020

SCHEDULE OF DRAWINGS		
SHEET #	TITLE	REV
C00	COVER SHEET	A
C01	GENERAL NOTES	A
C02	GENERAL ARRANGEMENT OF BOAT WASH AREA	C
C03	UNDERGROUND SYSTEM CONFIGURATION AND WASHPAD PLAN VIEW	C
C04	UNDERGROUND SYSTEM CONFIGURATION	C
C05	CONCRETE WASHPAD AND CONTROLLED DISCHARGE POINT DETAILS	A
C06	KDC TYPICAL BEDDING AND BACKFILL DETAILS	A
C07	PUMP SHED - ELECTRICALS SCHEMATIC	A

### IMPORTANT NOTE: PRODUCER STATEMENTS

PS4 WILL NOT BE ISSUED AT COMPLETION OF WORKS UNLESS ALL REQUIRED TESTS AND  
INSPECTIONS HAVE BEEN NOTIFIED TO COOK COSTELLO AND COMPLETED DURING CONSTRUCTION



GENERAL

G1: THIS SET OF DRAWINGS IS TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATION AND ALL OTHER CONTRACT DRAWINGS.

G2: THE DRAWINGS ARE A DIAGRAMMATIC REPRESENTATION OF THE WORK TO BE CARRIED OUT ONLY AND DIMENSIONS SHALL NOT BE OBTAINED BY SCALING.

G3: ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER FOR DECISIONS BEFORE PROCEEDING WITH THE WORK.

G4: THE CONTRACTOR IS TO CONFIRM THE LOCATION AND LEVEL OF ALL UNDERGROUND SERVICES PRIOR TO UNDERTAKING ANY EARTHWORKS OR FOUNDATION CONSTRUCTION.

G5: ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION AND/OR DRAWINGS:

- NZS 3101:2017 CONCRETE STRUCTURES STANDARD
- NZS 3109 CONCRETE CONSTRUCTION
- NZS 3121 WATER AND AGGREGATE FOR CONCRETE
- AS/NZS 4671 STEEL REINFORCING MATERIALS

G6: GENERAL ABBREVIATIONS

- NTS - NOT TO SCALE
- UNO - UNLESS NOTED OTHERWISE
- FFL - FINISHED FLOOR LEVEL
- EGL - EXISTING GROUND LEVEL
- FGL - FINISHED GROUND LEVEL

G7: WHERE PROPRIETARY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL AND SUBJECT TO KAIPARA DISTRICT COUNCIL APPROVAL.

G8: ALL WORKS ARE TO COMPLY WITH THE HEALTH & SAFETY AT WORK ACT 2015.

G9: ALL WORKS SHALL BE PREFORMED IN ACCORDANCE WITH THE APPROVED ENGINEERING PLANS, PROJECT SPECIFICATION AND ALL OTHER CONTRACT DRAWINGS AND TO BE SUBJECT TO THE KDC ES, 2011 AND USED IN CONJUNCTION WITH NZS4404:2010.

G10: KDC STANDARD DETAILS HAVE NOT BEEN INDEPENDENTLY VERIFIED BY COOK COSTELLO. WE HAVE ACCEPTED THAT THEY WILL PERFORM FOR THE REQUIRED LIFE EXPECTANCY AS STATED IN THE KDC ES, 2011. WE ACCEPT NO LIABILITY IF THE STANDARD DETAILS DO NOT ACHIEVE THIS DESIGN LIFE.

G11: ALL LEVELS & CONNECTION POINTS TO BE CHECKED & CONFIRMED ON SITE PRIOR TO CONSTRUCTION. ATTENTION TO LEVELS IS OF CRITICAL IMPORTANCE TO THIS DESIGN.

G12: EROSION CONTROL - ALL SILT CONTROL MEASURES SHALL BE PLACED PRIOR TO COMMENCEMENT OF EARTHWORKS. SUCH MEASURES SHALL BE SUBJECT TO FURTHER ADDITIONS AND ALTERATIONS, WHERE CONSIDERED NECESSARY, AS DIRECTED BY THE PROJECT MANAGER OR COUNCIL, DURING THE PROGRESSION OF WORKS. IT IS ADVISED TO CONTACT NRC PRIOR TO COMMENCEMENT OF EARTHWORKS, AFTER INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES TO ENSURE THEY HAVE BEEN INSTALLED TO THE SATISFACTION OF NRC.

CONCRETE

C1: ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH NZS3109 AND NZS3101 SUBJECT TO RELEVANT SECTIONS OF THE SPECIFICATION.

C2: NO CONCRETE SHALL BE PLACED UNTIL THE DESIGNER HAS HAD THE OPPORTUNITY TO OBSERVE THAT THE DRAWINGS AND SPECIFICATIONS HAVE BEEN COMPLIED WITH.

C3: ALL CONCRETE SUPPLY AND PRODUCTION SHALL BE IN ACCORDANCE WITH NZS 3104, 3101:2017.

C4: WHERE THE LOCATION OF CONSTRUCTION JOINTS IS NOT SPECIFICALLY DETAILED ON THE STRUCTURAL DRAWINGS, CONSTRUCTION JOINTS SHALL BE COORDINATED WITH THE ENGINEER AS REQUIRED. THE CONSTRUCTOR SHALL ALLOW FOR ALL SUCH CONSTRUCTION JOINTS.

CONCRETE PAVEMENTS

CP1: UPON EXPOSURE OF SUBGRADE AT PAVEMENT BASE CONTACT ENGINEER FOR INSPECTION AND INSTRUCTION TO REMOVE AND REPLACE ANY SOFT AREAS PRIOR TO COMMENCING CONSTRUCTION OF PAVEMENT LAYERS. EXCAVATED MATERIAL TO BE REMOVED FROM SITE.

CP2: SUPPLY AND COMPACT BASECOURSE LAYER IN ACCORDANCE WITH CROSS SECTIONS SUPPLIED.

CP3: CONCRETE USED SHALL BE SPECIAL GRADE WITH 28 DAY COMPRESSIVE STRENGTH OF 30MPA.

CP4: ALL CONCRETE SHALL BE CURED BY AN APPROVED METHOD FOR AT LEAST 7 DAYS AFTER POURING. CURING METHOD SHALL BE PROPOSED TO ENGINEER FOR APPROVAL. SOME PROPRIETARY SURFACE TREATMENTS MAY NOT BE APPROVED.

EARTHWORKS

E1: ALL SITE EARTHWORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF NZS4431. SOIL BEARING CAPACITY IS TO BE VERIFIED UPON COMPLETION OF SITE EARTHWORKS AND DURING FOUNDATION EXCAVATION TO ENSURE ACTUAL SITE CONDITIONS ARE COMPATIBLE WITH THE INFERRED GEOTECHNICAL MODEL. OVER EXCAVATION AND BACKFILLING WITH ENGINEERED FILL OR SITE CONCRETE MAY BE NECESSARY WHERE SOFT SOIL / FILL IS ENCOUNTERED WITH PRIOR VARIATION APPROVAL.

E2: COMPACTION IN BASE OF PIPE TRENCHES TO ACHIEVE CLEGG 10.

STORMWATER DRAINAGE

SW1: ALL WORK AND MATERIALS SHALL COMPLY WITH THE PROJECT DRAWINGS AND SPECIFICATIONS AND CURRENT KDC STANDARDS AND SPECIFICATIONS. ANY CONFLICT BETWEEN THE PROJECT DOCUMENTS AND COUNCIL STANDARDS SHALL BE RAISED WITH THE ENGINEER FOR RESOLUTION, PRIOR TO CONSTRUCTION.

SW2: ALL TRENCH EXCAVATION SHALL COMPLY WITH ALL WORKPLACE HEALTH AND SAFETY REQUIREMENTS.

SW3: THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, CERTIFICATION, APPROVAL AND CONSTRUCTION OF ALL TEMPORARY WORKS INCLUDING BOTH STRUCTURAL ENGINEERING AND GROUNDWATER CONTROL. SUITABLY QUALIFIED PROFESSIONALS CARRYING ACCEPTABLE LEVELS OF PROFESSIONAL INDEMNITY INSURANCE SHALL BE PROPOSED TO THE ENGINEER BEFORE WORK COMMENCEMENT AND THE USE OF ANY PERSONS UNDERTAKING THIS TYPE OF WORK SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

SW4: FOR PIPE BEDDING, SURROUND AND BACKFILL DETAILS REFER TO PIPE BEDDING DETAILS.

SW5: WHERE PIPES ARE LAID IN FILL THE FILL SHALL BE PLACED TO FINAL SURFACE LEVELS BEFORE TRENCHING IS COMMENCED. THE FILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 200MM LOOSE THICKNESS AND COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS FOR EARTHWORKS (IF REQUIRED). A CERTIFICATE PROVIDED BY THE CONTRACTOR'S INDEPENDENT TESTING AGENCY CONFIRMING THE FILL MEETS THE SPECIFIED COMPACTION STANDARDS SHALL BE PROVIDED BEFORE ANY PIPE LAID IN NEW FILL WILL BE APPROVED BY THE ENGINEER OR ACCEPTED BY THE CONTROLLING AUTHORITY.

INSPECTIONS / SITE VISITS REQUIRED

I1: PRE-CONSTRUCTION SITE MEETING WITH CONTRACTOR, ENGINEER AND KDC PRESENT. NRC TO BE INFORMED OF WORKS ON SITE PRIOR TO COMMENCING WORKS.

I2: STRIPPED GROUND INSPECTIONS OF CROSSING, PAD, TANK SUBGRADE AND SITE FILL AREAS.

I3: CONTROLLED FILL TESTING TO BRING FILL UP TO SUBGRADE LEVELS TO BE CONSTRUCTED IN 200mm MAX LIFTS AND TESTED EVERY 600mm.

I4: SUBBASE PAVEMENT TESTING FOR ROAD IN ACCORDANCE WITH PAVEMENT DETAILS. CONTRACTOR TO ALSO PROVE SUBBASE METAL DEPTHS WITH STRING LINES

I5: BASECOURSE PAVEMENT TESTING FOR ROAD AND CROSSINGS IN ACCORDANCE WITH PAVEMENT DETAILS. CONTRACTOR TO ALSO PROVE BASECOURSE METAL DEPTHS WITH STRING LINES.

I6: STORMWATER TRENCH COMPACTION TEST

I7: REINFORCED CONCRETE WASHPAD - PREPOUR CONCRETE INSPECTION FOR CHECKING OF CROSSING DIMENSIONS AND REINFORCING PLACEMENT WITH ENGINEER AND KDC PRESENT.

I8: FINAL INSPECTION WITH KDC ENGINEER AND CONTRACTOR TO ENSURE ALL WORKS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE APPROVED ENGINEERING PLANS FOR FINAL SIGNOFF.

IMPORTANT NOTE: PRODUCER STATEMENTS

PS4 WILL NOT BE ISSUED AT COMPLETION OF WORKS UNLESS ALL REQUIRED TESTS AND INSPECTIONS HAVE BEEN NOTIFIED TO COOK COSTELLO AND COMPLETED DURING CONSTRUCTION



LAKE TAHAROA



- NOTES:
1. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH WORK.
  2. ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO COMMENCING ANY WORK.
  3. COMPLY WITH ALL WORKSAFE NZ ONSITE HEALTH AND SAFETY REQUIREMENTS AT ALL TIMES.
  4. COOK COSTELLO ACCEPT NO LIABILITY FOR UNAUTHORIZED CHANGES FROM THE DETAILS AND INFORMATION CONTAINED IN THESE DRAWINGS.
  5. GENERAL ARRANGEMENT OF THE PROPOSED BOAT WASHDOWN FACILITY AT KAI IWI LAKES (WGS84 -35.812799, 173.646591)

 **cook | costello**  
www.coco.co.nz  
Whangarei | Auckland | Wellington | Christchurch

C	DETAILED DESIGN	24-02-20	AN	AT
B	DETAILED DESIGN	06-11-19	KAH	AT
A	1ST ISSUE	10-06-19	KAH	AT
REV.	REVISION DETAILS	DRAWN APP.		

PROJECT DETAILS

KAIPARA DISTRICT COUNCIL  
KAI IWI LAKES  
SECTION 63  
BLK I KAIWI SD

TITLE

GENERAL ARRANGEMENT  
BOAT WASH AREA

DATE CREATED	DRAWN	DESIGNED	APPROVED
10-06-2019	K HANSARD	YH CHONG	A TONKS
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DWG NUMBER	REVISION		
C02		C	

SCALE 1:400

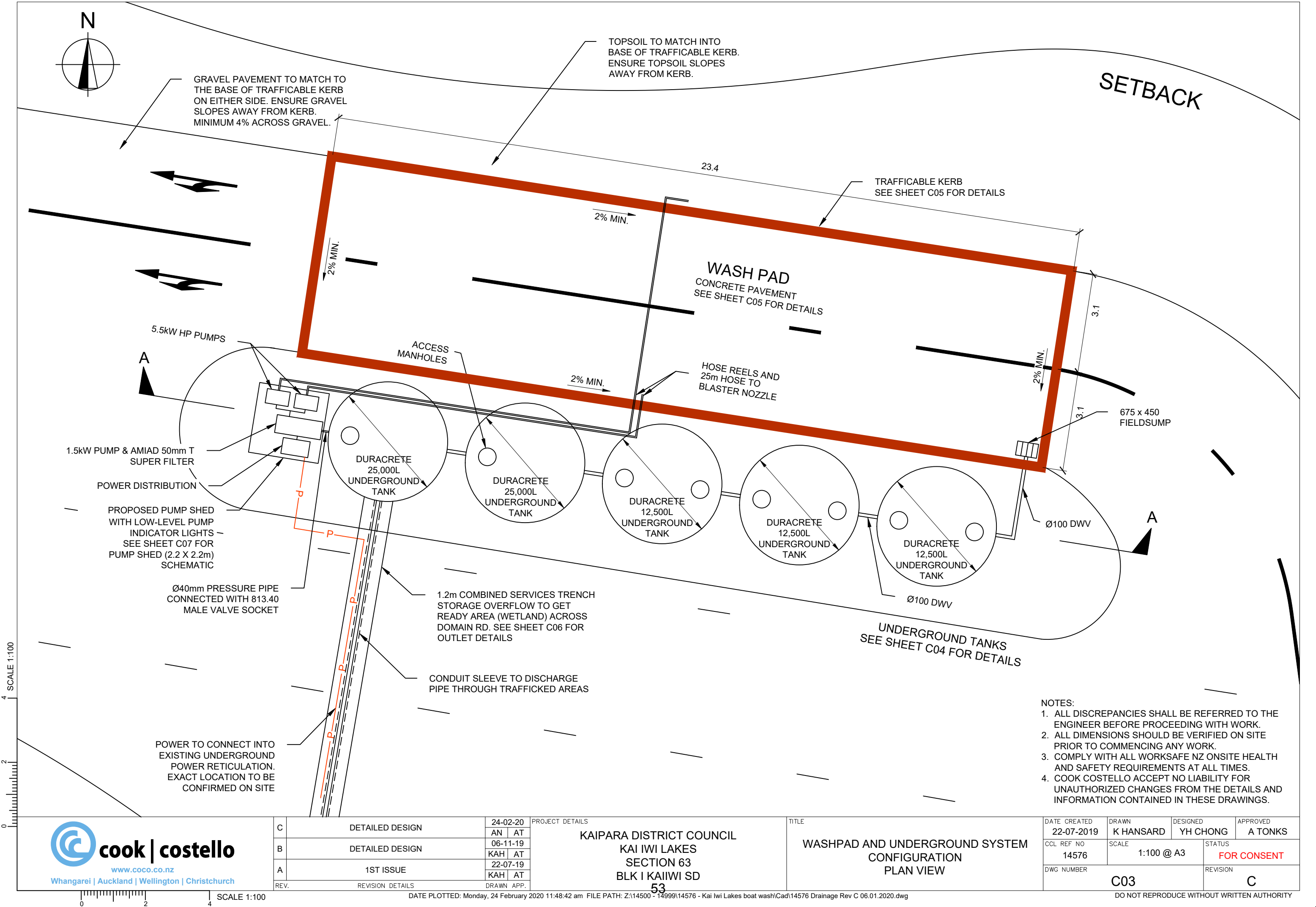
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5

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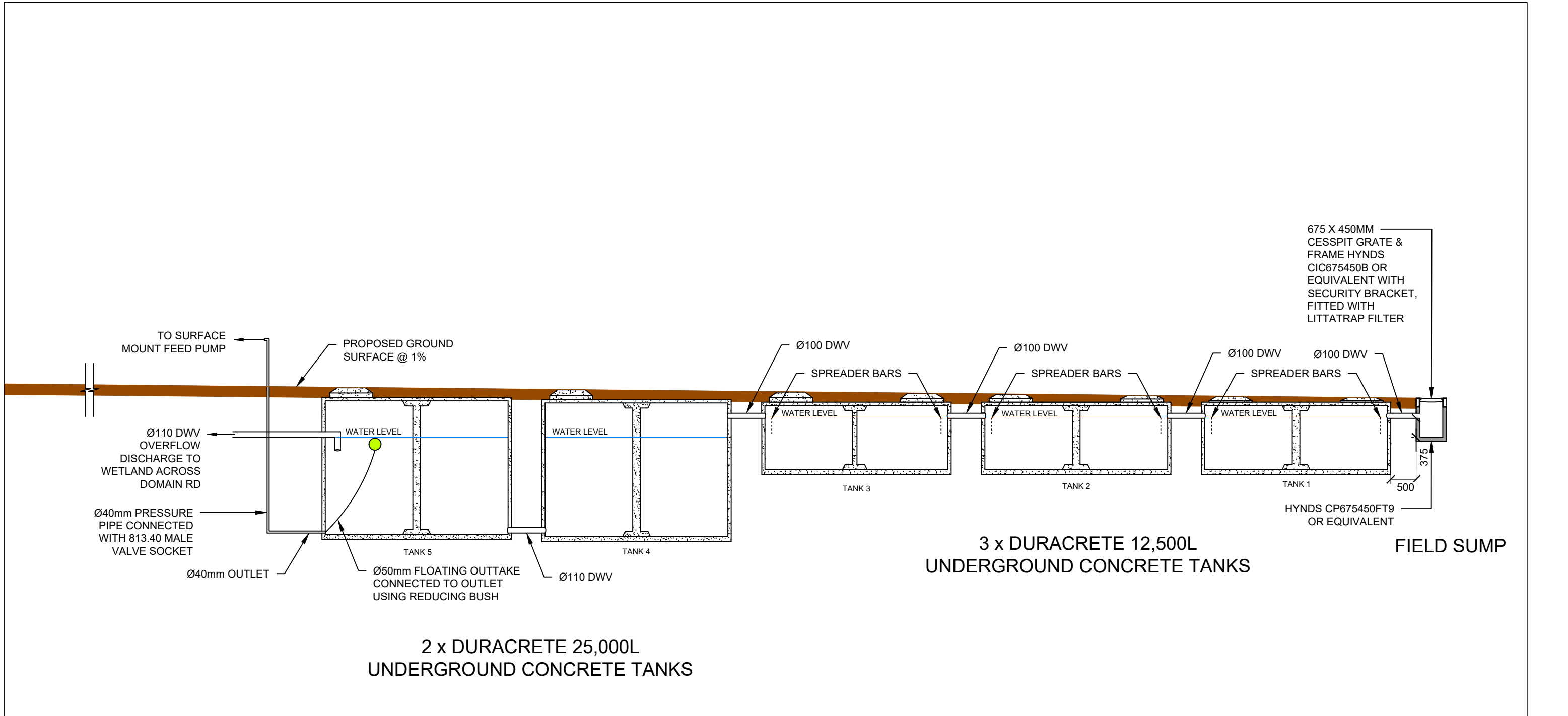


C	DETAILED DESIGN	24-02-20	AN	AT
B	DETAILED DESIGN	06-11-19	KAH	AT
A	1ST ISSUE	22-07-19	KAH	AT
REV.	REVISION DETAILS	DRAWN APP.		

PROJECT DETAILS
KAIPARA DISTRICT COUNCIL
KAI IWI LAKES
SECTION 63
BLK I KAIWI SD
53

TITLE
WASHPAD AND UNDERGROUND SYSTEM
CONFIGURATION
PLAN VIEW

DATE CREATED	22-07-2019	DRAWN	K HANSARD	DESIGNED	YH CHONG	APPROVED	A TONKS	
CCL REF NO	14576	SCALE	1:100 @ A3		STATUS			FOR CONSENT
DWG NUMBER	C03				REVISION			C



SECTIONAL ELEVATION A-A

SCALE 1:75

- NOTES:
1. ADOPT MINIMUM CLASS SN4 DWV PIPES TO COMPLY WITH KDC ENGINEERING STANDARDS.
  2. FIELD SUMP SPECIFICATIONS TO COMPLY WITH KDC ENGINEERING STANDARDS - DRAWING S29 (SEE SHEET C05). THE CONTRACTOR IS TO UNDERTAKE SUITABLE WATER TEST TO CHECK FOR WATER TIGHTNESS.
  3. BEDDING AND BACKFILL OF PIPES TO COMPLY WITH KDC ENGINEERING STANDARDS - DRAWING S25 (SEE SHEET C04).
  4. TANK INSTALLATION AND PREPARATION TO COMPLY WITH DURACRETE SPECIFICATIONS
  5. ALL TANKS TO HAVE DOUBLE LIDS AND SPREADER BARS AT THE INLET AND OULET.

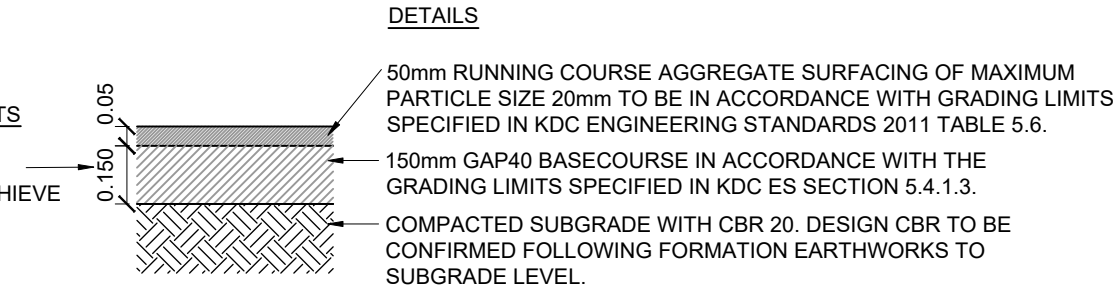
C	DETAILED DESIGN	24-02-19	AN	AT
B	DETAILED DESIGN	06-11-19	KAH	AT
A	1ST ISSUE	22-07-19	KAH	AT
REV.	REVISION DETAILS	DRAWN APP.		

PROJECT DETAILS
KAIPARA DISTRICT COUNCIL
KAI IWI LAKES
SECTION 63
BLK I KAI IWI SD

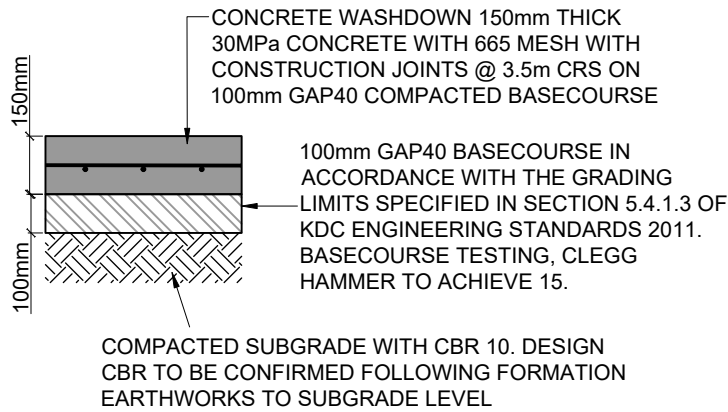
TITLE
UNDERGROUND SYSTEM CONFIGURATION

DATE CREATED	DRAWN	DESIGNED	APPROVED
22-07-2019	K HANSARD	YH CHONG	A TONKS
CCL REF NO	SCALE	STATUS	
14576	1:75 @ A3	FOR CONSENT	
DWG NUMBER	REVISION		
C04	C		

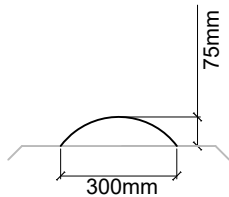
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0.6  
0.4  
0.2  
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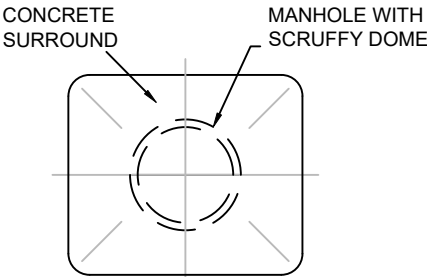
**PAVEMENT DETAILS FOR GRAVEL AREA**  
SCALE 1:20



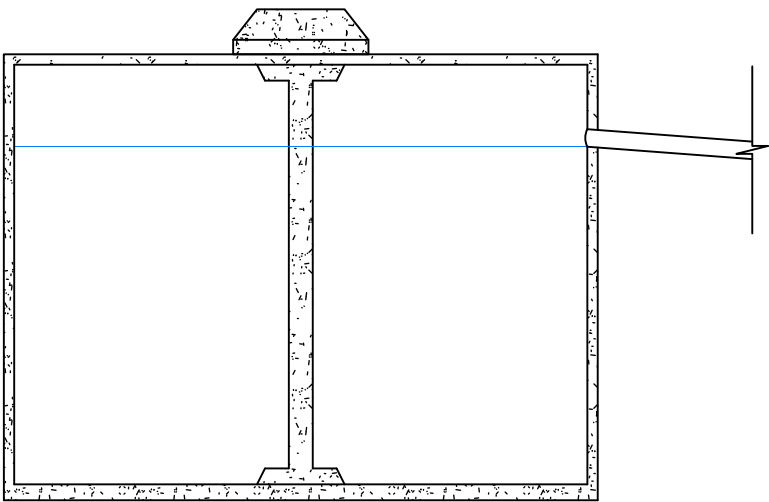
**PAVEMENT DETAILS FOR WASHPAD**  
SCALE 1:20



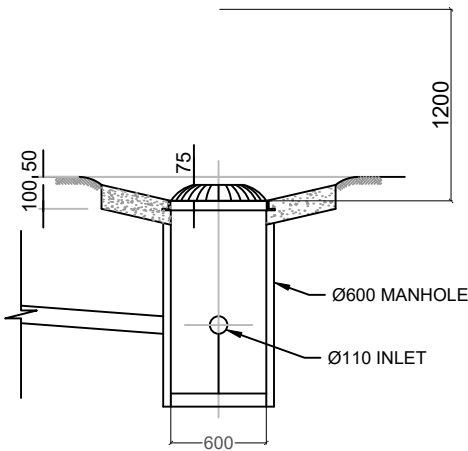
**TRAFFICABLE KERB DETAILS FOR WASHPAD**  
SCALE 1:20



**PLAN**



DURACRETE 25,000L UNDERGROUND TANK



CONTROLLED DISCHARGE OUTLET

**CONTROLLED DISCHARGE POINT DETAILS**

NOT TO SCALE

- NOTES:
1. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH WORK.
  2. ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO COMMENCING ANY WORK.
  3. COMPLY WITH ALL WORKSAFE NZ ONSITE HEALTH AND SAFETY REQUIREMENTS AT ALL TIMES.
  4. COOK COSTELLO ACCEPT NO LIABILITY FOR UNAUTHORIZED CHANGES FROM THE DETAILS AND INFORMATION CONTAINED IN THESE DRAWINGS.

A	REVISION DETAILS	DRAWN APP.

PROJECT DETAILS		
KAIPARA DISTRICT COUNCIL		
KAI IWI LAKES		
SECTION 63		
BLK I KAI IWI SD		
24-02-20		
AN AT		

TITLE	
CONCRETE WASHPAD AND CONTROLLED DISCHARGE POINT DETAILS	

DATE CREATED	10-02-2020	DRAWN	K HANSARD	DESIGNED	YH CHONG	APPROVED	A TONKS
CCL REF NO	14576	SCALE	AS SHOWN @ A3	STATUS			
DWG NUMBER				REVISION			
C05				A			

**CONCRETE PIPES**  
(SUITABLE FOR ALL SITUATIONS)

PIPE SIZE (mm)	CLASS	MIN. COVER (mm)	MAX. COVER (m)
225	3 (Y)	300	3.0
	2 (X)	500	2.4
300	4 (Z)	300	-
	3 (Y)	400	3.0
375	2 (X)	700	2.0
	4 (Z)	300	-
450	3 (Y)	400	3.0
	2 (X)	700	1.8
525	4 (Z)	300	-
	3 (Y)	400	3.0
600	2 (X)	700	1.8
	4 (Z)	300	-
750	3 (Y)	400	3.0
	2 (X)	500	2.0
900	3 (Y)	-	3.0
	2 (X)	300	2.0
1050			
1200			

Note: Information obtained from Concrete Pipe Association of Australasia

**ALUMINIUM PIPES**  
(ENTRANCE CROSSINGS - PRIVATE ROAD CULVERTS ONLY)

PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
300	300	3.0
375	300	
450	300	
600	300	
750	375	
900	450	
1050	525	
1200	600	

Note: Information obtained from C.S.P.Pacific

**uPVC PIPES** (ENTRANCE CROSSINGS - PRIVATE ROAD CULVERTS ONLY)

**IPLEX TRANSIT - SPEC. CULVERTS**

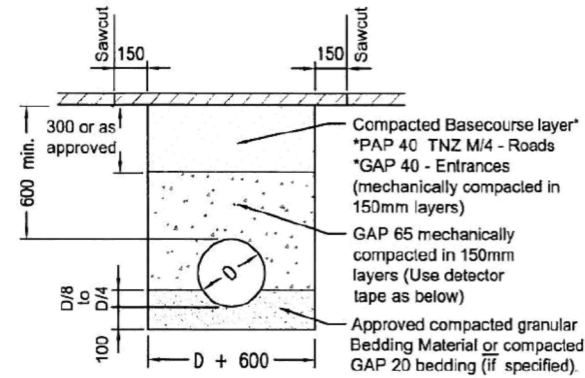
PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
225 - 475	300	3.0

Note: Information obtained from PLEX.

**ALI-TUFF PIPES** (16mm Gauge)

PIPE SIZE (mm)	MIN. COVER (mm)	MAX. COVER (m)
300 - 1200	600	Manufacturers Specification

Note: Information obtained from Richardson Pacific (NZ) Ltd



**ADDITIONAL BACKFILL REQUIREMENTS UNDER CARRIAGEWAYS**

All types of pipe except concrete (refer to concrete pipe chart)

**BEDDING MATERIAL**

Crushed aggregate with the following requirements:

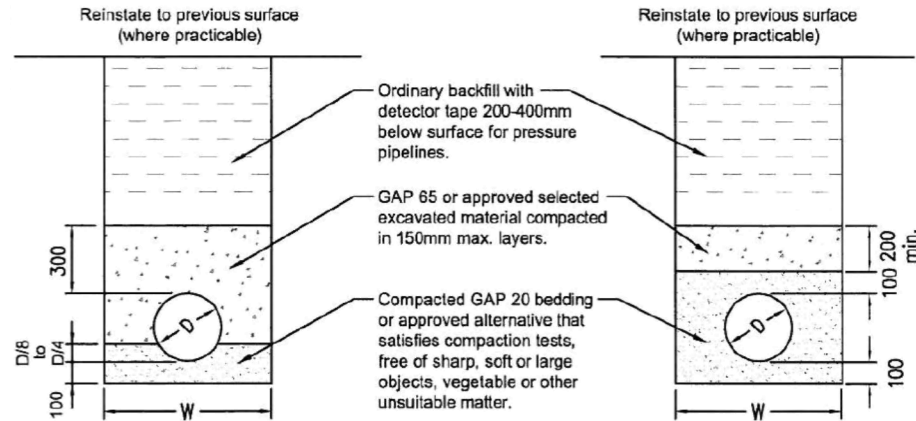
Crushing resistance 110KN

Weathering resistance: AA, AB, AC, BA, BB, CA, CB

Clay index: B

Sand equivalent: 15

Grading: Sieve Size (mm) 19.0 2.36 0.60 0.30 0.15 0.075  
% Mass Passing 100 100-50 90-20 60-10 25-0 10-0



**ALUMINIUM, CONCRETE GALVANISED STEEL OR VITRIFIED CLAY PIPE**  
(Where specifically approved)

**PVC & PE PIPE**

(PVC not approved for water supply)

PE pipe bedding aggregate shall not exceed 5% of the Nominal pipe dia.

W	TYPE OF PIPE
D + 600	Aluminium
D + 600	Galvanised Steel
D + 450	Concrete
D + 450	Vitrified Clay
D + 400	uPVC & PE

Variations in W require additional design compensation.

**NOTES**

- Concrete pipes to be RCRRJ "Class X" (or stronger) installed to Manufacturers requirements.
- Aluminium pipes to be "Aluflo" or "Highflo" type design (or similar).
- Ordinary backfill shall be free from stones or rocks greater than 150mm nominal diameter & compacted in 300mm layers.
- Replace topsoil to original depth as necessary.
- Existing sealed roadway excavations are to be resurfaced with 50mm of asphaltic concrete.
- Privateway basecourse metalling within pipe trenches may be in accordance with the Privateway Standards.
- Unsatisfactory trench material is to be undercut and replaced with compacted hardfill.  
In poor soils such as swamp/peat material and in rock the minimum depth of granular bedding material below the invert is to be 200mm or Specific design as necessary.
- Trench width shall not exceed W at the pipe crown level.
- Pipelines at 1:8 gradient or steeper shall have cement stabilised bedding and/or surrounds.
- Pipelines at 1:3 gradient or steeper shall have 'weak mix' concrete bedding (10MPa). Large pipes will require Specific pipe design.
- Concrete bedding shall be allowed to cure for 48 hours prior to backfilling.
- Backfilling under carriageways may be with 'flowable fill' (low strength fly-ash concrete).
- Granular bedding is to satisfy N.Z.S 7643 - Appendix B.
- Minimum cover over pipes (unless specifically designed or protected in accordance with KDC S26), to the highest point or bell, of the outside of the pipe (or collar) in any area shall be:  
a) 300mm - if not subjected to traffic loading  
b) Ref. to above charts - under carriageways and trafficked areas.

**BEDDING & BACKFILL DETAILS**

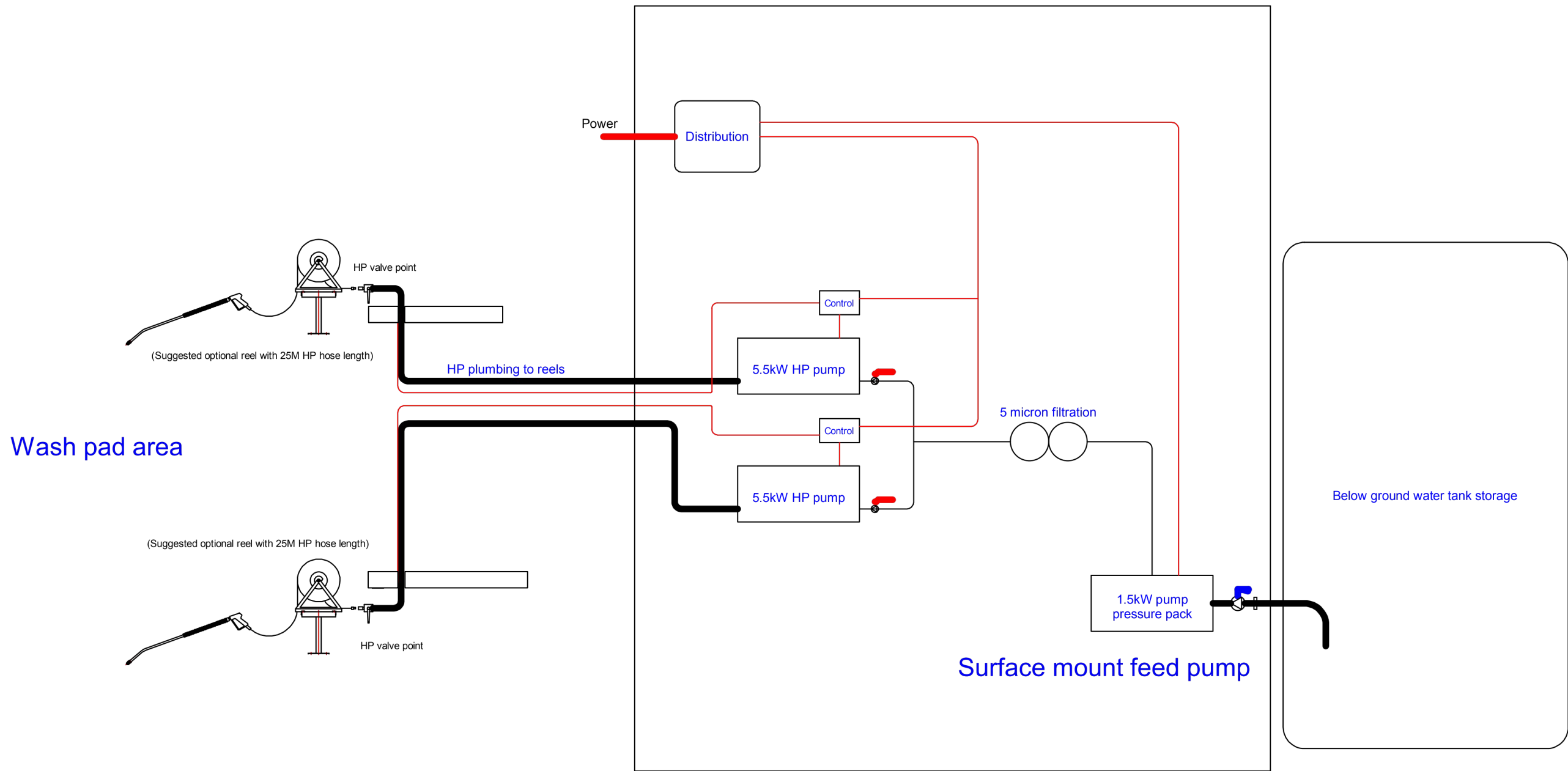
SHEET S25 KDC EES 2011 - NOT TO SCALE

**NOTES:**

- ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH WORK.
- ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO COMMENCING ANY WORK.
- COMPLY WITH ALL WORKSAFE NZ ONSITE HEALTH AND SAFETY REQUIREMENTS AT ALL TIMES.
- COOK COSTELLO ACCEPT NO LIABILITY FOR UNAUTHORIZED CHANGES FROM THE DETAILS AND INFORMATION CONTAINED IN THESE DRAWINGS.



Pump/control enclosure - shed



- NOTES:
1. ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH WORK.
  2. ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO COMMENCING ANY WORK.
  3. COMPLY WITH ALL WORKSAFE NZ ONSITE HEALTH AND SAFETY REQUIREMENTS AT ALL TIMES.
  4. COOK COSTELLO ACCEPT NO LIABILITY FOR UNAUTHORIZED CHANGES FROM THE DETAILS AND INFORMATION CONTAINED IN THESE DRAWINGS.
  5. SECURE ABOVE GROUND ASSETS WITHIN A 2.2 X 2.2m PUMP SHED.
  6. PUMPS AND FILTER INSTALLATION TO COMPLY WITH SPRAY PUMP SERVICES' SPECIFICATIONS

Suggested schematic sketch for layout  
With HP boat wash system installation

A	DETAILED DESIGN	24-02-20	
		AN	AT
REV.	REVISION DETAILS	DRAWN	APP.

PROJECT DETAILS
KAIPARA DISTRICT COUNCIL
KAI IWI LAKES
SECTION 63
BLK I KAIWI SD
57

TITLE
PUMP SHED ELECTRICALS SCHEMATIC (PROVIDED BY SUPPLIER)

DATE CREATED 10-02-2020	SUPPLIED SPRAY PUMP SERVICES	APPROVED
CCL REF NO 14576	SCALE NTS @ A3	STATUS FOR CONSENT
DWG NUMBER C07		REVISION A



# Financial report at 31 March 2020

**Meeting:** Taharoa Domain Governance Committee  
**Date of meeting:** 28 May 2020  
**Reporting officer:** Violeta Kayryakova, Financial Services Manager

## Purpose/Ngā whāinga

To provide the Taharoa Domain Governance Committee (the Committee) with detailed financial information and to provide an opportunity to discuss strategic directions.

## Executive summary/Whakarāpopototanga

Council management provides the Committee with detailed operational Financial reporting.

Key Indicators for year to March 2020 are set out in the tables below:

	Actual	Budget
	31 March 2020	30 June 2020
Revenue total	\$ 520,345	\$ 439,500
Expenditure total	\$ 437,171	\$ 629,516
Capital expenditure	\$ 194,294	\$ 200,000

## Recommendation/Ngā tūtohunga

That the Taharoa Domain Governance Committee:

- a) Notes the financial report as at 31 March 2020.

## Context/Horopaki

This report covers: Kai Iwi lakes (Taharoa Domain) including Pine Beach and Promenade Point camp grounds.

## Discussion/Ngā kōrerorero

Income for the last quarter continued to increase with a total of \$317,414 received. The total revenue at March 2020 is \$520,345 well ahead of budgeted reflecting the high occupancy rates through the season. Some of the additional income is funds received from NRC as a joint share of costs for the pest plant control and planting plan (\$13,043.48) and the final payment from Tourism Infrastructure Fund (TIF) for the new toilet and Caravan dump station (\$10,500).

### Costs:

Costs overall are below budget at year to date March 2020.

- The summer months incur higher refuse disposal costs.
- Salaries costs are now split on 60/40% basis.
- Sundry costs include:
  - 1) Financial costs of \$11,295 – are bank fees and charges (Eftpos of \$112.90 per month and Merchant fees).
  - 2) Communication costs of \$3,216– one off cost of \$433 for new equipment setting, \$336 monthly internet and phone charges.
  - 3) Office administration costs of \$11,269 – includes one off payments: of \$5,872 to AA Tourism for advertising in New Zealand AA Book, \$1,075 to Visual Solution for Taharoa Domain brochures and further cost for media advertisings.
  - 4) Cost of sales – are purchases of ice bags for resale purpose, total of \$6,723.

## Capital Expenditure

The projects in the financial year are:

- Improving Kai Iwi facilities in general.

New picnic tables	\$1,010
Additional powered sites	\$7,716
Air-conditioning office	\$3,186
Office upgrades	\$4,800
Toilet gates	\$2,018
Playground shade sails	\$19,425
Water meters for Resource consent monitoring	\$4,212
<b>Total</b>	<b>\$42,367</b>

- Public Toilets improvements at Lake Waikare.

Toilet and caravan dump station	\$98,707
<b>Total</b>	<b>\$98,707</b>

- Taharoa Domain Reserve management plan.

Walking track signage	\$19,946
Signage	\$2,303
Plants	\$10,183
Security cameras	\$2,830
<b>Total</b>	<b>\$35,262</b>

## Significance and engagement/Hirahira me ngā whakapāpā

The decisions or matters of this report do not trigger the significance criteria outlined in Council's Significance and Engagement Policy, and the public will be informed via agenda on the website.

## Next steps/E whaiake nei

This report is for information only and does not trigger legal or delegation implications.

## Attachments/Ngā tapiritanga

A	Detailed financial report as at 31 March 2020



# Financial Summary Report for the period ended 31 March 2020

	Kai Iwi Camp	Taharoa Domain	Actual 31 March 2020 \$	Budget 30 June 2020 \$
<b>Revenue</b>				
Camping fees	496,802	23,543	520,345	439,500
Other Income	-	-	-	-
<b>Revenue Total</b>	<b>496,802</b>	<b>23,543</b>	<b>520,345</b>	<b>439,500</b>

	Kai Iwi Camp	Taharoa Domain	Actual 31 March 2020 \$	Budget 30 June 2020 \$
<b>Expenditure</b>				
Transport costs	2,204	3,518	5,721	17,859
Resource Consents	-	-	-	838
Grounds maintenance	36,853	99,992	136,846	162,000
Building maintenance	37,645	18,072	55,717	64,500
Professional service	14,395	4,626	19,021	26,414
Advertising and promotion	10,161	1,352	11,513	19,561
Staff salaries and employee costs	115,500	39,858	155,358	202,066
Insurance	493	1,949	2,441	4,381
Power and water costs	4,220	5,230	9,450	12,386
Refuse disposal	19,012	-	19,012	32,500
Sundry	21,436	654	22,091	22,511
<b>Expenditure total</b>	<b>261,918</b>	<b>175,252</b>	<b>437,171</b>	<b>565,016</b>

	Kai Iwi Camp	Taharoa Domain	Actual 31 March 2020 \$	Budget 30 June 2020 \$
<b>Capital Expenditure</b>				
10705 Public Toilets - Lake Waikare	-	98,707	98,707	-
11055 Kai Iwi Camp Ground Facilities	42,367	-	42,367	100,000
11019 Implement Reserve Management Plan	-	35,262	35,262	100,000
<b>Capital Expenditure</b>	<b>42,367</b>	<b>133,969</b>	<b>176,336</b>	<b>200,000</b>



# Kai Iwi Lakes Dune Lakes Galaxias Working Group update

**Meeting:** Taharoa Domain Governance Committee  
**Date of meeting:** 28 May 2020  
**Reporting officer:** Mark Schreurs, Policy Analyst

## Purpose/Ngā whāinga

To update the Taharoa Domain Governance Committee (the Committee) on the work of the Kai Iwi Lakes Dune Lakes Galaxias Working Group (the Working Group).

## Executive summary/Whakarāpopototanga

The Working Group last met on 11 December 2019. Notes from that meeting are presented with this report as **Attachment A**. At this meeting the Working Group agreed to next meet in March 2020 to further discuss the results of their research and how they would present these results to the Taharoa Domain Governance Committee in a formal report by the end of 2020. However, by March 2020, progress on the Working Group's research projects had progressed slower than anticipated and it was agreed to postpone the meeting till May 2020. Since then, the outbreak of COVID-19 and the ensuing lockdown have further disrupted the Working Group's progress. Despite this, progress has been made and the Working Group members have kept in touch with updates on their respective projects.

This report provides a summary of the key matters discussed at the 11 December 2019 meeting and progress made since.

## Recommendation/Ngā tūtohunga

That the Taharoa Domain Governance Committee:

- a) Notes the report 'Kai Iwi Lakes Dune Lakes Galaxias Working Group update, and its Attachment A.

## Context/Horopaki

The DLG (Galaxias sp.) is a small native fish found only in the Kai Iwi Lakes and there are fears its population is declining. In response to this problem, Te Roroa, Te Kuihi, Kaipara District Council (KDC), Northland Fish and Game Council (Fish and Game), Northland Regional Council (NRC), NorthTec and the Department of Conservation (DOC) have formed the Kai Iwi Lakes Dune Lakes Galaxias Working Group (the Working Group). The members of this Working Group are making a coordinated effort to better understand the DLG, its ecology, interactions with other species and what management actions will be successful in promoting its survival.

## Discussion/Ngā kōrerorero

The Working Group last met on 11 December 2019. The meeting notes from this meeting are included with this report as **Attachment A**. The next meeting of the Working Group has been postponed due to delays processing samples and due to the COVID-19 Lockdown.

The following is a general update on the Working Group's progress to date.

The Working Group has been undertaking a number of research and monitoring projects, most notably the trout diet study, otolith study and a review of DOC's DLG spotlight monitoring

programme. The Working Group's key projects are focused on better understanding food webs in the lakes, and the lifecycle and population structure of the Dune Lakes Galaxias (DLG).

Sample collection for the otolith study and trout diet study has progressed well with much of the work undertaken by NorthTec supported by funding and equipment from Fish and Game, including the use of their boat. However, delays have been experienced processing samples in the laboratory. This has partly been due to reliance on just a few NorthTec students for gut and otolith analysis as well as laboratory closures at NorthTec and Massey University due to the COVID-19 pandemic. Despite this, the gut sample analysis has been almost completed. The NorthTec students involved have completed their qualifications however Fish and Game have provided funding to employ one of these students to continue processing the remaining samples. This gut sample analysis has been able to progress despite the COVID-19 Lockdown. In addition, Massey University had started radio isotope analysis of some samples, however this work has had to be postponed due to the COVID-19 Lockdown. Radio isotope analysis will recommence when the Lockdown ends. This work by Massey University is part of a national study into trout diet being completed for Fish and Game.

DOC have been reviewing their DLG spotlight monitoring programme. They are intending to amend their methodology to make this monitoring programme more robust. This will include introducing additional monitoring sites.

The preliminary findings of the Working Group's studies are yielding some valuable insights. It appears the DLG are spawning in all months of the year though there may be peaks of greater spawning activity at certain times. The fish are also reaching sexual maturity at a smaller size than previously thought (45mm). Further insights are anticipated as this research progresses.

The Working Group also made the suggestion that Kaipara District Council should monitor the number of vehicle movements in and out of the Domain to assess the level of visitor pressure on the Domain. Kaipara District Council has since begun a monitoring programme to this effect. The first round of monitoring was undertaken over December 2019 and January 2020. The results of this monitoring are summarised in table 1.

*Table 1: Kai Iwi Lakes Vehicle Movements - Summer 2019.*

	Domain Road	Promenade Point	Kai Iwi Lakes Road
<b>Week 1 (19 Dec - 26 Dec) daily average</b>	523	122	No data
<b>Week 2 (26 Dec - 2 Jan) daily average</b>	1167	140	233
<b>Week 3 (2 Jan - 9 Jan) daily average</b>	798	121	234
<b>Average</b>	829	128	233

This is intended to give an indication of how many visitors are coming to the lakes over what period and if numbers are increasing from one season to the next. By subtracting camper numbers (which are available through the campground booking system) it is also possible to get an indication of day visitor versus camper numbers.

## Next steps/E whaiake nei

The Working Group's next meeting will be scheduled after processing of the samples collected to date has progressed sufficiently to allow informed discussion of the findings.

Key items for discussion will include:

- Discussion of preliminary findings;
- Report structure – for reporting research findings and recommendations to the Taharoa Domain Governance Committee; and
- Discussion on whether current environmental monitoring programs are adequate.

The Working Group has the goal of compiling a report on their findings by the end of 2020, however this deadline may need to be revised if the COVID-19 pandemic results in further delays. When completed, this report will give advice on how to best protect the DLG.

### **Attachments/Ngā tapiritanga**

	Title
A	11 December 2019 Kai Iwi Lakes Dune Lakes Galaxias Working Group Meeting Notes



## Meeting Notes

### Kai Iwi Lakes Dune Lake Galaxias Working Group

**Date :** Wednesday 11 December 2019  
**Time :** 11:20 am start, concluded at 1.43pm  
**Venue :** Northland Regional Council, Whangarei Office

### Attendance

Tom Drinan	Department of Conservation
Matthew Calder (via phone)	Department of Conservation
Mark Schreurs	Kaipara District Council
Tanya Cook	NorthTech
Graham Gallagher	Northland Fish and Game Council
Carol Nicholson	Northland Regional Council
Will Trusewich	Northland Regional Council
Claire Heyns	NorthTech
Alex Going	Northland Regional Council/NorthTech

### Opening

Mark welcomed everyone and explained the agenda for today.

### Apologies

Ric Parore (Te Kuihi), Rudi Hoetjes (Fish and Game), Andrew Knock (DOC), Kathie Fletcher (KDC) and Taoho Patuawa (Te Roroa).

### Preliminary findings

The Working Group had instigated a number of research and monitoring projects, most notably the trout diet study, otolith study and review of the Department of Conservation's (DOC) Dune Lake Galaxias (DLG) spotlight monitoring. These projects had now been running for over a year and were beginning to show results. The Working Group discussed these initial findings and how effective these were proving.

Tanya explained the methods used to collect a set of samples of DLG. These samples were now being used for otolith and radio isotope analysis. In addition, visual observations have been made of what fish are present (regardless of species) at the time of sampling and measurements are taken of every DLG caught.

Macroinvertebrate samples have also been collected as part of this project. In addition, samples of trout have been caught, their stomachs taken and frozen for analysis and their heads taken for radio isotope analysis.

To date, samples have been collected at regular (typically two monthly) intervals since November 2018. However, analysis of these samples has yet to be fully completed. It is noted that analysis of the samples is very time consuming and takes the NorthTech students involved many hours in the laboratory. In particular, the radio isotope analysis will only begin once all samples have been collected. The findings from this research is therefore still incomplete. However, the findings so far show the methods being employed are robust and yielding good results.

Preliminary findings show the DLG appear to be spawning in all months of the year though there may be peaks of greater spawning activity at certain times. The fish are also reaching sexual maturity at a smaller size than previously expected (45mm). As the study progresses, peaks in spawning will be compared with data on lake level, rainfall, phase of the moon, Gambusia abundance and the trout

release cycle. This is anticipated to give insights into what may trigger spawning events. The findings will also be compared against the spotlighting data collected by the Department of Conservation (DOC) over the same period. It was noted that some of the sample collection sites align with the DOC spotlighting sites, meaning there is good correlation between the two research initiatives.

It was suggested that local iwi along the Pouto Peninsular be asked if they are aware of any patterns in spawning of landlocked inanga populations. Mātauranga Māori from iwi in this area has already contributed some useful insights to understanding the life cycle of other species.

**Action: Mark to suggest this to Taoho.**

There was some discussion on the effects of bully (*Gobiomorphus cotidianus*) predation on DLG (research so far has revealed that bully eat both DLG and Gambusia). There was also some discussion on tuna (eel) diet. One tuna stomach has been collected to date for analysis. It is hoped further samples of tuna can be obtained for stomach content and isotope analysis.

Matthew gave an update on DOC's DLG spotlight monitoring programme. They are currently in the process of recruiting a new Ranger to be based at the Kauri Coast DOC Office (Dargaville) and have a focus on freshwater. This new staff member will take over responsibility for the DLG spotlight monitoring and will amend the methodology to bring it in line with the recommendations of the recent research DOC have done into this method (see meeting notes from the 12 June 2019 meeting). Till then they are continuing with quarterly monitoring as per their existing methods i.e. surveying each of the regular sites twice in the same night.

There was some discussion on DOC's spotlighting method. It was suggested that DOC's spotlighting method could benefit from a catch and measure calibration exercise to confirm that the size classes are being recorded correctly.

There was some discussion on when the various research programmes will be finished. Results from all research streams should be available by mid-2020. A final report to the Taharoa Domain Governance Committee with recommendations can be provided by late 2020.

It was identified that another round of sample collection was needed to fill gaps in the trout diet study and lake food web study. This would need to be undertaken before the Lakes get busy over the Christmas period. The working group considered their availability and concluded that the following day, Thursday 12 December 2019, would be the best date for this.

**Action: Tanya to call Te Roroa to let them know about and invite them to participate in the sampling activities.**

Mark extended a big thankyou to NorthTec on behalf of the Working Group. It is acknowledged that the lion's share of the work associated with these research initiatives is being undertaken by the students at NorthTec and that these projects would not be possible without their involvement.

***The meeting broke for lunch at 12:32pm and reconvened at 1:03pm***

### **Gambusia Busters**

Will explained the suggestion of running a "Gambusia Busters" event at the Lakes. This event would involve issuing children and other interested persons at the Lakes nets and buckets and offering prizes for the most Gambusia caught. Gambusia would be euthanized humanely by submersing them in a slurry of ice water. The intention would be to reduce the population of Gambusia by catching the pregnant females at the start of summer before they have a chance to give birth (Gambusia are a warm water species and experience a population crash over winter before breeding back up again over summer). Will suggested these events could be run in conjunction with the annual Kai Iwi Lakes Open Day.

The Working Group identified a number of concerns about this suggestion, particularly regarding identification of target species by participants and the risk of bycatch. Will noted past research indicates DLG of a similar size to Gambusia are in deep water during the day (when these events would be held) making them less likely to be caught.



There were also concerns over participants trampling lake edge vegetation. And further concerns that predators of Gambusia may switch their predation pressure onto DLG if Gambusia numbers reduce.

The education value of such an event was considered greatly beneficial.

It was suggested a trial be undertaken in 2020. The results of this trial and the findings of the Working Group's research could inform a Gambusia Busters programme in the summer of 2020/2021.

**Action: Will to investigate a trial.**

### **Current environmental monitoring programs**

Mark asked the Working Group to consider the pre-circulated report giving an overview of the many research and monitoring programmes being undertaken within the Taharoa Domain.

The intention was that the Working Group consider if the current environmental monitoring programmes in place in the Taharoa Domain were sufficient or if more was needed. The Working Group's conclusion could then be put as a recommendation to the Taharoa Domain Governance Committee.

The Working Group considered this matter should be discussed with Mana Whenua as it was they who had raised it initially.

The Working Group also noted that monitoring of koura (freshwater crayfish) remained a gap. Concerns remained over reports their population is declining in the lakes with harvesting by campers and day trippers suggested as the cause. It was suggested the traditional fishing method using bundles of bracken fern could be used by Mana Whenua to monitor the koura population.

The Working Group also considered Kaipara District Council should consider monitoring and addressing the amount of litter left at the Lakes by visitors. Council should also consider monitoring the number of vehicle movements in and out of the Domain and subtracting the number of campers to get an indication of day visitor numbers.

**Action: This matter is to be discussed again at the next meeting when Mana Whenua can be present.**

**Action: Mark to report back on the possibility of Kaipara District Council monitoring vehicle movements and littering.**

### **Next meeting**

The Working Group will next meet in March 2020.

Key items for discussion will include:

- Adequacy of current environmental monitoring programs
- Discussion of preliminary findings
- Report structure – for reporting research findings and recommendations to the Taharoa Domain Governance Committee.

### **Meeting closure**

Mark closed the meeting at 1:43pm.