KAIPARA DISTRICT

Kaipara te Oranganui • Two Oceans Two Harbours

KAIPARA DISTRICT COUNCIL

I hereby give notice that an Ordinary meeting of the

Taharoa Domain Governance Committee

will be held on:

Date: **Tuesday 12 February 2019**

Time: **2.00 pm**

Venue: **Lake Waikare Centre, Taharoa Domain**

Open Agenda

Membership

Chair: Ric Parore

Members: Councillor Karen Joyce-Paki

Alan Nesbit

Councillor Andrew Wade

Staff and Associates:

Parks and Recreation Manager, Financial Services Manager, Policy Analyst, Governance Advisor (Minute-taker)

Jason Marris

General Manager Governance, Strategy and Democracy

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Ordinary meeting of Taharoa Domain Governance Committee

Tuesday 12 February 2019

1 Opening

1.1 Karakia

1.2 Present

1.3 Apologies

1.4 Confirmation of Agenda

The Committee to confirm the Agenda.

1.5 Conflict of Interest Declaration

Committee Members are reminded of the need to be vigilant to stand aside from decision-making when a conflict arises between their role as a Committee Member/Councillor and any private or other external interest they might have. It is also considered best practice for those members of the Executive Team attending the meeting to also signal any conflicts that they may have with an item before the Committee.

2 Deputations and Presentations

Nil.

3 Confirmation of Minutes

3.1 Taharoa Domain Governance Committee minutes 15 November 2018

General Manager Governance, Strategy and Democracy **1606.17**

Recommended

That the minutes of the Taharoa Domain Governance Committee meeting on 15 November 2018 be confirmed as a true and correct record.

Taharoa Domain Governance Committee

Ordinary meeting held

Date	Thursday 15 November 2018
Time	Meeting commenced at 2.17pm Meeting concluded at 3.17pm
Venue	Lake Waikare Centre, Taharoa Domain
Status	Unconfirmed

Minutes

Membership

Chair: Ric Parore

Members: Alan Nesbit, Councillor Karen Joyce-Paki and Councillor Andrew Wade

Staff and Associates:

Parks and Recreation Manager, Financial Services Manager, Policy Planner, Policy Analyst, Governance Advisor (minute-taker)

Jason Marris
General Manager Governance, Strategy and Democracy

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Ordinary meeting of Taharoa Domain Governance Committee

Thursday 15 November 2018

1 Opening

1.1 Karakia

Iwi Relations Manager opened the meeting with a karakia.

1.2 Present

Ric Parore (Chair), Councillors Karen Joyce-Paki and Andrew Wade

In attendance	Designation	Item(s)
Hamish Watson	Parks and Recreation Manager	All
Andrew Howells	Domain Manager	All
Kathie Fletcher	Policy Manager	All
Paula Hansen	Policy Planner	All
Mark Schreurs	Policy Analyst	All
Francis Toko	Iwi Relations Manager	All
Jason Marris	General Manager Governance, Strategy and Democracy	All
Lisa Hong	Governance Advisor	All (minute-taker)

1.3 Apologies

Moved Parore/Joyce-Paki

That the apology of Alan Nesbit be received.

Carried

1.4 Confirmation of Agenda

The Committee confirmed the Agenda.

1.5 Conflict of Interest Declaration

Name	Interest
Councillor Karen Joyce-Paki	Councillor Joyce-Paki Declared an interest as a full-time employee of Department of Conservation

2 Deputations and Presentations

Nil.

3 Confirmation of Minutes

3.1 Taharoa Domain Governance Committee Extraordinary meeting minutes 16 August 2018

General Manager Governance, Strategy and Democracy 1606.17

Moved Joyce-Paki/Parore

That the minutes of the Extraordinary meeting of the Taharoa Domain Governance Committee held on 16 August 2018 be confirmed as a true and correct record.

Carried

4 Decision

4.1 Taharoa Domain Bylaw 2018 (Draft) and associated Statement of Proposal - recommend to Council to adopt for public consultation - update

Policy Planner 3216.0

Moved Joyce-Paki/Wade

That the Taharoa Domain Governance Committee:

1 *Receives the Policy Planner's report 'Taharoa Domain Bylaw 2018 (Draft) and associated Statement of Proposal – recommend to Council to adopt for public consultation update' dated 01 November 2018; and*

2 *Believes it has complied with the decision-making provisions of the Local Government Act 2002 to the extent necessary in relation to this decision; and in accordance with the provision of s79 of the Act determines that it does not require further information prior to making a decision on this matter; and*

3 *Determines that the proposed bylaw (circulated as Attachment 1 of the aforementioned report) is required and is the most appropriate way of addressing the perceived problem and is the most appropriate form of bylaw; and*

4 *Recognises that Council's legal obligations under the Reserves Act to protect Ecological Values and to provide Recreational Safety for the users of Lake Waikare and Lake Kai Iwi are met; and*

5 *Delegates officers to correct minor typographical errors; and*

6 *Recommends that Kaipara District Council adopts the Taharoa Domain Bylaw 2018 (draft) and associated Statement of Proposal for public consultation as amended, both documents circulated as Attachment 1 and Attachment 2 of the aforementioned report.*

Carried

5 Information

5.1 Taharoa Domain Operations Update: August 2018 to October 2018

Parks and Recreation Manager **4702.24.02.02**

Moved **Joyce-Paki/Parore**

That the Taharoa Domain Governance Committee receives the Parks and Recreation Manager's report 'Taharoa Domain Operations Update: August 2018 to October 2018' dated 01 November 2018 and the information contained therein.

Carried

[Secretarial Note: The Committee requested that staff:

- ask the beehive owner to remove the beehives from the Taharoa Domain; and
- include a clause to allow community fundraising (e.g. charity sausage sizzle) in the Agreement with the concession holder.]

5.2 Financial report for the four month period ending 31 October 2018

Financial Services Manager **4702.24.02.01**

Moved **Wade/Joyce-Paki**

That the Taharoa Domain Governance Committee receives the Financial Services Manager's report 'Financial report for the four month period ending 31 October 2018'.

Carried

5.3 Kai Iwi Lakes Dune Lakes Galaxias Working Group update

Policy Analyst **4702.24.05**

Moved **Joyce-Paki/Wade**

That the Taharoa Doman Governance Committee receives the Policy Analyst's report 'Kai Iwi Lakes Dune Lakes Galaxias Working Group update' dated 26 October 2018 and the information contained therein, giving an update on the work of the Kai Iwi Lakes Dune Lakes Galaxias Working Group and its members.

Carried

Closure

A member of the public, Andrew Knock from the Department of Conservation, closed the meeting with a karakia.

Meeting closed at 3.17 pm.

Confirmed ……
Chair ……

Kaipara District Council
Dargaville

4 Information

Taharoa Domain Operations Update - November 2018 to January 2019

Meeting: **Taharoa Domain Governance Committee**
Date of meeting: **12 February 2019**
Reporting officer: **Hamish Watson, Parks and Recreation Manager**

1 Purpose/Ngā hāinga

To present the operational report for the Kai Iwi Lakes (Taharoa Domain) for the November 2018 to January 2019 period so the Committee can be well-informed.

2 Recommendation/Ngā tūtohunga

That the Taharoa Domain Governance Committee note the 'Taharoa Domain Operations Update - November 2018 to January 2019' report.

3 Executive summary/Whakarāpopototanga

The Committee is charged with implementing the Kai Iwi Lakes (Taharoa Domain) Reserve Management Plan (RMP) 2016. The RMP has been developed to provide strategic guidance to the custodianship and enhancement of Kai Iwi Lakes (Taharoa Domain).

A summary of activities, operations and maintenance work carried out over the months of November 2018 to January 2019 is reported below.

4 Context/Horopaki

The Kai Iwi Lakes are among the best known dune lakes in New Zealand and all three Lakes, Taharoa, Waikare and Kai Iwi, are ranked as outstanding by NIWA. Growing populations, particularly Auckland, along with road improvements has led to increased visitors and associated pressures.

It is the intent of the 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.

Finding a balance between public use and ensuring its continued health and well-being of the Lakes is a challenge for the Committee. Continued thought, collaboration, planning and funding is required around pest and weed control (the largest issues facing the long term health and natural character of the Domain) along with biosecurity (aquatic weed incursion and prevention), understanding the hydrology of the Lakes, as well as recognising the cultural importance of the area.

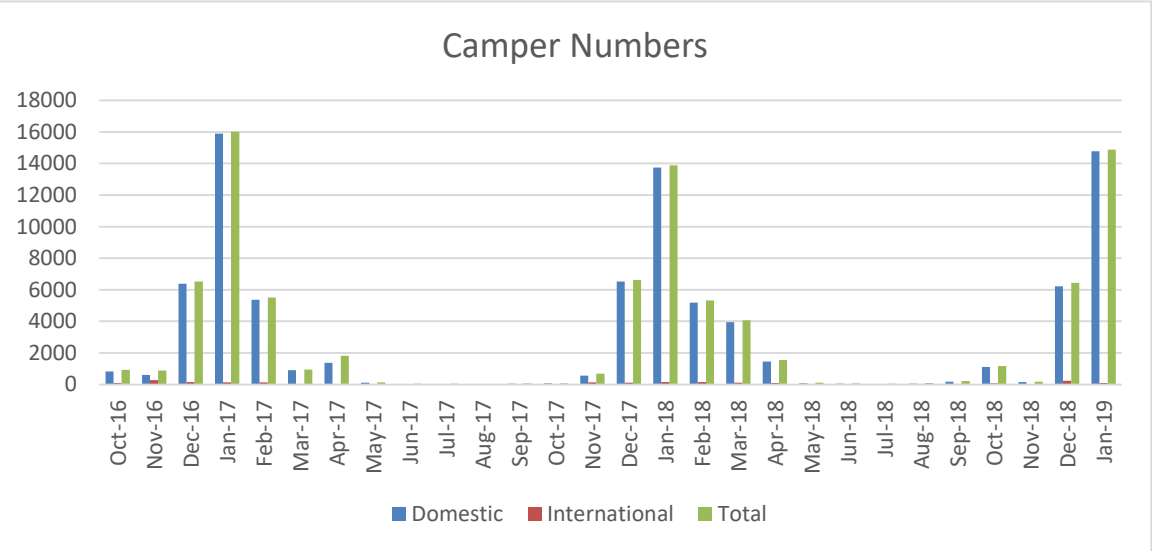
5 Discussion/Ngā kōrerorero

The following is a summary of activities, operations and maintenance work carried out over the months of November 2018 to January 2019:

- The new toilet facility for Lake Waikare is currently on hold waiting input from affected parties;
- Design and engineering for the boat ramp has been received. This needs to be reviewed and budgets assessed (**Attachment 1**);
- A budget of $180,000 for the Kai Iwi Camp Ground Facilities that was allocated as a part of the Long Term Plan 2018/2028 (LTP) is funded from Reserve Contributions. Staff are prioritising work from the approved Infrastructure Plan that can be carried out utilising this funding source;
- Project Jonah, Open Water Swim and Whitebait Connection Education Day events were all very successful days showcasing the Domain;
- Camp ground numbers have been full since before Christmas;
- Day visitor numbers appear to be up on previous years, with more people from outside the region visiting;
- Dog numbers have been high again, but when the people are spoken to they have generally been happy to move on;
- In general, most campers and day visitors have been well behaved with only a couple of camping groups having to be removed;
- Freedom camper numbers have been lower this year, due to better signage and the availability of staff onsite to move them on earlier before they get set up;
- Council staff received a report of a helicopter landing at the Taharoa Domain. Staff investigated this and found that the Domain Manager had spoken to the person in charge of the helicopter and advised them that they should not be landing within the Domain. Staff also checked the Council Bylaws which states, '*Except with the permission of council or an authorized officer a person shall not on any public place: fly from or land any aeroplane including model aeroplanes, a hot air balloon or hang glider except in an emergency'*;

- The application to the Provincial Growth Fund for a feasibility report for the development of Taharoa Domain has been declined.

Camper numbers:



Camper numbers:

Month	Total visitors	Domestic visitors	International visitors
January 2019	14,880	14778	102
December 2018	6,448	6216	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
October 2017	74	64	10
September 2017	63	55	8
August 2017	27	12	15
July 2017	53	32	21
June 2017	47	29	12
May 2017	129	114	15
April 2017	1,816	1,376	33
March 2017	939	904	35
February 2017	5,500	5,363	137
January 2017	16,022	15,899	123
December 2016	6,531	6,382	149

Month	Total visitors	Domestic visitors	International visitors
November 2016	888	609	279
October 2016	921	828	93

5.1 Financial implications/Ngā ahumoni hīraunga

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

5.2 Policy and planning implications/Kaupapa here me hoahoa hīraunga

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

5.3 Risk/Ngā tūraru

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

6 Significance and engagement/Hirahira me ngā whakapāpā

This matter does not trigger Council's Significance and Engagement Policy.

Attachments/Ngā Tāpiritanga

- Attachment 1: Kai Iwi Lakes (Taharoa Domain) Boat Ramp Feasibility Report

Hamish Watson
30 January 2019

FEASIBILITY REPORT

FOR

KAI IWI LAKES PROPOSED BOAT RAMP

CLIENT: KAIPARA DISTRICT COUNCIL

PROJECT LOCATION: KAI IWI LAKES

DATE OF ISSUE: 25 JANUARY 2019

PROJECT NUMBER: NTH-S0003.01

Version Number	Description	Date	Author
Rev 000	Feasibility Report Final	25/01/19	Eric Lee

1.0 EXECUTIVE SUMMARY

NAL Civil & Structural Engineers Limited (NAL) were engaged by Kaipara District Council to conduct a feasibility study for a proposed boat ramp at Lake Kai Iwi.

The existing boat ramp appears to be a natural sloping sandstone ramp with access via a gravel road and vehicle turning on the existing beach. The slope of the existing tidal zone sandstone ramp is approximately 1 in 17.

This report considers two options for the proposed boat ramp. Option 1 utilises a precast concrete panel ramp, which follows the natural slope of the sand in the tidal zone to minimise cost of construction and any associated environmental impact from a more extensive structure. Option 2 utilises a timber plank ramp with anti-slip mesh, which also follows the existing natural slope.

Option 1 should have higher durability and be easier to maintain than Option 2, however, the construction timeframe might take longer.

A cost estimate for the two options was completed, where it was found that there was a slight difference in construction cost. Option 1, costing $174,971.00 (excluding GST), was cheaper than Option 2, which cost $205,795.00 (excluding GST).

Due to the higher durability, slightly lower initial construction cost, and easier maintenance, Option 1 is perhaps the best option to adopt for the proposed boat ramp.

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2.0 EXISTING SITE DESCRIPTION

The proposed boat ramp at Lake Kai Iwi, as shown in figure 1 below, is accessed from Domain Road via an existing gravel driveway. Located 35 kilometres from Dargaville, the pristine lake currently does not have a dedicated boat ramp, but uses a natural gentle slope of sandstone outcrops.

There appears to be no natural source of inlet or outlet, hence, seasonal rainfall would likely influence the lake water levels. The nearby Lake Taharoa, which is connected to Lake Kai Iwi via a narrow channel, has been recorded to have seasonal water levels fluctuating between 400 to 600mm.

The existing ground levels indicate that the existing slope of the sandstone natural ramp has a slope of 1 in 17. This has been matched by the proposed boat ramp design. There appears to be sufficient space for vehicle manoeuvre and launching of small recreational boats on the beach. There is a concern that the 1 in 17 slope is insufficient for boats to be launched, which is discussed in detail in the next section of this report.

Figure 1: Proposed Boat Ramp Location at Lake Kai Iwi

3.0 FEASIBILITY STUDY OPTIONS

The existing slope of the beach and tidal zone is approximately 1 in 17. Typically, this is too shallow for launching of boats, which normally require between 1 in 8 and 1 in 10 slope. The proposed design of the boat ramp uses a slope of 1 in 17. The following are reasons the shallower slope has been utilised in this feasibility report:

- The environmental impact of the construction is minimized if the existing slope is retained.
- The cost of construction is reduced.
- Currently, boats can be launched without concern.

Should the requirement for a steeper ramp be required, this can be designed. However, the following minimum requirements will need to be considered:

- A beach slab or platform will need to be raised by at least 800mm.
- For vehicle turning circle, the areas surrounding the beach slab will need to be raised, hence the surrounding flora may need to be cut back to allow sufficient space.
- The gravel road leading to the beach will need to be raised to match the raised beach slab and space for vehicle turning circles.
- The ramp in the tidal zone will need to be raised instead of dug out, as sand will cover the ramp through tidal movements if it was dug down.

Therefore, taking the above factors into consideration, this feasibility report only considers a boat ramp which matches the existing slope of 1 in 17. Two options have been considered, precast concrete ramp and timber ramp as discussed in sections 3.1 and 3.2 respectively.

A geotechnical investigation and report was completed for this feasibility study, which is included in Appendix B. The geotechnical report indicates that the surrounding soil is of good condition for construction.

A survey was done and incorporated into the conceptual structural engineering drawings in Appendix A. The survey drawing indicated that the beach and tidal zone for the boat ramp has a slope of approximately 1 in 17.

3.1 OPTION 1 – PRECAST CONCRETE RAMP

Option 1 involves the offsite construction of precast concrete panels, which are to be placed in the tidal zones for boat launching. To minimize the impact of scouring, rocks are placed around the precast panels. Interlocking the precast panels are stainless steel metal straps, which are bolted together and fast setting grout is then pressure pumped in between the panels to minimize corrosion. Grooves are constructed in the precast panels to minimize wheel slippage during launching.

On the beach, there is a cast in-situ concrete slab, which is a platform for cars reversing into the ramp. The concrete platform is flat and the ramp is sloped with the sandstone natural slope at 1 in 17. This is done to minimize construction cost and any digging or introduction of additional construction materials.

A section of Option 1 is shown in Figure 2 below with full concept structural drawings included in Appendix A.

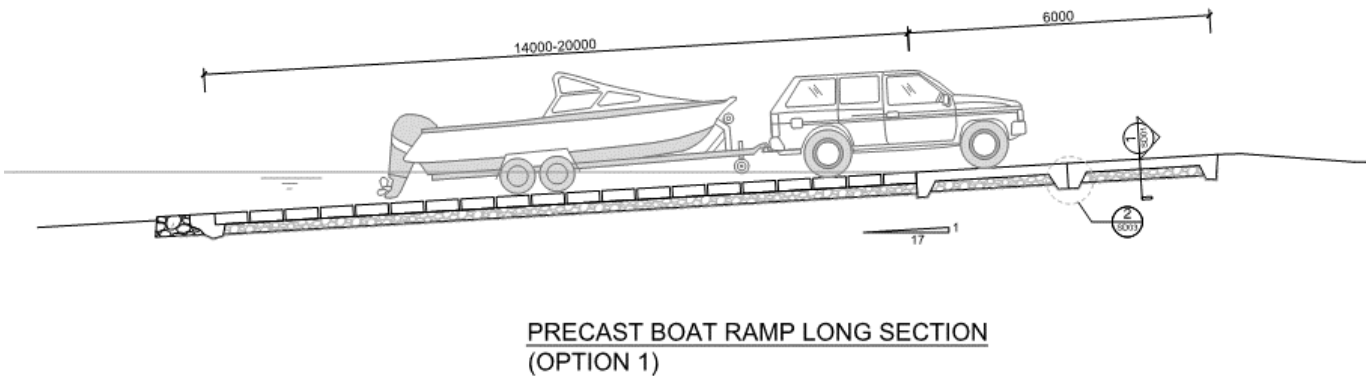

Figure 2: Proposed Boat Ramp – Option 1 – Precast Panel Ramp

3.2 OPTION 2 – TIMBER RAMP

Option 2 involves the offsite construction of three lines of precast concrete beams, which are placed in the tidal zones for boat launching. Between the beams, timber planks are placed to form the floor of the ramp. An anti-slip mesh is then fixed to the top of the timber to minimize slippage.

The same cast in-situ concrete slab platform used in Option 1 is utilized for this timber option.

A section of Option 2 is shown in Figure 3 below with full concept structural drawings included in Appendix A.

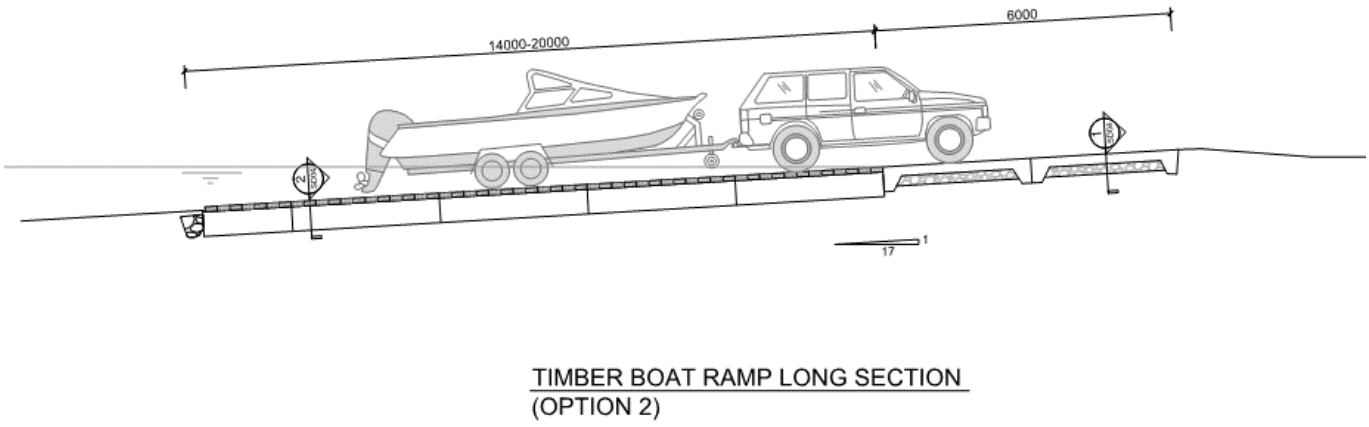

Figure 3: Proposed Boat Ramp – Option 2 – Timber Plank Ramp

4.0 COST STUDY

Brothers Construction Group Limited (BCG) were engaged to complete a cost study of the two options based on preliminary drawings prepared by NAL. BCG are a design and build contractor, who have in-house quantity surveyors.

They discussed with NAL the construction methodology and environmental impacts of the construction. Both companies agreed that sand bags should be used to surround a construction zone, which are to be wrapped with damp proof membrane to minimise water moving in and out

of the construction zone. The water shall then be pumped to an external silt trap polyurethane tank and dumped off site. This has been included as an item in the cost study.

From the structural concept design, the quantities and costs were derived for both options and it was found that there was a slight cost difference, with Option 1 (precast concrete ramp) cost estimate $174,971.00 and Option 2 (timber plank ramp) cost estimate $205,795.00.

4.1 COST STUDY ITEMISED SUMMARY

Below are cost estimate tables for the conceptual design construction for the two options:

Project Title: Kai Iwi Lakes Boat Ramp Project
Estimate Stage: Preliminary Design

Project No:	NTH-S0003.01	Office:	Auckland
Prepared by:	N Prasad	Date:	24-Jan-18

Item	Description	Qty	Unit	Rate	Amount	Subtotal
1	**Preliminary and General**					
1.1	Preliminary and General	1	LS	$4,725.00	$4,725.00	
	Subtotal Item 1					**$4,725**
2	**Mobilisation**					
2.1	Mobilisation	1	LS	$6,825.00	$6,825.00	
	Subtotal Item 2					**$6,825**
3	**Health and Safety**					
3.1	Contractor's Health and Safety	1	LS	$3,255.00	$3,255.00	
	Subtotal Item 3					**$3,255**
4	**Environmental Protection**					
4.1	PU Sediment Tank	1	LS	$3,675.00	$3,675.00	
4.2	Water Pump	1	LS	$1,417.50	$1,417.50	
4.3	Sand Bags	1	LS	$6,825.00	$6,825.00	
4.4	DPM	1	LS	$682.50	$682.50	
	Subtotal Item 4					**$12,600**
5	**Precast Plank**					
5.1	Base Course	19.36	m^3	$131.25	$2,541.00	
5.2	Geo-textile filter fabric	104.24	m^2	$5.25	$547.24	
5.3	Mass Concrete	0.73	m^3	$378.00	$274.43	
5.4	HD12 Steel Bars (4300 LG)	2.00	No.	$36.75	$73.50	
5.5	R10 Steel Rod @ 300 crs (800mm long)	72.00	No.	$17.85	$1,285.20	
5.6	Precast Concrete Plank (4000 x 675 x 220)	34	No.	$2,441.25	$83,002.50	
5.7	10x40mm Flot Stainless Steel Strap	44	m	$13.65	$600.60	
5.8	M16 Stainless Steel Bolt connecting straps	68	No.	$89.25	$6,069.00	
5.9	Plank Reinf 3900 LG (3HD12) inside precast pricing	0.00	No.	$0.00	$0.00	
5.10	Plank Reinf 600 LG (R10@300 crs) inside precast pricing	0.00	No.	$0.00	$0.00	
5.11	High Pressure Fast Set Grout	1.00	LS	$1,575.00	$1,575.00	
	Subtotal Item 5					**$94,393**
6	**Concrete Slab In-situ**					
6.1	Base Course	7.74	m^3	$131.25	$1,016.40	
6.2	Geo-textile filter fabric	30.98	m^2	$5.25	$162.62	
6.3	Concrete	11.22	m^3	$378.00	$4,241.16	
6.4	SE72 mesh	26.40	m^2	$26.25	$693.00	
6.5	R16 Stainless Steel Dowel (400LG) @ 400 crs	12.00	No.	$36.75	$441.00	
6.6	R10 @ 600 crs stirrup (1000 LG total)	65	No.	$19.95	$1,287.44	
6.7	HD12 (2900 LG)	12	No.	$24.15	$289.80	
6.8	HD12 (3900 LG)	16	No.	$28.35	$453.60	
6.9	Flexible Sealant 20mm deep	4.00	m	$21.00	$84.00	
	Subtotal Item 6					**$8,669**
7	**Scour Protection Rock**					
7.1	Scour Protection Rock	12.76	m^3	$183.75	$2,344.65	
7.2	Surplus soil to be remove / tipping	93.60	m^3	$99.75	$9,336.60	
	Subtotal Item 7					**$11,681**
8	**Geotechnical Engineering**					
	Geotechnical Testing during construction	1	No.	$10,000.00	$10,000.00	
	Subtotal Item 8					**$10,000**
Total Base Estimate						**$152,149**
	Assessed/Analysed Contingency				15%	$22,822.31
Total Cost Estimate (excl. GST)						**$174,971**

Table 1: Cost Breakdown for Option 1 – Precast Concrete Ramp Option

Project Title: Kai Iwi Lakes Boat Ramp Project
Estimate Stage: Preliminary Design

Project No:	NTH-S0003.01	Office:	Auckland
Prepared by:	N Prasad	Date:	24-Jan-18

Item	Description	Qty	Unit	Rate	Amount	Subtotal
1	**Preliminary and General**					
1.1	Preliminary and General	1	LS	$4,725.00	$4,725.00	
	Subtotal Item 1					**$4,725**
2	**Mobilisation**					
2.1	Mobilisation	1	LS	$6,825.00	$6,825.00	
	Subtotal Item 2					**$6,825**
3	**Health and Safety**					
3.1	Contractor's Health and Safety	1	LS	$3,255.00	$3,255.00	
	Subtotal Item 3					**$3,255**
4	**Environmental Protection**					
4.1	PU Sediment Tank	1	LS	$3,675.00	$3,675.00	
4.2	Water Pump	1	LS	$1,417.50	$1,417.50	
4.3	Sand Bags	1	LS	$6,825.00	$6,825.00	
4.4	DPM	1	LS	$682.50	$682.50	
	Subtotal Item 4					**$12,600**
5	**Timber Ramp**					
5.1	Timber (100x250mm H5 Planks) - 4 meters long	82.00	No.	$809.45	$66,374.49	
5.2	M12 Stainless Steel Expansion Bolts ss316 200mm into footing	246.00	No.	$26.25	$6,457.50	
5.3	Anti-Slip Mesh and fixing (size,materials, and fixing method)	82.00	m^2	$94.50	$7,749.00	
5.4	Precast Concrete Footing (300 x 500 x 3000 LG)	23.00	No.	$1,312.50	$30,187.50	
5.5	R16 Stainless Steel Dowel @ 400 crs (400 LG)	12.00	No.	$120.75	$1,449.00	
5.6	2HD12 (2900 LG)	69.00	No.	$37.80	$2,608.20	
5.7	R10 @ 300 crs (400 LG)	276.00	No.	$18.90	$5,216.40	
5.8	100mm thick Base Course	8.80	m^3	$131.25	$1,155.00	
	Subtotal Item 5					**$121,197**
6	**Concrete Slab In-situ**					
6.1	Base Course	7.74	m^3	$131.25	$1,016.40	
6.2	Geo-textile filter fabric	30.98	m^2	$5.25	$162.62	
6.3	Concrete Slab In-situ	11.22	m^3	$378.00	$4,241.16	
6.4	SE72 mesh	26.40	m^2	$26.25	$693.00	
6.5	R16 Stainless Steel Dowel (400LG) @ 400 crs	12.00	No.	$36.75	$441.00	
6.6	R10 @ 600 crs stirrup (1000 LG total)	65	No.	$19.95	$1,287.44	
6.7	HD12 (2900 LG)	12	No.	$24.15	$289.80	
6.8	HD12 (3900 LG)	16	No.	$28.35	$453.60	
6.9	Flexible Sealant 20mm deep	4.00	m	$21.00	$84.00	
	Subtotal Item 6					**$8,669**
7	**Scour Protection Rock**					
7.1	Scour Protection Rock	12.76	m^3	$183.75	$2,344.65	
7.2	Surplus soil to be remove / tipping	93.60	m^3	$99.75	$9,336.60	
	Subtotal Item 7					**$11,681**
8	**Geotechnical Engineering**					
	Geotechnical Testing during construction	1	No.	$10,000.00	$10,000.00	
	Subtotal Item 8					**$10,000**
Total Base Estimate						**$178,952**
	Assessed/Analysed Contingency				15%	$26,842.85
Total Cost Estimate (excl. GST)						**$205,795**

Table 2: Cost Breakdown for Option 2 – Timber Ramp Option

5.0 ADVANTAGES AND DISVANTAGES OF BOTH OPTIONS

The advantages and disadvantages of both options are discussed below:

5.1 OPTION 1 – PRECAST CONCRETE RAMP

Advantages:

- Less maintenance required, hence minimized long term environmental impact from maintenance works.
- Should be more durable, and hence longer lasting than timber.

Disadvantages:

- Lead time to prefabricate all the precast panels might take longer, and the overall placement and installation of the precast panels might take longer.
- Requirement for longer duration of small machinery to place the precast planks may have slightly higher risk of environmental impact.

5.2 OPTION 2 – TIMBER RAMP

Advantages:

- Easier replacement of timber planks if required.
- Potentially faster construction.
- Shorter time required for small machinery to place timber planks, hence reduced time for potential environmental impact from machinery breakdown.

Disadvantages:

- Maintenance required could be higher due to slippage, and potential requirement for regular replacement of anti-slip mesh.
- Slightly higher potential for slip due to timber and water interaction, which is minimized with construction of the anti-slip mesh.

6.0 SUMMARY

Two options were considered in this feasibility report, with one, Option 1, being precast concrete panels for the ramp and the other, Option 2, with timber planks. The ramp is considered within the tidal zone of the lake. There is an additional concrete slab on the beach for both options, which is a platform for vehicles reversing into the lake.

Option 1 has advantages of less maintenance due to higher durability and being less prone to build up of mould. Grooves proposed on the precast concrete panels should reduce slippage during usage.

Option 2 has advantages of easier replacement of timber planks if damaged and potentially faster construction and hence less chance of environmental impact during construction.

Although the initial construction timeframe for Option 1 may be slightly longer, the maintenance required should be less than Option 2 and the initial construction cost is slightly lower. Therefore, Option 1 is perhaps the best solution for the long term.

7.0 VERIFICATION

Prepared by:	ERIC LEE Technical Director *B.E (Civil), CMEngNZ, CPEng, IntPE(NZ)*		25/01/2019
Approved by:	NITESH PRASAD Senior Civil & Structural Engineer *Dip (Civil), B.E (Civil), MEngSt (Hons), CMEngNZ, CPEng, IntPE(NZ)*		25/01/2019

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APPENDIX A

CONCEPTUAL STRUCTURAL DESIGN

CONCEPT DRAWINGS

FOR

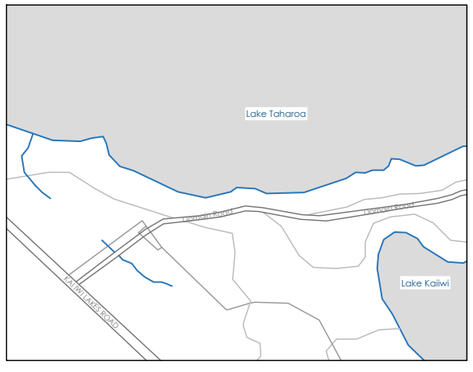
KAI IWI LAKES BOAT RAMP, KAIPARA DISTRICT COUNCIL

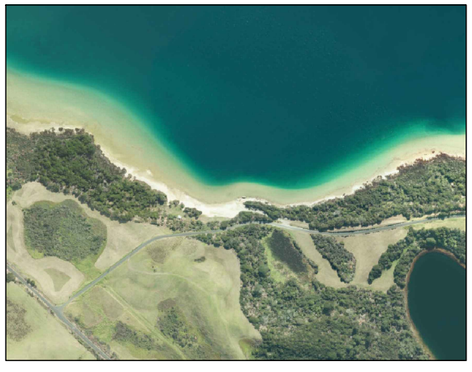
394 KAI IWI LAKES ROAD, OMAMARI 0373

JANUARY 2019

SHEET INDEX

No.	SHEET TITLE	REVISIONS		NOTE
SS01	GENERAL SPECIFICATION I	0		
SS02	GENERAL SPECIFICATION II	0		
SP01	TOPOGRAPHY PLAN	0		
SP02	3D TOPOGRAPHY	0		
SP03	BOAT RAMP SECTION	0		
SP04	BOAT RAMP PLAN	0		
SD01	PRECAST BOAT RAMP LONG SECTION (OPTION 1)	0		
SD02	PRECAST BOAT RAMP DETAILS (OPTION 1)	0		
SD03	PRECAST BOAT RAMP DETAILS (OPTION 1)	0		
SD04	TIMBER BOAT RAMP LONG SECTION (OPTION 2)	0		
SD05	TIMBER BOAT RAMP DETAILS (OPTION 2)	0		





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Project: KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet: COVER SHEET

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	C00	00

GENERAL:

1. READ STRUCTURAL DRAWINGS WITH ALL OTHER CONTRACT DRAWINGS AND THE SPECIFICATION. NOTIFY ANY DISCREPANCY AND OBTAIN WRITTEN INSTRUCTION BEFORE PROCEEDING. REFER TO ARCHITECTURAL SITE PLAN FOR LEVEL, DIMENSION AND GENERAL ARRANGEMENT.

2. CONTRACTOR TO CONFIRM LOCATION AND LEVEL OF UNDERGROUND SERVICES PRIOR TO FOUNDATION PILING/EXCAVATION WORKS. NOTIFY ANY CONFLICTS WITH THE DESIGNED WORKS AND OBTAIN WRITTEN INSTRUCTION BEFORE PROCEEDING.

3. CHECK AND VERIFY EXISTING DIMENSIONS AND LEVELS ON-SITE BEFORE COMMENCING CONSTRUCTION OR OFF-SITE FABRICATION.

4. DEMOLISH EXISTING WORK AS INDICATED BUT OTHERWISE TO THE MINIMUM EXTENT NECESSARY TO CONSTRUCT NEW WORK. DEMOLITION OF EXISTING CONCRETE TO BE DELINEATED BY STRAIGHT AND REGULAR SAWCUT LINES. MAKE GOOD ON COMPLETION OF NEW WORK. PROVIDE TEMPORARY PROPPING/BRACING OF EXISTING AS NECESSARY.

5. REFER TO STRUCTURAL STANDARD DETAIL DRAWINGS FOR COMMON CONSTRUCTION DETAILS, REQUIREMENTS, NOTES, INTERPRETATIVE INFORMATION ETC.

6. CONFIRM SOIL BEARING COMPLIES WITH NZS 3604 PRIOR TO CASTING FOUNDATIONS.

7. ALL LEVELS ARE IN METERS AND DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.

8. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT CODES AND STANDARDS.

FOUNDATIONS:

1. ALL FOUNDATION ARE DESIGNED AS "GOOD GROUND" SPECIFIED IN NZS3604 UNLESS A SPECIFIC GEOTECHNICAL REPORT HAS BEEN PREPARED FOR THIS PROJECT.

2. PROVIDE 200mm BASE COURSE LAYER UNDER ALL FOUNDATION BEAMS, STRIP AND SLAB.

3. FOUNDATION SIZES AND DETAILS INDICATED ARE BASED ON A DEPENDABLE ULTIMATE BEARING CAPACITY OF 300 kPa. THIS IS EQUIVALENT TO AN ALLOWABLE BEARING CAPACITY OF 100 kPa, WHEN SUBJECT TO SERVICEABILITY (WORKING) LOADS. CONTRACTOR TO VERIFY ACTUAL SOIL BEARING CAPACITY AT REGULAR INTERVALS IN FOUNDATION EXCAVATION AND REPORT RESULT TO ENGINEER.

TIMBER:

1. UNLESS OTHERWISE STATED ALL TIMBER TO BE MSG8 GRADE COMPLYING WITH NZS3602 AND GRADED TO NZS3631.

2. MOISTURE CONTENT OF FRAMING TIMBER SHALL NOT EXCEED 25% AT TIME OF INSTALLATION NOR 18% AT TIME OF ENCLOSURE.

3. TIMBER TREATMENT SHALL COMPLY WITH THE REQUIREMENTS OF THE NEW ZEALAND TIMBER PRESERVATION COUNCIL INCORPORATING - MP3640. TIMBER USED IN THE BOAT RAMP SHALL BE TREATED TO CLASS H6.

4. UNLESS SHOWN OTHERWISE GENERAL CONSTRUCTION DETAILS SHALL COMPLY WITH REQUIREMENTS OF NZS3604.

5. PROVIDE WASHERS FOR BOLTED CONNECTIONS IN LOCATIONS AND TO SIZES REQUIRED BY NZS3603. RE-TIGHTEN NUTS PRIOR TO ENCLOSURE OF JOINTS.

6. ALL FIXING AND FASTENS SHALL BE STAINLESS STEEL TYPE 304. WHICH IS COMPLYING WITH TABLE 4.1 OF NZS3604.

STRUCTURAL STEEL WORK:

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH NZS3404 SUBJECT TO RELEVANT SECTIONS OF THE SPECIFICATION.

2. READ STRUCTURAL STEELWORK DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS. ALLOW FOR ALL HOLES, CLEATS, FIXINGS, ETC. AND INDICATE ON SHOP FABRICATION DRAWINGS.

3. ALL STEELWORK, EXCEPT FOUNDATION PILES, SHALL BE SURFACE PROTECTIVE TREATED AFTER FABRICATION. REFER TO MANUFACTURER SPECIFICATION.

4. ALL STRUCTURAL STEEL WELDING SHALL COMPLY WITH AS/NZS 1554 CLASS S.P. ALL WELDS TO BE 6mm MINIMUM CONTINUOUS FILLET WELDS, UNLESS NOTED OTHERWISE.

5. ALL BOLTS TO BE HIGH STRENGTH STEEL CLASS 8.8/S TO SPECIFICATION UNLESS NOTED OTHERWISE.
   ALL BOLTS TO BE COMMERCIAL STEEL BOLTS CLASS 4.6/S TO SPECIFICATION UNLESS NOTED OTHERWISE.

6. HOT ROLLED OPEN SECTIONS, FLATS, PLATES AND FABRICATED SECTIONS SHALL BE GRADE 300 UNLESS OTHERWISE INDICATED. REFER TO SPECIFICATION.

CONCRETE WORK:

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

2. SIZE OF CONCRETE ELEMENTS DO NOTE INCLUDE THICKNESS OF APPLIED FINISHES.

3. PROVIDE SAW CUTS OR CRACK INDUCER FOR SLAB AT 6m CENTRES MAXIMUM.

4. CONCRETE STRENGTHS:
   REINFORCED CONCRETE = 30 MPa
   CEMENT GROUT = 25 MPa

5. SURFACE FINISHES SHALL BE:
   CONCEALED WORK: F1
   EXPOSED EDGES OF FOUNDATON: F5
   FLOOR SLAB: U3

REINFORCEMENT:

1. REINFORCEMENT SHALL IN ACCORDANCE WITH AS/NZS 4671, NOTED AS FOLLOWS:
   R - PLAIN ROUND BARS GRADE 300E;
   D - DEFORMED BARS GRADE 300E;
   HD- DEFORMED BARS GRADE 500E;
   M - MESH GRADE 500E;

2. ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671 AND BE MANUFACTURED USING THE MICRO ALLOY PROCESS. QUENCH AND TEMPERED STEEL SHALL NOT BE USED.

3. LAP OF REINFORCEMENT SHALL IN ACCORDANCE WITH THE TABLE IN THIS DRAWING UNLESS NOTED OTHERWISE. LAP FOR MESH SHALL BE ONE SPACING PLUS 50MM MINIMUM.

4. HOOKS AND BENDS ARE TO BE IN ACCORDANCE WITH NZS3109;

5. COVER TO REINFORCEMENT SHALL BE:
   50 mm AGAINST DPM;
   40 mm SIDE OF THE BEAM;
   75 mm AGAINST GROUND;
   75 mm BACK OF RETAINING WALL ;

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Project: KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet: GENERAL SPECIFICATION I

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	SS01	00

ABBREVIATIONS:	
B.	Bottom (Reinforcement only)
B.	Breadth
crs.	Centres
D.	Depth
Dia.	Diameter
DPC.	Damp proof course
DPM.	Damp proof membrane
Ext.	Existing
EQ.	Equal
FFL	Finish floor level
FGL.	Finish ground level
HTG.	Hot tip galvanised
Max.	Maximum
Min.	Minimum
SS.	Stainless steel
T.	Top (Reinforcement only)
Thk.	Thick
TYP.	Typical
TW.	Two ways
W.	Width

PROJECT INFORMATION:

DESIGN LIFE: 50 YEARS(15 YEARS FOR TIMBER)
EXPOSURE CLASSIFICATION: A2
CONCRETE CLASS: 30MPa
MIN. CONCRETE CURING TIME: 3 DAYS
COVER TO REINFORCEMENT: 75mm - 90mm

BOAT RAMP SURFACE FINISH:

THE SURFACE FINISH ON THE BOAT RAMP SHOULD PROVIDE SUFFICIENT TRACTION FOR TOW VEHICLES AND SOUND FOOTING FOR PEDESTRIANS IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE.

CONSTRUCTION METHODOLOGY:

BELOW THE MEAN WATER LEVEL, GROOVED PRECAST CONCRETE PLANKS OR PRECAST FOUNDATION ARE RECOMMENDED TO EXTEND THE RAMP SURFACE TO THE DESIGN TOE DEPTH.
IT IS POSSIBLE TO INSTALL AND GROUT THE PRECAST CONCRETE BY WET CONSTRUCTION METHODS. ALTERNATE CONSTRUCTION METHODS IS TO INVOLVE PUMPED PLACEMENT OF CONCRETE UNDERWATER, OR CONSTRUCTION OF A COFFER DAM, DEWATERING AND CONSTRUCTION IN THE DRY.
THE CONTRACTOR SHALL BE RESPONSIBILITY FOR THE CONSTRUCTION METHODOLOGY WITH CONSIDERATIONS OF THE COST, QUALITY CONTROL AND TIME FRAME.

INSPECTION AND MAINTENANCE:

MAINTENANCE OF BOAT RAMPS WILL ALWAYS BE REQUIRED OVER THEIR DESIGN LIFE. THE FREQUENCY AND NATURE OF ROUTINE MAINTENANCE WOULD BE SUBJECT TO THE LOCAL WATERWAY AND WEATHER CONDITIONS, SCALE OF THE BOAT RAMP FACILITY AND LEVEL OF USAGE.
THE SCHEDULE OF ROUTINE MAINTENANCE SHOULD BE SUPPORTED BY AN INSPECTION PROGRAM AND SHOULD ENSURE THAT THE FACILITY IS CLEAN, SAFE AND USABLE OVER THE BOATING SEASON. REGULAR MAINTENANCE EXTENDS THE LIFE OF THE FACILITY, REDUCES THE LIKELIHOOD OF MAJOR AND COSTLY REPAIRS, AND REDUCES OR ELIMINATES EXPOSURE TO LIABILITY.
THE INSPECTION PROGRAM FOR COMPONENTS OF THE BOAT RAMP FACILITY ON THE WATERS EDGE SHOULD BE CARRIED OUT BY PERSONS SUITABLY QUALIFIED IN THE DESIGN AND CONSTRUCTION OF MARITIME STRUCTURES, AND INCLUDE AN ASSESSMENT OF THE FOLLOWING MECHANISMS FOR DETERIORATION:

BOAT RAMP:

1. *MARINE GROWTH ON THE RAMP SURFACE;*
2. *MOVEMENT OR UNDERMINING OF ROCK SCOUR PROTECTION ALONG THE EDGES AND TOE OF THE RAMP;*
3. *TRIP HAZARDS OR WHEEL HAZARDS;*
4. *LOSS OF RAMP FOUNDATION MATERIAL;*
5. *FORMATION OF A 'DROP-OFF' OR HOLE AT THE TOE OF THE RAMP;*
6. *VISUAL EVIDENCE OF REINFORCEMENT CORROSION WITHIN CONCRETE ELEMENTS (SIGNS INCLUDE CRACKING, SPALLING, WHITE SALT ENCRUSTATION, RUST STAINS AND EXPOSED REINFORCEMENT);*
7. *SETTLING OF THE RAMP DECK AND SEPARATION AT JOINTS AND CONNECTIONS; AND,*
8. *DETERIORATION OR DETACHMENT OF LANE DEMARCATION ELEMENTS (LINE MARKINGS OR RAISED PAVEMENT MARKERS).*

A PROVISIONAL INSPECTION PROGRAM IS OUTLINED IN THE FOLLOWING TABLE, WHICH INCLUDES INSPECTION INTERVALS AND DETAIL.

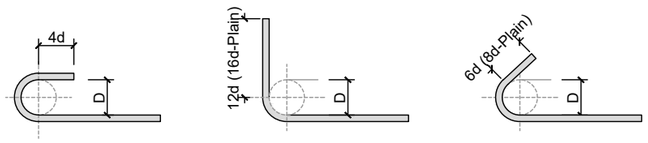
INSPECTION INTERVAL	BOAT RAMP COMPONENT	TYPE OF INSPECTION
6 MONTHS	BOAT RAMP	VISUAL INSPECTION AT LOW WATER FOR SURFACE FRACTURE, CRACKING AND OTHER SIGNS OF ENVIRONMENTAL DEGRADATION.
1 YEAR	TIMBER STRUCTURE	VISUAL CHECK ON CONDITION OF FRAMING AND THE CONNECTIONS BETWEEN MEMBERS. ALIGNMENT OF TIMBERS AND THE FASTENINGS AND HARDWARE SHOULD BE INSPECTED. CHECK FOR DECAY. ANNUAL PEST INSPECTIONS AND TREATMENT AS REQUIRED.
1 YEAR	ROCK SCOUR PROTECTION	VISUAL INSPECTION AT LOW WATER, LOOKING FOR MOVEMENT OR UNDERMINING OF ROCK PROTECTION, LOSS OF RAMP FOUNDATION MATERIAL OR FORMATION OF SCOUR.
5 YEARS	TIMBER STRUCTURE	DETAILED ABOVE AND BELOW WATER INSPECTION OF STRUCTURAL ELEMENTS. ATTENTION TO ROT, DECAY AND MARINE BORER ATTACK. ASSESSMENT OF STRUCTURE PERFORMANCE.
5 YEARS	CONCRETE STRUCTURE	DETAILED INSPECTION OF CONCRETE SURFACES AND CHECK FOR VISUAL SIGNS OF REINFORCEMENT CORROSION (CRACKS, SPALLING, WHITE SALT ENCRUSTATION, RUST STAINS AND EXPOSED REINFORCEMENT).

TABLE 1. LAP LENGTH OF THE REINFORCEMENT(mm)

Dia.	R10	D10	D12	HD10	HD12	HD16
Concrete	350	350	400	550	650	850
Blocks	800	400	480	700	800	1120

TABLE 2. MINIMUM BEND DIAMETER FOR REBAR(mm)

Bar Dia.(d)	6	10	12	16	20	25
Plain bar	30	50	60	80	100	150
Deformed bar	30	50	60	80	100	150
Plain(ties)	20	20	30	40	40	80
Deformed(ties)	30	40	50	70	80	150



ROUND HOOK 90° HOOK TIE & STIRRUP

REPRESENTATION OF REINFORCING BARS ON DRAWINGS:

(1)LAPS:

(2)HOOKS AND LEGS:

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Sheet: GENERAL SPECIFICATION II

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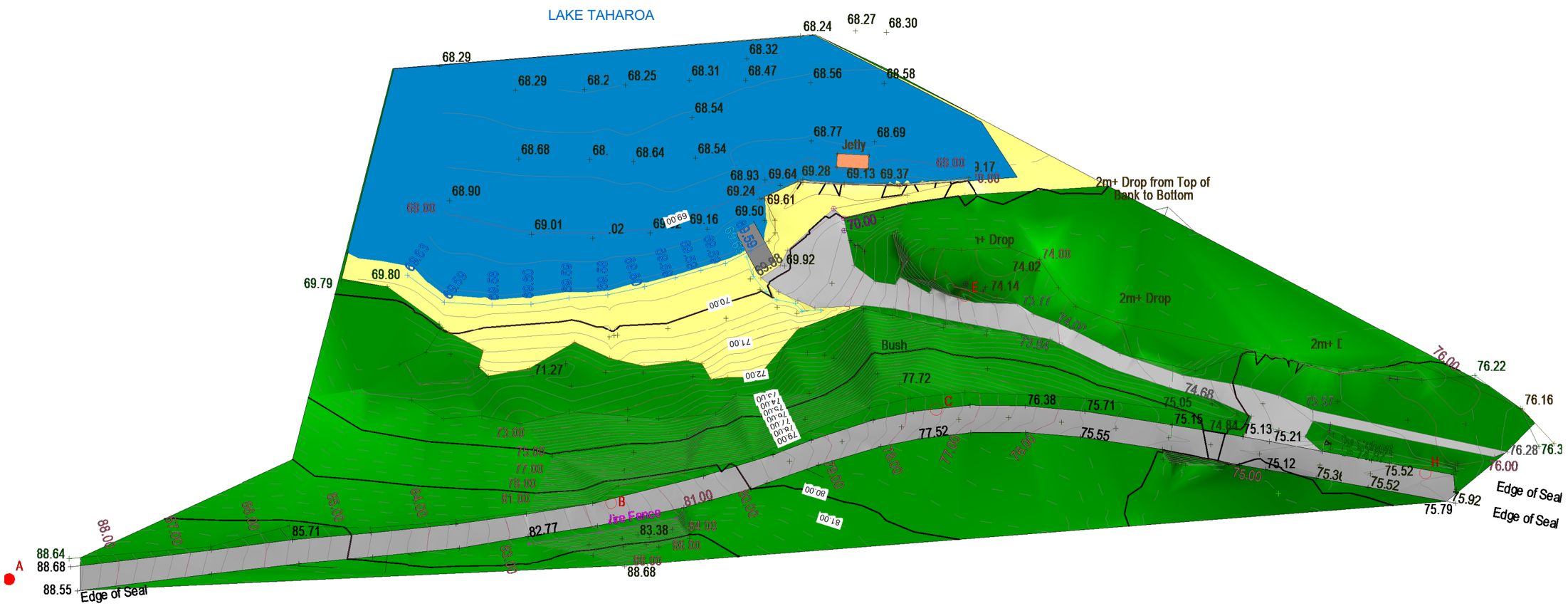
SEC 63
BLK I KAIIWI SD



TOPOGRAPHY PLAN

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Sheet
TOPOGRAPHY PLAN

Drawing No.	Sheet. No.	Revision
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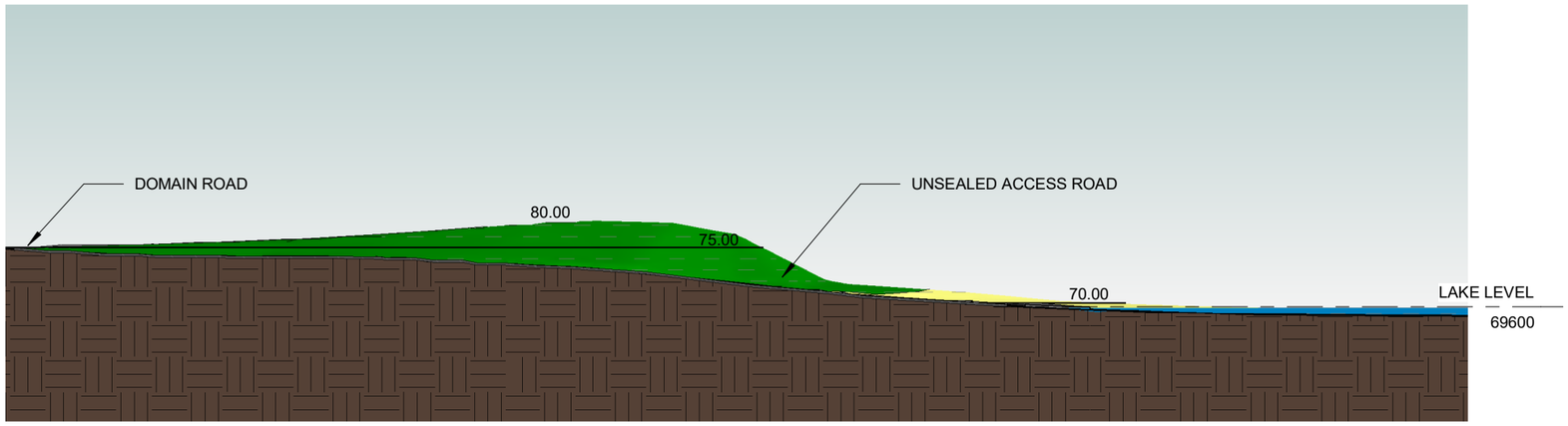
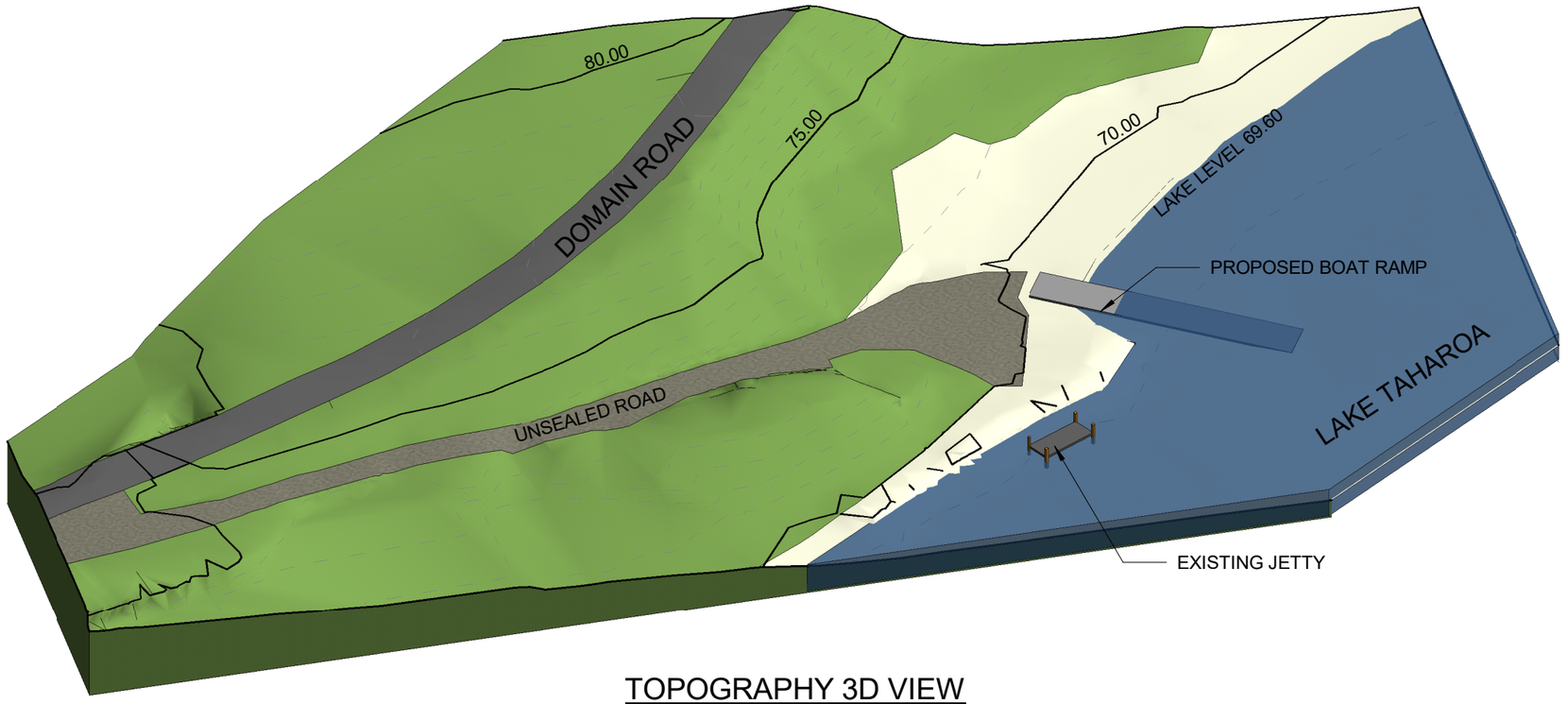


ACCESS ROAD LONG SECTION



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Sheet
3D TOPOGRAPHY

Drawing No.	Sheet. No.	Revision
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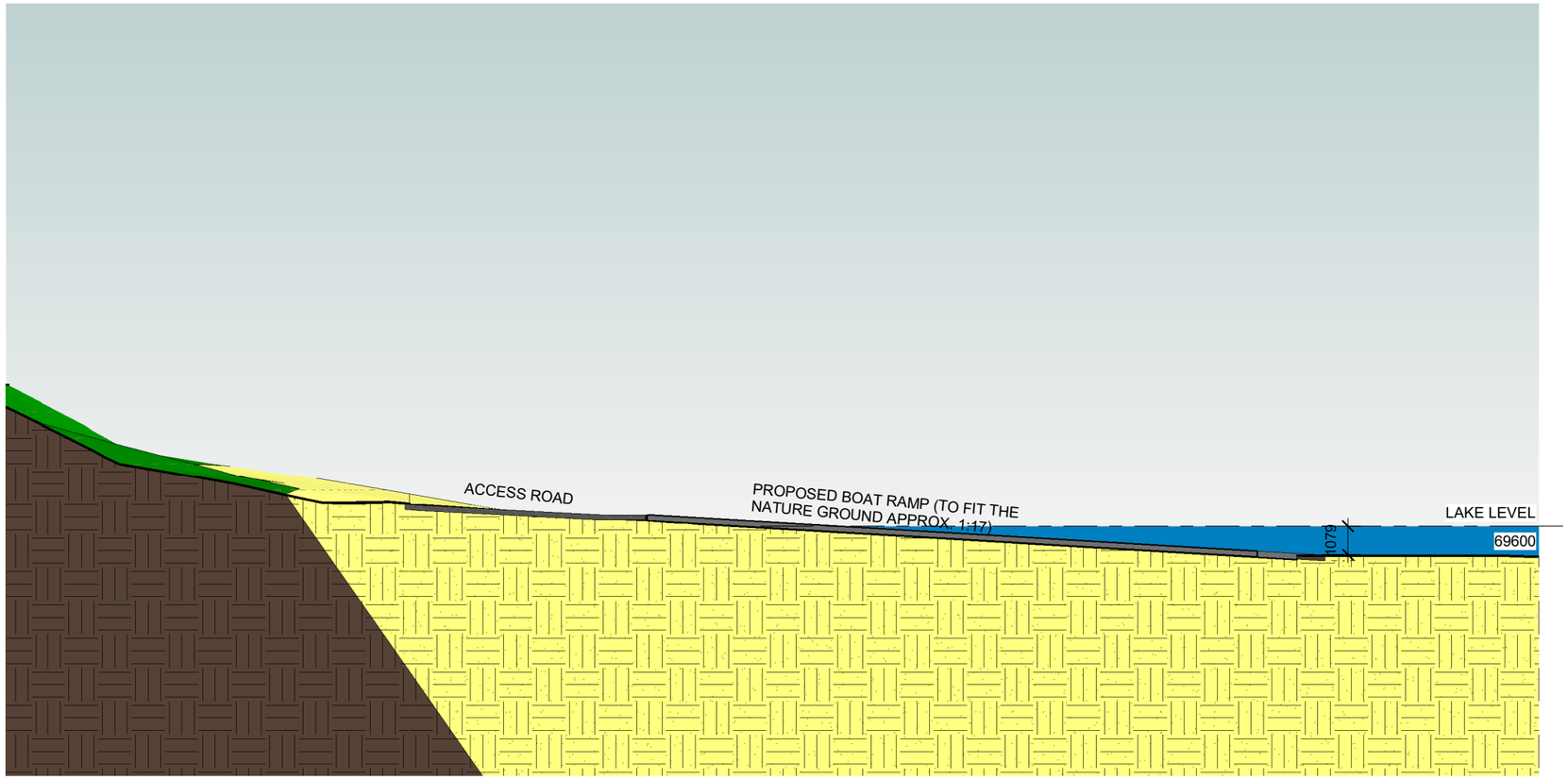

BOAT RAMP SECTION

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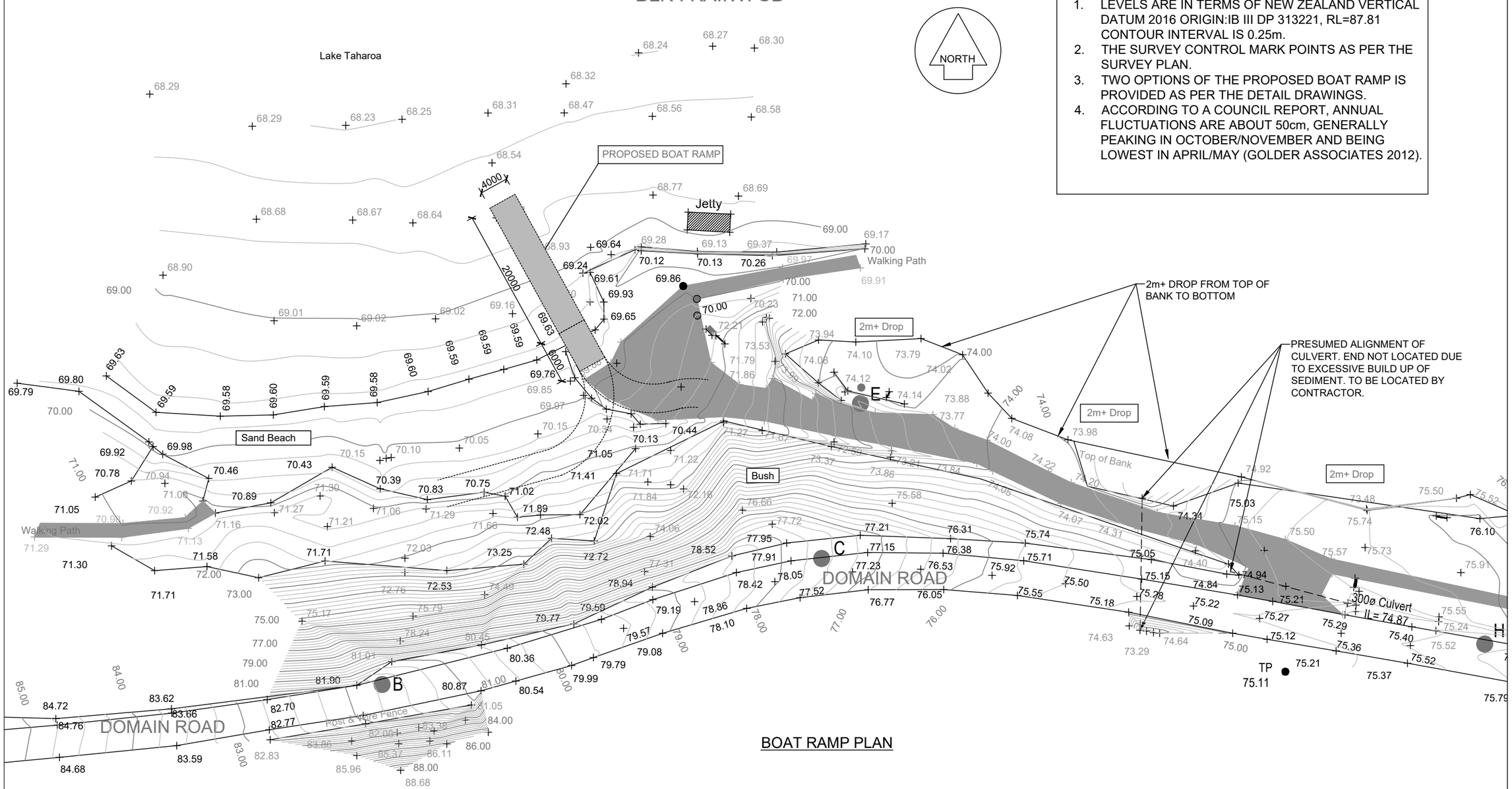
Sheet: BOAT RAMP SECTION

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	SP03	RE00

SEC 63
BLK I KAIIWI SD

NOTES:
1. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016 ORIGIN:IB III DP 313221, RL=87.81 CONTOUR INTERVAL IS 0.25m.
2. THE SURVEY CONTROL MARK POINTS AS PER THE SURVEY PLAN.
3. TWO OPTIONS OF THE PROPOSED BOAT RAMP IS PROVIDED AS PER THE DETAIL DRAWINGS.
4. ACCORDING TO A COUNCIL REPORT, ANNUAL FLUCTUATIONS ARE ABOUT 50cm, GENERALLY PEAKING IN OCTOBER/NOVEMBER AND BEING LOWEST IN APRIL/MAY (GOLDER ASSOCIATES 2012).



BOAT RAMP PLAN

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KAIPARA DISTRICT
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Project: KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet: BOAT RAMP PLAN

Drawing No.	Sheet. No.	Revision
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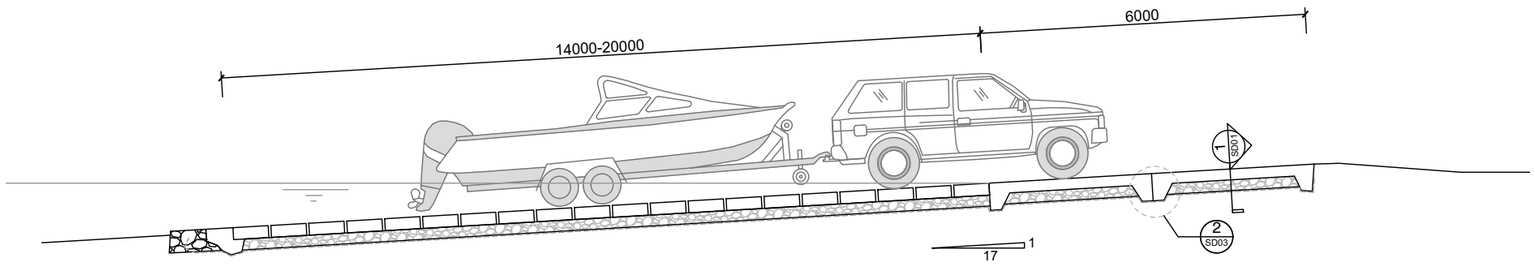
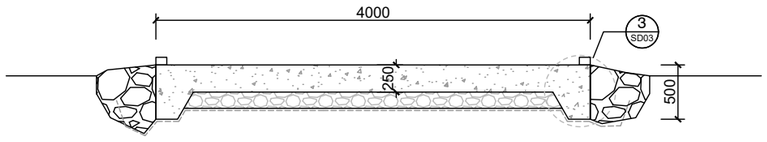


PRECAST BOAT RAMP LONG SECTION
(OPTION 1)



1 SD01 CROSS SECTION 1

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Sheet
PRECAST BOAT RAMP LONG SECTION (OPTION 1)

Project No.	Scale	Drawing No.	Sheet. No.	Revision
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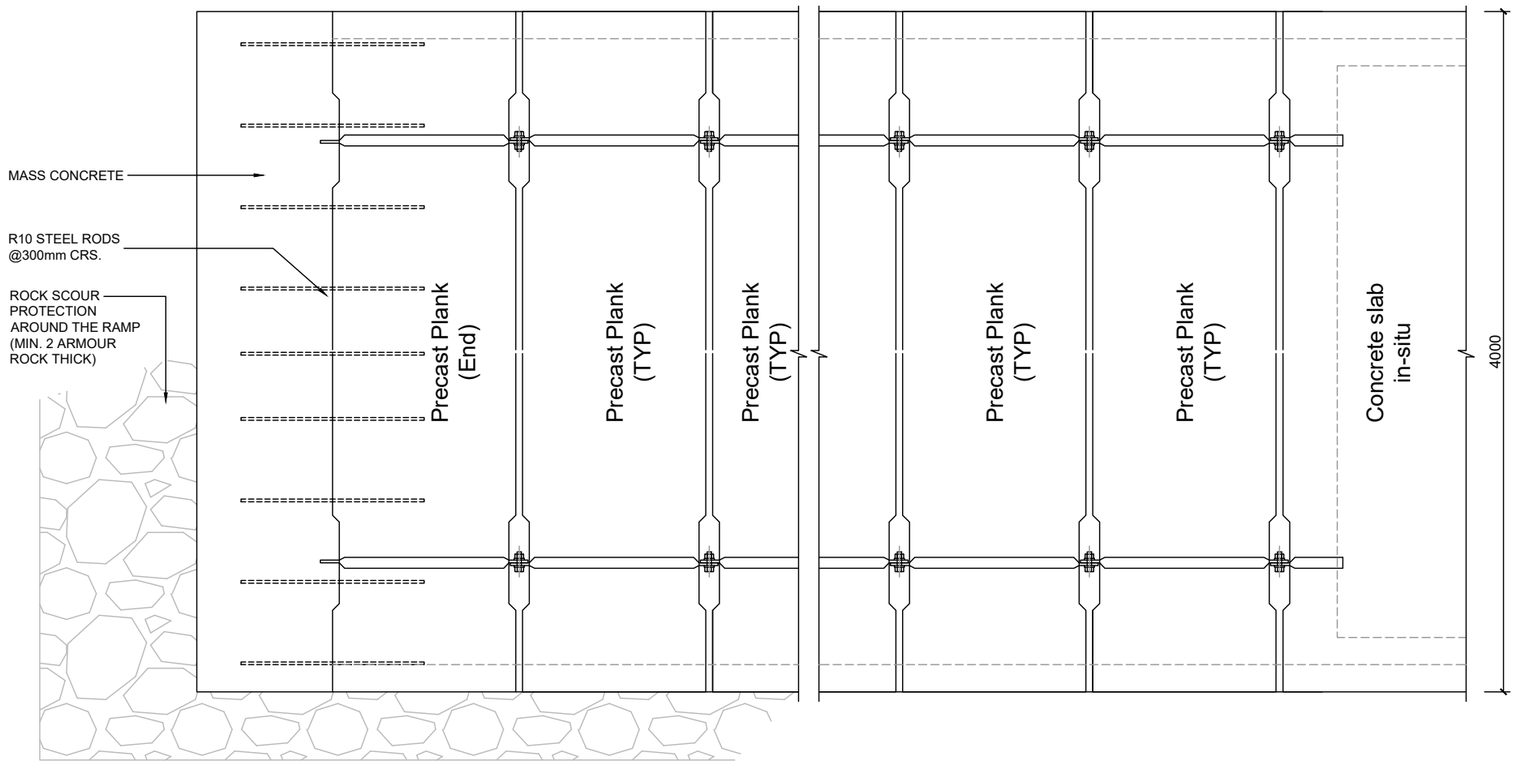
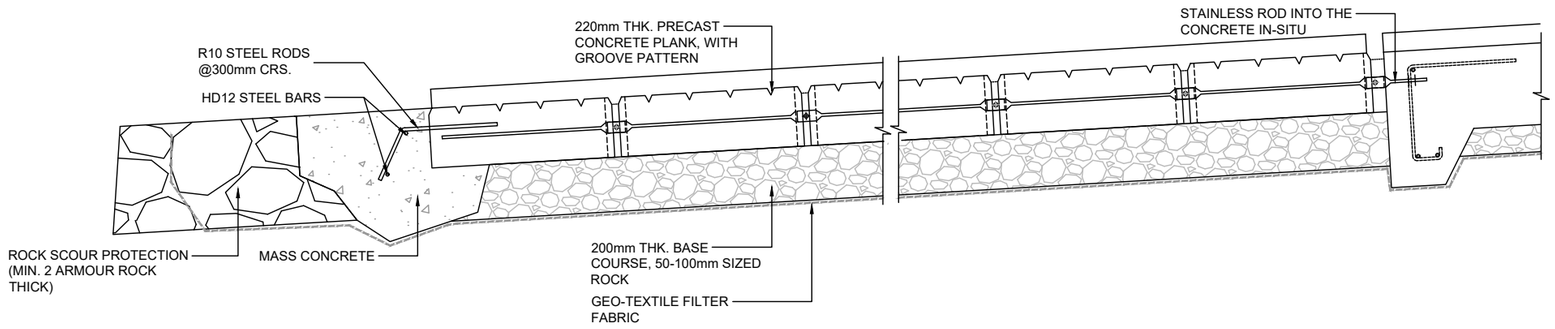


PRECAST PLANK LAYOUT



PRECAST PLANK SECTION

Revision	Amendment	Approved	Revision Date

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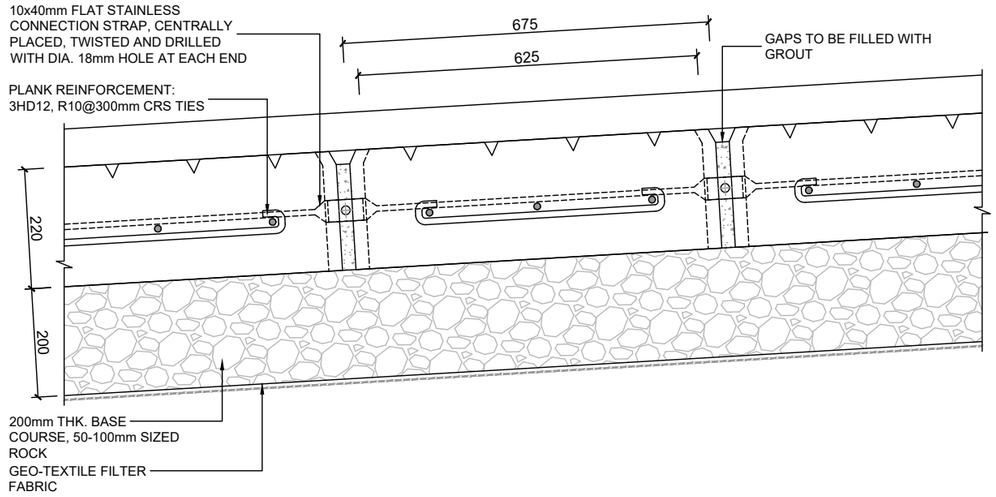
LJ	LJ	NP	01/2019

Project No.	Scale
NTN-S0003.01	1:20@A3

Project: KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet: PRECAST BOAT RAMP DETAILS (OPTION 1)

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	SD02	00



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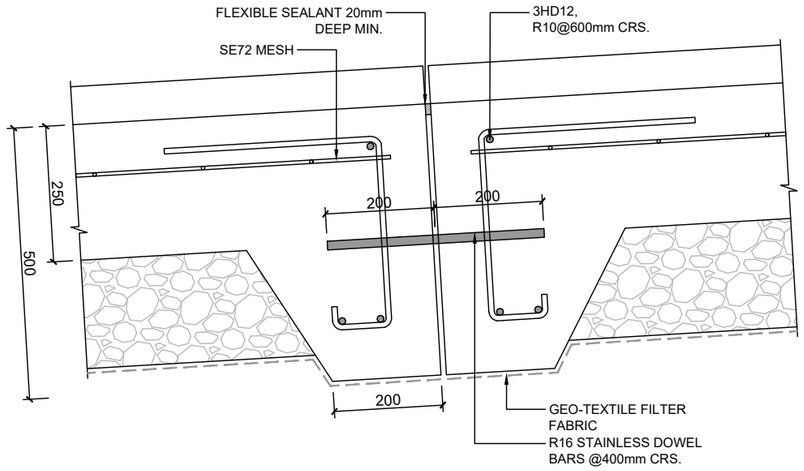

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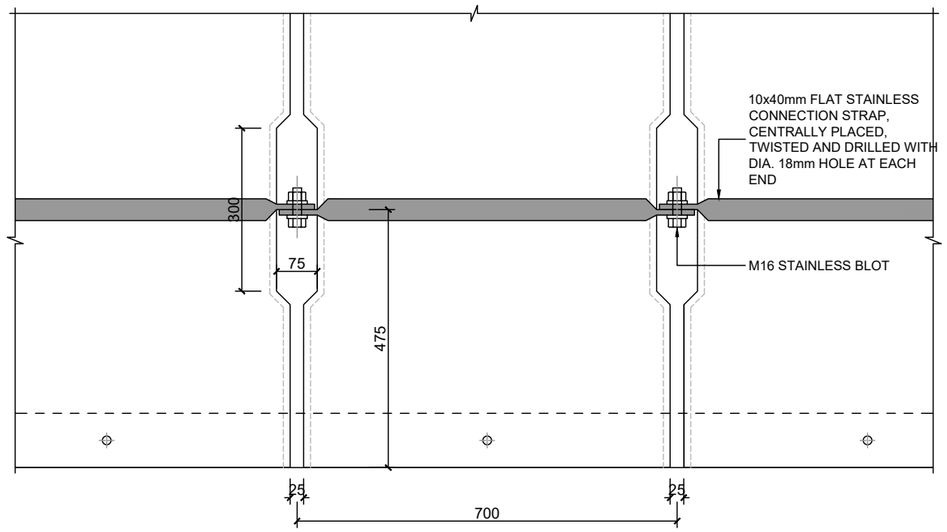

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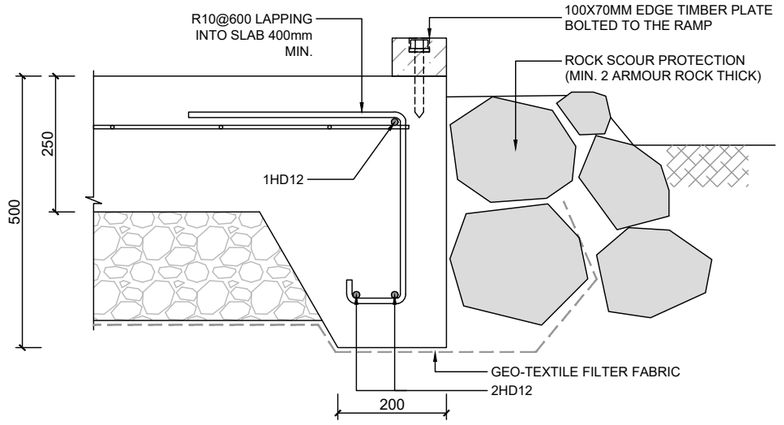

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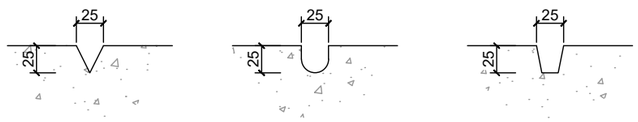

ALTERATION OF THE GROOVE

Revision	Amendment	Approved	Revision Date

KAIPARA DISTRICT
Kaipara te Oranganui
Two Oceans Two Harbours

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Drawn	Designed	Approved	Revision Date
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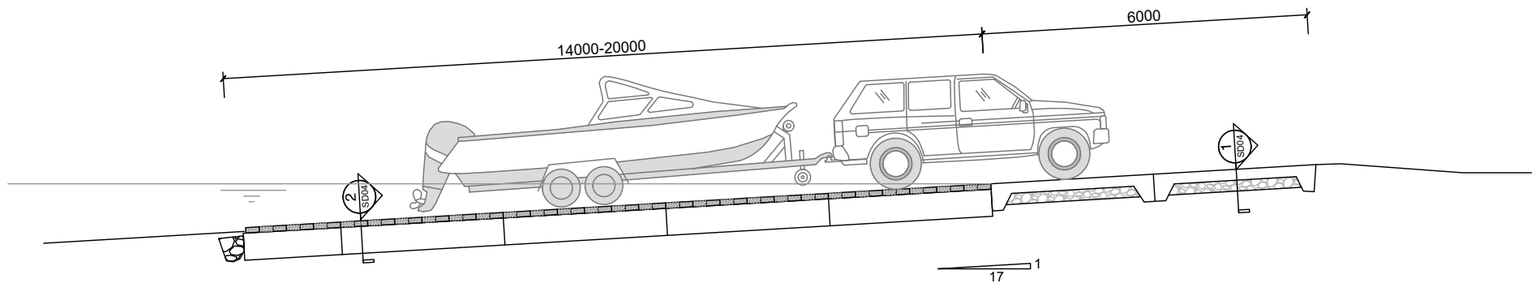
Project
KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet
PRECAST BOAT RAMP DETAILS (OPTION 1)

Project No.	Scale	Drawing No.	Sheet. No.	Revision
NTN-S0003.01	1:10@A3	NTN-S0003.01	SD03	00



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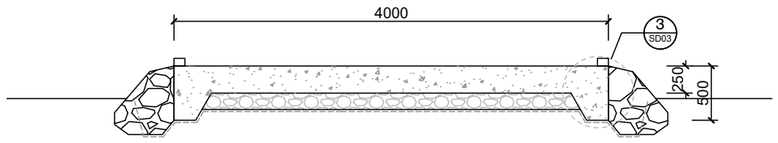
(OPTION 2)



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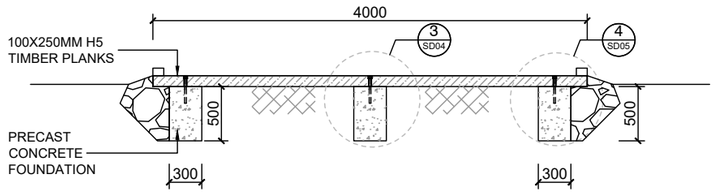

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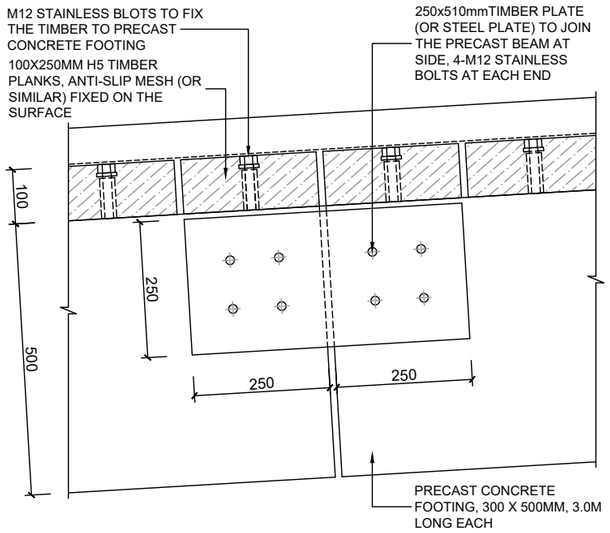
Project No.	Scale
NTN-S0003.01	1:100(50)@A3

Project
KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet
TIMBER BOAT RAMP LONG SECTION (OPTION 2)

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	SD04	00



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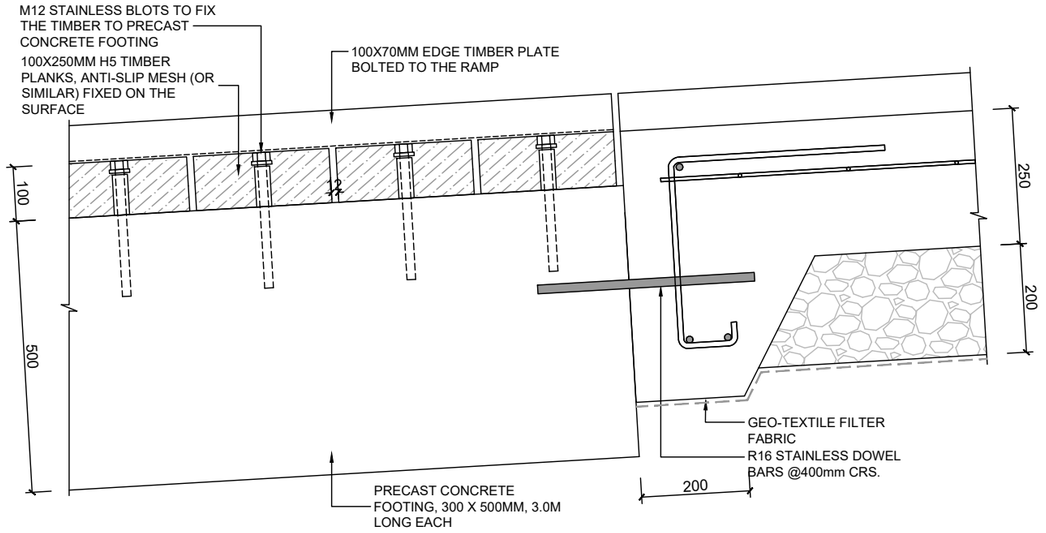

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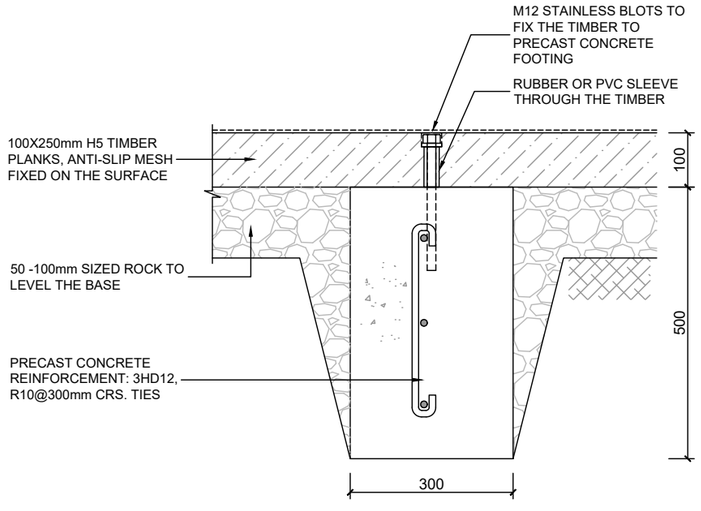

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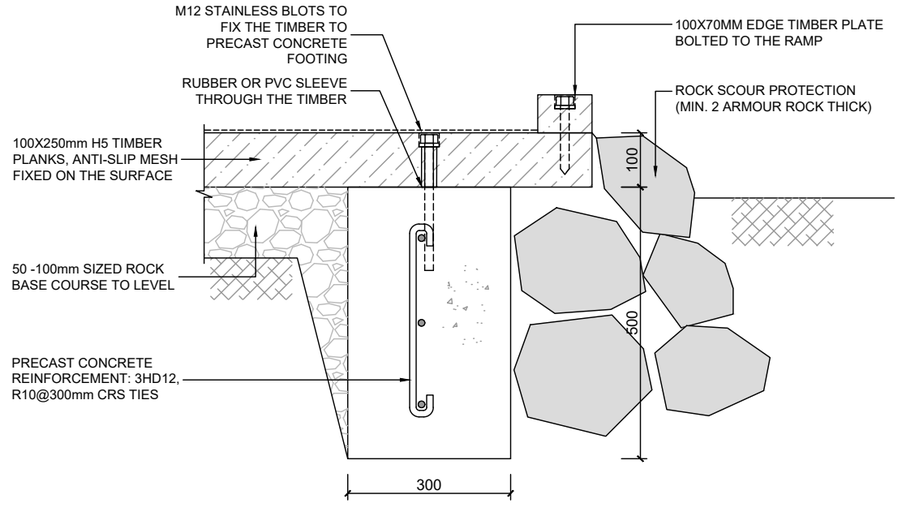

4 SD01 PRECAST FOUNDATION DETAIL II

Revision	Amendment	Approved	Revision Date

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Drawn	Designed	Approved	Revision Date
LJ	LJ	NP	01/2019

Project
KAI IWI LAKES BOAT RAMP, 394 KAI IWI LAKES ROAD, OMAMARI 0373

Sheet
TIMBER BOAT RAMP DETAILS (OPTION 2)

Project No.	Scale	Drawing No.	Sheet. No.	Revision
NTN-S0003.01	1:10@A3	NTN-S0003.01	SD05	00

APPENDIX B

GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

Kaipara te Oranganui
KAIPARA DISTRICT
Two Oceans Two Harbours

Prepared for:	Boat Ramp
For the Project at:	Kai Iwi Lakes
	Kaipara District
Date Prepared:	21 January 2019
Project Number:	NTH-G0002.01

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1 INTRODUCTION

NAL Civil & Structural Engineers Limited (NAL) was engaged by Kaipara District Council to conduct a site investigation and provide a Geotechnical Report for the proposed Boat Ramp at Lake Takaroa of Kai Iwi Lakes, Kaipara District, here on after referred to as the "site". The proposed development encompasses constructing a boat ramp. A walkover appraisal has been done by this office on 14 January 2019 in line with conducting a shallow subsoil investigation to get actual soil parameters for the proposed development by this office prior to issue of this report. A site plan has been supplied to NAL Civil & Structural Engineers and is attached to Appendix B to show the locations of the completed subsoil investigation boreholes.

1.1 Scope of Works

The scope of this report is to address the geotechnical soil parameters through a site investigation by means hand auguring and dynamic (scala) penetrations to propose the bearing capacity for the relevant footings based on the current construction code and others guidance document requirements.

This report is specifically for the purpose of assessing the ultimate of bearing capacity, providing a suitable depth of footing and ramp requirements.

1.2 Engineering Limitations

This report is based on investigations carried out at a limited number of locations. It must be understood that soil conditions may vary across the site from those encountered at the test holes. Therefore, it is possible that there are some unobserved soil layers that may become evident in future construction works. If this occurs, please contact NAL for further evaluation.

NAL provides this report for the limited and sole use of the client. No responsibility of liability to any third party is accepted for any loss of damages whatsoever arising out of the use of, or reliance of this report by any other property than the one specified.

The ground conditions at the site are suitable for future development provided foundations and ramp structures are designed in accordance with this report and subject to NAL Civil and Structural Engineers Ltd being given the opportunity to check the design of foundations prior to building

consent approval. NAL Civil & Structural Engineers Ltd should be given the opportunity to review any updates /changes to any existing foundation design(s).

The nominated contractor undertaking the construction works shall be responsible to ensure that any constructions carried out meet the current regulations and manufacturer's installation guidelines. Any work requiring building consent shall be granted prior to commencing of work.

Our professional services are performed using a degree of care, engineering skill and judgement normally exercised, under similar circumstances, by reputable consultants practicing in this profession at this time.

2 SITE GEOLOGY

The New Zealand Geological web map reveals the geology at the site as being composed of weakly cemented and partly consolidated sand in fixed parabolic dunes, capped by clay-rich sandy soils of Karioitahi Group of the Early Pleistocene sediments. The site is close to the Awhitu Group composed of cemented dune bedded sand and associated estuarine and fluviatile deposits of Neogene sedimentary rocks. The geologic condition at Boat Ramp site, Kai Iwi Lakes is shown on Figure 1.

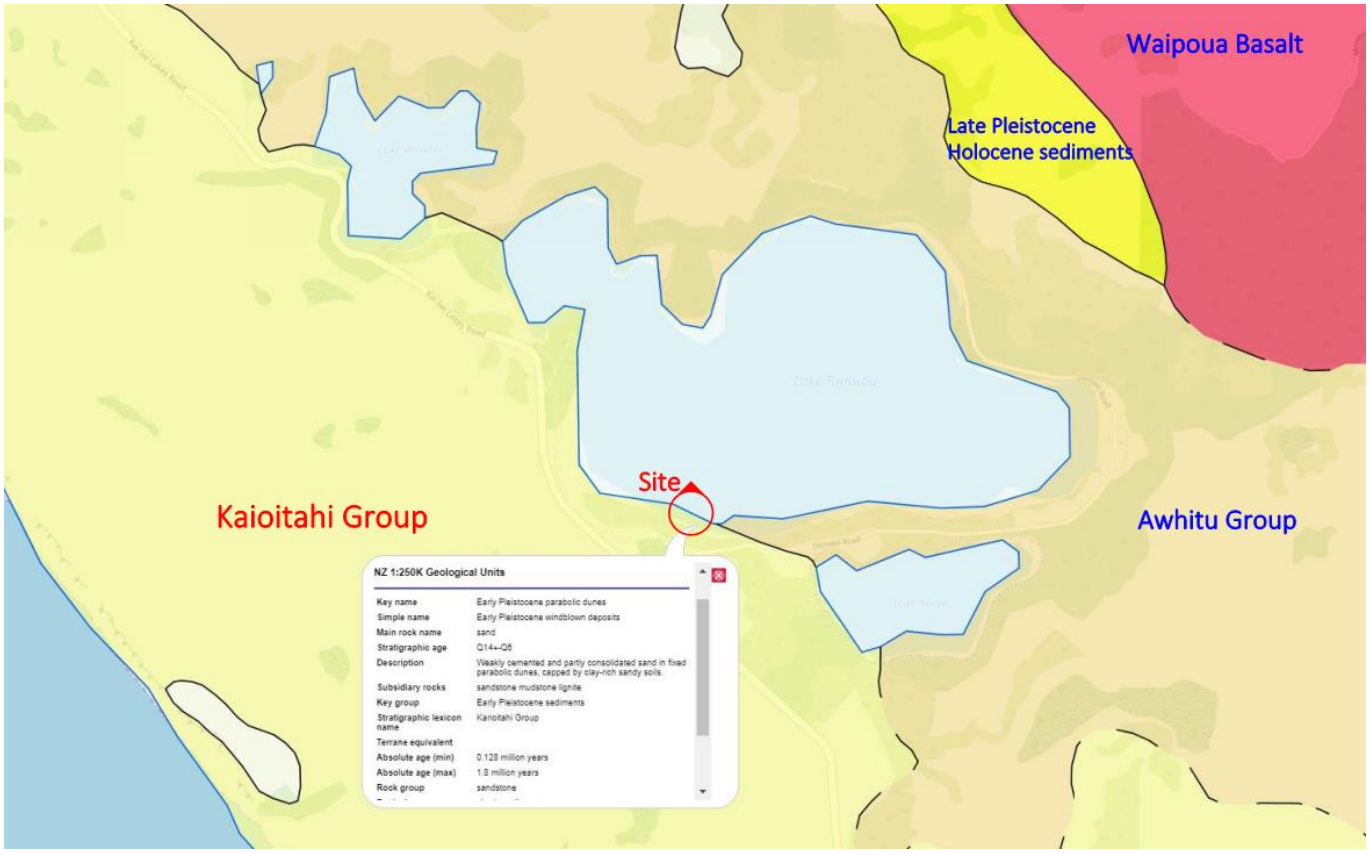

Figure 1: Geological Condition at Boat Ramp site, Kai Iwi Lakes

3 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site can be accessed from Domain Road through compacted gravel driveways at about 90m to the left of the road. Kai Iwi Lakes located 35 kilometres from Dargaville is one of New Zealand's best holiday spot. The existing boat ramp is a natural gentle sloping of the sandstone outcrops.

The Kai Iwi Lakes consist of 3 lakes namely Lake Kai Iwi, Lake Taharoa and Lake Waikere, which are basin type dune lakes formed in consolidated sand of late Pleistocene geological origin. They were formed by accumulation of rainwater in depressions of sand underlain by relatively impermeable ironstone pans. Dune lakes are one of nine major lake types found in New Zealand and are the predominant type found along west coast of the North Island. Lake Kai Iwi and Taharoa are connected by a narrow channel and are about 70m above sea level. Lakes Taharoa and Waikere are the deepest known dune lakes in the country. The NZ Oceanographic Institute bathymetric chart of lakes record the maximum depth of Lake Taharoa to the 37m, and Lake Waikere 30m. Lake Kai Iwi is considerably shallower than the other two lakes and has a maximum recorded depth of 16m.

The Kai Iwi lakes have no known natural inlets or outlets. Their principal source of water is likely to be rain which falls directly onto the lake surface. As a result their levels fluctuate considerably with climatic conditions. Seasonal lake level movements of 400-600mm have been recorded on Lake Taharoa.

However, the proposed development of the boat ramp at Lake Taharoa on the site will be consist of concrete slab and precast planks.

4 SOIL INVESTIGATION

A subsoil investigation was carried out on the site on 14 January 2019 by two (2) NAL Engineers. The subsoil investigation was conducted by executing four (4) 50mm diameter shallow hand auger exploratory boreholes on the site, the locations of the boreholes were selected to fall within the proposed boat ramp location. Four (4) 50 mm diameter boreholes were executed on marked locations within the proposed boat ramp (Boreholes A – D), as shown on the attached site plan (Appendix B) and the summary of the soil investigation is shown on Table 1.

Borehole Number	Borehole Depth (mbgl)	Scala termination Depth (mbgl)	Groundwater Depth (mbgl)
A	0.2	2.65	0.1
B	0.3	0.6	0.3m under water
C	0.2	5.0	0.8m under water
D	0.4	0.55	0.1

Table 1: Borehole & Scala Penetrometer Tests Summary

The boreholes were hand auger drilled up to a refusal depth of 0.2m – 0.4m bgl. A Scala Penetrometer test (Dynamic Cone Test) was conducted from the ground level about 500mm away from each borehole location up to a maximum depth of 5.0m bgl or the practical refusal depth, a total of four (4) Scala Penetrometer tests were conducted on the site. The purposes of the scala penetrometer tests are to provide supplementary subsoil strength information. The results for the scala penetrometer tests are shown in tabulated format and attached to Appendix D, these are provided graphically on the borehole logs in Appendix C.

5 GROUND MODEL

This section provides a brief description of the subsoil conditions encountered on site as identified in the completed borelogs from hand augur (attached to appendix C). The groundwater was encountered at the depth of 0.1m bgl during the subsoil investigation.

Borehole A located at the edge of the lake on the gentle slope about 2m from the water surface and consisted of a 100mm thick brown fine to medium SAND, compact, wet overlying orangey brown belonging to Karioitahi Group up to a refusal depth of 0.2mbgl which the hole was terminated. A scala penetrometer test was conducted from the ground surface about 500mm away from the borehole and terminated at a refusal depth of 2.65mbgl. The static groundwater table was encountered at 0.1mbgl within borehole A during site investigation.

Borehole B located about 5.5m inside the lake with 0.3m water high and consisted of a 300mm thick dark brown fine to medium SAND, compact, wet and hit the refusal depth upon which the hole was terminated. A scala penetrometer test was conducted from the base of the lake about 500mm away from borehole and terminated at the refusal depth of 0.6mbgl.

Borehole C located about 15.5m inside the lake with 0.8m water high and consisted of a 200mm thick un-retrieved sand as the risk of drilling under water. This was underlain by hard sandstone upon which the hole was terminated. A scala penetrometer test was conducted from the base of the lake about 500mm away from borehole and terminated at target depth of 5.0m bgl.

Borehole D located at the edge of the lake on the gentle slope about 2m from the water surface and consisted of a 200mm thick brown fine to medium SAND, compact, wet overlying orangey brown in colour up to a refusal depth of 0.4mbgl upon which the hole was terminated. A scala penetrometer test was conducted up to a refusal depth of 0.55mbgl. The static groundwater table was encountered at 0.1mbgl during site investigation.

The scala penetrometer results from BH A to BH D are provided graphically on Figure 2.

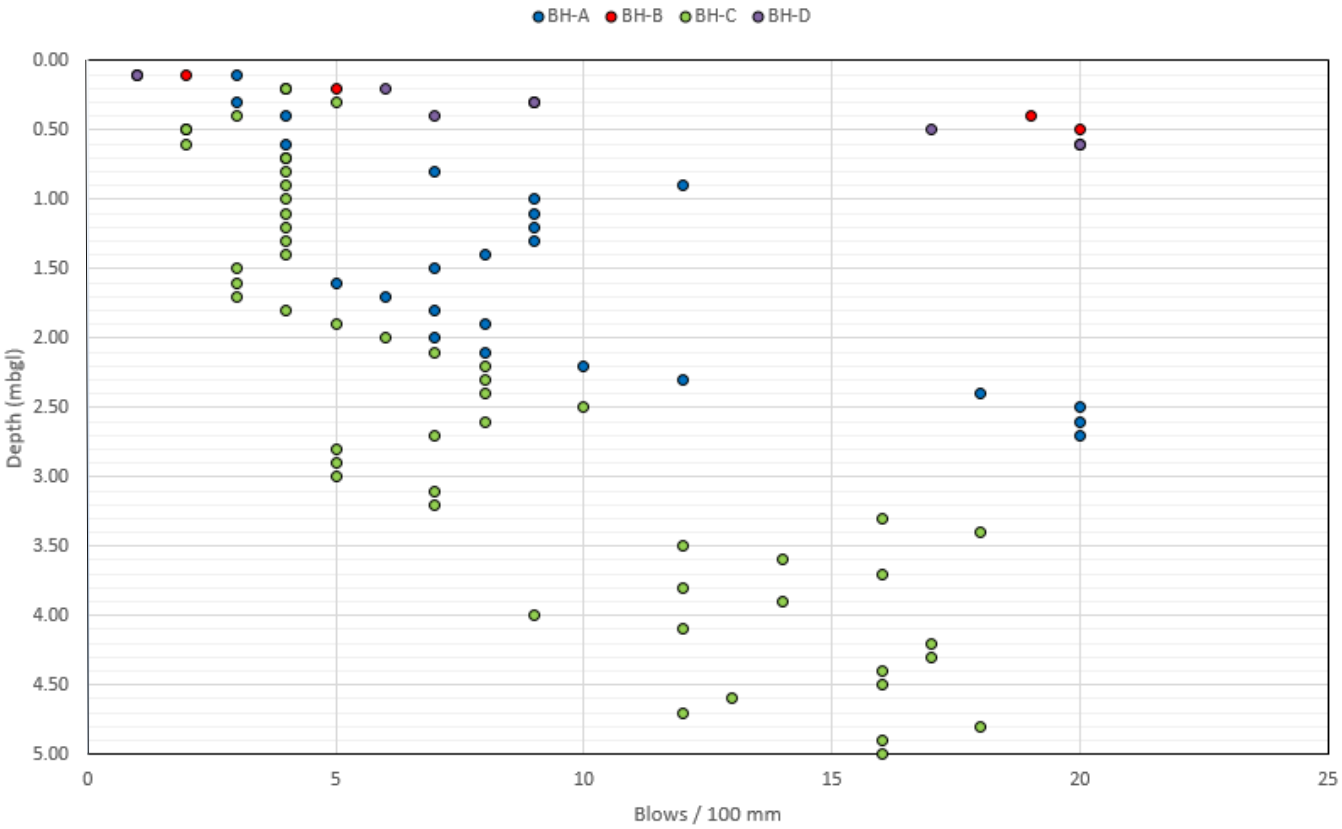

Figure 2: Scala Penetrometer Results

6 GEOTECHNICAL RECOMMENDATIONS

The soils encountered at the proposed boat ramp is typically dense SAND covered by loose sand up to 100mm thick. The soils are consistent with the expected soil types within the Karioitahi Group Formation.

Foundations for the proposed boat ramp will need to be designed to use a shallow foundations as the prime option. The boat ramp will consist of the concrete slab for vehicle and trailer movements and concrete planks that submerged in the water for launching and retrieval operations.

6.1 Foundation recommendations

The following recommendations are outlined along with representative soil design parameters for the specific engineering design of the foundation for the proposed development of the boat ramp at Lake Taharoa. Shallow foundations are the favoured foundation option for the proposed boat ramp.

The following provisions should be incorporated in to the specific engineering design:

1. Shallow foundations option can be considered the preferred option for this development, provided that any loose sand is removed and replaced by site concrete or well compacted AP65 aggregate.
2. Shallow foundations can be strip or pad foundations to be taken to a minimum depth of 450mm below cleared ground level.
3. Shallow foundations can be designed with an ultimate bearing capacity of 450kPa and dependable bearing capacity of 225kPa.
4. It is recommended that the boat ramp design compensate for at least 600mm seasonal lake level movement.
5. It is recommended to construct rock scour protection at the side and the toe of boat ramp.

7 OBSERVATIONS DURING CONSTRUCTION

NAL Civil & Structural Engineers Limited or a Chartered Professional Engineer familiar with this report should inspect the foundation excavations to ensure that the recommendations of this report are achieved on site. Prior to construction, inspections must be made either by this office or another Chartered Professional Engineer to ensure that foundation excavations are clean of any noxious/soft materials and that the subsoil conditions onsite are consistent with those outlined in this report. Such inspection should be no less than the procedures outlined within NZS 4431:1989, shear vane tests need to be conducted on the bases of excavations to ensure that the in-situ natural ground has at least sufficient shear strength to those provided by this report. Should any discrepancies in soil condition be suspected between the in-situ natural soil and the soil conditions outlined in this report, this office or another Chartered Professional Engineer must be contacted immediately.

8 DESIGN CERTIFICATION

The ground conditions at the site are suitable for future development provided foundations and retaining structures are designed in accordance with this report and subject to NAL Civil and Structural Engineers Limited being given the opportunity to check the design of foundations prior to building consent approval. NAL Civil & Structural Engineers Limited should be given the opportunity to review any updates /changes to any existing foundation design(s).

PLEASE NOTE: *This report is based on investigations carried out at a limited number of locations. It must be understood that soil conditions may vary across the site from those encountered at the test holes.*

9 REFERENCE

Evans, RB (compiler) 2005 Geology map of Northland. Institute of Geological & Nuclear Sciences Limited, 1:250,000

Standards Australia. Residential Slabs and footings AS 2870-2011.

Standards New Zealand *Paerewa Aotearoa*. February 2011. NZS3604:2011 New Zealand Standard, Timber-framed buildings.

Stockwell, M. J. 1977. Determination of allowable bearing pressure under small structures. New Zealand Engineering (32, 6) P132 – 135.

10 APPENDICES

- Appendix A: Site Photographs
- Appendix B: Exploratory Hole Location Plan
- Appendix C: Borehole Logs
- Appendix D: Scala Penetrometer Results

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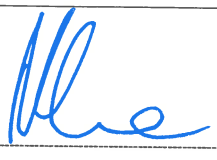
11 VERIFICATION

Quality Assurance Statement		
Geotechnical Assessment Report: Boat Ramp at Kai Iwi Lakes	Prepared by	 Lukito Widjaja Senior Geotechnical Engineer BE(Civil), MEng(Geotechnical)
Prepared for Kaipara District Council	Peer Reviewed by	 21/1/19. Peter Deane Senior Civil & Structural Engineer B.E (Civil), MIPENZ, CPEng

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APPENDIX A

SITE PHOTOGRAPHS

Photo 1. Boat ramp entry

Photo 2. Location of boat ramp

Photo 3. Location of borehole A

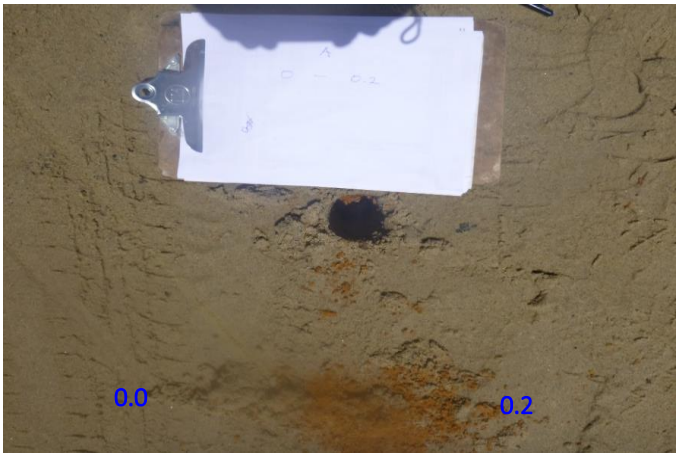


Photo 4. Soil cuttings borehole A (0.0-0.2m)

Photo 5. Location of borehole B

Photo 6. Soil cuttings borehole B (0.0-0.3m)

Photo 7. Scala tests at borehole A

Photo 8. Retrieved scala rods at borehole B

Photo 9. Location of borehole D

Photo 10. Soil cuttings borehole D (0.0 – 0.4m)

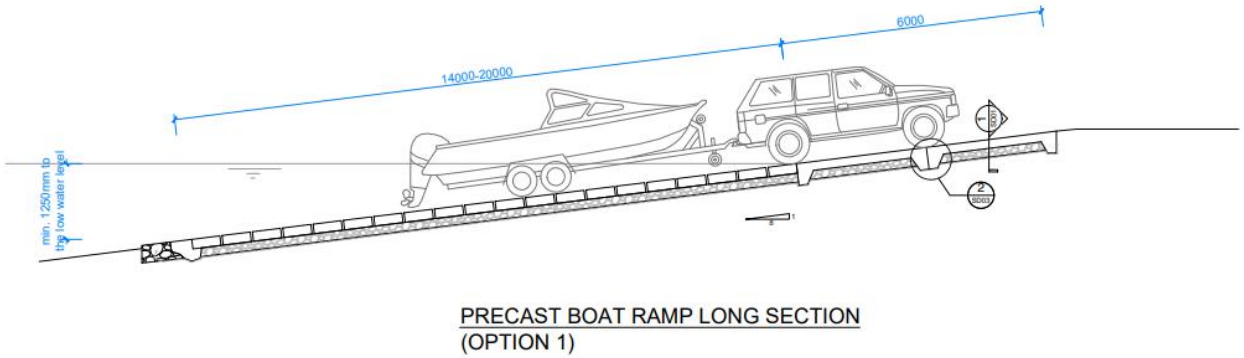


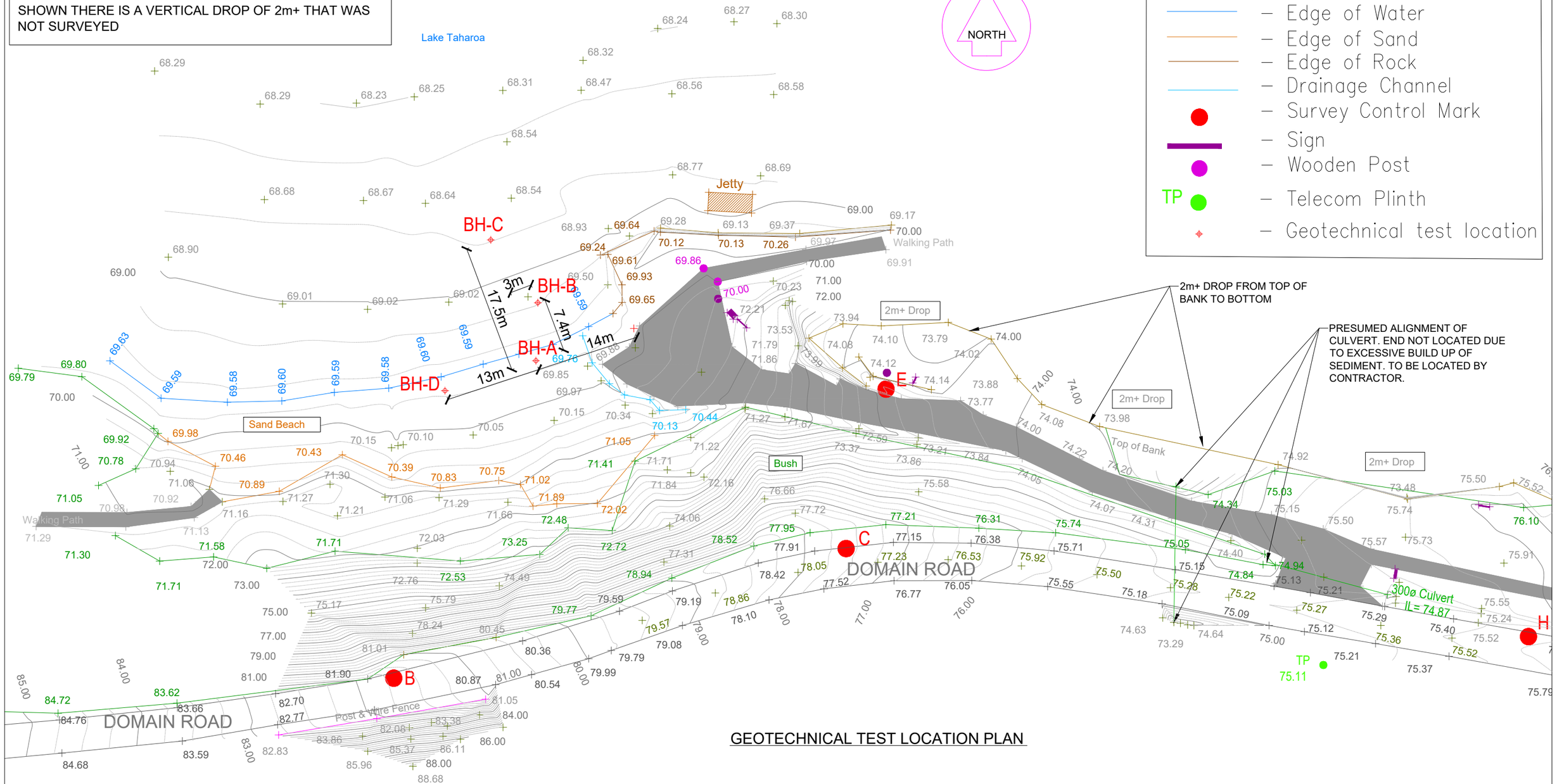
Photo 11. Proposed Boat Ramp

APPENDIX B

EXPLORATORY HOLE LOCATION PLAN

NOTES:
LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016 ORIGIN:IB III DP 313221, RL=87.81
CONTOUR INTERVAL IS 0.25m.
THIS PLAN HAS BEEN PREPARED SPECIFICALLY FOR USE IN THIS APPLICATION ONLY
WHERE A TOP OF BANK AND NO BOTTOM OF BANK IS SHOWN THERE IS A VERTICAL DROP OF 2m+ THAT WAS NOT SURVEYED

SEC 63
BLK I KAIIWI SD



GEOTECHNICAL TEST LOCATION PLAN

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Drawn	Designed	Approved	Revision Date
SN	SN	LW	01/2019

Project No.	Scale
NTN-S0003.01	1:500@A3

Project
Kai Iwi Lakes Boat Ramp, 394 Kai Iwi Lakes Road, OMAMARI 0373

Sheet
GEOTECHNICAL TEST LOCATION

Drawing No.	Sheet. No.	Revision
NTN-S0003.01	G01	00

APPENDIX C

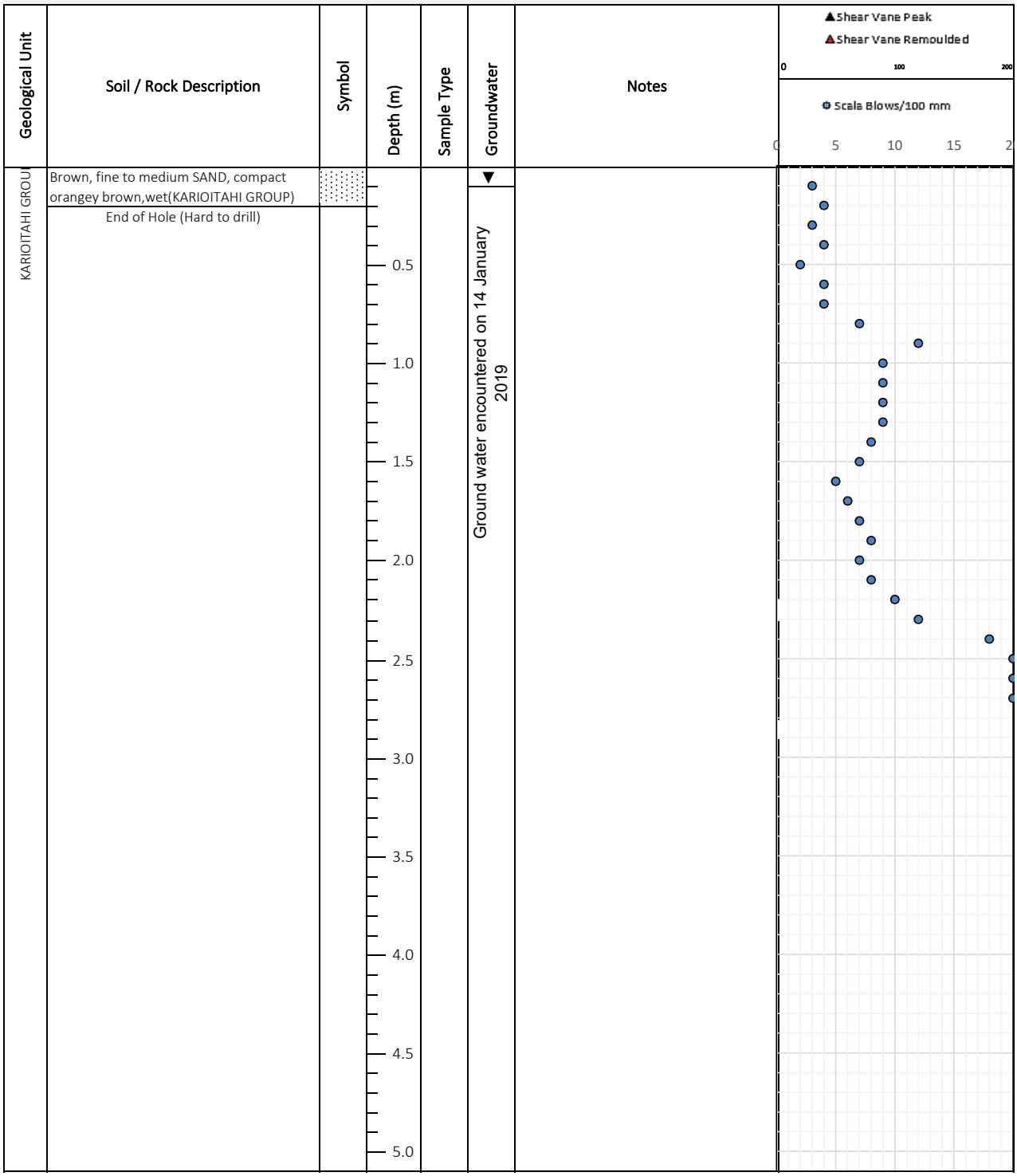
BORE LOGS

AUGER / SCALA PENETROMETER INVESTIGATION REPORT

Project	:	Boat Ramp
Project Number	:	NTH-G0002.01
Location	:	Kai Iwi Lakes
Client	:	Kaipara District Council
Tested by	:	SN/LW
Poisition	:	As per attached plan
Surface Conditio	:	Gentle Slope, sand

NAL CIVIL & STRUCTURAL ENGINEERS

AUGER HOLE LOG A



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402:1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	The test positions are approximate only.
Date tested: 14 January 2019 Date reported: 16 January 2019	UTP = Unable to Penetrate This report may only be reproduced in full.

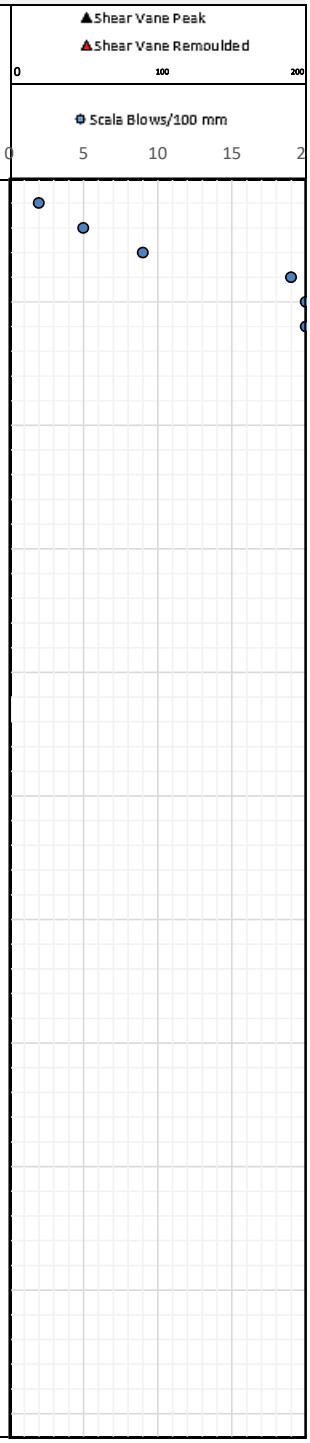
AUGER / SCALA PENETROMETER INVESTIGATION REPORT

Project	:	Boat Ramp
Project Number	:	NTH-G0002.01
Location	:	Kai Iwi Lakes
Client	:	Kaipara District Council
Tested by	:	SN/LW
Test position	:	As per attached plan
Surface Conditio	:	Gentle Slope, 0.3m water

NAL CIVIL & STRUCTURAL ENGINEERS

AUGER HOLE LOG B

Geological Unit	Soil / Rock Description	Symbol	Depth (m)	Sample Type	Groundwater	Notes
KARIOITAHI GROUP	Dark brown, fine to medium SAND, compact, wet (KARIOITAHI GROUP)		0.0			
	End of Hole (Hard to drill)		0.5			
			1.0			
			1.5			
			2.0			
			2.5			
			3.0			
			3.5			
			4.0			
			4.5			
			5.0			



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402:1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	The test positions are approximate only.
Date tested: 14 January 2019 Date reported: 16 January 2019	UTP = Unable to Penetrate This report may only be reproduced in full.

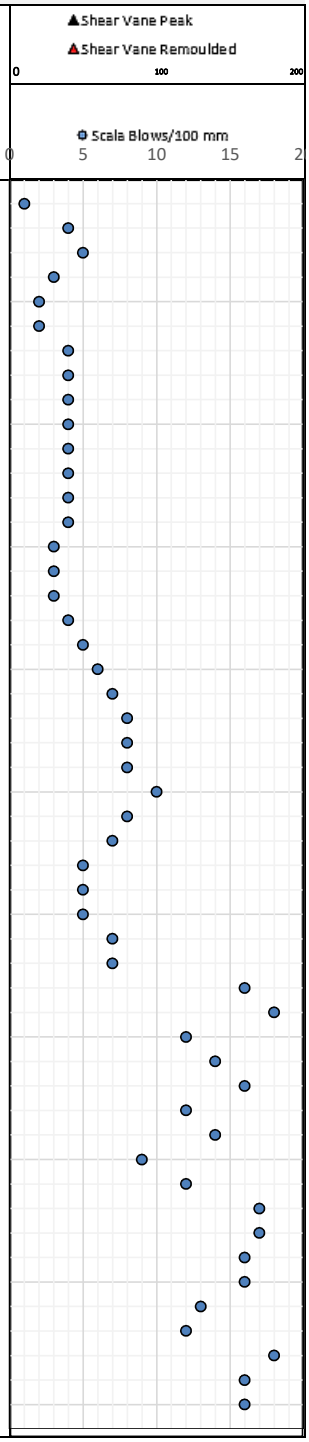
AUGER / SCALA PENETROMETER INVESTIGATION REPORT

Project	:	Boat Ramp
Project Number	:	NTH-G0002.01
Location	:	Kai Iwi Lakes
Client	:	Kaipara District Council
Tested by	:	SN/LW
Test position	:	As per attached plan
Surface Conditio	:	Gentle Slope, 0.8m water

NAL CIVIL & STRUCTURAL ENGINEERS

AUGER HOLE LOG C

Geological Unit	Soil / Rock Description	Symbol	Depth (m)	Sample Type	Groundwater	Notes
KARIOITAHI GROUP	washed away		0.0			
	End of Hole (Hard to drill)		0.5			
			1.0			
			1.5			
			2.0			
			2.5			
			3.0			
			3.5			
			4.0			
			4.5			
			5.0			



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402:1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	The test positions are approximate only.
Date tested: 14 January 2019 Date reported: 16 January 2019	UTP = Unable to Penetrate This report may only be reproduced in full.

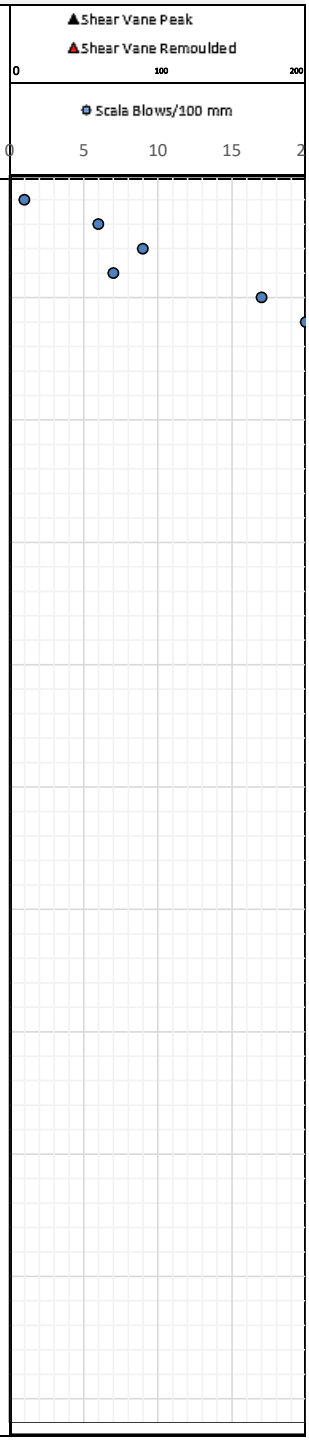
AUGER / SCALA PENETROMETER INVESTIGATION REPORT

Project	:	Boat Ramp
Project Number	:	NTH-G0002.01
Location	:	Kai Iwi Lakes
Client	:	Kaipara District Council
Tested by	:	SN/LW
Test position	:	As per attached plan
Surface Conditio	:	Gentle Slope, sand

NAL CIVIL & STRUCTURAL ENGINEERS

AUGER HOLE LOG D

Geological Unit	Soil / Rock Description	Symbol	Depth (m)	Sample Type	Groundwater	Notes
KARIOITAHI GROUP	Brown, fine to medium SAND, compact, wet (KARIOITAHI GROUP) orangey brown		0.0		▼ Ground water encountered on 14 January 2019	
	End of Hole (Hard to drill)		0.5			
			1.0			
			1.5			
			2.0			
			2.5			
			3.0			
			3.5			
			4.0			
			4.5			
			5.0			



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402:1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	The test positions are approximate only.
Date tested: 14 January 2019 Date reported: 16 January 2019	UTP = Unable to Penetrate This report may only be reproduced in full.

APPENDIX D

SCALA PENETROMETER RESULTS

NAL CIVIL & STRUCTURAL ENGINEERS

SCALA PENETROMETER TEST

Project : Boat Ramp
Project No. : NTH-G0002.01
Tested by : SN/LW
Date : 14/01/2019

Depth of Penetration [mm]	BH-A		BH-B		BH-C			BH-D			
Initial Depth [m]	0.00	2.00	0.00		0.00	2.00	4.00		0.00			
50 mm	1	4	0		0	3	6		0			
100	2	4	2		1	4	6		1			
150	2	5	3		3	3	8		2			
200	2	5	2		1	5	9		4			
250	1	5	3		2	4	9		5			
300	2	7	6		3	4	8		4			
350	2	9	9		2	4	8		3			
400	2	9	10		1	4	8		4			
450	1	10	10		1	5	8		7			
500	1	10	10		1	5	8		10			
550	2	10	10		1	5	7		20			
600	2	10	10		1	3	6					
650	2	10			2	3	6					
700	2				2	4	6					
750	2				2	2	10					
800	5				2	3	8					
850	6				2	2	8					
900	6				2	3	8					
950	5				2	2	8					
1000	4				2	3	8					
1050	4				2	3						
1100	5				2	4						
1150	5				2	3						
1200	4				2	4						
1250	4				2	8						
1300	5				2	8						
1350	4				2	9						
1400	4				2	9						
1450	3				1	6						
1500	4				2	6						
1550	3				1	7						
1600	2				2	7						
1650	4				1	8						
1700	2				2	8						
1750	3				2	6						
1800	4				2	6						
1850	4				2	7						
1900	4				3	7						
1950	3				2	4						
2000	4				4	5						
Final Depth [m]	2.00	2.65	0.60		2.00	4.00	5.00		0.55			

Testing Method: NZS 4402:1988 Test 6.5.2 Dynamic Cone Penetrometer

4.2 Financial report for the period ended 31 December 2018

Financial Services Manager **4702.24.02.01**

Recommendation

That the Taharoa Domain Governance Committee receives the Financial Services Manager's report 'Financial report for the period ended 31 December 2018'.

Taharoa Domain
Financial Summary Report for the period ended 31 December 2018

Revenue	Kai Iwi Camp	Taharoa Domain	ACTUAL 6 months to 31.12.2018	BUDGET 12 months to 30.06.2019
			$	$
Camping fees	227,882	30,000	257,882	434,500
Other Income	-		-	-
TOTAL	**227,882**	**30,000**	**257,882**	**434,500**

Expenditure	Kai Iwi Camp	Taharoa Domain	ACTUAL 6 months to 31.12.2018	BUDGET 12 months to 30.06.2019
Description			$	$
Transport costs	269	4,891	5,160	17,856
Resource Consents	-	472	472	840
Grounds maintenance	4,969	48,059	53,028	167,000
Building maintenance	10,550	8,050	18,601	60,500
Professional service	13,763	-	13,763	51,416
Advertising and promotion	-	1,439	1,439	1,584
Staff salaries and employee costs	53,320	37,054	90,374	211,785
Insurance	1,233	1,041	2,274	4,381
Power and water costs	7,611	1,614	9,225	12,384
Refuse disposal	-	7,700	7,700	30,000
Sundry	17,491	- 927	16,564	40,491
TOTAL	**109,208**	**109,393**	**218,601**	**598,237**

Capital Expenditure	Kai Iwi Camp	Taharoa Domain	ACTUAL Total 6 months to 31.12.2018	BUDGET Total 12 months to 30.06.2019
			$	$
10087 Kai Iwi facilities			-	180,000
10705 Public Toilets - Lake Waikare			16,649	40,000
10706 Taharoa Domain RMP			2,674	34,000
11019 Implement Reserve Management Plan			58,315	100,000

Taharoa Domain – Camping Facilities

Meeting: **Taharoa Domain Governance Committee**

Date of meeting: **12 February 2019**

Reporting officer: **Hamish Watson, Parks and Recreation Manager**

1 Purpose/Ngā whāinga

To advise the Taharoa Domain Governance Committee of the camping ground facilities and requirements under the Camping-Ground Regulations 1985.

2 Recommendation/Ngā tūtohunga

That Taharoa Domain Governance Committee notes the 'Taharoa Domain – Camping Facilities' report.

3 Executive Summary/Whakarāpopototanga

Council's Health Licence for the camp grounds at Taharoa Domain was renewed in August 2018 for the 2018/2019 financial year. As part of this renewal, Council's Health Officer has highlighted that Council should look to improve services at the Domain in line with legislation.

4 Context/Horopaki

The current maximum occupancy numbers for camping within Taharoa Domain are 120 people at Promenade Point and 480 people at Pine Beach (total 600).

Currently Council operates the Domain camp grounds with a number of exemptions under the Camping-Ground Regulations 1985. There are provisions in the legislation that allow for exemptions to an operator of a remote campsite. A remote campsite is defined as a camp ground in a 'national park, State forest, State forest park, or public reserve, or on Crown land'.

Council should endeavour to operate within legislative guidelines even if there is an ability to evoke an exemption.

5 Discussion/Ngā kōrerorero

5.1 Issues/Take

The table below displays what the Camping-Grounds Regulations 1985 state are the requirements for camp grounds, and the current facilities that are offered at Taharoa. ***Attachment A*** is the 'Schedule Standards camping grounds' from the 1985 regulations.

Taharoa Domain Camp Ground Facilities							
Facility	**Camp Ground Regulations**		**Pine Beach**		**Promenade**		**Shortfall**
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	
Showers	6 per 220 then 1 per additional 50	6 per 220 then 1 per additional 50	4	4	Nil	Nil	3 – Male, 3 – Female, Pine Beach 2 – Male, 2 – Female, Promenade
Wash Hand Basins	6 per 250 then 1 per additional 50	6 per 250 then 1 per additional 50	5	5	3		1 – Male, 1 – Female Pine Beach
Toilets	5 per 100 then 1 per 40 additional	3 per 100 then 1 per 40 additional	7	5	5		2 – Male, 2 – Female Pine Beach 2 additional pans Promenade
Camp Plan	See note below[1]		Do not have		Do not have		
Laundry	2 tubs and 1 washing machine for every 200 persons		Do not have		Do not have		6 tubs and 3 washing machines needed either across both sites or located at one

Note 1. For a camp plan every camp ground shall prepare and maintain a camp plan showing:

- The position and boundaries of camp ground, camp sites and site numbers. Position of buildings, roads, paths, toilets, sewage tanks, ablution places etcetera. This must be made available on request at reasonable times for examination by an inspector.

Staff will look to undertake a camp plan this financial year to remedy this exemption.

To move away from the need for continual exemptions under the regulations, work will be needed to upgrade the current facilities at the Domain.

Analysis on the camper numbers for the 2017/2018 financial year show:

Camper Numbers 2017/2018			
July	53	Jan	13,884
Aug	27	Feb	5,331
Sept	63	Mar	4,066
Oct	74	Apr	1,544
Nov	689	May	108
Dec	6,626	June	72
Total for year			32,539

Toilet facilities at the Domain also need to consider the needs of day visitors.

5.2 Options/Ngā kōwhiringa

The options, once fully scoped, would be to:

i. upgrade the Domain facilities to ensure compliance with the Camping-Grounds Regulations 1985 'Schedule Standards for camping grounds'; or

ii. reduce camper numbers; or

iii. formally resolve to continue to operate the camp ground as a remote campsite under s14(3) of the Camping-Grounds Regulations 1985.

Upgrades – ***Attachment B*** is the works programme that was adopted as part of the Long Term Plan process. This programme will alleviate some of the current shortfall through investment in improved infrastructure at the Domain and will work towards upgrading Domain facilities but is unlikely to cover all the work required. This means that capital projects may need to be re-prioritised in order to complete all the necessary work required to ensure compliance with the Camping-Grounds Regulations 1985 'Schedule Standards for camping grounds'.

Reduce numbers – another option is to look to reduce camper numbers to reduce the extent of upgrading facilities. It would be suggested that if this was the decision undertaken, that camp numbers be reduced in stages to allow public to adjust. Camper numbers and a visitor count that was undertaken in Easter 2018 is provided below for the Committee's information:

Easter 2018 Analysis (4 days)	
People	5,134
Max camper numbers	2,400
Day visitors	2,734

Easter 2018 Visitor Count		
Visitors	Amount	%
Vehicles	1,743	24.8
People	5,134	72.9
Jet Skis	34	0.5
Boats	69	1
Campervans	48	0.7
Caravans	10	0.1
Total	7,038	100

The survey undertaken at Easter 2018 shows that day visitors can exceed the number of campers at the Domain at times. Reducing camper numbers does not necessarily guarantee that these issues would be alleviated, rather, the nature of the issues will change. Reducing campers would not reduce day visitors but will reduce income.

Continue to operate the camp ground as a remote camp site under s14(3) of the Camping-Grounds Regulations 1985 – this option would allow the status quo to continue. A recommended level of service would be included in this option to clarify what facilities are to be provided to campers.

5.3 Financial implications/Ngā ahumoni hīraunga

More work is needed to analyse the full financial impact between the cost of work needed to eliminate exemptions and what has been provided for through the LTP process. Once this has been undertaken, a further report will be brought back to the Committee.

Staff have also considered that once the financial analysis has been completed that Council should make an application to the Tourism Infrastructure Fund to offset impact to rates.

5.4 Policy and planning implications/Kaupapa here me hoahoa hīraunga

The Taharoa Domain Management Plan states that the intention of the Committee is "to implement actions within the Reserve Management Plan (RMP) that 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. Seeking a way to resolve the issues reinforces the intention of the Committee's commitment to the RMP.

5.5 Risks and mitigations/Ngā tūraru me ngā whakatika

Once the financial analysis has been completed, options will be presented to the Committee to confirm the preferred option. There is no immediate risk as current practice has been maintained for 30 years to date under exemption.

6 Significance and engagement/Hirahira me ngā whakapāpā

This report does not trigger the Council's Significance and Engagement Policy as an information item.

7 Next steps/E whaiake nei

Undertaken further financial analysis and cost of investment with a further report to be brought back to the Committee.

8 Attachments/Ngā tapiritanga

Number	Title
A	Camping-Grounds Regulations 1985 Schedule Standards for camping grounds
B	Taharoa Domain Long Term Plan works programme

Hamish Watson

31 January 2019

Schedule

r 9(1)(a)

Standards for camping grounds

Part 1
Buildings

The buildings shall be maintained in good repair.

Schedule Part 1: amended, on 19 January 1994, by regulation 4(1) of the Camping-Grounds Regulations 1985, Amendment No 1 (SR 1993/403).

Part 2
Water supply

1 There shall be an adequate supply of wholesome and potable water provided to the satisfaction of the local authority.

2 There shall be an adequate supply of hot water, provided to the satisfaction of the local authority, to ablution, kitchen, and laundry facilities.

3 Water shall be reticulated throughout the camping ground to taps, which shall be located not more than 25 metres from any camp site.

4 Water shall be reticulated to every relocatable home site.

Part 3
Ablution and sanitary fixtures

1 Ablution and sanitary fixtures shall be provided in accordance with the following table:

Table
Numbers of sanitary fixtures

Nature of fixture	Number of fixtures	Maximum number of persons to be served	
		Male	*Female*
Water closet pans	1	25	12
	2	50	25
	3	100	50

Part 3—*continued*

Nature of fixture	Number of fixtures	Maximum number of persons to be served
	4	75
	5	100

An additional fixture shall be provided for each 40 persons of either sex, or part thereof.

Urinals	1	For each 50 males or part thereof

Note: Every 600 mm length of continuous wall urinal shall be the equivalent of 1 urinal stall.

		Male	*Female*
Wash-hand basins	1	25	25
	2	50	50
	3	100	100
	4	150	150
	5	200	200
	6	250	250

An additional wash-hand basin shall be provided for each additional 50 persons of either sex, or part thereof.

		Male	*Female*
Showers	1	25	25
	2	60	60
	3	100	100
	4	140	140
	5	180	180
	6	220	220

An additional shower shall be provided for each additional 50 persons of either sex, or part thereof.

2 It shall be assumed that the persons to be served by the sanitary fixtures consist of equal numbers of either sex, unless the purposes for which the premises are generally used or other special circumstances otherwise require.

Part 3—*continued*

3 In calculating the occupancy of a camping ground or relocatable home park, no site shall be deemed to accommodate less than 3.5 people.

4 Ablution and sanitary fixtures shall be readily accessible, and shall be located not more than 75 metres from any camp site or relocatable home site that they are required to serve.

5 Surfaces of internal walls of buildings containing sanitary fixtures shall be constructed of materials that are durable and capable of being readily cleaned.

6 Sanitary fixtures, in temporary living places or relocatable homes, for the exclusive use of occupants shall not be counted for the purpose of this schedule.

7 Every room or compartment containing a bath, shower, urinal, or water-closet pan shall be so constructed and situated as to ensure the privacy of the user.

Part 4
Refuse disposal

1 Refuse containers shall be provided not more than 50 metres from every camp site.

2 Refuse containers shall be of either a single-use disposable type, or constructed of metal or other materials that are durable and capable of being readily cleaned, and shall have close-fitting lids.

Part 5
Cooking places

1 Cooking places of a type, number, and location shall be provided to the satisfaction of the local authority.

2 Each cooking place shall be provided with adequate hot water, sinks, benches, and cooking facilities.

3 Surfaces of internal walls of kitchens shall be constructed of materials that are durable and capable of being readily cleaned.

Part 6
Laundry facilities

Clothes washing and drying facilities for the use of campers shall be provided so that the number of fittings is not less than 2 laundry tubs and 1 washing machine for every 200 persons, or part thereof.

Part 7
Drainage

A drainage system for the removal and disposal of foul water, waste water, and storm water shall be provided in accordance with the building code set out in Schedule 1 of the Building Regulations 1992, or to the satisfaction of the local authority, as may be required.

Schedule Part 7: amended, on 19 January 1985, by regulation 4(2) of the Camping-Grounds Regulations 1985, Amendment No 1 (SR 1993/403).

P G Millen,
Clerk of the Executive Council.

Issued under the authority of the Acts and Regulations Publication Act 1989.
Date of notification in *Gazette*: 10 October 1985.

Contents

1 General
2 Status of reprints
3 How reprints are prepared
4 Changes made under section 17C of the Acts and Regulations Publication Act 1989
5 List of amendments incorporated in this reprint (most recent first)

Notes

1 General

This is a reprint of the Camping-Grounds Regulations 1985. The reprint incorporates all the amendments to the regulations as at 1 November 2009, as specified in the list of amendments at the end of these notes.

Relevant provisions of any amending enactments that contain transitional, savings, or application provisions that cannot be compiled in the reprint are also included, after the principal enactment, in chronological order. For more information, *see* http://www.pco.parliament.govt.nz/reprints/.

2 Status of reprints

Under section 16D of the Acts and Regulations Publication Act 1989, reprints are presumed to correctly state, as at the date of the reprint, the law enacted by the principal enactment and by the amendments to that enactment. This presumption applies even though editorial changes authorised by section 17C of the Acts and Regulations Publication Act 1989 have been made in the reprint.

This presumption may be rebutted by producing the official volumes of statutes or statutory regulations in which the principal enactment and its amendments are contained.

3 How reprints are prepared

A number of editorial conventions are followed in the preparation of reprints. For example, the enacting words are not included in Acts, and provisions that are repealed or revoked

are omitted. For a detailed list of the editorial conventions, *see* http://www.pco.parliament.govt.nz/editorial-conventions/ or Part 8 of the *Tables of New Zealand Acts and Ordinances and Statutory Regulations and Deemed Regulations in Force.*

4 Changes made under section 17C of the Acts and Regulations Publication Act 1989

Section 17C of the Acts and Regulations Publication Act 1989 authorises the making of editorial changes in a reprint as set out in sections 17D and 17E of that Act so that, to the extent permitted, the format and style of the reprinted enactment is consistent with current legislative drafting practice. Changes that would alter the effect of the legislation are not permitted.

A new format of legislation was introduced on 1 January 2000. Changes to legislative drafting style have also been made since 1997, and are ongoing. To the extent permitted by section 17C of the Acts and Regulations Publication Act 1989, all legislation reprinted after 1 January 2000 is in the new format for legislation and reflects current drafting practice at the time of the reprint.

In outline, the editorial changes made in reprints under the authority of section 17C of the Acts and Regulations Publication Act 1989 are set out below, and they have been applied, where relevant, in the preparation of this reprint:

- omission of unnecessary referential words (such as "of this section" and "of this Act")
- typeface and type size (Times Roman, generally in 11.5 point)
- layout of provisions, including:
  - indentation
  - position of section headings (eg, the number and heading now appear above the section)
- format of definitions (eg, the defined term now appears in bold type, without quotation marks)
- format of dates (eg, a date formerly expressed as "the 1st day of January 1999" is now expressed as "1 January 1999")

- position of the date of assent (it now appears on the front page of each Act)
- punctuation (eg, colons are not used after definitions)
- Parts numbered with roman numerals are replaced with arabic numerals, and all cross-references are changed accordingly
- case and appearance of letters and words, including:
  - format of headings (eg, headings where each word formerly appeared with an initial capital letter followed by small capital letters are amended so that the heading appears in bold, with only the first word (and any proper nouns) appearing with an initial capital letter)
  - small capital letters in section and subsection references are now capital letters
- schedules are renumbered (eg, Schedule 1 replaces First Schedule), and all cross-references are changed accordingly
- running heads (the information that appears at the top of each page)
- format of two-column schedules of consequential amendments, and schedules of repeals (eg, they are rearranged into alphabetical order, rather than chronological).

5 *List of amendments incorporated in this reprint (most recent first)*

District Courts Rules 2009 (SR 2009/257): rule 17.1

Camping-Grounds Regulations 1985, Amendment No 1 (SR 1993/403)

Wellington, New Zealand:
Published under the authority of the New Zealand Government—2011

YR	0	1	2	3	4	5	6	7	8	9	10	
Projects	**2017/2018**	**2018/2019**	**2019/2020**	**2020/2021**	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**	**2025/2026**	**2026/2027**	**2027/2028**	
Manager's office/reception and limited accommodation	$ 50,000											
Tracks per annum	$ 50,000	$ 60,000	$ 60,000									
Tractor	$ 50,000											
Day Visitor toilets - Lake Waikare	$ 40,000											
Upgrade boat launching facilities at Marina Bay	$ 30,000											
Bollards to protect new plantings	$ 20,000											
Improved signage to inform day visitors/interpretation	$ 20,000		$ 10,000	$ 10,000	$ 10,000		$ 10,000					
Restoration Plants	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	
Install UV water treatment system (Pine Beach, Prom, Lake Waikare	$ 15,000											
Development of a biosecurity inspection area at Marina Bay	$ 15,000											
Investigate and obtain boat ramp consents	$ 10,000											
Campervan dump sites	$ 10,000											
New signage SH12/Omamari, north Dargaville and Brynderwyns	$ 10,000	$ 5,000	$ 5,000									
Day Visitor toilets - Pine Beach north old changing rooms		$ 35,000										
Day Visitor toilets - Sandy Bay (Dry Vault)					$ 60,000							
Day Visitor toilets - Marina Bay (Dry Vault)		$ 60,000										
Day Visitor toilets - Pine Beach/Lake Kai Iwi (Dry Vault)					$ 60,000							
Pedestrian boardwalk access Promenade Point					$ 20,000	$ 20,000						
Lookouts on ridges					$ 10,000	$ 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					
Business Plan, Resource & Building Consent Rangers house		$ 10,000										
Power upgrade		$ 10,000										
Ranger's house to provide 24 hour staff presence			$ 150,000	$ 150,000								
Storage shed and area adjacent to Ranger's house		$ 80,000										
Interpretation Shelter/ Interpretation panels					$ 20,000	$ 20,000						
Nursery to grow restoration plants						$ 20,000						
Extend powered sites		$ 20,000			$ 20,000							
Mountain Bike trails (5km trails)				$ 70,000		$ 50,000						
Business Plan accomadation												
Development of Visitor accomadation (cabins)						$ 100,000						
Future Domain projects					$ 10,000		$ 40,000	$ 70,000	$ 70,000	$ 70,000	$ 70,000	
Total Expenditure	**$ 340,000**	**$ 300,000**	**$ 245,000**	**$ 250,000**	**$ 250,000**	**$ 250,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	
LTP 2018-2028												
Taharoa Domain	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	
Kai Iwi Camp Ground	$ 150,000	$ 200,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ -	$ -	$ -	$ -		
Lake Waikare - toilets	$ 40,000											
Tractor	$ 50,000											
Total	**$ 340,000**	**$ 300,000**	**$ 250,000**	**$ 250,000**	**$ 250,000**	**$ 250,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	$ 1,800,000
LTP 2015-2025												
Kai Iwi facilities		$ 150,000	$ 180,000	$ 200,000	$ 150,000	$ 150,000	$ 150,000					
Taharoa Domain		$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	
Total		**$ 250,000**	**$ 280,000**	**$ 300,000**	**$ 250,000**	**$ 250,000**	**$ 250,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	**$ 100,000**	$ 1,980,000

Kai Iwi Lakes Dune Lakes Galaxias Working Group update

Meeting: **Taharoa Domain Governance Committee**
Date of meeting: **12 February 2019**
Reporting officer: **Mark Schreurs, Policy Analyst**

1 Purpose/Ngā whāinga

To update the Taharoa Doman Governance Committee (the Committee) on the work of the Kai Iwi Lakes Dune Lakes Galaxias Working Group (the Working Group) and its members.

2 Recommendation/Ngā tūtohunga

That the Taharoa Doman Governance Committee notes the 'Kai Iwi Lakes Dune Lakes Galaxias Working Group update' report giving an update on the work of the Kai Iwi Lakes Dune Lakes Galaxias Working Group and its members.

3 Executive summary/Whakarāpopototanga

The Kai Iwi Lakes Dune Lakes Galaxias Working Group (the Working Group) last met on 23 November 2018. The meeting notes from that meeting are presented with this report as **Attachment 1**. This report provides a general update on recent progress the Working Group has made.

In summary, matters discussed at the 23 November 2018 meeting included:

- Methods for monitoring the abundance of the Dune Lakes Galaxias (DLG);
- Progress on a study involving measuring the otoliths (a bony structure in the ear/gill of the fish) to better understand the lifecycle and population structure of the DLG;
- The need to prepare an annual report on the findings of the Working Group;
- The possibility of translocating Dune Lakes Galaxias to another lake;
- The possibility of releasing trout into Lake Kai Iwi or removing trout from Lake Waikare as an experiment;
- Progress on the Research Protocol; and
- Possibility of releasing tuna (eels) into the Kai Iwi Lakes.

The Working Group's next meeting will be held in late February 2019.

4 Context/Horopaki

The Dune Lakes Galaxias (Galaxias sp.) (hereafter referred to as the DLG) 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 group are making a co-ordinated effort to better understand the DLG, its ecology, interactions with other species and what management actions will be successful in promoting its survival.

5 Discussion/Ngā kōrerorero

The Working Group last met on 23 November 2018 to discuss their progress and plan their next actions. The meeting notes from the 23 November 2018 meeting are included with this report as **Attachment 1**.

The following is a summary of how the Working Group's projects are progressing.

Monitoring methods

DOC is continuing to review their DLG spotlight surveying methodology. In response to the findings of this review, DOC has decided to expand their methodology to include additional monitoring sites. This is anticipated to provide more robust results. DOC is also having its spotlight data statistically analysed to see if any patterns can be identified, particularly any correlations to environmental variables such weather and phase of the moon.

Otolith study and supporting larval fish monitoring

The Working Group (particularly NorthTec, NRC and Fish and Game) now have all the approvals needed to progress the otolith study and supporting larval fish monitoring. An Envirolink grant to the value of ~$10,000 has also been received. This study has now commenced, beginning with the collection of samples. An invitation remains open to interested parties to be involved in this research, particularly Mana Whenua who have been invited to provide a Kaitiaki presence.

Annual Report on findings

The Dune Lake Galaxias Monitoring Strategy states that the Working Group will prepare an annual report on its findings to the Committee. As the Working Group's projects are now nearing the end of their first year of implementation, it is timely that the Working Group prepares such a report. Compilation of this report is currently progressing.

Impacts of sunscreen on the lake environment

The Working Group noted that the Committee had raised the need to fully understand the impact on water quality from the use of sunscreen. There was some discussion on this and Council staff have since done a preliminary review of the literature on this subject. Council staff consider that concerns over the effects of sunscreen on these lake ecosystems are valid and worthy of being explored further. Staff have written to NIWA and The University of Waikato about the possibility of commissioning a study or supporting a Master's thesis into this topic.

Possibility of translocating Dune Lakes Galaxias to Black Lake (the Greer Lake) or others such as Shag Lake.

The Working Group is investigating the possibility of establishing a new population of DLG in another lake to reduce the species' vulnerability to extinction (i.e. the old adage of "not having all your eggs in one basket"). Black Lake (the lake on the Greer's property) was considered an ideal location for such a translocation. However, since the Working Group's last meeting it has been revealed that the pest fish Gambusia (Gambusia affinis) is present in this lake as well as Shag Lake. The Working Group is now considering other locations as potential sites for a translocation.

Possibility of releasing trout into Lake Kai Iwi or removing trout from Lake Waikare as an experiment.

The Working Group is continuing to explore the possibility of designing an experiment that would test the two competing hypotheses over if the presence of trout in the lakes is beneficial or detrimental to the survival of the DLG, given that Gambusia are also present in the lakes. Such an experiment would however need to be supported by ample baseline data. It would also require sufficient financing.

Draft Research Protocol

KDC staff have prepared an initial draft of a research protocol which has been supplied to Te Roroa staff for their review. As the request for a research protocol has come from the Committee and particularly from Te Roroa, the Working Group acknowledged the need for Mana Whenua to work through the development of this protocol at a pace they are comfortable with. Once a draft version has been completed; the Working Group, including the representatives from Mana Whenua, will review and refine the draft before presenting it to the Committee for adoption.

Possibility of releasing tuna into the Kai Iwi Lakes

The Committee inquired about the possibility of releasing tuna (eels) into the Kai Iwi Lakes at their 15 November 2018 meeting. The Working Group discussed this possibility and what the implications might be.

It was agreed that Mana Whenua would take the lead in developing this idea. The Working Group can then assist with technical expertise.

Next meeting

The next meeting of the Kai Iwi Lakes Dune Lakes Galaxias Working Group will be hosted by Kaipara District Council and held in late February 2019 at the Lake Waikare Centre at the Kai Iwi Lakes.

6 Significance and engagement/Hirahira me ngā whakapāpā

These matters do not trigger Council's Significance and Engagement Policy.

7 Next steps/E whaiake nei

The Working Group will continue to meet as required to discuss progress on these projects, opportunities for collaboration and to reprioritise where needed. The findings of the Working Group's studies will be reported to the Committee as they become available via regular updates following each meeting of the Working Group. In addition, an annual report is being compiled to present the findings to date.

8 Attachments/Ngā tapiritanga

Number	Title
1	23 November 2018 Kai Iwi Lakes Dune Lakes Galaxias Working Group Meeting Notes

Mark Schreurs
25 January 2019

Meeting Notes

Kai Iwi Lakes Dune Lake Galaxias Working Group

Date : **Thursday 23 November 2018**
Time : 1:49pm start, concluded at 3:23pm
Venue : Northland Regional Council Office - 36 Water Street, Whangarei

Attendance

Will Trusewich	Northland Regional Council
Brooke Hartigan	Northland Regional Council
Alex Going	Northland Regional Council
Tom Drinan	Department of Conservation
Andrew Knock	Department of Conservation
Ric Parore	Te Kuihi
Mark Schreurs	Kaipara District Council
Tanya Cook	NorthTech

Apologies

Rudi Hoetjes	Northland Fish and Game Council

Opening

Mark welcomed everyone and noted that a quorum was not achieved because the Terms of Reference state that all partners need to be represented to qualify as a quorum. However, as the Working Group was not meeting to make any key decisions, it was considered acceptable to proceed with discussing progress on the Group's projects.

Ric opened the meeting with a karakia at 1:49pm.

Monitoring methods

An action of the 21 June 2018 meeting was for the Department of Conservation (DOC) to review their spotlight surveying of Dune Lake Galaxias (DLG). Andrew and Tom reported on how the review had progressed.

The current methodology involves surveying each site twice on the same night in order to reduce variability between passes. An analysis of the data recorded on the first pass compared to the second pass revealed little variability. This suggested that one pass was sufficient. Because of this, DOC will amend their methodology to only include one pass of the current sites (all of which are non-vegetated shallow sandy sites) and introduce a new pass of a vegetated site near each of the existing sites. This is anticipated to provide more robust results.

DOC will be installing waratahs to more clearly mark the new and existing monitoring sites.

However, to a large extent spotlight monitoring remains uncertain in terms of its accuracy, especially without another effective method to correlate to. What it is able to tell us is that the DLG continue to be present in the lakes and are consistently more abundant in Lake Waikare than in Lake Taharoa. DOC is continuing to review the methodology and consider how it can be improved.

The Working Group suggested adding a site or two in the sheltered part of Lake Taharoa beyond Promenade Point. It was noted that all current surveying sites in Lake Taharoa are located in the same part of the lake.

Monitoring frequency has increased from what was done historically.

There was some discussion on the possibility of using environmental DNA (eDNA) to monitor the abundance of DLG in the lakes. DOC and the Northland Regional Council (NRC) have worked with the Cawthron Institute to explore this possibility in the past. They found it is still an emerging technology, capable of showing presence or absence of a species but not abundance. It was agreed that Mark would write to one of his contacts to ask if the technology had progressed to being able to assess species abundance. NorthTec offered to provide samples of DNA from the DLG they are catching for the otolith research they are undertaking.

Action: Mark to write to Dr Hester Roberts from Manaaki Whenua Land Care Research regarding the use of eDNA for monitoring of species abundance.

Tom mentioned that work is also continuing on using genetic techniques to identify if the DLG is a distinct species or merely a morphologically different land locked population of Inanga (*Galaxias maculatus*). It could be that the DLG has not been isolated long enough for speciation to occur. It could even be that its morphological differences are the result of water chemistry and diet rather than unique genetics.

Action: Tom is to enquire how this research is progressing and report back to the Working Group.

Another action of the 21 June 2018 meeting was for DOC to have its spotlight monitoring data set reanalysed by an external statistical expert. This reanalysis would include exploring possible correlations between DLG abundance, as measured by the spotlighting, and environmental variables such as weather and the phase of the moon. To date, DOC has succeeded in gaining permission to proceed with this work, however it has yet to commence.

Action: Tom is to write to The University of Auckland (who will be providing this reanalysis) regarding this work.

Otolith study and supporting larval fish monitoring

The Working Group (particularly NorthTec, NRC and Fish and Game) have succeeded in acquiring all the approvals needed to progress with this study. They have also received an Envirolink grant to the value of ~$10,000 with which to fund this project.

The first expedition to collect a sample of DLG is scheduled for Wednesday 28 November 2018 through to Friday 30 November 2018. NorthTec will be assisted in this undertaking by DOC staff and by Fish and Game who will provide a boat and larval fish net to assist with collecting samples from the pelagic zone (open water environment) of the lake. The research partners stated they would welcome anyone

interested to join them in this expedition to collect samples. In particular, Mana Whenua have been invited to provide a Kaitiaki presence.

Eimear Egaa (an expert in studying otoliths) will be coming to Whangarei to training those staff and students who will be involved in the DLG otolith study. This training is open to any members of the Working Group (e.g. staff from any of the partnering organisations/Iwi) who would like to attend. The training will involve practicing on Inanga before progressing to DLG. This training is expected to be run over a week, though interested persons are welcome to attend just one or a few days as their schedules allow. Those interested to should contact Tanya Cook from NorthTec.

Action: Tanya will e-mail the Working Group with details for this training session.

It was asked what weather monitoring equipment was in place for the Kai Iwi Lakes, particularly wind speed monitoring, as this was an important variable to record when collecting fish samples. Officially, the nearest is Dargaville however Andrew is aware of one at Trounson Kauri Park.

Action: Andrew will follow up on what weather monitoring equipment is available at Trounson Kauri Park.

Action: NRC will follow up on what weather and water quality data they can provide, including if they have a continuous monitoring instrument in the lakes.

Annual Report on findings

Mark explained that the Dune Lake Galaxias Monitoring Strategy states that the Working Group will prepare an annual report on its findings to the Taharoa Domain Governance Committee. As the Working Group's projects are now nearing the end of their first year of implementation, it is timely that the Working Group prepare such a report.

Mark asked that the various project partners e-mail him a summary of their work and findings over the past year (possibly just a few paragraphs explaining their projects and progress to date). He would then compile this into an annual report.

Once compiled, the draft report will be e-mailed to all members for their comment. Mark will then amend and finalise the report before presenting it to the Taharoa Domain Governance Committee and circulating it to all members of the Working Group.

It was noted that the Taharoa Domain Governance Committee had raised the need to fully understand the impact on water quality from the use of sunscreen at their last meeting. There was some discussion on this and also on the amount of rubbish (chiefly cigarette butts) found in trout stomachs.

It was suggested that the "Lakes 380 Study" being undertaken by the Cawthron Institute should also be mentioned in the report. This programme, jointly led by GNS Science and Cawthron Institute, aims to obtain a historical health overview for 10% of New Zealand's lakes (380 lakes). A combination of traditional environmental reconstruction techniques and more recent methods (such as eDNA and high resolution core scanning) will be used to collect data that will allow current lake health to be characterised, and rates and causes of change over the last 1,000 years explored.

Action: Mark is to coordinate compilation of this report, beginning with letting the other members of the Working Group know when they need to get their input to him by and the overall timeframes for preparing this report.

Action: All partner organisations are to prepare a few paragraphs on their projects relating to Protecting the DLG and are to e-mail these, with their findings (data), to Mark.

Possibility of translocating Dune Lakes Galaxias to the Greer Lake or others such as Shag Lake.

NIWA has sent divers to both the Greer Lake and Shag Lake to assess the submerged vegetation. DOC is going to survey these lakes in 2019 to determine what fish species are present there. The Greer Lake, Black Lake and Shag Lake will all have pest fish surveys done in 2019.

Regrettably, Gambusia (*Gambusia affinis*) are already known to be present in Shag Lake and in the drain between the Greer Lake and Lake Waikare. The Working Group considered action should be taken urgently to prevent the spread of Gambusia into the Greer Lake via the drain.

Action: NRC to work with the other partners to prevent Gambusia from entering the Greer Lake. This may involve building some kind of structure across the drain to prevent fish passage (Gambusia cannot climb structures the way native fish can).

Following these assessments of what fish and plant species are present in these lakes, the next step will be to assess water chemistry to see if it is suitable for the DLG.

It was suggested that Lake Wainui would be another good lake to explore as a potential translocation site. Currently, the lake has no fish in it and its water quality is improving.

There is also a need to resurvey Lake Te Riu, the previous translocation site, to see if the translocated population really did fail to survive. Another spotlight search was suggested. Another option would be to use eDNA to test for the presence or absence of DLG in this lake. eDNA might also be useful for identifying if any pest fish are present in a lake.

Action: Mark to enquire about the use of eDNA as per the above.

Action: DOC to undertake a spotlight search of Lake Te Riu to see if any DLG have survived there.

It was noted that studies on the dwarf Inanga (which is closely related to DLG) reveal the species is fairly hardy in terms of water quality. The availability of spawning habitat is more likely to be the limiting factor in any translocation.

Possibility of releasing trout into Lake Kai Iwi or removing trout from Lake Waikare as an experiment.

An action of the 21 June 2018 meeting was for the Northland Fish and Game Council (Fish and Game) to work with the other partners to design an experiment that would test the two competing hypotheses over if the presence of trout in the lakes was beneficial or detrimental to the survival of the DLG, given

that Gambusia are also present in the lakes. Due to the absence of Fish and Game from this meeting, there was limited discussion on this item.

The Working Group was of the consensus that the existing balance between trout, Gambusia and DLG in Lake Waikare should not be altered until another population of DLG has been successfully established in a third lake. However the Working Group considered there was no harm releasing trout into Lake Kai Iwi and monitoring the effects on the Gambusia present in that lake. However, for such an experiment to show conclusive results, it would need to be supported by ample base line data. NorthTec has been active in gathering baseline data on the distribution of Gambusia in this lake, including what habitats they utilise. However, they noted that they do not have sufficient baseline date to support an experiment like the one envisaged. They currently have no plans to do any further studies on the Gambusia population in Lake Kai Iwi.

There was some discussion over how such an experiment could be funded.

It was noted that a nation-wide study on effects of trout on freshwater food webs was currently being undertaken by Adam Canning from Fish and Game. The Group considered it would be beneficial if the Kai Iwi Lakes were to some extent included in this study.

Action: Tanya to circulate information on this study to the Working Group.

Draft Research Protocol

Mark reiterated that the request for a research protocol had come from the Taharoa Domain Governance Committee and particularly from Te Roroa. Therefore, he was happy for this project to progress at the pace that Mana Whenua are comfortable with. To date, a draft Research Protocol has been prepared by Kaipara District Council staff and is currently being reviewed by staff at Te Roroa. While Te Roroa were not present at the meeting, Mark stated he had received correspondence from Te Roroa staff stating they would like to work through the preparation of a draft in detail so as to ensure it meets their needs and is workable for all parties.

The Working Group will be available to assist in the preparation of the Research Protocol when Te Roroa is ready to discuss a proposed draft.

The partners of the Working Group noted that it would be good to have clarity on the process for seeking approval from, and working with Mana Whenua when planning and undertaking research.

Whether a Research Protocol was in place or not, the Group noted that good working relationships with Mana Whenua remained key.

Action: Mark will continue to work with Taoho to prepare a refined draft. This will then be circulated to the Working Group for comment before being discussed at a meeting. It can later be presented to the Taharoa Domain Governance Committee for adoption.

Possibility of releasing tuna into the Kai Iwi Lakes

At their 15 November 2018 meeting, the Taharoa Domain Governance Committee inquired about the possibility of releasing tuna (eels) into the lakes. This followed an offer from Fish and Game to assist Mana Whenua with such a project.

The working group discussed this project. Key discussion points included:

- Were tuna naturally found in the Kai Iwi Lakes?
    - The Group considered that while no streams flow directly from the lakes to the coast, passage for tuna would once have been possible via a collection of wetlands which would once have existed between the lakes and the coast. Ric tabled some information from the Te Roroa Waitangi Tribunal Claim 1990 4th Amended Statement of Claim. This gave a historic account of how local Maori used to catch tuna in the Eel Drain between Lake Taharoa and Lake Kai Iwi. This account proves tuna were present in the lakes in large numbers even in historic times. Some sporadic passage of tuna might still be occurring (possibly during heavy rainfall events). This is suggested by the tuna present in the lakes being of only four distinct size classes, suggesting four distinct colonisation events.
- Tuna are a predator of DLG, as such it may not be a good idea to release more of them into those lakes.
    - There was some discussion on this but the ultimate conclusion was that we do not know. Questions over what effect tuna predation has on the DLG population are as difficult to answer as questions over trout predation. It was suggested that the existing balance between fish species should not be altered given that DLG are currently surviving and it is unknown how their population might respond if this balance were to change.
- It was asked why it is desired to release tuna into the lakes as the overall intended goal will influence how such a project is undertaken.
    - If the intention is to create a mahinga kai resource then this could perhaps better be achieved by using shortfin eels (which can tolerate very low water quality) and keeping them in ponds or drains and feeding them on offal to assist them in growing more quickly. This would produce much higher yields than raising tuna in the Kai Iwi Lakes which have low fertility and low productivity.
    - If the intention is to create opportunities for recreational or cultural fishing then a permit system similar to that used for trout fishing could be imposed to ensure that the number of tuna caught is balanced by the number being released. Fish and Game's expertise in this area would be of great value. However a project such as this would raise the same questions as for the existing trout fishery i.e. what effect does predation pressure from tuna have on the population of DLG and how many tuna can be released without placing too much pressure on the food resources in the Lakes.
    - Lastly, introduction of longfin eels could be undertaken for conservation purposes. Longfin eels are considered "at risk, declining" by DOC and are only found in New Zealand. Unlike shortfin eels, longfin eels require very clean water for their habitat. With the degradation of many of New Zealand's lowland waterways, the longfin eel's habitat has been greatly reduced. The Kai Iwi Lakes, as a large body of very clean freshwater, could therefore provide a considerable amount of habitat for this at risk species. However, in order for the tuna to complete their lifecycle, provision would need to be made to either allow the tuna's

migration to the sea (e.g. by restoring wetlands between the lakes and the sea) or to transfer larger adults to streams which allow access to the sea. In addition to these conservation goals, the population might also be able to sustain a small customary take to allow for mahinga kai.

It was noted that Te Uri o Hau is currently releasing tuna into lakes in Pouto. However there are concerns over this practice because some of these lakes are home to threatened populations of Dwarf Inanga.

The suggestion was made to apply for funding from the Wai Ora Fund to restore wetlands and streams around the Kai Iwi Lakes to recreate tuna passage. This could allow for the natural migration of tuna between the coast and the lakes.

Concerns were raised over biological security risks of allowing tuna to be stocked into the lakes. The concern is that the tuna might be caught using nets in water bodies which contain aquatic weeds. These weeds might get caught in the nets and might be introduced to the Kai Iwi Lakes when the tuna are released.

Concerns were raised over the effects of tuna predation on koura (freshwater crayfish). There are concerns that koura are declining in the lakes. Campers and locals catching koura to eat is suspected to be the cause of this. It was suggested that a rahui be put on the collection of koura in the lakes.

It was suggested that Shag Lake might be a more appropriate location to release tuna as there are no DLG present there. Shag Lake is currently being fenced, planted and restored.

The Working Group considered that any plans to stock tuna should be focussed on Shag Lake or Lake Kai Iwi where there are no DLG. It was agreed that Mana Whenua will take the lead on progressing the conversation on stocking tuna.

Action: Ric is to discuss the idea of stocking tuna/improving tuna passage with Te Roroa and Te Kuihi. Ric is to report back to the Working Group with what Mana Whenua would like to achieve from stocking tuna (e.g. to create a mahinga kai resource, to create opportunities for recreational or cultural fishing, conservation purposes or a combination of these). The Working Group can then assist with progressing development of these ideas.

Andrew was invited to close the meeting with a karakia at 3:23pm

The next meeting will be hosted by Kaipara District Council and held in late February 2019 at the Lake Waikare Centre at the Kai Iwi Lakes.

Closure

Kaipara District Council

Dargaville