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Far North Holdings Limited

PROPOSED RECLAMATION RANGITANE LOOP ROAD

For Far North Holdings Limited

Ecological Assessment

June 2021

REPORT INFORMATION AND QUALITY CONTROL

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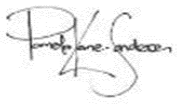
Author:	Pamela Kane-Sanderson Ecology Consultant	
Reviewer:	Dr Pete Wilson Principal Coastal Scientist	
Approved for Release:	Dr Pete Wilson Principal Coastal Scientist	

Document Name	R_8431 FNHL Proposed Reclamation Rangitane Loop Rd Ecological Assessment Report V2.0 Final 02062021.docx

Version History:	1.0 – Final Draft for client review	10 May 2021
	2.0 – Final	2 June 2021

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CONTENTS Page

List of Tables

List of Figures

List of Appendices

1 INTRODUCTION

4Sight Consulting was commissioned by Far North Holdings Limited (FNHL) to provide an ecological assessment of a proposed reclamation and development at Rangitane Loop Road, Kerikeri. The proposal includes a reclamation within the coastal marine area (CMA) and installing a new public boat ramp, pontoon and carparking facility. The proposed reclamation site is shown in Figure 1 and Figure 2 with proposed reclamation concepts in Appendix A.

The proposed reclamation area involves a number of activities for which consent is required. Specifically:

- Limited mangrove removal;
- Reclamation;
- Stormwater management; and
- New structures.

The proposal lies within the General Marine Zone under the Proposed Regional Plan for Northland August 2020 – Appeals Version (PRPN)[1].

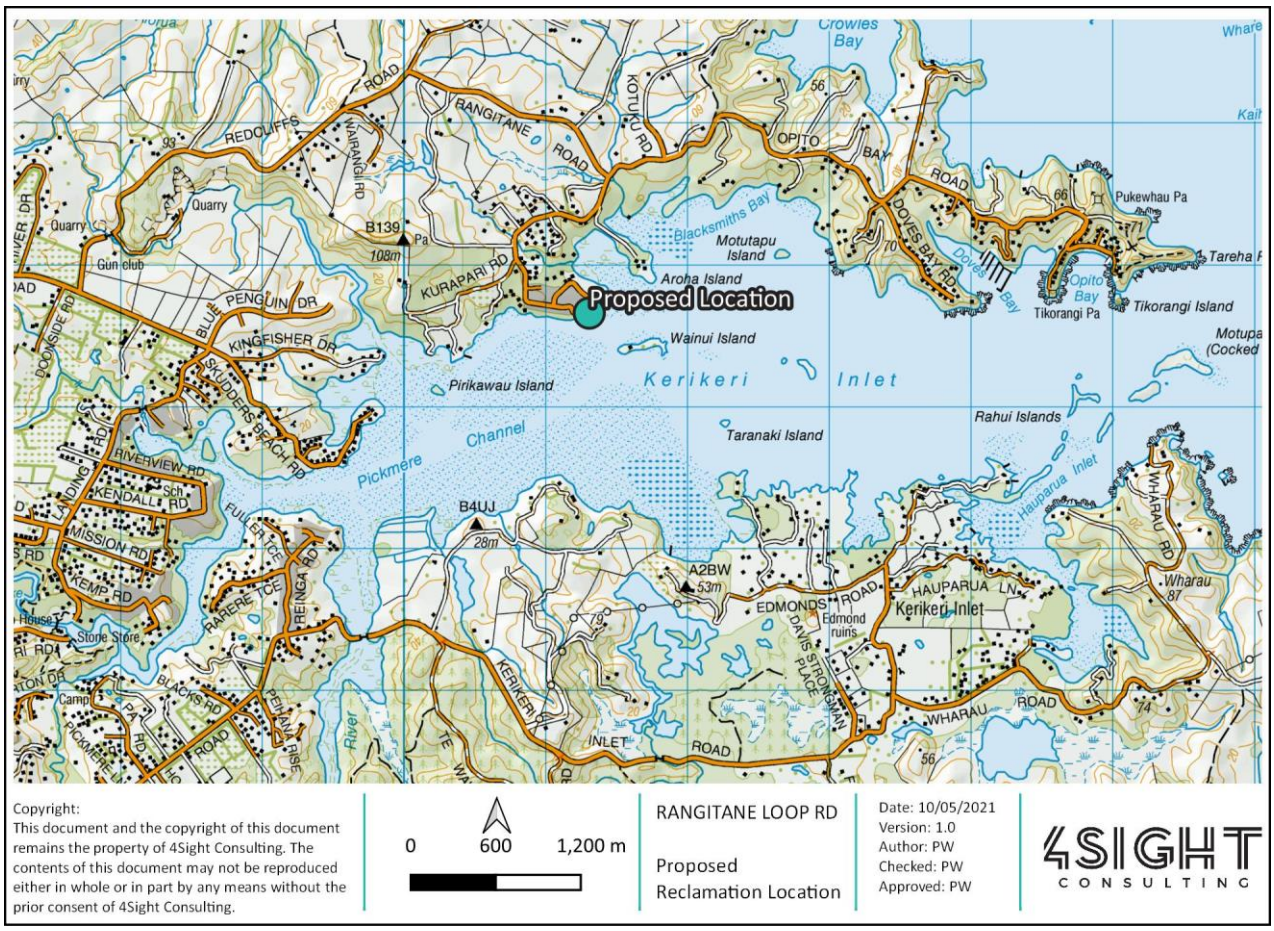


Figure 1: Location of proposed reclamation adjacent to Rangitane Loop Road, Kerikeri.

[1] Northland Regional Council (2020). Proposed Regional Plan for Northland August 2020 – Appeals Version.

Figure 2: Approximate location of proposed reclamation (teal area), adjacent to Rangitane Loop Road, Kerikeri.

1.1 Key Elements of the Proposal

The purpose of the proposed reclamation (approximately 7,400m^2) is to service:

- New two-sided 40m long boat ramp, with a two-metre-wide central boat ramp pontoon.
- Parking area for 16 trailer parks.
- Parking area for 12 car parks.
- 1.4m wide concrete footpath.

It is understood the works will be conducted as follows:

- Most of the work, drilling, pile-driving and construction of the reclamation, will be undertaken from land. Materials and cleanfill material will be brought in from land (i.e., trucked in via road) to avoid loading in via barge.
- Launching pontoon piles to be done by vibro hammer from excavator on land.
- Piling associated with establishing the pontoons, gangway and timber fender piles. No blasting will be required.
- The duration of bulk earthworks is estimated to be 3 months.

The reclamation will not service any habitable or non-habitable buildings.

2 WORK CARRIED OUT

The following work has been undertaken as part of this Ecological Assessment:

- A review of relevant databases, coastal plan information and other sources of information as relevant.
- A field survey on 8 March 2021. The field investigations included a vegetation survey of the landward areas that will potentially be impacted and a biological survey of the shoreline and intertidal areas during a period of low water. Sediments were collected from the proposed reclamation area for chemical and biological characterisation.
- Reporting on actual and potential effects and mitigation of effects.

3 EXISTING ENVIRONMENT

3.1 General

The site is located on Rangitane Loop Road in Kerikeri and faces southeast into the Kerikeri Inlet. The existing site has a tidally limited single lane boat ramp accessed directly off the road, and a timber jetty that is partially demolished.

The site drops off reasonably steeply, approximately two to three metres from the road berm down to the foreshore. Site photos are in Appendix B.

3.2 Terrestrial Vegetation

3.2.1 Method

The landward area (road berm) above the foreshore was inspected on 8 March 2021 (Photos 2 – 3). Planting is proposed in this area in addition to retaining the existing trees.

3.2.2 Results

The grassed road berm contains initially planted and evenly spaced, 6-7 metre tall pohutukawa (*Metrosideros excelsa*). Lower on the banks and protruding down to the foreshore were some scattered natives including oioi (*Apodasmia similis*), coastal five-finger (*Pseudopanax lessonii*), flax (*Phormium tenax*), and exotics including rank grasses but also pest plants[2] such as agapanthus (*Agapanthus pracox*) and giant reed (*Arundo donax*).

3.3 Intertidal Habitats

3.3.1 Method

The intertidal area was inspected at low tide on 8 March 2021 (See photos 4 – 6). The site includes a rocky area (rock retaining wall) beneath the road berm and beach of grainy muddy clay with the presence of rocks and predominantly Pacific oysters (*Crassostrea gigas*). A small rocky shoal is visible at low tide near the northern end of the site (Photo 4).

There are approximately seven shrubby three-metre-high mangroves along with pneumatophores on the lower shore and within the rock retaining wall (Photos 7 – 8). The reclamation and/or works area will potentially involve the removal of these mangroves.

Six intertidal sites were surveyed at low tide using a 0.25 m^2 (0.5 × 0.5 metre) quadrat, recording biota abundance as number or percent substrate cover as appropriate (Photos 9). To assess relative abundance of crabs, mud holes were counted in the quadrat locations. Intertidal sampling locations are shown in Figure 5, page 11.

[2] https://www.nrc.govt.nz/Environment/Weed-and-pest-control/pest-control-hub/

3.3.2 Results

The intertidal habitat is very limited and hard surfaces were often heavily silted. Pacific oysters (*Crassostrea gigas*) were the most abundant taxa observed on the rocky substrates (Table 1) and the burrows of the mudcrab (*Austrohelice crassa*) indicated this is the dominant soft shore animal along with the sea snail, black nerita (*Nerita melanotragus*). Some blue-banded periwinkles were noted at the site; however, these did not appear within our quadrat sampling. There is no significant intertidal habitat or biota such as seagrass or edible shellfish at the site.

Table 1: Summary of intertidal information. Intertidal sampling locations are shown in Figure 5, page 11.

	From south to north (1 – 6)					
Quadrat Number:	**1**	**2**	**3**	**4**	**5**	**6**
Species – Sessile (% Cover)						
Pacific oysters (*Cassostrea gigas*)	30	65	25	10	10	15
Small tufting and fibrous common algae		10		25		
Shell hash/gravel			50			5
Sediment (gravelly)	30	15	20	10	75	60
Bare rock	35	10		55	5	15
Pneumatophores	5		5		10	5
Total	**100**	**100**	**100**	**100**	**100**	**100**
Species – Mobile Invertebrates (No. individuals)						
Black nerita (*Nerita melanotragus*)	4	5	3	7	3	9
Mud crab holes	6	4	6		28	40
Marine worm (Annelid)		1				

3.4 Sediment

3.4.1 Method

Sediment was collected on 8 March 2021 (Photo 10).

Five sampling sites were chosen arbitrarily to broadly cover the reclamation area, which was advised by the client and shown in Figure 5, page 11 and Appendix A.

Sediment samples were collected using a spade and transferred to the box dredge. The coarse rocky seabed within the intertidal area made it difficult to collect the sample directly with the dredge. Samples were collected of near surface sediment down to about 10 cm. This is within the zone where most biota occur. The capacity of the dredge is 4320 cm^3, however, due to the predominantly coarse rock within the sediment that made collection more difficult, the volume of each sample collected was approximately half the dredge capacity (2160 cm^3).

Each seabed box dredge sample was sieved on site through a 0.5 mm nylon sock and the biota and debris retained were placed in a jar and fixed in ethanol. Each sample was subsequently stained with Rose Bengal dye to make the biota more visible against the backdrop of sediment and shell particles. Biota were extracted and again fixed in ethanol. These samples were identified to an appropriate taxonomic level by G Stephenson of Coastal Marine Ecology Consultants Ltd.

This sampling approach provides a semi quantitative evaluation of the type of community, diversity, and indication of general abundance of biota within the proposed reclamation footprint.

Additional sediment samples were collected at the same locations as those for biota to be assessed for chemistry and grain size.

3.4.2 Biota Results

The biota extracted from the five box dredge samples are presented in Appendix C. Many of the species are represented only by very small individuals, probably reflecting the time of year the collections were made and perhaps also giving a misleading indication of the level of species diversity in the area at times of the year when recruitment is not occurring. The left-hand column of Appendix C mostly classifies the taxa by family. The right-hand column of Appendix C provides notes on the numbers of species present and the identity of any that could be identified to a more detailed taxonomic level.

In total, 37 taxa were recorded, with individual samples ranging from 14 to 23 taxa. Marine bristle worms (polychaetes) dominated the community in terms of diversity with 14 taxa (4 to 10 species per sample), followed by crustacea (6 taxa), insecta (4 taxa), ribbon worms (nemertea) and bivalve molluscs (3 taxa each), anthozoa and gastropoda with (2 taxa each), and oligochaeta, sipunculida and turbellaria, (one taxon each).

The only species to be considered abundant (>10 animals per sample), were the introduced bivalve, the Asian date mussel (*Arcuatula senhousia*), which dominated numerically at site 1, cockles (*Austrovenus stutchburyi*), the polychaetes *Aonides trifida*, *Boccardia (Paraboccardia) syrtis,* nereididae (juveniles) and oligochaeta.

All other taxa were present in low abundance and or low occurrence. Specifically, 12 taxa had a mean density of between 1 and 10 individuals per sample and all other taxa (19 taxa) had low mean densities (≤ 1) with low and patchy abundance. It is noted that density estimates are of interest in terms of relative rather than absolute abundance because the samples are only semi quantitative.

The benthic fauna is not significant or unusual in terms of rarity, biodiversity or exotic species. The species recorded are common and dominated by sedentary and sessile filter and deposit feeders. It is noted that the sampling will underestimate the actual diversity. More samples are likely to result in the identification of a greater number of taxa.

Swales *et al*. (2012)[3] also investigated macro-benthic fauna in this general area. Their report states that inlets such as Kerikeri Inlet have areas with low sensitivity to future sediment deposition. Such that communities in these areas are dominated by mud-tolerant species including the mud crab *Austrohelice crassa*, annelids including *Nereidae* and bivalve *Theora lubrica*.

3.4.3 Sediment Quality

Samples were generally fine dark grey muddy sand with a light brown surface layer and most had organic debris and shell hash present. A typical seabed sample is shown in Photo 10.

Grain size analysis was undertaken for the five sediment samples. Seven grain size profiles were determined and shown in Figure 3 and Table 2. On average the sediment consisted of just under a third (31.2%) of the fraction <63µm, 20% of the fraction >/= 2mm and 17.8% of the fraction < 500 µm, >/= 250 µm. All other grain sizes consisted of less than 10%.

[3] Swales, A., Gibbs, M., Hewitt, J., Hailes, S., Griffiths, R., Olsen, G., Ovenden, R., Wadhwa, S., (2012). Sediment sources and accumulation rates in the Bay of Islands and implications for macro-benthic fauna, mangrove and saltmarsh habitats. Prepared for Northland Regional Council by NIWA, May 2012.

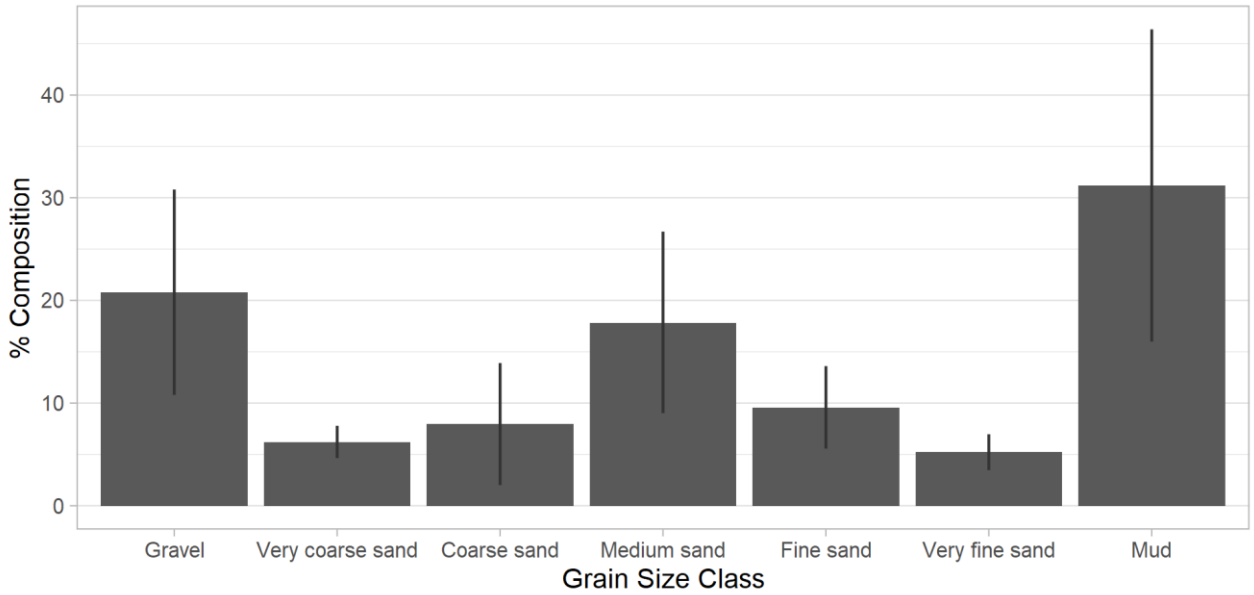


Figure 3: Summary of sediment grain size. Error bars show the 95% confidence interval of the mean (n = 5).

Table 2: Grain size analysis.

Grain Size (g/100g dry weight)	Sed Site 1	Sed Site 2	Sed Site 3	Sed Site 4	Sed Site 5	Average
Fraction >/= 2 mm	33.7	16.6	22.6	12.5	18.6	20.8
Fraction < 2 mm, >/= 1 mm	5.1	6	5.7	8.4	5.9	6.22
Fraction < 1 mm, >/= 500 µm	5.9	12.3	7.3	10.1	10.2	9.16
Fraction < 500 µm, >/= 250 µm	20.4	24.1	24.2	10.2	10.3	17.84
Fraction < 250 µm, >/= 125 µm	13.1	9.1	11.9	8.9	4.8	9.56
Fraction < 125 µm, >/= 63 µm	3.5	4.5	5.9	7.2	5	5.22
Fraction < 63 µm	18.2	27.3	22.4	42.7	45.4	31.2

Five sediment samples were collected from the locations shown in Figure 5, page 11. These were analysed for total recoverable concentrations of arsenic, cadmium, chromium, copper, lead, nickel and zinc and total organic carbon. Samples were analysed by Hill Laboratories.

The sediment quality results (Appendix D) are presented in Figure 4 and Table 4. These are compared with the NRC Coastal Sediment Quality Guidelines (PRNP), which are benthic sediment quality standards in the marine coastal area (tidal creeks/estuaries/open coast) and must not be exceeded by a discharge of a contaminant or any surface water flowing to coastal water. They are also compared with the background concentrations from Northland Regional Council's (NRC) sediment monitoring (NRC, 2016)[4] at Wainui Island (approximately 300 metres south-east off Rangitane Loop Road) and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG)[5] 2018 default guideline values (DGVs) and 'upper' guideline values (GV-high). DGVs are used to assess results against thresholds which should ensure the protection of aquatic ecosystems in relation to individual toxicants. GV-high values provide an indication of concentrations at which toxicity-related adverse effects are expected.

[4] Northland Regional Council (2016). Coastal Sediment Monitoring Programme Whangarei Harbour and Bay of Islands 2016 Results. October 2016.

[5] ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

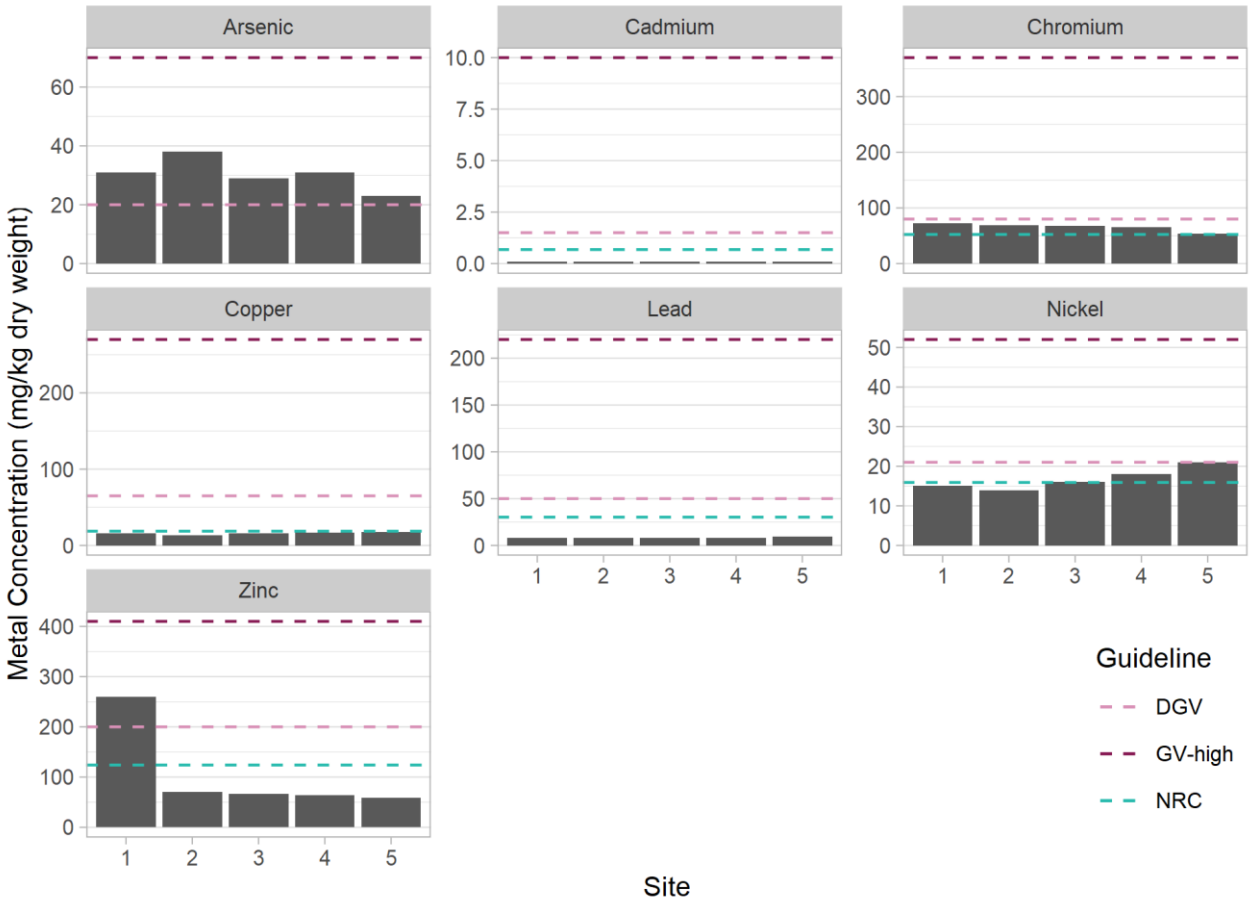


Figure 4: Summary of sediment metal concentrations and the NRC sediment quality guidelines (NRC), and ANZG (2018) default guideline value (DGV) and 'upper' guideline value (GV-high).

The sediment metal values are well within the NRC coastal sediment quality guidelines for cadmium, copper and lead, which suggests that the sediments are not polluted with these metals.

Arsenic was slightly elevated at all sediment sights such that it was slightly higher than ANZG DGV. This elevation is likely localised historical contamination and nearby geologic sources may also have contributed. Benthic species present at this location are likely tolerant of these levels of arsenic.

Cadmium results were below ANZG DGV but above the more conservative NRC coastal sediment quality guidelines and also above recent background concentrations recorded by NRC from Wainui Island.

Nickel was above the NRC coastal sediment quality guidelines at three sites but only one of these sites reached the ANZG DGV level.

Zinc was elevated above ANZG DGV level at site 1.

ANZG guidelines do not include trigger values for total organic carbon, and there are currently no nationally accepted trigger values in marine sediment. Robertson and Stevens (2007)[6] developed a classification for total organic carbon concentrations. Southland Regional Council, Tasman District Council and Northland Regional Council have used this in monitoring programmes. Guidelines from Robertson and Stevens (2007) provide a relative measure of the degree to which sediments can be considered enriched with carbon.

[6]Robertson, B., Stevens, L., (2007). Waiwaka estuary 2007 fine scale monitoring and historical sediment coring. Prepared for Environment Southland. Wriggle limited, Nelson.

Results for total organic carbon are also compared with background concentrations from NRCs sediment monitoring within the Bay of Islands (Table 3). Total organic carbon levels ranged from very good at sediment site 1 to enriched at sediment site 5. On average the site showed low to moderate enrichment, which is slightly lower than the enriched values from NRC sediment monitoring at Wainui Island.

Table 3: Summary of sediment total organic carbon compared to Robertson and Stevens (2007) guidelines.

Parameter (g/100 g)	Sed Site 1	Sed Site 2	Sed Site 3	Sed Site 4	Sed Site 5	Total Organic Carbon (g/100 g) Rating				Wainui Island (NRC)		
						Very Good	Low- Mod Enrichment	Enriched	Very Enriched	2012	2014	2016
Total Organic Carbon	0.86	1.21	1.59	1.71	2.6	< 1	1 – 2	2 – 5	> 5	4.43	4.16	3.23

Parameter (mg/kg)	Sed Site 1	Sed Site 2	Sed Site 3	Sed Site 4	Sed Site 5	NRC Coastal Sediment Quality Guidelines	ANZG (2018)		Wainui Island (NRC)			
							DGV	GV-high	2010	2012	2014	2016
Arsenic	31	38	29	31	23		20	70				
Cadmium	<0.10	<0.10	<0.10	<0.10	<0.10	0.68	1.5	10	0.05	<0.09	0.098	0.09
Chromium	73	69	68	65	54	52.3	80	370	47	42	39	48
Copper	16	13	16	17	18	18.7	65	270	15.1	15	14	12
Lead	8.1	8.4	8.2	8.2	9.4	30.2	50	220	10.3	8.3	7.2	7.9
Nickel	15	14	16	18	21	15.9	21	52	N.S.	N.S.	14	14
Zinc	260	71	66	64	59	124	200	410	59	64	59	82

Table 4: Sediment metal concentrations compared to NRC Coastal Sediment Quality Guidelines, ANZG guidelines and NRC sampling at nearby Wainui Island. N.S. = not sampled.

3.5 Birdlife

The small area of exposed sandflat at low tide offers soft shore habitats to common birdlife within or likely to feed within the vicinity. These birds include the New Zealand kingfisher (*Todiramphus sanctus vagans*), white faced heron (*Egretta novaehollandiae*), southern black-backed gull (*Larus dominicanus dominicanus*) and little shags (*Phalocrocorax melanleucos brevirostris*) which are all native and not threatened species (Robertson et al., 2017).

During the site survey two variable oystercatcher (*Haematopus unicolor*) (at risk – recovering) were feeding within the proposed site area, one pied shag (*Phalacrocorax varius varius*) (at risk – recovering) was swimming within the area, five red-billed gulls (*Larus novaehollandiae scopulinus*), a white-fronted tern (*Sterna striata striata*) (both at risk – declining) and two southern black back gulls were seen flying in the area.

No birds or signs of birds (e.g., feathers or guano) were seen roosting in the pohutukawa that fringed the site. There is extensive similar habitat available to bird species in this region of the Bay of Islands.

It is noted that the general area is classed as a 'Significant Marine Mammal and Seabird Area' within the Proposed Regional Plan, however this also applies to the entire Northland region.

Northern brown kiwi are unlikely to be present at or in the vicinity (<500 m) of the site, however, there are known populations in the wider area containing native bush. The potential effects of the development on kiwi in the surrounding area are discussed in Section 4.3.2.

3.6 Fishlife

Fish have not been specifically surveyed. However, fish are likely to use the local estuary for feeding, shelter, spawning and as a migratory route. Fish species likely to use the area at one time or another include yellow eyed mullet, grey mullet, flounders, piper, anchovy like fishes, kahawai, koheru, kingfish, snapper, trevally, parore, rays and small wrasses. These are common coastal species.

3.7 Marine Mammals

The general area is classed as a 'Significant Marine Mammal and Seabird Area' within the Proposed Regional Plan; however, this also applies to the entire Northland region. It is also within the 'Marine Mammal Sanctuary Proposal – Te Pēwhairangi (Bay of Islands)[7].

Thirty-three species of whales and dolphins have been recorded in Northland. Common marine mammals encountered in the Bay of Islands include the New Zealand fur seal, long-finned pilot whale, common dolphin, bottlenose dolphin, Bryde's whale, humpback whale and orca.[8]

The Department of Conservation states that Kerikeri Inlet is one of the designated rest areas for dolphins in the Bay of Islands, and dolphins must be avoided in these areas.

No marine mammals were seen on the day of the sight visit.

[7]https://www.doc.govt.nz/get-involved/have-your-say/all-consultations/2021-consultations/te-pewhairangi-bay-of-islands-marine-mammal-sanctuary-proposal/

[8] https://www.doc.govt.nz/parks-and-recreation/places-to-go/northland/bay-of-islands-marine-mammals/

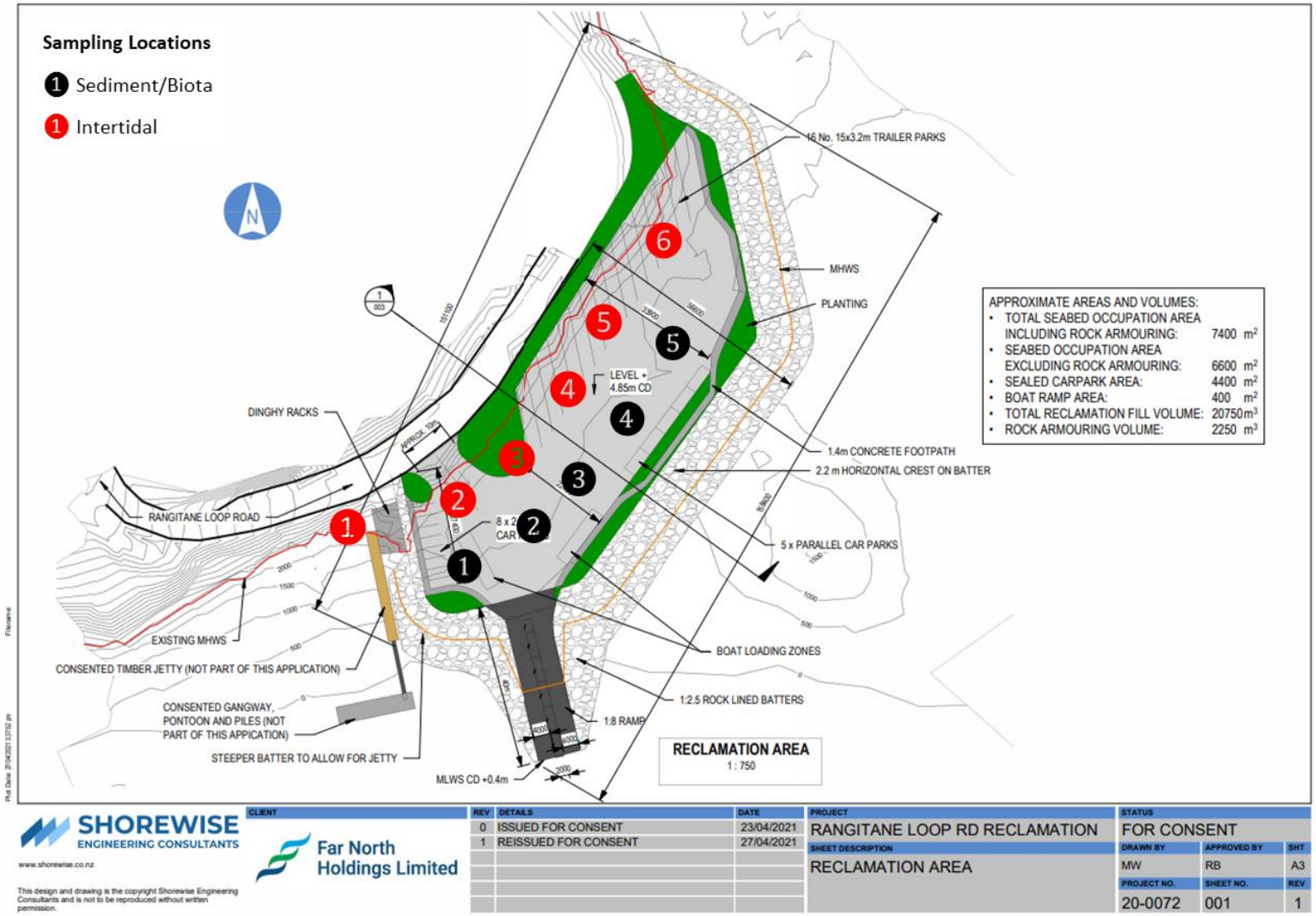


Figure 5: Sediment and biological sampling locations, overlaid on indicative plan.

4 ASSESSMENT OF ECOLOGICAL EFFECTS

The effects of the proposal are considered under the following headings:

- Effects on landward vegetated areas;
- Effects on marine invertebrates;
- Effects on avifauna
- Effects on fish life;
- Water quality effects; and
- Conclusions

4.1 Removal of Vegetation Effects

The main area of vegetation removal occurs on the grassed road berm and consists of some scattered natives including oioi, coastal five-finger and flax along with exotics including rank grasses but also pest plants such as agapanthus and giant reed. There will be no loss of botanical biodiversity or significant vegetation. This area is proposed to be planted and will potentially be enhanced by the removal of these pest species and the planting of appropriate natives.

The grassed road berm also contains some large, 6–7 m tall Pohutukawa, which will be untouched based on proposed plans.

The loss of a few mangroves is not ecologically significant relative to the extensive mangrove habitat present in the Kerikeri Estuary.

4.2 Reclamation and Construction Effects on Marine Invertebrates

4.2.1 Reclamation

The proposed reclamation will cover about 7,400m^2 of mostly intertidal and shallow subtidal habitat, but will also include some mangroves, intertidal soft shore, and seawall. As previously noted, biota which occurs within the area proposed for reclamation are not notable ecologically.

The biota that will be lost involves species which are common and therefore likely to be well represented elsewhere in estuarine areas of the Bay of Islands.

Some marine algae and invertebrates, such as oysters may develop on and aggregate around any new structures within the tidal zone, including the rock armouring on the reclamation. These species should largely reflect those found in the natural habitats nearby and can be considered a small, positive effect. The presence of the structures may also have a small positive effect on the local reef fish community, as fish diversity and abundance can be more concentrated on reef or physically complex habitats than they are on two dimensional habitats such as sand (or in this case muddy sand). On a small scale, the piling system will also introduce an element of complexity that should benefit marine life and fish life.

Overall, loss of marine biota or marine habitat within the reclamation is a low adverse effect.

4.2.2 Pontoon Construction

Direct effects on the intertidal and shallow subtidal marine area will occur from piles and construction of a pontoon, which will collectively cover a small area. The physical effect on the substrate will be small and is very low in terms of effects on habitat and biota.

Shore-based machinery needing to cross any hard-intertidal shore will not cause more than minor effects and these are not ecologically significant.

4.2.3 Pontoon Use

The potential increased use of this area by watercraft will increase the disturbance to the seabed relative to the current situation. This may have some influence on the biota in the future, but any effect is likely to be minor in terms of changed ecological value.

4.3 Effects on Avifauna

4.3.1 Shorebirds

No significant intertidal bird feeding areas will be affected. Impacts on shorebirds will be negligible.

4.3.2 Northland Brown Kiwi

General

The development of the proposed boat ramp facility is expected to increased traffic volumes on Rangitane Road and Rangitane Loop Road. It is anticipated that the proposed Rangitane Loop Road boat ramp will pull use from other ramp facilities in the surrounding area, including Opito Bay boat ramp, which is located approximately five kilometres east of the subject site. During the busiest peak hour, the boat ramp upgrades will increase the number of boats using the access by approximately 15-21 boats (TPC, 2021)[9]. Boat traffic will mainly occur during daylight, however, can occur around dusk and dawn when kiwis are known to be active, especially around roads leading into the proposed boat ramp facility.

Kiwi Road Deaths

There have been 21 recorded kiwi road deaths in the Rangitane/Doves Bay area since 2018 (Dean Wright, Landcare Group Co-ordinator), two of which have occurred in 2021. The Department of Conservation provided more in-depth figures with 39 recorded kiwi road deaths since 2008. Of these 39, five have occurred on Rangitane Loop Road, with the most recent in November 2020.

Mitigation to reduce kiwi deaths has included:

- Six roadside signs installed, four of them lit with solar powered lights at night.
- White crosses installed, where the deaths occur, with a kiwi symbol on top.
- Far North District Council put up 3 extra roadside signs in Rangitane where there has been a hot spot, 3 deaths in a year.
- Included year-to-date death toll on two of the signs.
- Approximately every 500m a kiwi symbol is stencilled on the road by the Kiwi Foundation.

Kiwi Dog Deaths

There have been two dog related deaths in Opito Bay within the last two years (Dean Wright, Landcare Group Co-ordinator). The Department of Conservation additionally stated that 17% of kiwi deaths were attributed to dogs, compared to 60% from vehicles.

Mitigation

The Northland Brown kiwi are classed as 'At Risk-Declining', and therefore effort should be made to reduce the risk to kiwi from the proposed boat ramp facility and associated increase in vehicle traffic.

The following suggestions could be implemented to reduce the potential adverse effects on local kiwi, resulting from increased traffic using the boat ramp:

1) Reduce speed limits on roads approaching the boat ramp/parking facility.

[9] Traffic Planning Consultants Ltd, 2021. Rangitane Reclamation and Boat Ramp Maritime Project Transport Assessment – Draft for Issue. For Far North Holdings Ltd, 31 May 2021.

2) Signage at the boat ramp/parking facility informing users about local kiwi populations and the associated danger from vehicles.

3) Requirement for dogs to be on a lead within the boat ramp facility.

4.4 Effects on Fish Life

Movement of estuarine fish and migratory native freshwater fish will not be impeded.

4.5 Effects on Marine Mammals

4.5.1 Construction Effects

The construction will be conducted from shore-based machinery, minimising the amount of interaction with the water. However, noise pollution from construction poses threats to our marine mammals and management measures for underwater noise effects should be followed if marine mammals enter the area.

These conditions are discussed further in a noise assessment report prepared for Far North Holdings Ltd by Marshall Day and include:

- Construction workers are trained to look for signs of marine mammals and are required to routinely observe marine mammals within 300m of the piling operation; and
- Ceasing or not commencing impact or vibration piling activities if a marine mammal or diver is observed within a 300m area.

4.5.2 Pontoon Use

As all marine mammals are fully protected, boating rules and regulations should be followed to keep marine mammals in the Bay of Islands safe.

4.6 Water Quality Effects

4.6.1 Reclamation and Pontoon Construction Effects

The reclamation and overall structure construction could take up to 7 months.

Based on the surficial sediment analyses, the sediments to be dredged have been shown to contain concentrations of most metals (cadmium, chromium, copper, lead) below the respective ANZG DGVs. On this basis, in respect to these metals, the sediments can be considered as unpolluted.

Levels slightly above ANZG DGVs were recorded for arsenic and nickel at site 5 and zinc at site 1. These exceedances are of a low magnitude relative to the DGV's. They are likely to reflect localised historical contamination rather than being characteristic of the bulk material. These sediments are also to be covered by the reclamation which will effectively reduce exposure to the marine environment.

There is a potential for the reclamation construction to generate localised turbidity in decant water discharged from the reclamation site. This may cause a visually conspicuous plume, but it should be relatively localised given the small scale and most likely intermittent nature of the operation. Experience of similar operations is that such effects from a small operation which is intermittent and interspersed with lengthy periods of no activity (due to the need to transport and load material during night-time and cessation in work for other reasons such as poor weather or equipment maintenance), should be highly localised and will dissipate rapidly.

The risk of down-current sedimentation or significant turbidity is considered to be very low taking into account the tidal flows and flushing characteristics in the area, which should quickly dissipate intermittent small sediment plumes and prevent concentration of sediment within the area over success tidal cycles.

4.6.2 Pontoon Use

Overall, there should be only minor water quality effects from the use of the pontoon. Motorised craft using the site will inevitably release some hydrocarbons but that is no different from anywhere else in the Bay of Islands. Highly productive ecologies have been documented on shorelines and seabed's elsewhere in the Bay of Islands[10], which are frequented or transited by high densities of recreational craft. There are pacific oysters on the rocks, but it is unknown if these are collected for food. Oysters are common on the intertidal shores in the vicinity. No other edible shellfish such as pipi or cockle beds on the rocky shore were discovered.

4.6.3 Reclamation Stormwater

The activities on the reclamation (car and trailer parking) are unlikely to generate more than small quantities of particulates and organic waterborne material. It is understood that stormwater will be run through a vegetative swale, which would likely be an appropriate level of treatment for the anticipated low level of contaminants.

Effects from stormwater discharges are considered to be minimal and contaminants such as oils and hydrocarbons are not expected to arise other than in minor quantities, as occurs off any paved road or parking surface in the region.

4.6.4 General Water Quality Effects

Default general water quality requirements (as per section 70(1) of the RMA) are also applicable. In particular, the reclamation discharge(s) after reasonable mixing must not give rise to any of the following effects:

- Production of conspicuous oil or grease films, scums or foams or floatable suspended material, or
- Any conspicuous change in colour or visual clarity or
- Any emission of objectionable odour.

Discharges from the car parking are not expected to raise issues of colour, clarity, odour, aesthetics or amenity or adverse effects on biota.

It is concluded that the general water quality effects will be low arising from any discharge from the completed project.

5 CONCLUSIONS

The following conclusions are drawn:

1) There will be no ecologically significant loss of botanical biodiversity or significant vegetation. The area is proposed to be planted and will potentially be enhanced by the removal of pest species and the planting of appropriate natives.
2) Based on proposed plans the large pohutukawa on the road berm will be untouched.
3) The loss of a small number of mangroves is not ecologically significant relative to the extensive mangrove habitat present in the Kerikeri Estuary.
4) The marine community within the reclamation footprint and its vicinity is dominated by common species that are well represented elsewhere in the Kerikeri Estuary. The addition of rock revetment will provide additional habitat for marine algae and invertebrates, such as oysters, to grow.
5) Effects on the benthic community from piling will be limited and not of ecological significance.
6) Overall, loss of marine biota or marine habitat within the reclamation is a low adverse effect.
7) The potential increased use of this area by watercraft will increase the disturbance to the seabed relative to the current situation. This may have some influence on the biota in the future, but any effect is likely to be very low in terms of changed ecological value.

[10] Brook, F.J. & Carlin, G. (1992). Subtidal benthic zonation sequences and fish faunas of rocky reefs in Bay of Islands. Department of Conservation, Northland Conservancy. 81 p

8) No potentially sensitive or rare ecological elements are affected by the proposal.

9) No significant intertidal bird feeding areas will be affected. Impacts on shorebirds will be negligible.

10) Reduced speed limits on roads leading to the proposed boat ramp facility, signs informing users of nearby kiwi populations and effects from speeding and dogs, along with dogs being restricted to leads would be good mitigation measures to have in place to ensure effects on kiwi from the proposed boat ramp facility remain low.

11) Movement of estuarine fish and migratory native freshwater fish will not be impeded.

12) Noise pollution from construction may pose a threat to marine mammals and management measures for underwater noise effects should be followed if marine mammals enter the area.

13) Marine water quality effects will be highly localised and short term. There may be an increase in turbidity and a small visible plume associated with the reclamation, piling and construction. Such effects will be confined to the works period.

14) Current water and sediment quality characteristics are likely to reflect, and to be maintained by, the flushing that occurs in response to tidal patterns.

15) Effects from stormwater discharges are considered to be minimal and contaminants such as oils and hydrocarbons are not expected to arise other than in minor quantities, as occurs off any paved road or parking surface in the region. Vegetative swales would further reduce the small concentrations of stormwater-derived contaminants.

Appendix A:

Proposed Reclamation Rangitane Loop Road, Boat Ramp Concepts

RECLAMATION AREA
1 : 750

APPROXIMATE AREAS AND VOLUMES:

• TOTAL SEABED OCCUPATION AREA INCLUDING ROCK ARMOURING:	7400	m^2
• SEABED OCCUPATION AREA EXCLUDING ROCK ARMOURING:	6600	m^2
• SEALED CARPARK AREA:	4400	m^2
• BOAT RAMP AREA:	400	m^2
• TOTAL RECLAMATION FILL VOLUME:	20750	m^3
• ROCK ARMOURING VOLUME:	2250	m^3

Filename:

Plot Date: 27/04/2021 3:37:52 pm

SHOREWISE ENGINEERING CONSULTANTS

www.shorewise.co.nz

CLIENT: Far North Holdings Limited

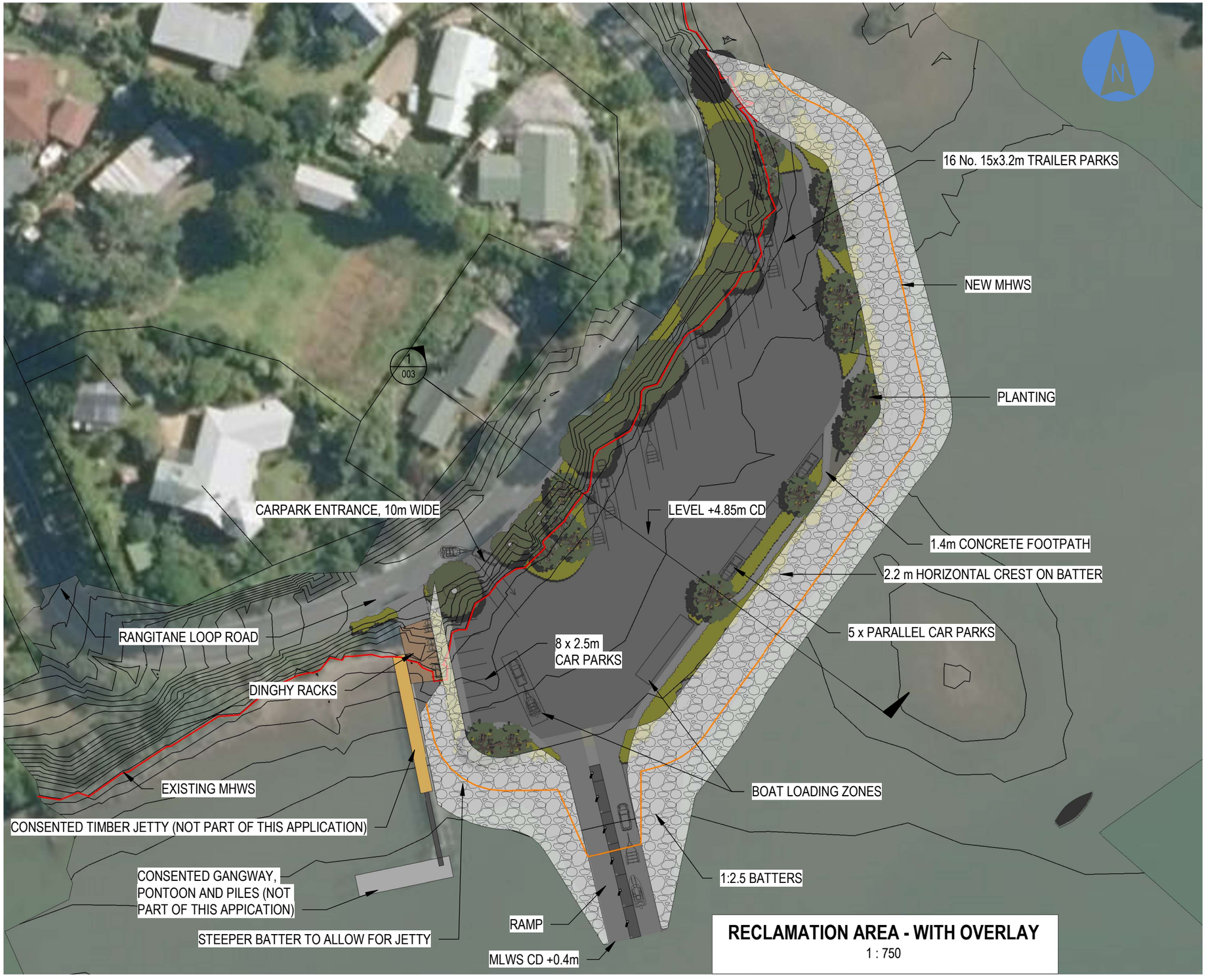
REV	DETAILS	DATE
0	ISSUED FOR CONSENT	23/04/2021
1	REISSUED FOR CONSENT	27/04/2021

PROJECT: RANGITANE LOOP RD RECLAMATION

SHEET DESCRIPTION: RECLAMATION AREA

STATUS: FOR CONSENT

DRAWN BY	APPROVED BY	SHT
MW	RB	A3
PROJECT NO.	**SHEET NO.**	**REV**
20-0072	001	1



RECLAMATION AREA - WITH OVERLAY
1 : 750

Filename:

Plot Date: 27/04/2021 3:37:53 pm

SHOREWISE ENGINEERING CONSULTANTS

www.shorewise.co.nz

CLIENT: Far North Holdings Limited

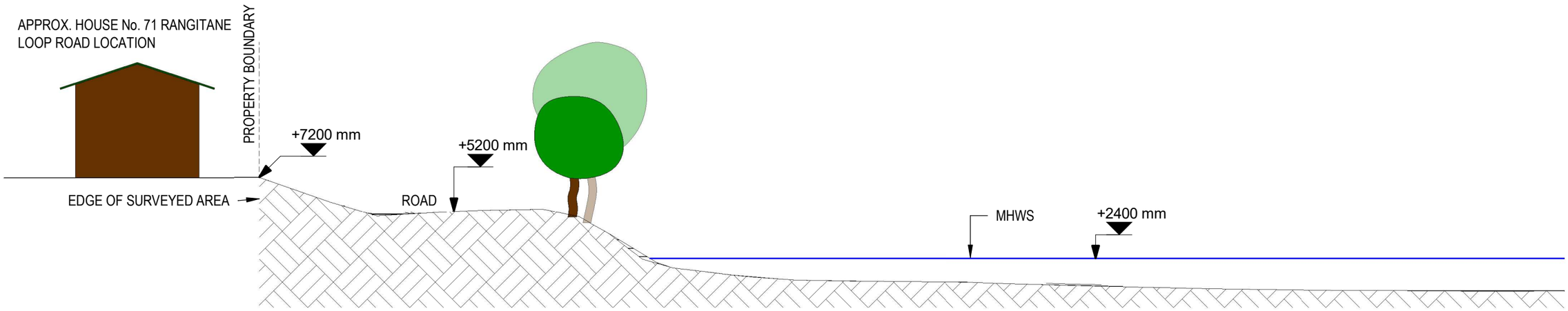
REV	DETAILS	DATE
0	ISSUED FOR CONSENT	23/04/2021
1	REISSUED FOR CONSENT	27/04/2021

PROJECT: RANGITANE LOOP RD RECLAMATION

SHEET DESCRIPTION: RECLAMATION - WITH OVERLAY

STATUS: FOR CONSENT

DRAWN BY	APPROVED BY	SHT
MW	RB	A3
PROJECT NO.	**SHEET NO.**	**REV**
20-0072	002	1



PRE-RECLAMATION SECTION

1 : 250

RECLAMATION SECTION

1 : 250

Filename:

Plot Date: 27/04/2021 3:37:54 pm

SHOREWISE ENGINEERING CONSULTANTS

www.shorewise.co.nz

CLIENT: Far North Holdings Limited

REV	DETAILS	DATE
0	ISSUED FOR CONSENT	23/04/2021
1	REISSUED FOR CONSENT	27/04/2021

PROJECT: RANGITANE LOOP RD RECLAMATION

SHEET DESCRIPTION: RECLAMATION SECTION VIEW

STATUS: FOR CONSENT

DRAWN BY	APPROVED BY	SHT
MW	RB	A3
PROJECT NO.	**SHEET NO.**	**REV**
20-0072	003	1

LEGEND

1	Dinghy racks	8	1.4m wide concrete footpath
2	Consented timber jetty (not part of this application)	9	5 parallel carparks
3	Consented gangway, pontoon and piles (not part of this application)	10	Bench seats
4	8 carparks	11	Native coastal planting spilling over rock armour and indigenous coastal trees
5	Boat tie-down bay	12	Picnic tables
6	Boat launch prep bay	13	16 trailer parks (15m long x 3.2m wide)
7	New boat ramp and pontoon		

Far North Holdings Limited

0 5 10 15 20 25 m

scale 1 : 500 @ A3

Ref: 1291_C1_20210424

SHOREWISE ENGINEERING CONSULTANTS

LITTORALIS LANDSCAPE ARCHITECTURE

DRAFT BOAT RAMP CONCEPT
RANGITANE LOOP ROAD KERIKERI

Appendix B:

Photos

Photo 1: Existing single lane boat ramp and a timber jetty that is partially demolished at end, looking southeast to Kerikeri Inlet.

Photo 2: Landward area (road berm) above the foreshore, showing Pohutukawa and mangrove on foreshore.

Photo 3: Landward area (road berm) above the foreshore.

Photo 4: Low tide area.

Photo 5: Low tide area.

Photo 6: Presence of oysters.

Photo 7: Foreshore showing mangrove, oysters and rock retaining area.

Photo 8: Foreshore showing mangrove, oysters and rock retaining area.

Photo 9: Quadrat sample 6.

Photo 10: Biota sample 1.

Appendix C:

Sediment Biota Results

Species	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Mean	Notes
ANTHOZOA							
Anthopleura aureoradiata	14					2.8	
Edwardsia sp.#1			1			0.2	
TURBELLARIA							
Turbellaria sp.#1	3					0.6	
NEMERTEA							
Nemertea sp.#1	2	1	3	1		1.4	
Nemertea sp.#2			1			0.2	
Nemertea sp.#3				1		0.2	
POLYCHAETA							
Aonides trifida	65	1	1			13.4	
Boccardia (Paraboccardia) syrtis	22	1	55	22	9	21.8	
Capitella sp.#1	8	7	8	16	3	8.4	
Dorvilleidae sp.#1		1				0.2	
Heteromastus filiformis				5		1	
Leodamas cylindrifer	36	7	4	2		9.8	
Nereididae (juveniles)	77	3	5			17	Category includes specimens of *Ceratonereis* sp.
Nicon aestuariensis				5		1	
Perinereis vallata	3					0.6	
Polydora cornuta	2	1	29	1	5	7.6	
Prionospio aucklandica	20	1	1	20		8.4	
Scolecolepides benhami	1			1		0.4	
Syllidae sp.#1	5	4	1	1	3	2.8	
Syllidae sp.#2	1					0.2	Exogoninae
OLIGOCHAETA							
Oligochaeta	19	3	29	82	14	29.4	
GASTROPODA							
Cominella adspersa?	1					0.2	One small specimen possibly belonging to this species
Onchidella nigricans					1	0.2	
BIVALVIA							
Arcuatula senhousia	600	51	14			133	
Austrovenus stutchburyi	56	25	18	12	2	22.6	
Pleuromeris zelandica?	1					0.2	One small, damaged specimen possibly belonging to this species
CRUSTACEA							
Austrohelice crassa		12	7	7	17	8.4	
Austrominius modestus	12					2.4	
Halicarcinus whitei	2		1	1		0.8	
Josephosella awa					1	0.2	
Paracorophium sp.#1			1			0.2	
Tanaidacea sp.#1	4	2	1		4	2.2	
INSECTA							
Diptera sp.#1			1			0.2	Family Chironomidae
Diptera sp.#2					1	0.2	Family Muscidae
Unidentified insect larva					1	0.2	
Unidentified insect pupa					1	0.2	

SIPUNCULIDA							
Sipunculida sp.#1	1	1	1	1	9	2.6	
Total specimens in sample	955	121	182	178	71		

Appendix D:

Hill Laboratories Sediment Chemical Analysis

Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	4SIGHT Consulting Limited	**Lab No:**	2550340 SPv2
Contact:	Pamela Kane-Sanderson	**Date Received:**	09-Mar-2021
	C/- 4SIGHT Consulting Limited	**Date Reported:**	28-Apr-2021
	PO Box 402053	**Quote No:**	97403
	Tutukaka 0153	**Order No:**	8431
		Client Reference:	8431 - Rangitane Loop Road
		Submitted By:	Pamela Kane-Sanderson

Sample Type: Sediment

Sample Name:		1 06-Mar-2021 12:10 pm	2 06-Mar-2021 12:20 pm	3 06-Mar-2021 12:30 pm	4 06-Mar-2021 12:40 pm	5 06-Mar-2021 12:50 pm
Lab Number:		2550340.1	2550340.2	2550340.3	2550340.4	2550340.5
Individual Tests						
Total Organic Carbon*	g/100g dry wt	0.86	1.21	1.59	1.71	2.6
Heavy metals screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	31	38	29	31	23
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	73	69	68	65	54
Total Recoverable Copper	mg/kg dry wt	16	13	16 #1	17	18
Total Recoverable Lead	mg/kg dry wt	8.1	8.4	8.2	8.2	9.4
Total Recoverable Nickel	mg/kg dry wt	15	14	16	18	21
Total Recoverable Zinc	mg/kg dry wt	260	71	66	64	59
7 Grain Sizes Profile as received*						
Dry Matter of Sieved Sample*	g/100g as rcvd	69	67	63	56	53
Fraction >/= 2 mm*	g/100g dry wt	33.7	16.6	22.6	12.5	18.6
Fraction < 2 mm, >/= 1 mm*	g/100g dry wt	5.1	6.0	5.7	8.4	5.9
Fraction < 1 mm, >/= 500 µm*	g/100g dry wt	5.9	12.3	7.3	10.1	10.2
Fraction < 500 µm, >/= 250 µm*	g/100g dry wt	20.4	24.1	24.2	10.2	10.3
Fraction < 250 µm, >/= 125 µm*	g/100g dry wt	13.1	9.1	11.9	8.9	4.8
Fraction < 125 µm, >/= 63 µm*	g/100g dry wt	3.5	4.5	5.9	7.2	5.0
Fraction < 63 µm*	g/100g dry wt	18.2	27.3	22.4	42.7	45.4

Analyst's Comments

#1 It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected. This may reflect the heterogeneity of the sample. Replicate 1 = 16mg/kg, replicate 2 = 20mg/kg.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Sediment

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-5
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	1-5
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-5

Sample Type: Sediment			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Organic Carbon*	Acid pretreatment to remove carbonates present followed by Catalytic Combustion (900°C, O2), separation, Thermal Conductivity Detector [Elementar Analyser].	0.05 g/100g dry wt	1-5
Heavy metals screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-5
7 Grain Sizes Profile as received			
Dry Matter for Grainsize samples (sieved as received)*	Drying for 16 hours at 103°C, gravimetry (Free water removed before analysis).	0.10 g/100g as rcvd	1-5
Fraction >/= 2 mm*	Wet sieving with dispersant, as received, 2.00 mm sieve, gravimetry.	0.1 g/100g dry wt	1-5
Fraction < 2 mm, >/= 1 mm*	Wet sieving using dispersant, as received, 2.00 mm and 1.00 mm sieves, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5
Fraction < 1 mm, >/= 500 µm*	Wet sieving using dispersant, as received, 1.00 mm and 500 µm sieves, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5
Fraction < 500 µm, >/= 250 µm*	Wet sieving using dispersant, as received, 500 µm and 250 µm sieves, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5
Fraction < 250 µm, >/= 125 µm*	Wet sieving using dispersant, as received, 250 µm and 125 µm sieves, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5
Fraction < 125 µm, >/= 63 µm*	Wet sieving using dispersant, as received, 125 µm and 63 µm sieves, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5
Fraction < 63 µm*	Wet sieving with dispersant, as received, 63 µm sieve, gravimetry (calculation by difference).	0.1 g/100g dry wt	1-5

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 11-Mar-2021 and 28-Apr-2021. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental