Auckland Council
Te Kaunihera o Tāmaki Makaurau

I hereby give notice that a hearing by commissioners will be held on:

Date:	**Monday 1 – Thursday 4 March 2021**
	Monday 8 – Friday 12 March 2021
Time:	**9.30 a.m.**
Meeting Room:	**Warkworth Town Hall**
Venue:	**2 Alnwick Street, Warkworth**

HEARING REPORT

COASTAL MARINE AREA - PAKIRI SAND EXTRACTION

KAIPARA LIMITED

COMMISSIONERS

Chairperson	**Les Simmons**
Commissioners	**Karyn Kurzeja**
	Melean Absolum
	Juliane Chetham

Sam Otter
SENIOR HEARINGS ADVISOR

Telephone: 09 353 9587 or 021 196 2582
Email: sam.otter@aucklandcouncil.govt.nz
Website: www.aucklandcouncil.govt.nz

Note: The reports contained within this document are for consideration and should not be construed as a decision of Council. Should commissioners require further information relating to any reports, please contact the hearings advisor.

WHAT HAPPENS AT A HEARING

At the start of the hearing, the Chairperson will introduce the commissioners and council staff and will briefly outline the procedure. The Chairperson may then call upon the parties present to introduce themselves to the panel. The Chairperson is addressed as Mr Chairman or Madam Chair.

Any party intending to give written or spoken evidence in Māori or speak in sign language should advise the hearings advisor at least five working days before the hearing so that a qualified interpreter can be provided.

Catering is not provided at the hearing. Please note that the hearing may be audio recorded.

Scheduling submitters to be heard

A timetable will be prepared approximately one week before the hearing for all submitters who have returned their hearing appearance form. Please note that during the course of the hearing changing circumstances may mean the proposed timetable is delayed or brought forward. Submitters wishing to be heard are requested to ensure they are available to attend the hearing and present their evidence when required. The hearings advisor will advise submitters of any changes to the timetable at the earliest possible opportunity.

The Hearing Procedure

The usual hearing procedure is:

- The applicant will be called upon to present his/her case. The applicant may be represented by legal counsel or consultants and may call witnesses in support of the application. After the applicant has presented his/her case, members of the hearing panel may ask questions to clarify the information presented.
- The relevant local board may wish to present comments. These comments do not constitute a submission however the Local Government Act allows the local board to make the interests and preferences of the people in its area known to the hearing panel. If present, the local board will speak between the applicant and any submitters.
- Submitters (for and against the application) are then called upon to speak. Submitters may also be represented by legal counsel or consultants and may call witnesses on their behalf. The hearing panel may then question each speaker. The council officer's report will identify any submissions received outside of the submission period. At the hearing, late submitters may be asked to address the panel on why their submission should be accepted. Late submitters can speak only if the hearing panel accepts the late submission.
- Should you wish to present written information (evidence) in support of your application or your submission please ensure you provide the number of copies indicated in the notification letter.
- Only members of the hearing panel can ask questions about submissions or evidence. Attendees may suggest questions for the panel to ask but it does not have to ask them. No cross-examination - either by the applicant or by those who have lodged submissions – is permitted at the hearing.
- After the applicant and submitters have presented their cases, the chairperson may call upon council officers to comment on any matters of fact or clarification.
- When those who have lodged submissions and wish to be heard have completed their presentations, the applicant or his/her representative has the right to summarise the application and reply to matters raised by submitters. Hearing panel members may further question the applicant at this stage.
- The chairperson then generally closes the hearing and the applicant, submitters and their representatives leave the room. The hearing panel will then deliberate "in committee" and make its decision.
- Decisions are usually available within 15 working days of the hearing.

A NOTIFIED DISCRETIONARY ACTIVITY RESOURCE CONSENT APPLICATION BY KAIPARA LIMITED

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<u>Colin Hopkins, Planner</u>

Reporting on an application to extract sand from the coastal marine area off-shore at Pakiri at Coastal Marine Area - Pakiri Sand Extraction. The reporting officer is recommending, subject to contrary or additional information being received at the hearing, that the application be **CONSENTED** to, subject to certain conditions.

APPLICANT: KAIPARA LIMITED

Report on an application for resource consent under the Resource Management Act 1991 (RMA)

Discretionary activity

To:	Independent Hearing Commissioners
From:	Colin Hopkins, Consultant Planner (DCS)
Hearing date:	1 March 2021

Note:

- This is not the decision on the applications.
- This report sets out the advice and recommendation of the reporting planner.
- This report has yet to be considered by the independent hearing commissioners delegated by Auckland Council to decide these resource consent application/s.
- The decision will be made by the independent hearing commissioners only after they have considered the applications and heard from the applicant, submitters and council officers.

1. Application description

Application numbers:	CST60343373 & DIS60371583
Applicant:	Kaipara Limited
Site address:	Auckland Offshore Sand Extraction Site – Coastal Marine Area (Off-Shore from Pakiri)

NZTM map reference:

Northing (NZTM)	Easting (NZTM)	LAT (Y)	LONG (X)
5990925.3	1758084.67	36 12 48.98649 S	174 45 31.24864 E
5989464.69	1756328.79	36 13 37.39802 S	174 44 22.00475 E
5994126.25	1751721.2	36 11 08.81017 S	174 41 14.26562 E
5998824.36	1748945.94	36 08 37.94140 S	174 39 19.99142 E
6000863.22	1747812.5	36 07 32.41856 S	174 38 33.27521 E
6002956.33	1746958.06	36 06 24.97795 S	174 37 57.69935 E
6004081.89	1748380.44	36 05 47.68210 S	174 38 53.80442 E

Lodgement date:	7 August 2019
Notification date:	8 May 2020
Submission period ended:	4 June 2020
Number of submissions received:	4 in support 1 neutral 655 in opposition

2. Locality Plans

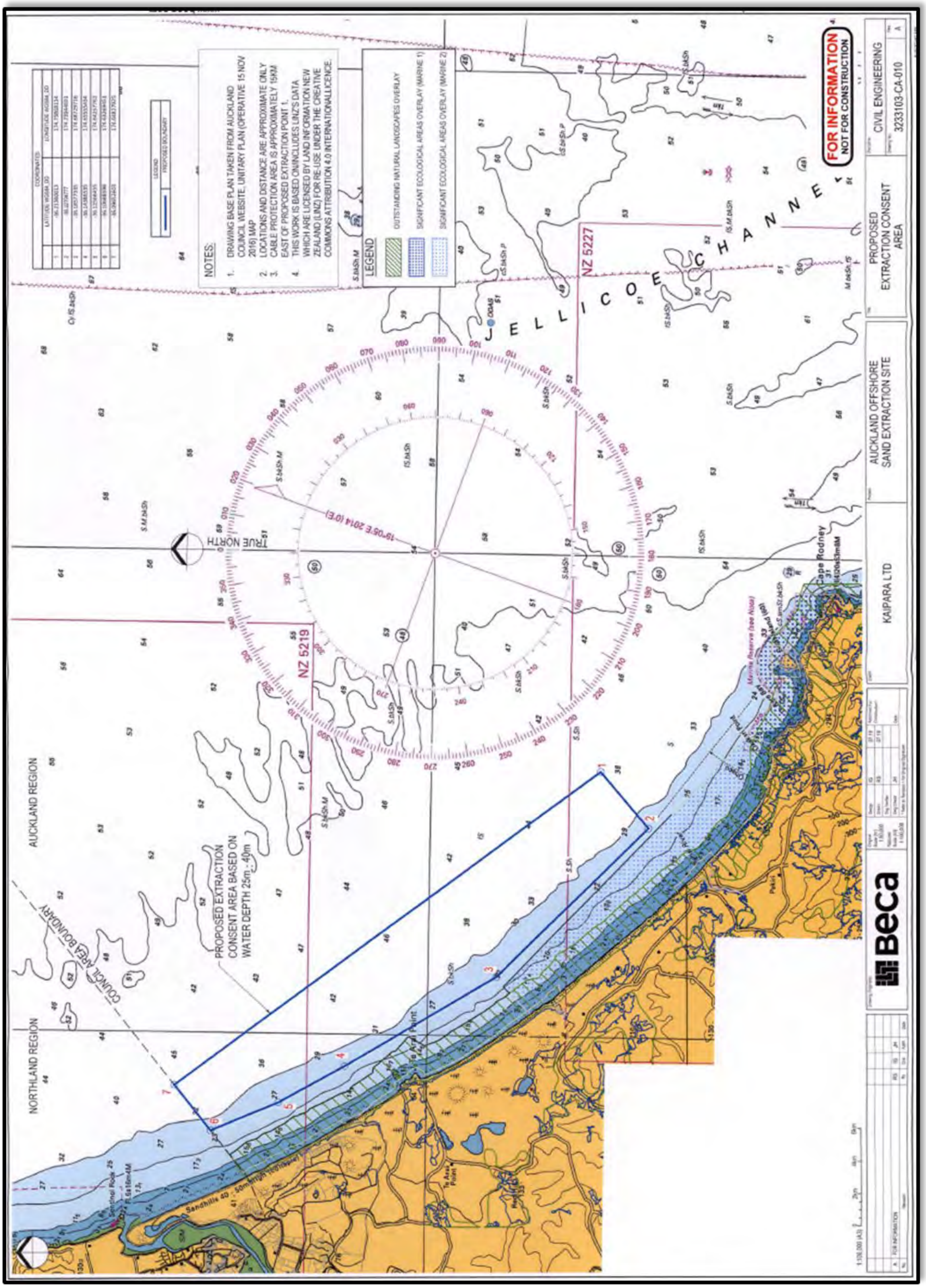

Figure 1: Sand Extraction Area Plans (in blue). Source: Appendix Two of the submitted A.E.E.

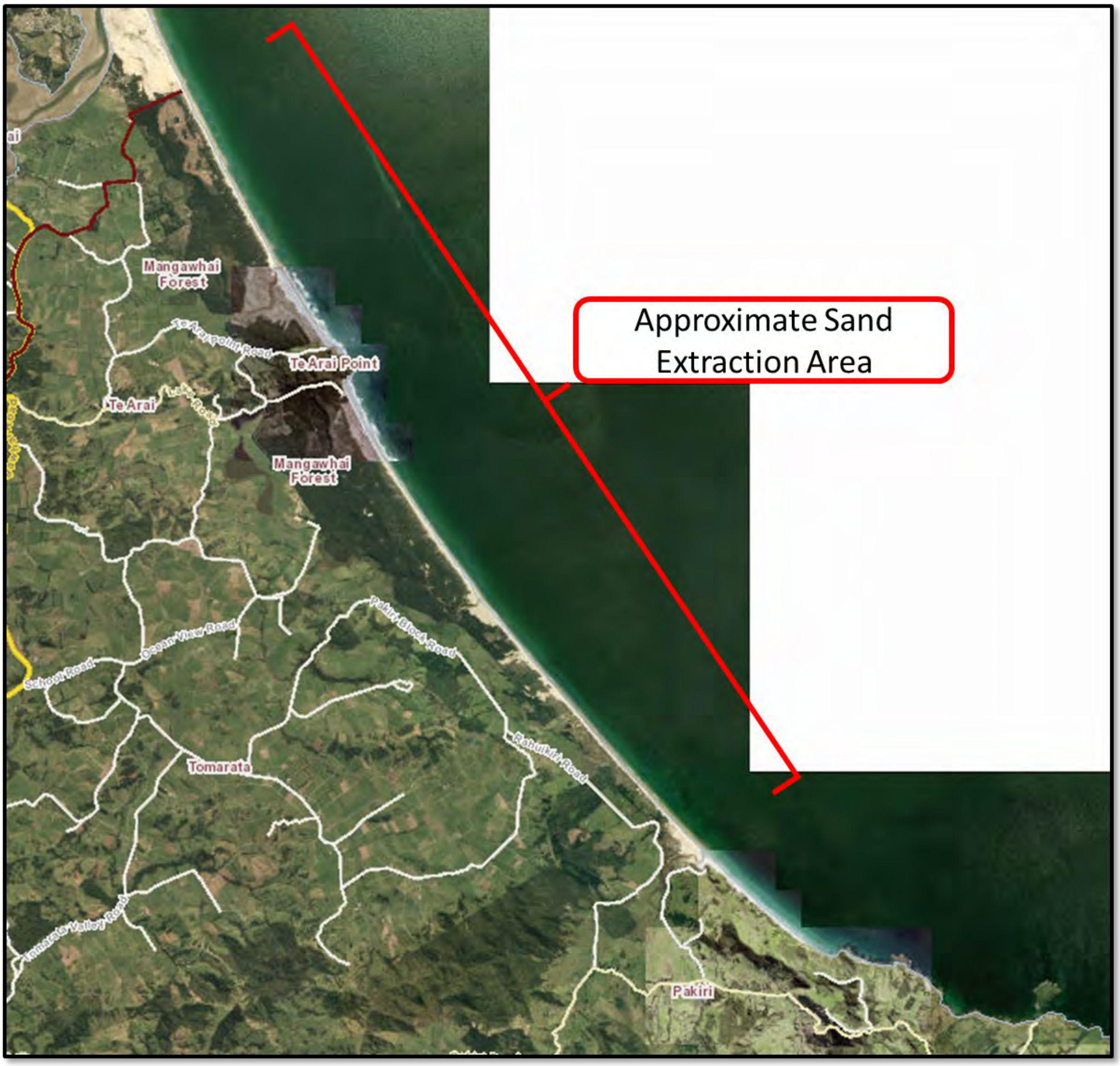

Figure 2: Aerial Photograph. Source: Auckland Council GIS

3. Application documents

The list of application documents and drawings (the submitted A.E.E) is set out in **attachment 1** of this report.

4. Adequacy of information

The information submitted by the applicant is sufficiently comprehensive to enable the consideration of the following matters on an informed basis:

- The nature and scope of the proposed activity that the applicant is seeking resource consents for.
- The extent and scale of the actual and potential effects on the environment.
- Those persons and / or customary rights holders who may be adversely affected.
- The requirements of the relevant legislation.

A request for further information under s92 of the RMA was made on thy 7th of October 2019. The applicant provided all of the information requested on 14 April 2020.

Further information provided during the processing of the application is included in **attachments:**

- 2A: Further information response 14 April 2020;
- 2B: Further information response post submissions including:
  - Confirmation of co-ordinates;
  - Confirmation that discharge consent is being sought
  - Surf Break Impact Assessment
  - Marine Mammal Management Plan
  - Photos of vessel
  - Cultural Effects Assessment from Te Uri O Hau

5. Qualifications and experience

I hold a Masters in Planning Practice from the University of Auckland and a Bachelor of Arts from Otago University.

I have fifteen years of experience in the planning profession in New Zealand and Scotland, including nine years in government roles and six years in the private sector.

I have extensive experience in the preparation and assessment of resource consent applications for private clients and the Auckland Council, and have worked as a Principal Planner and Team Leader within the Auckland Council Resource Consents Department.

6. Report and assessment methodology

The applications are appropriately detailed and comprehensive and include a number of expert assessments. Accordingly, no undue repetition of descriptions or assessments from the applications is made in this report.

I have made a separate and independent assessment of the proposal, with the review of technical aspects by independent experts engaged by the council, as needed.

Where there is agreement on any descriptions or assessments in the application material, this is identified in this report.

Where professional opinions differ, or extra assessment and / or consideration is needed for any reason, the relevant points of difference of approach, assessment, or conclusions are detailed. Also, the implications for any professional difference in findings in the overall recommendation is provided.

The assessment in this report also relies on reviews and advice from the following specialists:

- Dr Kala Sivaguru, Senior Coastal Specialist – Auckland Council

- Ashishika Sharma, Coastal Specialist – Auckland Council
- Bin Qiu, Noise Specialist – Auckland Council
- Peter Kensington, Landscape Architect – Consultant to the Auckland Design Office, Auckland Council.

These assessments are included in **attachment 6** of this report.

This report is prepared by:	Colin Hopkins, Consultant Planner, DCS
Signed:	
Date:	Date: 2nd February 2021
Reviewed and approved for release by:	Chelsea Gosden, Team Leader, Resource Consents
Signed:	
Date:	Date: 2 February 2021

7. Executive summary

The applicant, Kaipara Limited, has applied to the Council for the necessary resource consents, to extract sand from the seabed, using a trailer suction dredge within the Coastal Marine Area offshore from Pakiri.

The application seeks coastal and discharge permits under the Coastal Section of the Auckland Council Unitary Plan: Operative in Part (AUP (OP)). Overall, the proposal requires consents as a discretionary activity.

A total of 660[1] submissions to the application have been received. 4 of these submissions are in support of the application and 655 of the submissions are in opposition. 1 submission was neutral. The submissions in support generally consider that the resource is valuable for the construction industry and will provide positive social and economic benefits. The submissions in opposition generally consider that the application should be declined due to the adverse effects associated with the activity on coastal processes, ecology, and effects on recreational activities.

The assessment of effects contained within Section 13 in this report concludes that adverse effects are acceptable subject to recommended conditions.

The application has been assessed against the relevant statutory documents in Section 15 of this report and is considered to be generally consistent with the direction of the relevant statutory documents relating to the proposed extent of sand (mineral) extraction and associated activities.

[1] Note the submissions are numbered 1-662, with 2 submissions being not applicable and/or invalid.

It is recommended that, **subject to new or contrary evidence** presented at the hearing, this application for resource consent be **approved subject to conditions**.

8. The proposal, site and locality description

Proposal

The applicant, Kaipara Limited, has applied to the Council for the necessary resource consents, to extract sand from the seabed, using a trailer suction dredge within the Coastal Marine Area offshore from Pakiri (as defined in section 1 of this report).

A description of the proposed activity is provided in section 2.0 of the submitted A.E.E (as amended by the further information responses), and in summary the applicant proposes to:

- Extract up to 2,000,000m^3 of sand from between the 25m and 40m isobath over an approximate area of 44,126,536m^2 with no more than 150,000m^3 per any 12-month period between the 25m and 30m isobaths.

  With respect to the area for the extraction it is noted that:

  - The landward side of the sand extraction site is limited to a minimum depth of 25m, with the seaward side limited to a depth of approximately 40m;
  - The southern extent of the extraction area is approximately 3.8km from the northern boundary of the Leigh Marine Reserve, with the western extent between 1.2km and 4km from the shoreline;
  - The proposed sand extraction area is approximately 44km^2.
  - Two control areas are proposed (identified as the Northern and Southern control areas) for monitoring purposes and are immediately adjacent to the northern/western and southern boundaries of the proposed extraction area. No extraction is proposed in these areas, and it is noted that whilst the Southern Control Area is located within the Auckland Council boundaries, the Northern Control Area is located within the Northland Regional Council boundaries.
  - The proposed extraction area and control areas are proposed to be divided into "management cells", which form the basis for controlling volumes, and for monitoring purposes. Each cell is 40,000m^3. The proposed management cells are shown in Figure 3 below.
  - The application is made on the basis that the minimum isobaths of 25m for the western boundary has been selected as this equates to the 'depth of closure' (DoC)[2], which is an indicator of the outer extent of the significant seabed movement and where there is limited interchange between the inner bar system and outer shelf, and therefore the extraction of sand beyond this depth is unlikely to affect nearshore and beach processes. The applicant has noted that the DoC in this vicinity was identified by the Environment Court in their decision on the existing permit held by the applicant.

[2] The 'depth of closure' is referred to as the "Hallemeier limit" in the council's specialist assessment

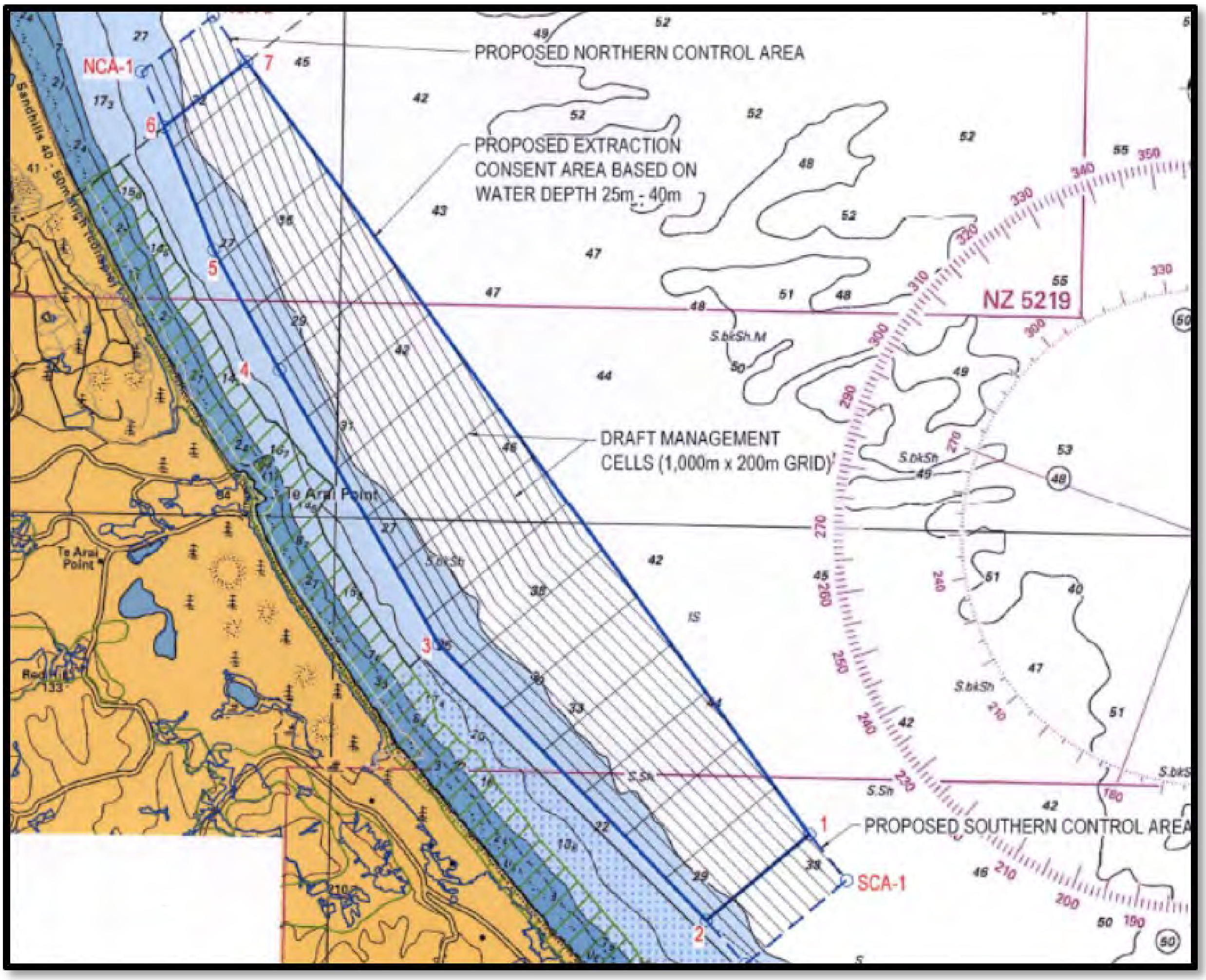

Figure 3: Draft Management Cells Plan Source: extract from proposed EMMP, Appendix Two of the submitted A.E.E.

- The sand will be extracted via a trailer suction dredge, with a dredge drag head trailed behind the vessel along the sea floor, disturbing the surface of the sand to a depth of approximately 30cm. In summary, the process for extracting sand includes:
    - Extraction of sand and water by the drag head to create a slurry which is pumped through two pipes through wire screens, where a portion of the slurry passes through to the hopper on board the vessel, and oversized material ejected via the flume pipe over the side of the vessel;
    - Within the hopper the slurry settles, with water and entrained superfine material released back over weir boards as they are put in place to fill the hopper;
    - The vessel, which is tracked by GPS, then travels back to the Ports of Auckland to off-load the sand;
    - The application outlines that the current vessel implementing their existing consent is the *Coastal Carrier,* and to be replaced by the *William Fraser*. Since the lodgement of the application, the sand is now extracted by the *William Fraser*. For completeness, it is noted that the consent seeks to approve the method and parameters of the extraction, and whilst the operational depth of the

William Fraser is anticipated to be up to 35m, consent is sought for up to 40m and provision is therefore made for a change in vessel that can operate within the parameters of the consent.

- It is proposed to manage the extraction activity and associated monitoring through the implementation of an Environmental Monitoring Management Plan (EMMP), and a draft version is provided in Appendix three of the submitted A.E.E. The EMMP (which applies management cells) is discussed in more detail in section 4 of the submitted A.E.E, and in summary provides for the following reporting and monitoring:

  - Pre-Sand Extraction Area Assessments (PSEAR). This includes identification of Proposed Sand Extraction Areas (PSEA) that are suitable for extraction (and exclusion of any areas to be avoided), and establishes the baseline information for the sand extraction monitoring;

  - Sand Extraction Monitoring Reporting (SEMR). This includes analysis and review of the monitoring required under the EMMP, including sediment transport processes and any impacts on benthic macrofauna as a result of the activity (and monitoring methodologies), and comparative analysis of control areas;

  - Tracking of sand extraction and vessel monitoring, including the recording of volumes and areas of extraction (informing the triggering of the SEMR).

- It is also proposed to manage any potential adverse effects on marine mammals through the implementation of a Marine Mammal Management plan (MMMP), and draft version is provided within the further information responses received post notification in attachment 2B of this report.

- No specific limit is sought on the hours of operation.

- The extracted sand is proposed to be used in the construction sector.

- Consent is sought for a 20-year duration.

- Should this consent be granted, the applicant proposes to surrender their existing extraction permit 20795 within one month of the consent holder giving effect to this consent.

For completeness it is noted that the proposed sand extraction area is located outside of the following overlays and controls:

- Natural Resources: Significant Ecological Areas Overlay - SEA_T_6672, Terrestrial

- Natural Resources: Significant Ecological Areas Overlay - SEA-M2-87a, Marine 2

- Natural Heritage: Outstanding Natural Features Overlay [rcp/dp] - ID 149, Pakiri Beach

- Natural Heritage: Outstanding Natural Landscapes Overlay [rcp/dp] - Area 22, Pakiri Beach
- Natural Heritage: Outstanding Natural Landscapes Overlay [rcp/dp] - Area 28, Coastline from Pakiri River to Omaha Cove
- Natural Heritage: High Natural Character Overlay [rcp/dp] - AREA 48, Te Arai and Pakiri Beach
- Controls: Surf Breaks [rcp] - ID 1, Te Arai Beach (including Pacific Road access point 'Black Swamp')
- Controls: Surf Breaks [rcp] - ID 2, Pakiri Beach (North - 'Forestry')
- Controls: Surf Breaks [rcp] - ID 3, Pakiri Beach (South)

Site and surrounding environment description

A description of the subject area is provided within the Introduction in section 1 of the submitted A.E.E., and within section 3 of the Council S95 report prepared by Ms Gemma Hayes.

In addition to these summaries detailed descriptions are provided in the specialist reports attached to the submitted A.E.E. and further information response documents, and include:

- A description of the coastal environment including the morphology and geomorphology context of the Mangawhai – Pakiri Embayment and coastal processes is provided in section 2 of the Coastal Processes Assessment prepared by BECA (Appendix four of the submitted A.E.E), and section 2 of the Surf Break Impact Assessment (provided as further information, and included in attachment 2B of this report);
- A description of the ecological environment and seabed conditions is provided in the Ecological Effects Assessment by Bioresearches (Appendix five to the submitted A.E.E);
- A description of the nearby surf breaks is provided in section 3 of the Surf Break Impact Assessment (provided as further information and included in attachment 2B of this report).

Having visited the site and relying on the advice of Council specialists, I can confirm that these descriptions are accurate.

9. Background

Existing Permit - 20795

As outlined in the Introduction section of the submitted A.E.E., the applicant currently holds resource consent to extract up to 2,000,000m^3 of sand over a 20 year period (expiring February 2023). This consent provides for an extraction rate of 150,000m^3 per annum from between the western boundary (being the 25m isobaths) and 30m isobaths. There is no prescribed limited between the 30m isobaths and eastern boundary of the site with the sand extraction limited by the total permitted volume.

A copy of this consent is attached to the submitted A.E.E., as Appendix One (see Figures 4 and 5 for a comparison of the existing and proposed extraction areas). The extraction area for the existing consent is 636km^2.

Although the extraction activities are not limited in terms of the time of day, it is understood that typically the extraction activities occur during the evening or early morning periods.

As noted above, should this consent be granted, the applicant proposes to surrender permit 20795 within one month of the consent being given effect to.

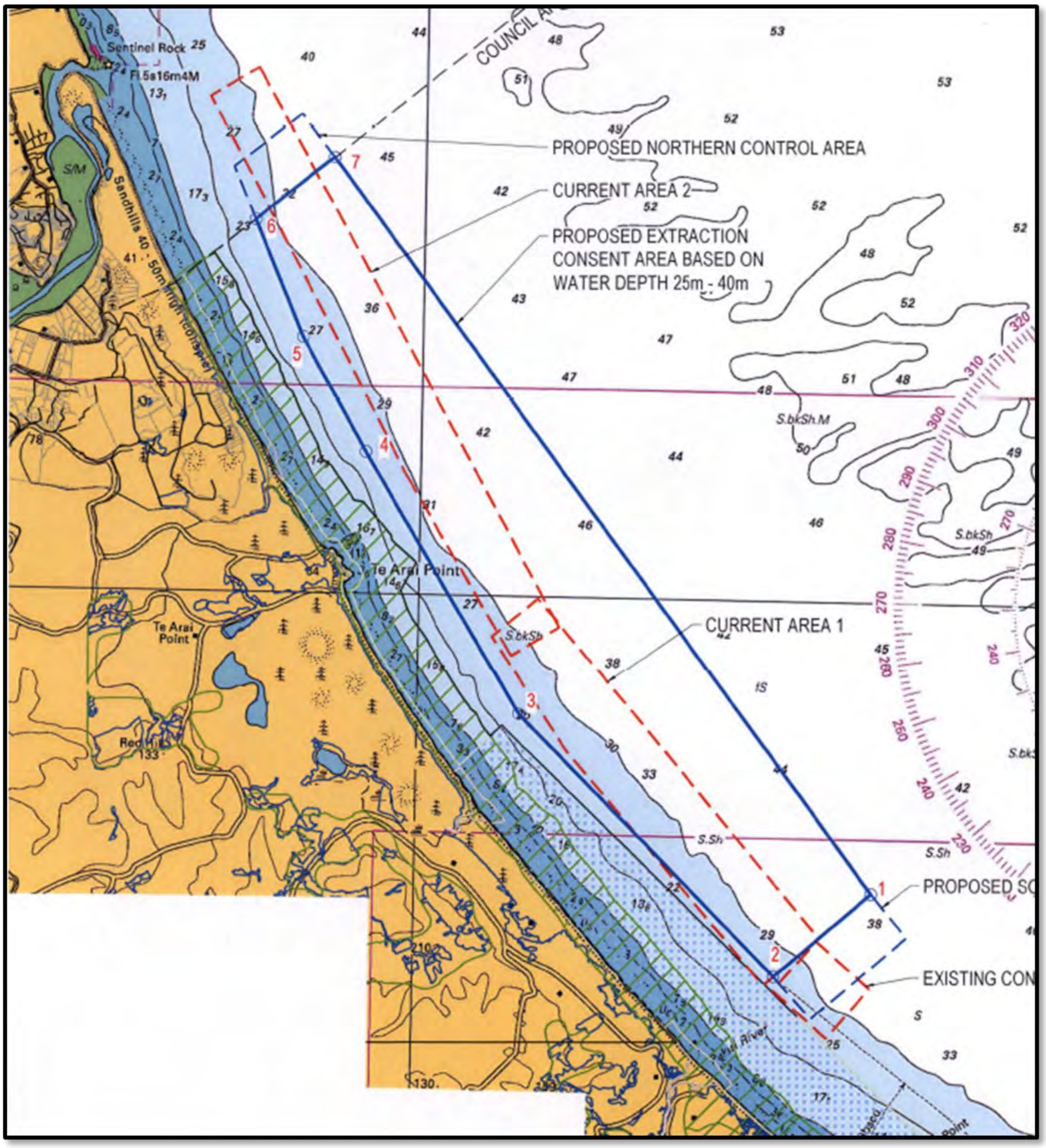

Figure 4: Sand Extraction Area Plan – Existing area of sand extraction (in red) and proposed areas (in blue). Source: extract from Appendix Two of the submitted A.E.E.

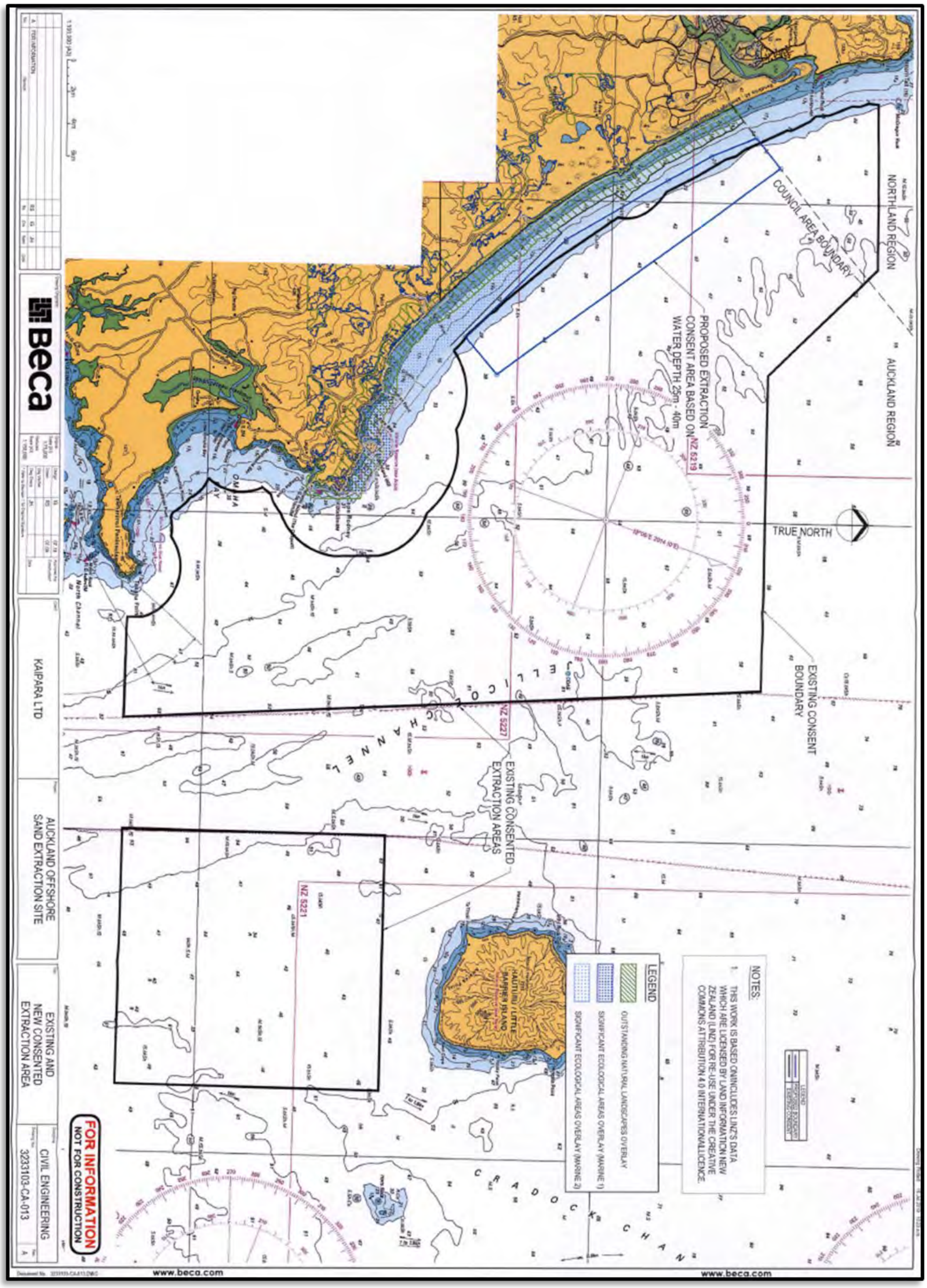

Figure 5: Sand Extraction Area Plan – Existing consented area (in black) and proposed extraction area (in blue). Source: extract from Appendix Two of the submitted A.E.E.

Other existing consents and current applications not by the applicant

As noted above, this extraction of sand as proposed by this application, and as undertaken in accordance with the existing permit held by the applicant, is completed by McCallum Brothers Limited (MBL), and by their vessel the "*William Fraser*" (previously undertaken by the motorised barge the "*Coastal Carrier*").

MBL have an existing permit (Council Reference ARC28165, ARC28173 and ARC28174) to extract 76,000m^3/year of sand from a depth of 5m-10m isobath. Whilst this consent expired on the 6th of September 2020, the activity continues in accordance with s124 of the RMA, with a renewal application currently processing, and at the time of writing pending a notification decision (Council Reference BUN60352951).

In addition, MBL have lodged consent for the extraction of 125,000m^3/year over any consecutive 5 year period and a maximum rate of 150,000m^3/year over any 12 month period from a depth of between 15m-25m isobaths (Council Reference BUN60369079). This application has been lodged seeking public notification, and at the time of writing is currently pending notification.

These existing and current applications by MBL are independent of this application and are addressed in Section 14 in the assessments below.

Notwithstanding that these applications are independent of the subject application (and each other), as noted in the assessments below, given that the extraction of the sand is currently undertaken by MBL, the MMMP that has been submitted with the application refers to MBL implementing the consent rather than the applicant.

10. Reasons for the applications

Resource consents are required for the following reasons:

Coastal Permit (s12) – CST60343373

Auckland Unitary Plan (Operative in part)

Regional Coastal Use (operative plan provisions)

F2 Coastal – General Coastal Marine Zone

- Consent is required as a discretionary activity for coastal marine disturbance for mineral extraction (excluding petroleum) in accordance with rule F2.19.4 (A28);
- Consent is required as a discretionary activity for coastal marine disturbance within the northern and southern control monitoring areas, that is not otherwise provided for in the GCMZ in accordance with rule F2.19.4 (A37);

Discharge Permit (s15) – DIS60371583

Auckland Unitary Plan (Operative in part)

Regional Coastal Use (operative plan provisions)

F2 Coastal – General Coastal Marine Zone

- Consent is required as a discretionary activity for the disposal or storage of waste or other matter arising directly from, or related to, the exploitation and associated offshore processing of seabed mineral resources in accordance with rule F2.19.2 (A15).

The reasons for consent are considered together as a **discretionary activity** overall.

NOTE:

The application was lodged on the basis that it seeks all necessary consents to give effect to the application, and whilst initially consent was sought only with respect to F2.19.4 (A28), the applicant has subsequently confirmed that consent is also being sought with respect to F2.19.2 (A15) (see attachment 2B).

It is also noted that the initial Council interpretation and advice to the applicant was that consent was not explicitly required with respect to F2.19.2 (A15), with these matters forming part of the activities associated with F2.19.4 (A28) and the permitted activity F2.19.7 (A62). Noting, however, that there is some inconsistency with the interpretation of the relatively new rules of the AUP (OP) and some overlap of the activities, it is acknowledged that it is appropriate for consent to also be sought for this discharge.

In addition, the Council consider it appropriate that within the control areas (proposed for monitoring purposes), that it is appropriate to distinguish these activities from the mineral extraction activities and have therefore recommended that in line with the applicant seeking all the necessary consents for the activity, that consent also be considered for F2.19.4 (A37).

11. Status of the resource consents

Where a proposal:

- consists of more than one activity specified in the plan(s); and
- involves more than one type of resource consent or requires more than one resource consent; and
- the effects of the activities overlap;

The activities may be considered together.

Where different activities within a proposal have effects which do not overlap, the activities will be considered separately.

In the instance, the effects of the proposed resource consents will overlap and thus they are considered together as a **discretionary activity** overall.

12. Notification and submissions

Notification background

The application was publicly notified on 8 May 2020 at the request of the applicant, with the submission period closing on 4 June 2020.

All notification matters (under ss95 to 95G) were addressed in the notification determination report (refer **attachment 3**).

Submissions

When the submission period ended, a total of 660 submissions were received (no submissions were recorded as received late after the close of the submission period).

Of the submissions received:

4 in support 1 neutral 655 opposing

A summary of the issues raised in submissions together with the relief sought by the submitters is set out as follows:

This table is **only a summary** of the key issues raised in submissions. For the specific details, refer to the full set of submissions, included in **attachment 4** to this report.

This summary of submissions identifies the following:

- the issues raised in submissions in terms of the key issues below
- details any relief sought by the submitter
- whether a submitter wishes to be heard at the hearing.

Summary of submissions

Issues raised:	
1.	Adverse effects on coastal processes (including general opposition to activity)
2.	Adverse effects of coastal erosion of the beach
3.	Adverse ecological effects (including benthic, fish, birds, and marine mammals)
4.	Adverse effects on recreational activities (including effects on surf breaks and recreational fishing and boating)
5.	Adverse landscape and visual effects
6.	Adverse light effects
7.	Adverse noise effects
8.	Adverse cultural effects
9	Other (including unrelated activities, alternatives, and other consents)

Issues raised:	
10	Ineffective compliance / breeches of existing consents
11	General support (including support for efficient use and support for infrastructure)

Relief sought:	
A.	In general, submissions in opposition seek that the consent be refused.
B.	Some submissions in opposition seek changes to the application in order for it be granted.
C.	Applications in support, seek for the consent to be granted as applied for.
D.	Neutral

A table summarising the submissions received and whether those persons wish to be heard can be found in **attachment 5** to this report.

Late submissions

No late submissions were received in this case.

Written Approvals

No written approvals have been provided with the application.

Amendments to the application following notification

After the submission period ended, the applicant provided further information on a number of matters. These changes (to clarify the co-ordinates and reasons for consent) and extra information (including assessments of surf breaks, photos of the vessel, and providing the Cultural Values Assessment) are included in **attachment 2B** of this report and referenced earlier in this report.

This information forms part of the applications and is considered in this report. The amendments (including the additional reason for consent) are considered to be within the scope of the original application, and therefore re-notification of the application was not required.

All submitters were given written or electronic notice that the information is available online and at the council office on 4th February 2021.

Consideration of the application

13. Statutory considerations

Resource Management Act 1991

In considering any application for resource consent and any submissions received, the council must have regard to the following requirements under s104(1) of the RMA – which are subject to Part 2 (the purpose and principles):

- any actual and potential effects on the environment of allowing the activity;
- any measure proposed to or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity;
- any relevant provisions of national policy statements, New Zealand coastal policy statement; a regional policy statement or proposed regional policy statement; a plan or proposed plan, a national environmental standard (NES), or any other regulations; and
- any other matter the council considers relevant and reasonably necessary to determine the application.

When considering any actual or potential effects, the council may disregard any adverse effects that arise from permitted activities in a NES or a plan (the permitted baseline). The council has discretion whether to apply this permitted baseline.

For a discretionary activity (or a non-complying activity), the council may grant or refuse consent (under s104B). If it grants the application, it may impose conditions under s108.

Sections 105 and 107 address certain matters (in addition to the matters in s104(1)), relating to discharge permits and coastal permits where the proposal would otherwise contravene s15 (or ss15A or 15B).

Sections 108 and 108AA provide for consent to be granted subject to conditions and sets out the kind of conditions that may be imposed.

14. Actual and potential effects on the environment

Sections 104(1)(a) and 104(1)(ab) of the RMA requires the council to have regard to:

- any actual and potential effects on the environment of allowing the activity (including both the positive and the adverse effects); and
- any measure proposed to or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity.

In considering the adverse effects of the proposal, the council:

- may disregard those effects where the plan permits an activity with that effect; and
- must disregard those effects on a person who has provided written approval, and trade competition or the effects of trade competition.

Effects that must be disregarded

Any effect on a person who has given written approval to the application

As outlined in section 12 of this report, no written approvals have been provided with the application.

Trade competition

In this case, trade competition or the effects of trade competition are not expressly relevant to the consideration of the proposal.

However, it is noted that the submission by Bram Smith, Kayasand (submitter 514) is made on the basis that alternative technology (manufactured sand via a V7 Plant) that they supply should be considered. It is noted that the assessments below consider the application as proposed and do not specifically consider this alternative.

Effects that may be disregarded

Permitted baseline assessment

The permitted baseline refers to permitted activities on the subject site. The permitted baseline may be taken into account and the council has the discretion to disregard those effects where an activity is not fanciful.

Within section 5 of the submitted A.E.E, the applicant has outlined that given the nature of the activity that there is no permitted based that is relevant in this case. I generally agree with the applicant in this regard, however it is noted that the movement of vessels through the General Coastal Marine Zone is a permitted activity, and this is of some relevance to the visual effects of the activity.

Assessment

Receiving environment

The receiving environment beyond the subject site includes permitted activities under the relevant plans, lawfully established activities (via existing use rights or resource consent), and any unimplemented resource consents that are likely to be implemented. The effects of any unimplemented consents on the subject site that are likely to be implemented (and which are not being replaced by the current proposal) also form part of this reasonably foreseeable receiving environment. This is the environment within which the adverse effects of this application must be assessed.

In this case and of particular relevance is the existing coastal environment within the Mangawhai – Pakiri environment (as described and referenced in section 8 of this report)

With respect to lawfully established uses, of relevance is the existing permit held by the applicant to extract sand which does not expire until February 2023, with the monitoring records and survey from the exercise of this consent of particular relevance to establishing the receiving environment and the basis for assessments of the potential effects of the proposal. It is noted that should this consent be granted whilst this permit remains valid, the application is made on the basis that both consents will not be implemented at the same time, with the existing consent surrendered should this consent be granted (and following its implementation).

As noted above, MBL have two applications that are currently being processed by the Council and are operating under their expired consent (in accordance with s124). At the time of writing the two applications being processed had not progressed through to a notification determination and not relevant to the assessment of this application. With respect to the existing consent, whilst the extraction areas of this consent do not overlap with the area of extraction as proposed by the applicant, the assessment of coastal processes considers whether the exercise of these two consents at the same time has cumulative effects.

There are no other unimplemented consents that I am aware of relating to this environment that would be relevant.

This is the reasonably foreseeable environment within which the adverse effects of the proposal are considered.

For completeness, it is noted that given the nature of the activity, once extracted, the sand is taken by barge to be unloaded at the Port of Auckland as part of the lawfully established activities on that site. As such there are no relevant adverse effects associated with these activities that required consideration as part of this application.

<u>Assessment of actual and potential effects</u>

While having regard to the above, the following assessment is done after I have:

- analysed the application (including any proposed mitigation measures);
- visited the site and surrounds;
- reviewed the council's records;
- reviewed the submissions received; and
- taken advice from appropriate experts.

The following actual and potential effects have been identified:

Positive effects

Submissions

The submissions in support of the activity generally recognised the value of the resource to the construction industry.

Assessment

The applicant has outlined in section 5 of the submitted A.E.E that the proposal will have positive effects in terms of contributing to the supply of sand for use in the construction industry for concrete, and the importance of concrete to the region's economy as it contributes to the built future of Auckland (including urban expansion for residential, business, and road construction).

In addition, the applicant has provided an Economic Assessment (see Appendix six of the submitted A.E.E), which identifies the positive benefits associated with the economic efficiency of transporting the sand for the market.

I generally agree with the applicant in respect to the identification of the positive effects and note the high level recognition in the AUP (OP) that mineral extraction activities in the coastal environment can have social and economic benefits and can be appropriate activities in the coastal environment.

Adverse effects

Adverse effects on coastal processes

Submissions

The majority of submissions received opposing the application raised concerns with the adverse effects of the activity on coastal processes.

Assessment

To understand the coastal process within the Mangawhai-Pakiri Embayment and the effects of the proposed sand extraction on these processes the applicant has provided a Review of Coastal Processes Effects Report, prepared by Beca (Appendix Four of the submitted A.E.E. and as amended by the further information response (see attachment 2A)).

A survey report prepared by Survey Worx is also provided with the application material (see attachment 2A).

These assessments have been peer reviewed by Council’s Coastal Specialist Ms Ashishika Sharma, who has provided a Technical Memo co-authored with Dr Sivaguru (see attachment 6).

The Beca report includes a description of the geomorphology of the Mangawhai-Pakiri Embayment, coastal dunes, beach foreshore and inshore, headlands, and sand texture and mineralogy, as well as assessment of effects of the current sand extraction on coastal processes. Summaries of these descriptions and features is provided in the Council Technical Memo and are not repeated in detail here. However, with respect to the existing environment and coastal processes in the Mangawhai-Pakiri Embayment, it is noted that the report identifies that:

- Significant sediment transport does not occur beyond the 25m water depth, other than in large (infrequent) storms, and sediment exchange between the inner shelf and nearshore environment at Pakiri is unlikely and almost insignificant;
- In normal sea state conditions, wave induced currents in deeper water are relatively low and do not mobilise the predominately coarse-grained sand in those locations (which are only moved in large storms);
- Monitoring of the extraction areas and control areas indicated that changes to the seabed and sediment texture are due to natural processes;

- Bathymetry surveys beyond the 25m isobaths DoC carried out by the applicant as part of the monitoring of their existing permit show no significant variance in the seabed levels outside the immediate extraction area, with extraction to date showing results in short term localised depressions, with the longer term effect being reflected in the lowering of the seabed over a large area equal to the volume of sand extracted.

Within this context, Beca's review concludes that on the basis of the monitoring of offshore sand extraction between 2003 and 2019 has not identified any significant effects on bathymetry, geomorphology or coastal processes, that the continuation of the activity will not cause any significant further effects on these components. However, as the monitoring has demonstrated that there are some localised effects, the applicant proposes to mitigate these effects through the implementation of the EMMP and management cell approach (including the limit of extraction within any cell in every 12 month period).

Having reviewed the reports and assessments (including further information) by Beca and SurveyWorx, Ms Sharma has confirmed that she agrees with the applicant's interpretation of the monitoring results and concludes that the effects of the proposed sand extraction on bathymetry will be minor, whilst effects on the seabed and sediment texture will be less than minor. Although the bathymetry will be modified and sand supply reduced by the extraction, Ms Sharma agrees with the applicant that the extraction, and in particular the proposed management of the extraction within the EMMP, will have negligible effects on the swell, and will not change the wave period (please note a specific assessment on effects of the sand extraction on surfing is provided below).

In terms of coastal erosion, the applicant has outlined that as the sand extraction area is below the DoC / Hallemeier limit it will not cause or exacerbate coastal erosion, and Ms Sharma has confirmed that she agrees with this conclusion, and that there has been no evidence of coastal erosion along the Pakiri-Mangawhai embayment which can be attributed to the sand extraction beyond the 25m isobath depth.

Whilst acknowledging the difficulties of assessing the cumulative effects across the coastal processes, Ms Sharma agrees with the applicant that there have been no discernible cumulative effects on coastal processes from sand extraction within the embayment. Ms Sharma makes recommendations on inclusions in the EMMP to include monitoring of the adjacent cells from which sand is extracted within the reporting as this will enable a better understanding of localised effects and changes in bathymetry, this has been accepted by the applicant.

Having considered the specialist assessments (and further information) provided with the application (including the management and monitoring proposed), and the technical review by Ms Sharma, it is considered that effects on coastal process from the extraction of sand within the extraction area proposed are acceptable from a resource management perspective.

Conditions of consent reflecting the application (including extent and method of extraction), implementation of the EMMP and monitoring and reporting are recommended should consent be granted.

Adverse ecological effects

Submissions

A significant number of submissions opposing the application raised concerns with the adverse ecological effects of the activity, including benthic biota fish, marine mammals, and birds.

Submissions were also received raising concerns with the adverse effects associated with underwater noise on marine mammals

Assessment

An assessment of ecological effects of the proposal prepared by Bioresearches is provided with the application (see Appendix five to the submitted A.E.E and as amended by the further information response in attachment 2A), along with an assessment of Underwater Noise Effects by Styles Group, and a Marine Mammal Assessment of Effects by Cawthron (both provided in the further information response in attachment 2A).

These assessments have been peer reviewed by Council's Senior Coastal Specialist Dr Kala Sivaguru who has provided a Technical Memo co-authored with Ms Sharma (see attachment 6).

The Bioresearches assessment presents the results from the monitoring of the sand extraction activities authorised under the existing permit, and summaries of these results are provided in the Council Technical Memo and are not repeated in detail here. With respect to the ecological assessments and the anticipated effects of the proposed sand extraction as presented by Bioresearches I note the following:

- In terms of benthic fauna:
    - There is a natural variation over time over and above any effects of sand extraction, with sand extraction having little or no effect on the percent composition of the major taxa groupings, with fewer polychaetes and bivalves present in the sand extraction areas, but an increase in number of crustacea when compared to the control area.
    - Benthic communities identified in the sand extraction areas are common along the north eastern coast of the North Island, with the results not indicating that the loss of benthic communities within the extraction area will impact on fisheries.
    - Stony Corals were recorded in one location within the sand extraction area, and areas identified as having stony corals be excluded from sand extraction.
    - The composition of the seabed is such that disturbance will not result in adverse ecological effects through chances of particle size or contamination.
    - Estimates of the time taken for a benthic community to recover from a disturbance event of the scale of sand dredging is between 6 months to several years.

  - Based on this frequency of dredging, extent of extraction area, and proposed limits of frequency on dredging the same cell, it is expected that the benthic communities will recover between dredging events.

- In terms of fin fish:
  - It is considered that mobile fish species will be able to avoid the dredge.
  - The amount of fine sediments discharged from the dredge will be small and unlikely to adverse affected fish present.
  - Results do not suggest there is a decrease in abundance of benthic biota for bottom feeding fish.

- In terms of birds:
  - No direct adverse effects on birds are anticipated, and it has been observed that birds frequent the area of the plume foraging for biota fragments.

- In terms of marine mammals:
  - Although Marine mammals are likely to be transient through the extraction area, they are not present in the extraction area, and the intermittent operation of the dredge is unlikely to have any adverse effects on cetaceans or pinnipeds within the extraction area;

In addition, with respect to marine mammals, the Marine Mammal Assessment of Effects by Cawthron, identifies that any adverse effects on marine mammals by the activity are less than minor to negligible, recommending that the activity be carried out in accordance with best practice shipping protocols to minimise any risk for collisions or entanglement.

With respect to the adverse effects of underwater noise, the Styles Group assessment models the underwater dredging noise of the *William Fraser* to assess the potential extent that the dredging noise may have on marine mammals. These results inform the Cawthron assessment on the effects that the underwater noise of the activity has on marine mammals, which concludes that the sound levels are not expected to result in any adverse injuries of noise exposure (either permanent (PTS) or temporary (TTS)), or result in any adverse behavioural effects. For completeness it is noted that as noise effects on fish and invertebrates are not expected to be greater than those predicted for marine mammals and are therefore are not explicitly addressed.

Having considered the assessments, in regards to effects on marine mammals and underwater noise predictions, Dr Sivaguru agrees that the effects from the predicted levels would be less than minor, and that there is unlikely to be any risk of TTS or PTS for marine mammals in the extraction area. Dr Sivaguru notes that as the modelling is based on the *William Fraser,* should an alternative vessel be used (which is not precluded), it would need to operate under similar conditions. I note that a condition restricting the sand extraction methodology to a trailer suction dredge, and requiring any changes to the method (which would include the vessel) to be confirmed as not having any materially different or increase in adverse effects is proposed by the applicant and is expected to address this matter should it arise during the implementation of the consent.

With respect to effects on fish and birds, Dr Sivaguru agrees with the applicant that they will not be directly affected by the extraction activities, and concludes that the total suspended solids (TSS) will be localised and temporary, reducing to ambient concentrations within a short time and therefore TSS from the extraction activities are not expected to have any effects on fish populations. Similarly, with respect to effects on water quality from the discharge, Dr Sivaguru concludes that any adverse effects of the extraction on water quality from turbidity and suspended sediment will be less than minor for the same reasons.

In terms of any cumulative ecological effects, Dr Sivaguru agrees with the applicant that the extraction of sand as proposed is not expected to result in cumulative effects, and the implementation of the EMMP as proposed by the applicant will enable cumulative effects to be identified should they arise.

With respect to the proposed management and monitoring of the sand extraction through the EMMP, Dr Sivaguru, agrees with the applicant's observations that the triggers did not help the monitoring of changes in benthic fauna being limited to two surveys across 17 years, however the proposed EMMP and triggers of volume of every 5 years, as proposed by the applicant, will be appropriate and adequate to provide monitoring data on changes to benthic biota and sediment composition.

Overall, Dr Sivaguru concludes that any adverse effects from sand extraction will be from minor in terms of benthic ecology to less than minor in terms fish, birds, marine mammals, water quality and underwater noise on marine mammals.

Having considered the specialist assessments (and further information) provided with the application (including the management and monitoring proposed), and the technical review by Dr Sivaguru, it is considered that any adverse ecological effects arising from the proposed extraction of sand are acceptable from a resource management perspective.

As noted above with respect to coastal processes, conditions of consent reflecting the application (including extent and method of extraction), implementation of the EMMP and monitoring and reporting are recommended should consent be granted.

Adverse effects on recreational activities

Submissions

A number of submissions were received that raised concerns with the adverse effects of the activity on recreational activities, and in particular adverse effects on surf breaks. Concerns were also raised with adverse effects on recreational fishing.

Assessment

In response to the submissions, the applicant has provided a detailed Surf Break Impact Assessment by eCoast (see attachment 2B) addressing the 6 regionally significant surf breaks within the Mangawhai-Pakiri embayment[3].

A detailed summary of this assessment is provided in the Council Technical Memo and is not

[3] Being Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island reef, and noting that Goat Island reef was identified as not having any potential impacts given its location 7km beyond the proposed extraction area.

repeated here. This assessment concludes that:

- The magnitude of potential impacts on wave quality at the 5 relevant surf breaks in the Mangawhai-Pakiri embayment associated with changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction are considered less than minor to negligible with the current consent.
- The potential impacts on wave quality due to changes in seabed morphology at the 5 central surf breaks in the Mangawhai-Pakiri embayment are also considered less than minor to negligible for the proposed resource consent application.
- Potential impacts on wave quality at the 5 sand-dependent surf breaks due to reduced sediment supply are considered less than minor to negligible for the proposed resource consent application and associated management regime.
- Based on the potential impacts and proposed management protocols (and in particular the EMMP), no direct monitoring of the surf breaks is recommended.

Council's Coastal Specialist Ms Sharma agrees with the applicant's conclusions outlined in both the Surf Impact Assessment and Coastal Processes Effects Report that the models and calculations show that the waves and surf breaks are unlikely to be impacted by the slight lowering of the seabed as shown in the bathymetry surveys, and that the proposed sand extraction (and monitoring and management proposed) will have negligible effects on the swell corridor of the surf break and the surf zone, noting that wave period does not change with water depth and is therefore unaffected by the proposed extraction.

With respect to effects on recreational fishing, noting the conclusions of the ecological assessments that fisheries will not be affected by the proposal, no specific adverse effects on recreational fishing have been identified.

On this basis, it is considered that adverse effects on recreational activities, including surfing and recreational fishing can be managed appropriately so that they are acceptable from a resource management perspective.

Adverse visual and landscape amenity effects

Submissions

Some submissions were received that raised concerns with the visual effects associated with the activity, and in particular the operation of the vessel.

Assessment

No specific assessment of landscape and visual effects is provided in the application, however the applicant has provided as part of the further information post notification (see attachment 2B), some images of the vessel operating within the extraction area. These images, along with a consideration of the potential viewing audience and visual and landscape amenity effects of the application have been considered by the Council's Consultant Landscape Architect Mr Peter Kensington.

Mr Kensington's assessment concludes that the proposal will result in very low adverse landscape, natural character and visual effects, subject to recommended conditions relating to the operation of the activity. In this regard, Mr Kensington recommends that during weekends and public holidays no sand extraction should occur during daylight hours. Mr Kensington also recommends that an upcoming operating schedule to be made available, and I also note that some submissions refer to the perception that the activity occurs during the night "in stealth" and having an understanding of the operational times may mitigate adverse amenity effects experienced by viewers on the nature of the activity (it is understood that in part the operation at night time, albeit for practical reasons is also to minimise the visual impact of the activity). I agree with this recommendation, and in the context of the nature of the activity and surrounding receiving environment and in particular the recreational use and enjoyment of this environment, it is recommend that a condition be imposed restricting the operation during daylight hours of the weekend and public holidays, and that an operational schedule be available.

Mr Kensington has also identified the potential for adverse cumulative effects should sand extraction occur at the same time from multiple vessels within the same visual catchment, and the area of the existing MBL whilst it continues to operate under s124 (noting that this application is made on the basis that only a single vessel will operate at any one time). Having considered this matter, whilst there is potential for this to occur, in the context of the extraction areas (which do not overlap) and surrounding receiving environment, it is considered that any adverse effects would be minimal whilst the MBL consent remained valid, and further consideration of any cumulative effects of multiple vessels will be relevant to the assessment of the MBL applications.

With the above considerations in mind, and subject to the recommended conditions, it is considered that any adverse landscape and visual amenity effects of the activity are less than minor and acceptable from a resource management perspective.

Adverse lighting effects

Submissions

Submissions were received that raised adverse nuisance effects associated with the lighting of the vessel.

Assessment

No specific assessment of adverse effects associated with lighting of the vessel is provided with the submitted A.E.E, however as part of the feedback on potential conditions post notification (see attachment 2B) the applicant has amended the proposal to include a condition requiring lighting to be downward facing and minimised as far as practical, subject to ensuring relevant regulations and safety requirements on the vessel are met.

As part of his review of the application, although Mr Kensington has concluded that any adverse natural character effects will be low, he has recommended that a condition be imposed restricting lighting to ensure that no objectionable glare occurs when viewing from land viewpoints.

In addition, as noted above with respect to amenity effects, it is recommended that a condition be imposed that the applicant maintain a schedule on their website of upcoming extractions, which may also mitigate the impact of adverse light effects (including nuisance) on some recreational activities.

Overall, it is considered that in the context of the activity, any adverse effects associated with lighting of the vessel can be managed to that they are less than minor.

Adverse surface noise effects

Submissions

Submissions were received that raised adverse surface noise effects of the operation of the vessel.

Assessment

An assessment of Airborne Noise Effects prepared by Styles Group has been submitted with further information response (see attachment 2A) which models the predicted noise levels of the *William Fraser* and ambient noise levels of the beach environment. This assessment concludes that the activity will meet the permitted noise standards of in the AUP (OP) by a significant margin (including with respect to night levels at any notational boundary within any Rural Coastal Zone land, and that with respect to s16 of the Act that any noise can be considered reasonable.

Council's Specialist, Contamination, Air & Noise Team, Mr Bin Qiu has reviewed the Airborne Noise Assessment by Styles Group and has confirmed that he agrees with the assessment and conclusions of the Styles Group report. Mr Qiu has concluded that the predicted noise levels from the proposed activity are significantly below the ambient noise levels and readily comply with the applicable AUP (OP) noise limits (day and night) and agrees that the noise from sand dredging is reasonable in terms of Section 16 of the Act.

Mr Qiu concludes that no specific noise mitigation measures are required in this case, and that the condition proposed by the applicant is appropriate subject to an amendment to ensure consistency with Chapter E25 of the AUP (OP). The proposed amendment (in addition to a rephrasing to fit the council format of conditions) relates to the measurement of noise being taken "*at the adjacent coastline and within the notational boundary of a site in the Rural Coastal Zone*", rather than "*when measured on shore from mean high water spring*" (see section 21 below).Having considered the relevant matters in chapter E25 and the assessments of Styles Group and Mr Qiu, it is considered that any adverse surface noise effects associated with the operation of the activity are less than minor, and acceptable in the context of the activity and surrounding environment.

Noting that whilst the application is made on the basis that the *William Fraser* is anticipated to be used to implement the consent (and was the subject of modelling for the Styles Group assessments), the consent does not preclude an alternative vessel from being used in the future to exercise the consent. However, given the significant margin of compliance, the proposed condition for compliance (and measurement) of noise levels is considered suitable to manage any potential changes should they arise.

Adverse heritage effects

Submissions

No submissions raised adverse heritage effects.

Assessment

In support of the application, a Heritage Assessment by Clough & Associates has been provided with the application (Appendix 7 to the submitted A.E.E). This assessment concludes that no known heritage sites have been identified, and in combination with the dredging that has occurred under the existing consents and ecological studies of the sea floor, that it is unlikely that the extraction of sand will result in any adverse effects from a heritage perspective.

Having reviewed this assessment, along with the council records of heritage sites it is accepted that any potential adverse heritage effects occurring are unlikely and can be considered acceptable from a resource management perspective.

Actual and potential effects on cultural values

Submissions

A number of submissions in opposition to the application raised that the proposed activity will have broad adverse cultural effects.

Assessment

An assessment of effects on cultural values is provided in section 5 of the submitted A.E.E, which identifies that a Memorandum of Understanding (MoU) is in place with the Ngati Wai Trust Board. An update is provided in the further information response (see attachment 2A), outlining that consultation with Ngati Manuhiri Settlement Trust, Ngati Wai Trust Board, and a representative of Ngapuhi Nui Tonu - Awataha, Matawhaorua, Maungarei, Taiao, Te Kotahitanga and Waitangi Maraes is ongoing.

A cultural values assessment from Te Uri o Hau is included in the post notification further information (see attachment 2B). With respect to the recommendations of the cultural values assessment by Te Uri o Hau, the applicant has advised that these will be included in an update to their recommended conditions. Comments on these conditions (if required) by council can be provided at the hearing.

It is anticipated that further updates from the applicant and any proposed inclusions in the conditions from other mana whenua consultation will also be provided at the hearing.

It is also noted that Ngāti Manuhiri Settlement Trust, and other local mana whenua have made broad submissions in opposition of the application.

Summary

Actual and potential effects conclusion

In summary, subject to new or contrary evidence being presented at the hearing, my opinion is that the adverse effects of the proposed sand extraction are acceptable in the context of the receiving environment and that adverse effects are considered to be minor, and can be appropriately managed through conditions of consent consistent with the management, monitoring, and reporting proposed as part of the application. In combination with the positive effects of the proposal, the sand extraction and associated discharge is considered to be acceptable from an effects perspective.

15. Relevant statutory documents - s104(1)(b)

The following are not applicable to the current resource consent application:

- No national environmental standards are relevant to this application (s104(1)(b)(i));
- No other regulations apply to this application (s104(1)(b)(ii));
- No national policy statements are relevant to this application;

Accordingly, only the relevant statutory documents and other matters are considered below.

New Zealand Coastal Policy Statement 2010 (NZCPS) – s104(1)(b)(iv)

The purpose of the NZCPS is to state policies in order to achieve the purpose of the RMA in relation to the coastal environment of New Zealand.

Given the nature of the application the NZCPS is of particular relevance, and the relevant objectives and policies of the NZCPS include:

- Objective 1:

  To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

  - *maintaining or enhancing natural biological and physical processes in the coastal*
  - *environment and recognising their dynamic, complex and interdependent nature;*
  - *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and*
  - *maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*

- Objective 2

  To preserve the natural character of the coastal environment and protect natural *features and landscape values through:*

- *recognising the characteristics and qualities that contribute to natural character,*
- *natural features and landscape values and their location and distribution;*
- *identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and*
- *encouraging restoration of the coastal environment.*

- Objective 3

  To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:

  - *recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;*
  - *promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;*
  - *incorporating mātauranga Māori into sustainable management practices; and*
  - *recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.*

- Objective 4

  To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

  - *recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;*
  - *maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and*
  - *recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.*

- Objective 6

To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*
- *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*
- *functionally some uses and developments can only be located on the coast or in the coastal marine area;*
- *the coastal environment contains renewable energy resources of significant value;*
- *the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;*
- *the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;*
- *the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and*
- *historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.*

- Policy 1: *Extent and characteristics of the coastal environment*;
- Policy 2: *The Treaty of Waitangi, tangata whenua and Māori*;
- Policy 3: *Precautionary approach*;
- Policy 4: *Integration;*
- Policy 6: *Activities in the coastal environment;*
- Policy 11: *Indigenous biological diversity (biodiversity)*;
- Policy 13: *Preservation of natural character*;
- Policy 15: *Natural features and natural landscapes*; and
- Policy 23: *Discharge of contaminants*.

Having considered the relevant matters in the NZCPS, the management techniques proposed by the applicant, and the specialist assessments of the sand extraction activity, I am satisfied that the proposed sand extraction and associated discharge activities can be managed in a way that is consistent with the anticipated outcomes of the NZCPS for the following reasons:

- Adverse effects on coastal processes and ecology are considered to be minor, and can be appropriately managed through conditions of consent consistent with the management, monitoring, and reporting proposed as part of the application;
- Any adverse effects on natural features and landscape values are assessed to be less than minor, and the nature of the activity is not anticipated to have any adverse effects on the natural character of the coastal environment;
- It is recognised that the applicant has engaged with Tangata Whenua (noting that engagement remains ongoing);
- The sand extraction activities do not impact on public access, and are not anticipated to have any adverse effects of significance on recreational activities;
- The proposed activity is considered to have positive social and economic benefits associated with the resource, and can be undertaken in a manner where significant adverse effects on the coastal environment are avoided and will not affect any protected coastal areas;
- The proposed activity includes appropriate management and monitoring that reflects the coastal environment where to the activity will occur;
- The applicant has demonstrated that adverse effects of the activity can be reasonably identified and suitable management (including monitoring) applied to the proposed activities such that applying a precautionary approach is not required to restrict the activity in this case; and
- Discharges associated with the activity are not anticipated to have any significant effects on the coastal environment.

Hauraki Gulf Marine Park Act 2000 (HGMPA) – s104(1)(b)(iv)

The council must have regard to sections 7 and 8 of the HGMPA when it is considering an application for resource consent for the Hauraki Gulf, its islands, and catchments. These sections are treated as a New Zealand coastal policy statement.

Section 7 recognises its national significance, while s8 outlines the objectives of the management of the Hauraki Gulf, its islands and catchments.

The objectives seek to protect, maintain and where appropriate enhance the life supporting capacity of the environment of the Hauraki Gulf and its islands.

Given the nature of the application, the HGMPA is of particular relevance to the application and an assessment of the HGMPA is provided in section 7 of the submitted A.E.E. This assessment concludes that the proposal is consistent with s7 of the HGMPA as it can be undertaken in a manner which does not adversely impact on the life supporting capacity of the Hauraki Gulf, and is not contrary to s8, as in addition to not adversely affecting life supporting capacity, no significant natural, physical (including kaimoana) or historic features will be adversely affected by the proposed sand extraction.

As with the consideration of the NZCPS, having considered the relevant matters in the HGMPA, the management techniques proposed by the applicant, and the specialist assessment and peer reviews of the council specialists (as outlined in the assessments above), I am satisfied that the proposed sand extraction can be managed in a way that is consistent with the anticipated outcomes of the HGMPA.

Auckland Unitary Plan (Operative in part): Chapter B Regional Policy Statement – s104(1)(b)(v)

Chapter B of the AUP (OP) sets out the strategic framework for the identified issues of significance, and resultant priorities and outcomes sought. These align with the direction contained in the Auckland Plan.

- B4. Te tiaki taonga tuku iho - Natural heritage
- B6. Mana Whenua
- B7. Toitū te whenua, toitū te taiao – Natural resources
- B8 Toitū te taiwhenua - Coastal environment

With respect to the above matters, the following comments are made:

- The sand extraction activity can be undertaken in a manner that ensures that the significant adverse effects associated with the activity are either avoided, or mitigated, and appropriately managed to minimise any adverse effects on the coastal environment;
- It is recognised that the applicant has engaged with Tangata Whenua (noting that engagement remains ongoing);
- The proposal reflects the high level direction of the plan to provide for mineral extraction activities in the Auckland region;
- The proposal is not located in any Significant Ecological Area or Outstanding Natural Landscape Overlay areas.

Plan or Proposed Plan – section 104(1)(b)(vi)

The relevant plans are identified in section 10 above of this report, and the proposal is considered against the relevant provisions below.

Auckland Unitary Plan (Operative in part)

Relevant objectives and policies

An assessment of the relevant objectives and policies of the sand extraction activity is provided in section 6 of the submitted A.E.E., whist an assessment of the relevant objectives and policies for the discharge is provided within the further information response addressing the inclusion of the additional reason for consent in attachment 2B.

With this assessment in mind, the following objectives and policies are considered relevant in this case:

Water Quality and Integrated Management (Chapter E1)

Managing water quality and integrating water management has direct ties to the objectives of the National Policy Statement for Freshwater Management (2011) (NPSFM) and the New Zealand Coastal Policy Statement (NZCPS), and recognises the need to have an approach in the AUP (OP) that seeks to improve the integrated management of freshwater and the use and development of land.

Of particular relevance is the direction to Plan to ensure that discharges associated with the activity prevent or minimise adverse effects of contaminants on coastal water quality.

As outlined in the assessments above and specialist reporting, given the nature of the discharge and the receiving environment, any adverse effects are considered to be localised and temporary, and are not anticipated to have adverse effects on water quality.

Coastal – General Coastal Marine Zone (Chapter F2)

F2.3 Depositing and disposal of material

Within the coastal environment, the AUP (OP) seeks to ensure that the disposal of any material in the CMA does not adversely affect natural character, coastal processes, water quality, sediment quality and the ecology of an area.

Given the nature of the discharge associated with the sand extraction activities, it is anticipated that any discharge will be localised and temporary, reducing to ambient concentrations within a short time, and is not anticipated to have any significant effects on coastal processes, water quality, sediment quality or the ecology of the extraction area.

F2.5 Disturbance of the foreshore and seabed

The AUP (OP) seeks to ensure that activities that disturb the foreshore and seabed are managed appropriate to ensure that adverse effects are managed appropriately.

In this case, based on the specialist assessments by the applicant and the peer reviews by the council specialists, it is considered that whilst the activity will disturb the seabed and result in discharge of sediment, that any adverse effects on coastal processes, coastal ecology, and recreational activities (in particular surfing) can be managed appropriately so that any adverse effects are appropriately mitigated such that they are acceptable in the context of the receiving environment.

As noted above with respect to landscape and visual amenity effects, in the context of the surrounding environment and in particular the recreational use and enjoyment of the coastal environment, that limiting the activity during daylight hours of the weekend and public holidays is recommended.

F2.6 Mineral extraction

The demand for minerals, including sand from the CMA and the social and economic benefits that are associated with extracting the resource is recognised by the AUP (OP), along with the need to ensure that the adverse effects of the mineral extraction are appropriately managed to ensure significant adverse effects do not occur.

As outlined in the assessments above, the location of the proposed extraction areas (beyond the DoC / Hallemeier limit) and management through the implementation of the EMMP (and application of the management cells) is considered appropriate to ensure that no significant adverse effects arise through the implementation of the activity.

F2.11 Discharges

Given the sensitive nature of the receiving environment, the AUP (OP) seeks to ensure that discharges associated with activities in the coastal environment do not adversely affect water quality or coastal ecology.

As noted above, given the nature of the discharge associated with the sand extraction activities, it is anticipated that any discharge will be localised and temporary, reducing to ambient concentrations within a short time, and is not anticipated to have any significant effects on coastal processes, water quality, sediment quality or the ecology of the extraction area.

F2.14 Use, development and occupation in the coastal marine area

The AUP (OP) acknowledges that within the CMA provision needs to be made to enable use and development, whilst providing for public access and enjoyment of the coastal environment.

In this case, the extraction of sand does not limit public access, or unreasonably affect recreational activities in the coastal environment. Whilst the extraction of the resource has a functional and operational need to be located within the CMA. There are no other existing activities that have occupation rights within the proposed extraction area.

F2.18 Underwater Noise

The Plan seeks to manage adverse effects associated with underwater noise sources on marine mammals and users of the coastal environment.

As outlined in the assessments above, the underwater noise associated with the operation of the vessel and dredge is of a level that any adverse effects on marine mammals and fish will be less than minor.

Summary – F2 - General Coastal Marine Zone

Overall, the proposal is considered to be generally consistent with the outcomes anticipated by the AUP (OP) for activities in the General Coastal Marine Zone.

Natural character of the coastal environment (Chapter E18) and Natural features and natural landscapes in the coastal environment (Chapter E19)

Managing the natural character, natural features and natural landscapes of the coastal environment has direct ties to the objectives of the New Zealand Coastal Policy Statement (NZCPS), and the AUP (OP) recognises that given this sensitive environment, there is a need to have consideration of the natural character of the coastal environment that are not within scheduled Outstanding Natural Character and High Natural Character Overlays (in Chapter E18), or within the Outstanding Natural Features Overlay or the Outstanding Natural Landscapes Overlays (in Chapter E19).

In this case, as outlined in the assessments above, any adverse effects on natural features and landscape values are assessed to be less than minor, and the nature of the activity is not anticipated to have any adverse effects on the natural character of the coastal environment.

Noise and vibration (Chapter E25)

The AUP (OP) seeks to control the levels of noise and vibration created by activities to limit adverse effects on amenity values, human health, as well as to protect existing activities from reverse sensitivity effects.

As outlined in the assessment above, the predicted noise levels from the proposed activity are significantly below the ambient noise levels and readily comply with the applicable AUP (OP) noise limits (day and night), and therefore are considered to be consistent with the outcomes and direction of the plan in this case.

Conclusion

In accordance with an assessment under s104(1)(b) of the RMA the proposal is generally consistent with the relevant statutory documents for managing adverse effects associated with the activities proposed. In particular the extraction of sand and associated discharge from the areas proposed can be appropriately manged within the coastal environment so that significant adverse effects are avoided, and the natural character and features of the receiving environment are maintained.

16. Any other matter – section 104(1)(c)

Section 104(1)(c) requires that any other matter the consent authority considers relevant and reasonably necessary to determine the application be considered. In this case the following matters are considered relevant.

Submissions

All of the submissions received by the council in the processing of this application have been reviewed and considered in the overall assessment of effects in this report. The council’s specialists have also reviewed the relevant submissions as required and incorporated comments into their assessments accordingly. Many of these submissions raised similar issues and have been dealt with generically in the body of this report. Those that have raised specific resource management matters and points of clarification have been specifically addressed in the assessment of actual and potential effects contained in section 14 of this report.

Local Board comments

The Rodney Local Board were invited to provide comments on the application on 24/04/2020. No comments were received from the Local Board.

Compliance with existing permits

A significant number of submissions raised concerns that the applicant has not complied with the limits of the existing consent. Noting that as the sand is extracted by MBL on behalf of the applicant, with the same vessel used to implement their existing permit, it is difficult for observers to identify which consent is being implemented. As such, the compliance records for both the existing permit held by the applicant, and the existing permit held by MBL were checked, and I have been advised that there have been no compliance issues with either consent.

Other relevant legislation

<u>Marine and Coastal Area (Takutai Moana) Act 2001</u>

Within section 8 of the submitted A.E.E, the applicant has outlined that they have undertaken consultation in accordance with s62 of the Marine and Coastal Area (Takutai Moana) Act.

17. Other relevant RMA sections

Monitoring – s35

Should consent be granted, the activity will need to be monitored in accordance with the conditions specified in this report, and the requirements contained in the AUP (OP).

It is considered that should consent be granted that a condition should be included on the consent to ensure that a suitable monitoring is provided for, and that reflects that monitoring of the consent will be required for the duration of the activity.

Matters relevant to discharge and coastal permits – s105

The proposal requires a consent to discharge contaminants under s15. Under section 105, the Council must have regard to additional matters for any application for a discharge permit or a coastal permit that would contravene s15 or s15B of the RMA. The proposal is considered to satisfy the matters set out in s105 because:

- With respect to the discharges to water, I am satisfied that the provisions of s105 have been met as the proposal will not generate any significant adverse effects (in particular any ecological effects), and that the applicant has demonstrated that the discharge is appropriate in the circumstances and underlying zoning. In addition, there are no alternative methods of discharge applicable in this case.

Restrictions on discharge permits – s107

The Council must have regard to the restriction on the granting of certain discharge permits that would contravene sections 15 or 15A. The proposal satisfies the provisions of s107 because:

- Having considered the nature and scale of effects associated with the discharge to water, I do not consider that section 107 matters are relevant to the level of discharge which will result from the proposal.

Conditions of resource consents – ss108, 108AA

The conditions offered by the applicant (updated as part of the post notification further information) are included in attachment 2B.

Council's specialists have reviewed these conditions as part of their assessments, and a recommended set of conditions is included in section 21 below. This set includes conditions recommended by the applicant to form part of the proposal.

In general, the applicant's proposed conditions are consistent with those recommended by the report writer and the Council specialists, however it is noted that the structure and order of the conditions do differ in that they reflect the standard Council structure and format and requirements for submissions of documents.

As outlined in the assessments above, additional conditions relating to the operational times, provision of a schedule, and some minor amendments to condition wording are proposed. It is noted that the council do not support the inclusion of a default approval following the submission of documents.

Duration of resource consents – s123

The applicant seeks that consent be granted for a 20 year period, and this is supported by the council specialists, and in particular the review of Ms Sharma and Dr Sivaguru. In the context of the nature of the activity, receiving environment, and monitoring and management conditions that form part of the application, it is considered that a term of 20 years is appropriate for the activity.

Lapsing of resource consents – s125

Under s125, if a resource consent is not given effect to within five years of the date of the commencement (or any other time as specified) it lapses automatically, unless the council has granted an extension. In this case, five years is considered an appropriate period for the consent holder to implement the consent due to the nature and scale of the proposal.

Review condition – s128

Section 128 of the RMA provides for the council to review the conditions of a resource consent at any time specified for that purpose in the consent. A consent may specify a time for review of the conditions of a consent for the following purposes.

- to deal with any adverse effects on the environment which may arise from the exercise of consent and which are appropriate to deal with at a later stage; or
- to require holders of discharge permits or coastal permits which could otherwise contravene ss15 or 15B of the Act to adopt the best practicable option to remove or reduce any adverse effect on the environment; or
- for any other purpose

In the case of coastal, water or discharge permits the council may also review conditions of consent at certain specified times.

The applicant has specifically proposed a review condition be imposed on the consent and this is supported by the council specialists and the writer as an appropriate condition for an application of this nature.

18. Consideration of Part 2 (Purpose and Principles)

Purpose

Section 5 identifies the purpose of the RMA as the sustainable management of natural and physical resources. This means managing the use of natural and physical resources in a way that enables people and communities to provide for their social, cultural and economic well-being while sustaining those resources for future generations, protecting the life supporting capacity of ecosystems, and avoiding, remedying or mitigating adverse effects on the environment.

Principles

Section 6 sets out a number of matters of national importance which need to be recognised and provided for. These include the protection of outstanding natural features and landscapes, the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna, and the protection of historic heritage.

Section 7 identifies a number of "other matters" to be given particular regard by the council in considering an application for resource consent. These include the efficient use of natural and physical resources, and the maintenance and enhancement of amenity values.

Section 8 requires the council to take into account the principles of the Treaty of Waitangi.

Assessment

Any consideration of an application under s104(1) of the RMA is subject to Part 2. The Court of Appeal in *R J Davidson Family Trust v Marlborough District Council* [2018] NZCA 316 has held that, in considering a resource consent application, the statutory language in section 104 plainly contemplates direct consideration of Part 2 matters, when it is appropriate to do so. Further, the Court considered that where a plan has been competently prepared under the RMA it may be that in many cases there will be no need for the Council to refer to Part 2. However, if there is doubt that a plan has been "competently prepared" under the RMA, then it will be appropriate and necessary to have regard to Part 2. That is the implication of the words "subject to Part 2" in s104(1) of the RMA.

In the context of these discretionary activity applications for coastal and discharge permits, where the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental outcomes. They also provide a clear framework for assessing all relevant potential effects, and I find that there is no need to go beyond these provisions and look to Part 2 in making this decision as an assessment against Part 2 would not add anything to the evaluative exercise.

19. Conclusion

Having considered the proposal against the relevant matters in the AUP (OP), the proposed extraction of sand and associated discharge has been demonstrated to be consistent with the direction of the Plan with respect to mineral extraction activities and discharges in the General Coastal Marine Zone. The proposal is considered to have positive social and economic benefits associated with the extraction of the resource, whilst the actual and potential adverse effects can be managed to ensure that they are acceptable from a resource management perspective.

In the context of the consideration and testing the broad discretionary aspects of the application, the proposal is also considered to be consistent with the outcomes of the NZCPS, HGMPA, and intent of Part 2 and is an efficient use of a natural resource.

Overall, the proposed sand extraction is considered to be acceptable in the context of the receiving and surrounding coastal environment, and I am satisfied that subject to conditions of consent this proposal can be supported from a resource management perspective.

20. Recommendation

Subject to new or contrary evidence being presented at the hearing, I recommend that under sections 104, 104B, 105, 106, 107, and Part 2, resource consents are **GRANTED SUBJECT TO CONDITIONS** for the extraction of sand within the Coastal Marine Area offshore from Pakiri (as defined in section 1 of this report).

The reasons for this recommendation are:

1. In accordance with an assessment under ss104(1)(a) and (ab) of the RMA, the actual and potential effects from the proposal are found to be acceptable, in particular:

   a. It is considered that effects on coastal process, including cumulative effects associated with the extraction of sand within the extraction area can be managed to ensure that they are acceptable from a resource management perspective.

b. In the context of the receiving environment, it is considered that any adverse ecological effects arising from the proposed extraction of sand can be managed to ensure that they are acceptable from a resource management perspective.

c. The proposed sand extraction is considered to have negligible effects on the swell corridor of the surf break and the surf zone and the wave period will not change as a result of the sand extraction activities.

d. The proposal is not anticipated to have any adverse effects on recreational fishing.

e. In the context of the scale and nature of the receiving environment, any adverse landscape and visual amenity effects of the activity are considered to be less than minor and acceptable from a resource management perspective.

f. It is considered that adverse effects associated with lighting of the vessel can be managed to that they are less than minor.

g. Any adverse surface noise effects associated with the operation of the activity are considered to be less than minor, and acceptable in the context of the activity and surrounding environment.

h. The proposal is not anticipated to have any adverse heritage effects, and no known heritage features have been identified in the extraction area.

i. The proposal is considered to have positive social and economic effects associated with the value that the resource has for the construction industry and the growth of Auckland.

2. In accordance with an assessment under s104(1)(b) of the RMA, the proposal is found to be consistent with the relevant statutory documents. In particular:

a. The proposal is considered to be consistent with the anticipated outcomes of the NZCPS and HGMPA for the management of activities and discharges in the coastal environment, and in particular adverse effects of the activities on the coastal environment can be appropriately managed through conditions of consent consistent with the management, monitoring, and reporting proposed as part of the application so that significant adverse effects are avoided, and the natural character and features of the receiving environment are maintained;

b. The proposal is considered to be generally consistent with the direction of the AUP (OP) for the management of activities within the General Coastal Marine Zone, and with respect to the management of adverse effects on water quality and associated with noise. In addition, the activities can be managed to ensure that any adverse effects associated with the sand extraction and associated on the coastal environment are acceptable from a resource management perspective and consistent with the outcomes anticipated by the AUP (OP).

3. In accordance with an assessment under s104(1)(c) of the RMA, relevant other matters including the requirements of the Marine and Coastal Area (Takutai Moana) Act 2001, compliance with existing permits, and input from submitters and the local board have been considered. No other matters are considered relevant.

4. In regard to other relevant RMA sections:

   a. Having considered the nature and scale of the effects associated with the proposed discharges to the coastal environment, the discharges are considered appropriate with respect to s105 and in particular:

      i. The applicant has given regard to the nature of potential discharges and sensitive areas of the receiving environment, and provided sufficient detail to confirm that that the adverse effects can be managed so that they are acceptable;

      ii. The applicant has proposed best practice contamination land management to ensure that effects of contaminants are managed in the most efficient and effective way for the environment.

      iii. Given the nature of the proposal, no alternatives are considered to be practical.

   b. There are no reasons with respect to the provisions of s107 that restrict the granting of consent.

5. In regard to Part 2 of the RMA, in the context of these discretionary activity applications for coastal and discharge permits, where the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental outcomes. They also provide a clear framework for assessing all relevant potential effects, and I find that there is no need to go beyond these provisions and look to Part 2 in making this decision as an assessment against Part 2 would not add anything to the evaluative exercise.

6. Overall, having considered the proposal against the relevant matters in the AUP (OP), the proposed extraction of sand and associated discharge has been demonstrated to be consistent with the direction of the Plan with respect to mineral extraction activities in the General Coastal Marine Zone. The proposal is considered to have positive social and economic benefits associated with the extraction of the resource, whilst the actual and potential adverse effects can be managed to ensure that they are acceptable from a resource management perspective.

   In the context of the consideration and testing the broad discretionary aspects of the application, the proposal is also considered to be consistent with the outcomes of the NZCPS, HGMPA, and intent of Part 2 and is an efficient use of a natural resource.

   For these reasons, the proposed sand extraction is considered to be acceptable in the context of the receiving coastal and surrounding land environment, and subject to conditions of consent acceptable from a resource management perspective.

21. Conditions

Under sections 108 and 108AA, I recommend any grant of these resource consents are subject to the following conditions:

Consent Glossary

ASEA	Approved sand extraction sub-area.
Management Cell	Subdivisions of the Extraction Area as defined on the Beca Drawing 3233103-CA-011.
EMMP	Environmental Monitoring Management Plan
Extraction Area	The consented sand extraction area as defined by the following coordinates:

Point New Zealand Transverse Mercator Projection World Geodetic System 1984 (G1762)

Point ID	Northing (NZTM)	Easting (NZTM)	LAT (Y)	LONG (X)
1	5990925.3	1758084.67	36 12 48.98649 S	174 45 31.24864 E
2	5989464.69	1756328.79	36 13 37.39802 S	174 44 22.00475 E
3	5994126.25	1751721.2	36 11 08.81017 S	174 41 14.26562 E
4	5998824.36	1748945.94	36 08 37.94140 S	174 39 19.99142 E
5	6000863.22	1747812.5	36 07 32.41856 S	174 38 33.27521 E
6	6002956.33	1746958.06	36 06 24.97795 S	174 37 57.69935 E
7	6004081.89	1748380.44	36 05 47.68210 S	174 38 53.80442 E

MMMP	Marine Mammal Management Plan
PSEA	Proposed Sand Extraction Area
PSEAR	Pre-Sand Extraction Assessment Report
SEMR	Sand Extraction Monitoring Report.

General conditions

These conditions apply to all resource consents.

1. These consents shall be carried out in accordance with the documents and drawings and all supporting additional information submitted with the application, detailed below, and all referenced by the council as resource consent number CST60343373 and DIS60371583:

   - Application Form and Assessment of Environmental Effects titled "Resource Consent Application and Assessment of Effects on the Environment of the Continuation of Sand Extraction" prepared by David Hay of OsborneHay (North), dated July 2019.

Report title and reference	Author	Rev	Dated
Auckland Offshore Sand Extraction Site – Review of Coastal Processes Effects	Beca	D	15 July 2019
Assessment of Ecological Effects: Following Sand Extraction from Auckland Offshore Sand Extraction Site	Bioresearches	1	24 July 2019
The Economic Contribution and Impact of Pakiri Sand Extraction	M.E. Consulting	-	7 August 2019
Deep Sand Dredging from Hauraki Gulf, Mangawhai Heads to Te Arai Point: Heritage Assessment	Clough & Associates	-	2011
Assessment of Underwater Noise Effects Sand Extraction – Auckland Offshore Extraction Area Mangawhai – Pakiri Embayment	Styles Group	2	31 March 2020
Assessment of Airborne Noise Effects Sand Extraction – Auckland Offshore Extraction Area Mangawhai – Pakiri Embayment	Styles Group	2	25 February 2020
Pakiri Sands, Multibeam Echo-Sounder Survey December 2018 Report of Survey	Survey Worx	3	23.05.2019
Kaipara LTD Offshore Sand Extraction: Marine Mammal Assessment of Effects	Cawthron		April 2020
Surf Break Impact Assessment: Mangawhai-Pakiri Kaipara Excavators Ltd Offshore Dredging Consent	eCoast	2	2 September 2020
Draft Environmental Monitoring Management Plan (EMMP)	Kaipara Limited	Draft V1	24/07/2019

Drawing title and reference	Author	Rev	Dated
Proposed Extraction Consent Area Drawing No 3233103-CA-010	BECA	A	08 June 2020
Existing and Proposed New Operating Areas Drawing No 3233103-CA-012	BECA	A	16 July 2019
Existing and Consented Extraction Areas Drawing No 3233103-CA-013	BECA	A	16 July 2019
Proposed EMMP Management Layout Drawing No 3233103-CA-011	BECA	A	16 July 2019

Other additional information	Author	Rev	Dated
Further Information Response: RE: CST60343373-S92 Response and Public Notification Request Including: • Assessment of Underwater Noise Effects (Styles Group): • Assessment of Airborne Noise Effects (Styles Group): • S92 Response – Ecology (Bioreserches) • S92 Response – (Beca) • Surveyworks Report of Survey; and • Marine Mammal Assessment of Effects (Cawthron)	Collated by David Hay of Osborne Hay	-	April 14 2020
Email: RE Kaipara Ltd Offshore Sand Extraction Site Application – Change to Site Boundary	David Hay of Osborne Hay	-	1 July 2020
Email: Kaipara Ltd – Additional Reasons for Resource Consent Including: • Letter: Kaipara Limited / CST60343373 / Discharges,	David Hay of Osborne Hay	-	1 July 2020

prepared by Morgan Slyfield, dated 10 September 2020

- Assessment: Re: Kaipara Ltd Application – Assessment of Discharges and Disposal, prepared by David Hay of Osborne Hay (North), dated 31 August 2020.

Cultural Effects Assessment	Te Uri o Hau	August 2020

2. Under section 125 of the RMA, these consents lapse five years after the date they are granted unless:

    a. The consents are given effect to; or

    b. The council extends the period after which the consents lapse.

3. The consent holder shall pay the council an initial consent compliance monitoring charge of $1,020 (inclusive of GST), plus any further monitoring charge or charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to these consents.

    Advice note:

    The initial monitoring deposit is to cover the cost of inspecting the site, carrying out tests, reviewing conditions, updating files, etc., all being work to ensure compliance with the resource consent(s). In order to recover actual and reasonable costs, monitoring of conditions, in excess of those covered by the deposit, shall be charged at the relevant hourly rate applicable at the time. The consent holder will be advised of the further monitoring charge. Only after all conditions of the resource consent(s) have been met, will the council issue a letter confirming compliance on request of the consent holder.

Duration of the consent

4. These consents shall expire 20 years from date of consent unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.

Commencement of the Consent and Surrender of existing consent

5. The consent holder shall notify the Council in writing at least ten (10) working days prior to sand extraction commencing under this consent.

6. Within 1 month of sand extraction commencing under this consent, the existing Coastal Permit 20795 is to be surrendered by the consent holder.

7. The consent holder shall notify Environs Holdings Limited (for the Te Uri o Hau Settlement Trust) in writing at least ten (10) working days prior to sand extraction commencing under this consent.

Provide for a review under section 128

8. Under section 128 of the RMA the conditions of this consent may be reviewed by the Council (Manager - Resource Consents) at the consent holder's cost:

   a. On five years following the commencement of the consent and every subsequent five years:

      (i) To deal with any significant adverse effect on the environment which are identified through the sand extraction monitoring report (SEMR); and

      (ii) To require any remedial actions or alterations to the extraction and discharge activities to rectify the significant adverse effects identified by (i).

Occupancy of the Common Marine and Coastal Area

9. The occupation of the common marine and coastal area by the authorised activities is not an exclusive right of occupancy. The general public or any person(s) may not be excluded from the area(s) or any part of the area(s) to which this consent applies.

Operational conditions

Extraction area

10. Sand extraction shall be limited to the approved extraction sub-areas (ASEA) within the extraction area as defined on the Beca Drawing 3233103-CA-010 Rev A. The extent of the extraction area is defined by the co-ordinates in the consent glossary and numbered 1 to 7 in the Chart References included on the Beca Drawing 3233103-CA-010 Rev A.

Sand extraction volume

11. The total volume of sand extracted (which is the sand which is loaded into the barge and transported from the site) during the life of the consent shall not exceed 2,000,000m^3. Sand extraction between the western boundary of the extraction area (being the 25m isobath) and the 30m isobath shall be limited to no more than 150,000m^3 of sand during any 12-month period.

12. In the event that sand extraction within a single cell in an ASEA reaches 40,000m^3 in any 12-month period then no further sand extraction from that cell is permitted for the following 12 months.

Sand extraction methodology

13. The sand extraction shall be carried out using a trailer suction dredge.

14. Any change of the sand extraction method from that provided in the consent application documentation will require the written approval from the Council, before any change in the sand extraction operation.

    Advice Note:

    Before such approval is given the consent holder shall provide a report that demonstrates that any proposed change of the sand extraction method (including *change to a different vessel) will not result in any materially effects and/or any increase in adverse environmental effects above those identified and assessed for the approved sand extraction methodology.*

Operational time restriction

15. No sand extraction shall take place during daylight hours on weekends or public holidays.

Management Plans

Environmental monitoring management plan

16. Prior to the preparation of the first PSEAR, the Consent Holder shall submit to the Council an environmental monitoring management plan ("EMMP") for certification to confirm that the monitoring to be undertaken in accordance with the EMMP will achieve the objectives of the EMMP and compliance with the relevant consent conditions.

    Any subsequent review or updates of the monitoring methodologies proposed in the EMMP shall be submitted to the Council for certification. Any other updates to the EMMP (including final PSEAR and PSEMP reports) shall also be submitted to the Council so that Council can maintain a current copy of the EMMP.

17. The consent holder shall meet the costs of the production, certification and subsequent updating of the EMMP. The EMMP will be based on the draft EMMP (dated September 2000) submitted with the resource consent application.

18. The EMMP shall:

    a. Outline the objectives of the EMMP and the proposed monitoring programme.

    b. Include a plan showing the sand extraction area, proposed sand extraction areas (PSEA) and approved sand extraction sub-areas (ASEA).

    c. Include a table defining the maximum quantity of sand to be extracted and volume which has been extracted from each PSEA and ASEA.

    d. Detail the pre-sand extraction monitoring programme for the pre-sand extraction assessment report (PSEAR) for each PSEA (as required under Condition 20) which shall:

        (i) Insofar as it relates to biological monitoring, be based on the: BACI (Before-After-Control-Impact) monitoring approach;

        (ii) Include, where appropriate, multiple control and impact sites;

        (iii) Set out the proposed reporting regime for the results of the monitoring, which, as a minimum, shall include a final reporting date three months from the completion of the monitoring programme, and may include interim reporting dates;

        (iv) Set out the bathymetric survey method for the sea floor (pre-sand extraction); and

(v) Sediment texture monitoring methodology.

e. Set out the monitoring programme for the sand extraction monitoring report (SEMR) (as required under the conditions of this consent) which shall:

(i) Set out the bathymetric survey method for the sea floor (post-sand extraction);

(ii) Sediment texture monitoring methodology;

(iii) Set out the monitoring methodology for the collection of information capable of detecting whether the sand extraction is having effects of ecological significance upon benthic macrofauna; and

(iv) Set out the methodology for the collection of information capable of determining how long it takes for the benthic macrofauna community affected by sand extraction to recover to levels which existed prior to the commencement of sand extraction operations.

f. Include copies of any completed PSEAR and SEMR.

19. All updates to the EMMP (including monitoring reports) shall be submitted to Environs Holdings Ltd (for the Te Uri o Hau Settlement Trust) so that Environs Holdings Ltd can hold a current copy of the EMMP.

Marine Mammal Management Plan

20. Prior to the commencement of the consent, the consent holder shall submit to Council a final Marine Mammal Management Plan (MMMP) (based on the draft MMMP dated 08/12/2020) for certification.

21. The MMMP shall detail the following:

a. Methods employed to minimise risk of whale strike;

b. Methods employed to avoid the attraction of marine mammals to the extraction vehicle;

c. Methods employed to minimise entanglement of marine mammals with the dredgehead and associated underwater equipment.

22. Any subsequent review or updates of the MMMP shall be submitted to the Council for certification. In the event the MMMP is not certified by the Council, a clear summary of alterations required for certification shall be provided to the consent holder by the Council.

Monitoring and Reporting

Volume and location

23. The Consent Holder shall keep daily records of the volume of sand loaded into the barge, the cell where extraction has occurred, the date, time, water depth and sea conditions during the period of extraction. The track of the sand extraction vessel shall be recorded and mapped using a differential global positioning system ("DGPS").

24. The Consent Holder shall provide a copy of the extraction records and the digital vessel tracking (as required by Condition 23) to the Council, annually by 15 April (commencing one year after the consent has been given effect to). If no sand extraction has occurred during that 12-month period then a statement to that effect will be provided to the Council.

Pre-Sand Extraction Assessment Report (PSEAR)

25. Prior to extracting sand from any PSEA the Consent Holder shall complete a pre-sand extraction assessment report (PSEAR) for that PSEA in accordance with the certified EMMP. The purpose of the PSEAR is:

    a. To identify within a PSEA any areas of the seafloor which are unsuitable for sand extraction due to:

        (i) The sediment in those areas having an average proportion of mud (grain size finer than 0.063 mm) exceeding 20% by volume; and/or

        (ii) The presence of significant benthic communities or benthic macrofauna.

    b. To provide baseline information for subsequent post-dredging monitoring; and

    c. To defined approved sand extraction sub-areas (ASEA).

    In the event that extraction within a single management cell exceeds the limit in the conditions of this consent a new PSEAR shall be completed prior to sand extraction recommencing in the cell.

26. The PSEAR shall include but not be limited to:

    a. Geomorphology

        (i) Identify within the PSEA, either by reference to established data or by reference to seabed sampling or surveys taken:

            - Any pathways for sediment transport;
            - Areas of ripples on the seafloor; and
            - Areas of the seafloor where the average proportion of mud (grain size finer than 0.063 mm) in samples exceeds 20% by volume.

    b. Benthic habitat monitoring

        (i) Identify from information collected throughout the PSEA any areas where benthic communities and /or benthic macrofauna, of particular conservation significance (for example, stony corals) or ecological significance (for example, shellfish beds) exist, and if so the degree of their ecological significance and the extent of their presence.

    c. Map

        (i) Include a map showing those areas within the PSEA that are approved sand extraction sub-areas (ASEA).

27. The completed PSEAR is to be submitted to the Council for certification prior to sand extraction occurring within that part of the PSEA which has been identified as the approved sand extraction area (ASEA).

Initial Pre-sand extraction reporting requirements

28. Within twelve months prior to the commencement of sand extraction within the extraction area, a pre-sand extraction assessment report (PSEAR) is to be prepared for an area where sand extraction and is to include those sub-areas identified as approved for sand extraction (ASEA).

Ongoing Pre-sand extraction reporting requirements

29. A PSEAR is to be completed for any PSEA where sand extraction has occurred previously but has not been undertaken within that PSEA for a period of greater than 12 months, unless agreed otherwise with the Council.

Sand Extraction Monitoring Report (SEMR)

30. Upon the cumulative extraction totals of 500,000m^3 (+/- 20,000m^3) increments of sand, or every 5 years (whichever occurs first) the Consent Holder shall undertake a sand extraction monitoring report (SEMR) for those ASEA's where sand extraction has occurred since the completion of the previous SEMR.

31. The SEMR shall be submitted to the Council within six months of either the 500,000m^3 (+/- 20,000 m^3) sand extraction volume being reached or 5 year timeframe occurring (which triggered the requirement for the SEMR).

    Advice Note:

    For clarity, it is noted that once triggered, both the volume and time triggers "re-set" to zero.

32. The SEMR shall include:

    a. An analysis of the results of the monitoring required under the approved EMMP and an assessment to ascertain whether extraction activity has adversely affected sediment transport processes and/or impacted on benthic macrofauna beyond impacts experienced as a result of natural perturbations;

    b. A comparative analysis of the bathymetry within the limits of the survey accuracy;

    c. A comparative analysis of sediment texture at sites within and adjacent to areas where sand extraction has been undertaken; and

    d. Any recommendations for sand extraction rates and periods between sand extraction episodes in any ASEA based on the results of the SEMR.

Other operational requirements

Operational Schedule

33. The consent holder shall make a copy of each upcoming weekly/monthly operating schedule available for public viewing.

Advice Note:

For clarity, publishing the operating schedule on the consent holder's website is considered sufficient to meet this condition of consent.

Noise

34. The noise (rating) level and maximum noise level from any pumping or mechanical equipment used in the sand extraction process shall not exceed the following at the adjacent coastline and within the notional boundary of a site in Rural Coastal zone:

    7am-10pm (Monday to Sunday) 50dB LAeq

    10pm-7am (Monday to Sunday) 40dB LAeq and 75dB LAmax

    All noise measurements and assessments shall be in accordance with the New Zealand Standard NZS 6801:2008 Measurement of environmental sound and the New Zealand Standard NZS 6802:2008 Acoustics – Environmental noise'

Lighting

35. For all vessels associated with the sand extraction, to avoid adverse effects on sea birds and to avoid adverse visual effects on people viewing from land, lighting is to be inward and downward facing and minimised as far as practicable while still complying with any relevant standards (including those at F2.21.1.2 and E24.6 under the Auckland Unitary Plan – or any subsequent update).

Advice notes

1. *Any reference to number of days within this decision refers to working days as defined in s2 of the RMA.*

2. *For the purpose of compliance with the conditions of consent, "the council" refers to the council's monitoring officer unless otherwise specified. Please email monitoring@aucklandcouncil.govt.nz to identify your allocated officer.*

3. *For more information on the resource consent process with Auckland Council see the council's website: www.aucklandcouncil.govt.nz. General information on resource consents, including making an application to vary or cancel consent conditions can be found on the Ministry for the Environment's website: www.mfe.govt.nz.*

4. *If you disagree with any of the above conditions, and/or disagree with the additional charges relating to the processing of the application(s), you have a right of objection pursuant to sections 357A and/or 357B of the Resource Management Act 1991. Any objection must be made in writing to the council within 15 working days of your receipt of this decision (for s357A) or receipt of the council invoice (for s357B).*

5. *The consent holder is responsible for obtaining all other necessary consents, permits, and licences, including those under the Building Act 2004, and the Heritage New Zealand Pouhere Taonga Act 2014. This consent does not remove the need to comply with all other applicable Acts (including the Property Law Act 2007 and the*

Health and Safety at Work Act 2015), regulations, relevant Bylaws, and rules of law. This consent does not constitute building consent approval. Please check whether a building consent is required under the Building Act 2004.

ATTACHMENT 1: Application documents & drawings

ATTACHMENT 2A: Further Information

ATTACHMENT 2B: Further Information provided post-submissions

ATTACHMENT 3: Notification determination report

ATTACHMENT 4: Copies of submissions received

ATTACHMENT 5: Submissions summary table

ATTACHMENT 6: Specialist Memos

ATTACHMENT 2B

FURTHER INFORMATION POST SUBMISSIONS

Colin Hopkins

From:	David Hay <david@osbornehay.co.nz>
Sent:	Wednesday, 1 July 2020 10:07 AM
To:	Colin Hopkins
Subject:	RE: Kaipara Ltd Offshore Sand Extract Site Application - Change to Site Boundary
Attachments:	NZTM to LAT and LONG.xlsx

Good-morning,

Coordinates attached.

Regards,

David Hay
Planning Consultant

Osbornehay
Resource Management Practice

Phone: 09 425-9844
Mobile: 027 425-0234
Skype: osbornehay01
Postal: PO Box 16, Warkworth 0941
Web: www.osbornehay.co.nz

From: Colin Hopkins <colin@dcs.gen.nz>
Sent: Monday, 29 June 2020 2:16 PM
To: David Hay <david@osbornehay.co.nz>
Subject: RE: Kaipara Ltd Offshore Sand Extract Site Application - Change to Site Boundary

Hi David,

Our Coastal specialists have asked if you can please also confirm the latitude and longitude co-ordinates for those points please?

Cheers
Colin

Colin Hopkins, Planning Consultant (MPlanPrac)

DCS

a Unit 67 Victoria Park Market, 210-218 Victoria Street West, CBD
p PO Box 91247, Victoria Street West, Auckland 1142
m +64 27 7511 117 **t** +64 9 631 0400
e colin@dcs.gen.nz **w** www.dcs.gen.nz

From: David Hay <david@osbornehay.co.nz>
Sent: Friday, 26 June 2020 11:41 AM
To: Colin Hopkins <Colin.Hopkins@aucklandcouncil.govt.nz>
Subject: Kaipara Ltd Offshore Sand Extract Site Application - Change to Site Boundary

Good-morning Colin,

As per our previous discussions, Council has raised a technical concern about the proposed boundary of the site being on the Auckland/Northland boundary.

To avoid this issue the applicant has now changed this boundary of the site slightly so it is now within the Auckland territorial area by about 5m off the boundary.

The revised coordinates are:

Point ID	Easting (NZTM)	Northing (NZTM)
1	1758084.67	5990925.30
2	1756328.79	5989464.69
3	1751721.20	5994126.25
4	1748945.94	5998824.36
5	1747812.50	6000863.22
6	1746958.06	~~6002961.33~~ 6002956.33
7	1748380.44	~~6004086.89~~ 6004081.89

The revised site plan is attached.

The revised area size is 44,126,536m^2.

Could you please ensure that this change is clearly noted in the Officers Report and Legal Counsel for Kaipara Ltd will also cover this in his opening submissions.

Regards,

David Hay
Planning Consultant

Osbornehay
Resource Management Practice

Phone: 09 425-9844
Mobile: 027 425-0234
Skype: osbornehay01
Postal: PO Box 16, Warkworth 0941
Web: www.osbornehay.co.nz

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New Zealand Geodetic Datum 2000 (version 2018070

			Degrees minutes seconds	
Point ID	**Northing (NZTM)**	**Easting (NZTM)**	**LAT (Y)**	**LONG (X)**
1	5990925.3	1758084.67	36 12 48.98649 S	174 45 31.24864 E
2	5989464.69	1756328.79	36 13 37.39802 S	174 44 22.00475 E
3	5994126.25	1751721.2	36 11 08.81017 S	174 41 14.26562 E
4	5998824.36	1748945.94	36 08 37.94140 S	174 39 19.99142 E
5	6000863.22	1747812.5	36 07 32.41856 S	174 38 33.27521 E
6	6002956.33	1746958.06	36 06 24.97795 S	174 37 57.69935 E
7	6004081.89	1748380.44	36 05 47.68210 S	174 38 53.80442 E

1
2
3
4
5
6
7

1) https://www.geodesy.linz.govt.nz/concord/

36° 12' 48.98649" S, 174° 45' 31.24864" E
36° 13' 37.39802" S, 174° 44' 22.00475" E
36° 11' 08.81017" S, 174° 41' 14.26562" E
36° 08' 37.94140" S, 174° 39' 19.99142" E
36° 07' 32.41856" S, 174° 38' 33.27521" E
36° 06' 24.97795" S, 174° 37' 57.69935" E
36° 05' 47.68210" S, 174° 38' 53.80442" E

Colin Hopkins

From:	David Hay <david@osbornehay.co.nz>
Sent:	Tuesday, 8 September 2020 10:55 AM
To:	Colin Hopkins
Subject:	Kaipara Ltd - Surf Break Impact Assessment
Attachments:	Surfbreak Impact Assessment - Final.pdf

Good-morning Colin,

Please find attached the Surf Break Impact Assessment prepared for the Kaipara Ltd application. This report has been prepared as a result of the number of submissions raising concerns about the potential impact on surf breaks. Evidence will also be presented at the Hearing on this matter.

The Cultural Values Assessment for Te Uri o Hau has now been received and once our client has read it I hope to have this to you by the end of this week.

As discussed, the photographs and drone footage of the William Fraser operating was to be undertaken yesterday. This was postponed due to weather conditions and we are just trying to confirm the new date for this to be undertaken.

Is there any feedback yet on the couple of queries we had on the Council comments on the draft EMMP and conditions?

Regards,

David Hay
Planning Consultant

Osbornehay
Resource Management Practice

Phone: 09 425-9844
Mobile: 027 425-0234
Skype: osbornehay01
Postal: PO Box 16, Warkworth 0941
Web: www.osbornehay.co.nz

Surf Break Impact Assessment: Mangawhai-Pakiri Kaipara Excavators Ltd Offshore Dredging Consent

Prepared for:

Kaipara Limited

eCoast
eTakutai

MOHIO - AUAHA - TAUTOKO
UNDERSTAND - INNOVATE - SUSTAIN

PO Box 151, Raglan 3225, New Zealand
Ph: +64 7 825 0087 | info@ecoast.co.nz | www.ecoast.co.nz

Surf Break Impact Assessment: Mangawhai- Pakiri– Kaipara Excavators Ltd Offshore Dredging Consent

Report Status

Version	**Date**	**Status**	**Approved by**
V.1	14 August 2020	Final Draft	EAA
V.2	2 September 2020	Revision 1	STM

It is the responsibility of the reader to verify the version number of this report.

Authors

Shaw Mead *BSc, MSc (Hons), PhD*

Jai Davies-Campbell *BSc, MSc*

Sam O'Neill *BSc, MSc (Hons)*

Executive Summary

A significant number of submissions indicated that there is concern that the existing and proposed sand extraction is, and will, have negative impacts on the surf breaks in the Mangawhai-Pakiri embayment. This impact assessment considers the 6 regionally significant surf breaks within the Mangawhai-Pakiri embayment which could potentially be impacted by the proposed offshore sand extraction. The methodology set out in the Management Guidelines for Surfing Resources was applied to the assessment. Due to the evident confusion in many submissions, it is important to note and differentiate between offshore sand extraction, which this surf break impact assessment is focussed on, and the nearshore sand extraction which also takes place in the embayment; the impacts of the nearshore sand extraction have not been assessed in this report. The current current resource consent application for the extraction of sand within the Mangawhai-Pakiri embayment is over a 44.2 km2 area some 2.0 km offshore between the 25 and 30 m depth contours.

The breaks assessed include Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island reef. Several of these breaks are ranked relatively high in the Auckland Council's regional surf break survey (2012), and the NZ surf break guides. Surfers from the Auckland and Northland regions, as well as international surf-tourists, utilise these breaks, resulting in a positive effect on the local economy. These surf breaks provide waves to surfers in the wider Auckland City area where the West Coast is often too big and 'messy' to surf and the inner Hauraki Gulf east coast to small.

The north eastern coast of New Zealand is relatively sheltered, with a mean wave height of <1.0 m. However, it receives frequent swells in the summer and autumn months off high pressure systems in the Pacific Ocean, occasional longer period swells from distant tropical cyclones in the summer and deep lows in the Southern Ocean, local storm swells throughout most of the year.

Each of the 6 breaks was characterised in terms of the physical aspects that comprise the breaks. These include the wave type (beach break, bar/delta break, reef break, point break, etc.), optimal tide, swell and wind directions, surfing/skill level, wave rating, wave height range and peel angle. Of the 6 regionally significant breaks, Goat Island reef will not be impacted by the proposed offshore sand extraction, since it is over 7 km south of the southern boundary of the proposed extraction area and is part of an extensive reef system that extends over 4 km south of Pakiri Beach to Goat Island. This means that there are no potential impacts from either changes to the seabed in the swell corridor, or changes to sediment supply that could affect this reef break.

Stakeholder engagement is an important aspect of surf break impact assessment, and will be covered in more detail at the Hearing for the application, since engagement is currently ongoing. To date, discussions with local and regularly visiting surfers to these surf breaks indicates that there is mostly uncertainty as to whether or not sand extraction has impacted on them since 2003, although there is unanimous concern that it will have in the future. Several believe that nearshore sand extraction (which is not the focus of this assessment) impacts on the surfing quality at Pakiri due to the disruption of the banks, and dredges have been observed very close to shore at this surf break.

The Risk assessment identified two potential impacts/threats on these surf breaks due to the proposed offshore sand extraction, a) changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction (e.g. shore-parallel channels and pits), and b) reduction of cross shore sediment transport delivering sediment to the breaks due to sediment trapping in shore-parallel channels and pits created by sand extraction.

To determine the Risk of Impacts on the 5 breaks (i.e., excluding Goat Island), the methodology set out in the Management Guidelines for Surfing Resources was followed. This includes determining the Sensitivity of the breaks due to their inherent composition, the Consequence of the Threat/activity (from Catastrophic to Minor), the Likelihood of the impact occurring (from Highly Likely (permanent/frequent) to Highly Unlikely (rare), and the combination of these factors to determine the Risk (Extreme to Low). The Risk assessment considered the potential to impact on surf breaks under the current management regime, as well as under the proposed management regime for the current application.

The Consequences, or magnitude of potential impacts on wave quality at the 4 central surf breaks in the Mangawhai-Pakiri embayment associated with changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction are considered *Less Than Minor to Negligible* with the current consent. The potential impacts on wave quality due to changes in seabed morphology at the 4 central surf breaks in the Mangawhai-Pakiri embayment are also considered *Less Than Minor to Negligible* for the proposed resource consent application.

The Consequences, or magnitude, of a reduced cross-shore sediment supply to the beaches in the Mangawhai-Pakiri embayment has the potential to have a *Minor* impact on the regionally significant surf breaks (excluding Goat Island reef) over the medium to long term due to the cumulative volume of sediment reduction. The impact is considered *Minor* because 240,000 m^3 of sediment not being transported to the nearshore system over the medium to long term is a small amount relative to the amount of sediment stored and influx within the system. The potential impacts on wave quality at the 5 sand-dependent surf breaks due to reduced sediment supply are considered *Less Than Minor to Negligible* for the proposed resource consent application and associated management regime.

The Likelihood of the impact with the existing consent regime is considered *Likely* to *Moderate* for all 5 breaks (excluding Goat Island), that is categories B to C. When the likelihood of the impact is considered for the proposed consent and management regime, it is considered *Unlikely (Remote) to Highly Unlikely (Rare*) for all 5 breaks (excluding Goat Island), that is categories D to E.

The resulting *Risk Rating* through the combination of the various factors indicates a likely *Low to Moderate* risk to the 5 surf breaks in the absence of operational management to minimise the magnitude of changes to the offshore seabed (i.e., the current consent). This results in a likely ***Risk Rating*** of ***Minor to No Risk*** with the application of operational management to minimise the magnitude of changes to the offshore seabed.

The Risk of the proposed resource consent on the surf breaks in the Mangawahi-Pakiri embayment is reduced from the current consent because to the conditions and environmental monitoring and management plan (EMMP) are an improvement on the existing consent with respect to managing changes to the seabed due to the activity that could potentially impact on wave propagation and sediment supply.

The proposed conditions and EMMP implements an improved management regime where dredging is undertaken in thin 'skims' (e.g. <10 cm, rather than repeated dredging of the same area creating deep channels) and there is progressive movement through the proposed extraction area cell by cell (management cells of 1,000 m x 200 m). In addition, a maximum of 40,000 m^3/yr can be extracted from any 1,000 m x 200 m cell, giving a maximum extraction depth of 200 mm, averaged over the cell, and the cell must remain un-dredged for the following year if this extraction volume is reached. This prevents the formation of deep channels/pits/strips and allows for the seabed to recover, which also mitigates the potential effects of changes to wave height and direction; and reduced cross shore sediment transport.

Based on the potential impacts and the proposed management protocols, direct monitoring of the surf breaks within the Mangawhai-Pakiri embayment is not recommended. However, all care should be taken to ensure that dredge run-lines within each cell are distributed evenly and/or randomly throughout the cell in order to reduce the potential for the creation of shore-parallel channels that have the potential to impact on cross-shore sediment transport.

In addition, involvement by local surfing representatives and/or the NZ Surfbreak Protection Society in any proposed working parties or consultation groups during the term of the resource consent (should it be granted) should be considered.

Contents

Figures

Tables

1 Background

Surf breaks are unique and valuable components of the coastal environment. There are an estimated 23-35 million surfers globally (O'Brien and Ponting, 2017), and have cultural, spiritual, recreational, and sporting value to in excess 145,000 people in New Zealand (NZ Surfing survey, 2016). The global growth rate is 12-16% per year and supports a $10 Billion industry (globally) (Orams, 1999; Buckley, 2002; Scarfe *et al*., 2009a & b). Nelson *et al*. (2007) reported that surfers significantly contribute to local economies, just as much, if not more than, regular beachgoers and surfers greatly extend the hours of tourism and expenditure within coastal communities. Yet, surf breaks and surfers as coastal users, until very recently, have not been included in the decisions and designs of environmental coastal engineering projects and in many parts of the world are still not. Mead (2003) and Scarfe *et al*. (2009a & b) contend that this situation has contributed to the loss of many high-quality surf breaks around the world. Those who wish to protect and preserve the integrity of surf breaks, such as the NZ Surfbreak Protection Society, Save the Waves and Surfrider Foundation, recognise that a range of benefits are associated with these unique places that transcend the recreational value of riding waves. These values depend on the integrity of natural processes which influence surf break environments, and on a variety of aspects important to surf break users including accessibility and environmental health (Perryman and Orchard, 2013); Policy 16 of the New Zealand Coastal Policy Statement (NZCPS; Department of Conservation, 2010) is a world-first policy which is directed at the protection of surf breaks.

The NZCPS (2010) provides guidance to local government for the management of the coastal environment (Rosier, 2004). Revision of the NZCPS (1994) included a comprehensive review process and input from stakeholder groups (Young, 2003; Rosier, 2004, 2005). The process attracted input from surfers and surfing organisations, and the resulting submissions provided recommendations for the definition for a "surf break" and provisions for surf break protection (Board of Inquiry, 2009a). These recommendations were largely adopted within the final NZCPS 2010 as Policy 16.

Policy 16: Surf breaks of national significance:

Protect the surf breaks of national significance for surfing listed in Schedule 1, by:

- *(a) ensuring activities in the coastal environment do not adversely affect the surf breaks; and*
- *(b) avoiding adverse effects of other activities on access to, and use and enjoyment of the surf breaks.*

Schedule 1 of the NZCPS defines a surf break as:

*A natural feature that is comprised of swell, currents, water levels, seabed morphology, and wind. The hydrodynamic character of the ocean (swell, currents and water levels) combines with the seabed morphology and winds to give rise to a '**surfable wave**'. A surf break includes the '**swell corridor**' through which the swell travels, and the morphology of the seabed of that wave corridor, through to the point where waves created by the swell dissipate and become non-surfable. '**Swell corridor**' means the region offshore of the surf breaks where ocean swell travels and transforms to a '**surfable wave**'. '**Surfable wave**' means a wave that can be caught and ridden by a surfer. Surfable waves have a wave breaking point that peels along the unbroken wave crest so that the surfer is propelled laterally along the wave crest.*

Policy 16 explicitly identifies 17 Surf Breaks of National Significance. Policies 13 and 15 of the NZCPS provide a mandate to preserve and/or protect surf breaks of regional or local significance or importance (Perryman, 2011). Local authorities are responsible for implementing NZCPS policies and an essential first step is to understand the features of the surf breaks in their area. There is an urgent need for a better understanding of resources in relation to the values derived by the community and consideration of the mechanisms by which degradation can occur.

The basis for the selection of nationally significant surf breaks in the NZCPS (2010) was the Wavetrack New Zealand Surfing Guide (WNZSG; Morse and Brunskill, 2004), with breaks rated 9 or 10 out of 10 being selected as nationally significant. In this impact assessment we have considered the surf breaks listed for the area of interest in all the available guides; this is consistent with the method used to identify regionally significant surf breaks in the Auckland Region (Coombes and Scarfe, 2010), as well as in the Taranaki Region (TRC, 2010), the Greater Wellington Region (Atkin *et al*, 2015), and the Waikato Region (Atkin and Mead, 2016). It is recognised that there is a measure of subjectivity as to whether a surf break is listed in a guidebook, however, objective methodologies are yet to be developed.

1.1 Area of Interest

Approximately 90 minutes' drive north of Auckland and 50 minutes south of Whangarei is the Mangawhai-Pakiri embayment (Figure 1.1), located on the east coast of the wider Auckland Region. The embayment stretches ~32 km on the NNW to SSE axis (Figure 1.1) and is a sandy, semi-exposed intermediate beach system (Short, 2020). The active beach is backed by an extensive dunes system, some extend 350 to 1,200 m inland and are up to 40-50 m high. This stretch of coastline hosts a number of iconic surf breaks. Surfers from the Auckland

and Northland regions, as well as international surf-tourists, utilise these breaks, resulting in a positive effect on the local economy. These surf breaks provide waves to surfers in the wider Auckland City area where the West Coast is often too big and 'messy' to surf and the inner Hauraki Gulf east coast to small. This surfing resource impact assessment is directed at considering the potential impacts of the proposed offshore sand mining on the surf breaks in the Mangawhai-Pakiri embayment.

This impact is assessment based on the methodologies set out in the "Management Guidelines for Surfing Resources" (Atkin *et al*., 2019). The historical and current dredging consents in the Mangawhai-Pakiri embayment, the submissions concerning surf break impacts with respect to the proposed offshore sand mining, and the 2012 Auckland Council Surf Breaks Survey are first considered as part of the background in this Section. Section 2 describes the physical characteristics of the Mangawhai-Pakiri embayment and coastal environment. Section 3 identifies and characterises the breaks within the embayment, and includes a summary of discussions with stakeholders undertaken during the development of this assessment. The swell corridors for the breaks of interest, that is the area through which waves propagate to the breaks out to the 12 nautical mile territorial limit, are presented in Section 4. Section 5 considers the threats to the surf breaks due to the proposed activity and quantifies the risks that they potentially represent; i.e., the impact assessment.

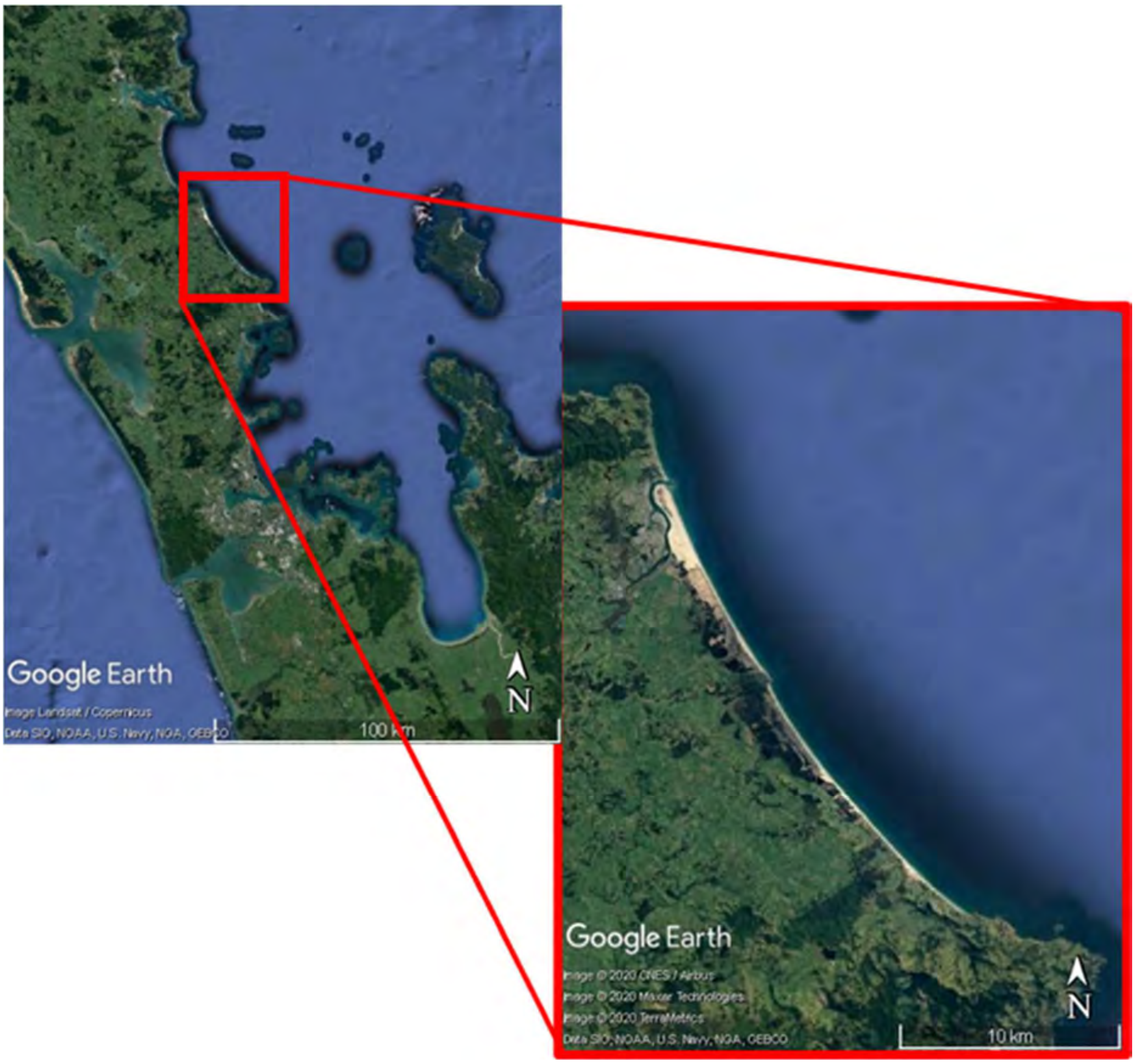

Figure 1.1 Images showing location of Mangawhai-Pakiri embayment of the east coast of the Auckland Council Area (Google Earth, 2020).

1.2 Historical and Current Dredging Consents

Since the 1950s, the Hauraki Gulf, particularly the north-western part of the Hauraki Gulf, has been a source of sand for construction and civil industries for the Auckland region due to its preferential grain size, textural, and mineralogical characteristics. Since records began in 1966, data indicates that ~4,400,000 m^3 of sand has been extracted from the embayment, which excludes sand mined from the dunes. Within the Mangawhai-Pakiri embayment, early sand extraction was concentrated around the 4-8 m depth contour on the seabed near the Mangawhai Bar, and also from the Mangawhai spit and estuary mouth. In 1978, the collapse of sand dunes, believed to be caused by sand mining, closed the harbour entrance for five and a half years (Ross, 2007).

In the 1990s, the then Auckland Regional Council commissioned the Mangawhai-Pakiri Sand Study, which was led by NIWA, in response to concerns that mining could be having an effect on the beach. During this same period, Kaipara Excavators Limit (KEL) were undergoing processes to obtain a new consent and undertook their own research with local iwi and residents looking into the concerns of the effects of inshore mining on the amenity and physical aspects of the beach. Subsequently, KEL applied for a deep-sea sand extraction permit, instead of a nearshore permit, which was subsequently granted. The consent was granted with reference to the findings of the Mangawhai-Pakiri Sand Study.

KEL currently holds a resource consent (permit #20795) to extract up to 2,000,000 m^3 of sand from the seabed over a 20-year period. The consent area totals 636 km^2 (Figure 1.2). Special Condition 4 of the Coastal Permit states that the Consent Holder shall extract no more 150,000 m^3 of sand during any 12-month period, from any part of the Extraction Areas between the Western Boundary and the 30 m isobath. The Consent Holder may dredge at any rate outside of this specific area. This consent has been in operation since February 2003 and expires February 2023.

In order to provide practical limits for establishing pre-extraction baseline and ongoing effects, Area 1 and Area 2 (Figure 1.3), totalling 21 km^2, were defined for extraction within the embayment, comprising a strip roughly 1.1 km wide and 19.5 km long from the Pakiri River in the south to just north of Mangawhai Heads in the north (between the 25-40 m isobaths). This has been the main area of extraction since the permit was granted.

A total of ~1,520,108 m^3 of sediment was extracted from Areas 1 and 2 between 2005 and 2019 (February). Beca[1] (2019) found that based on dredge tracks provided by KEL (between 2010 and 2019) and assumptions based on previous dredged locations, 1,445,180 m^3 was extracted from Area 1, while only 75,000 m^3 of sediment was extracted from Area 2.

Currently, KEL is seeking to replace the existing resource consent with a modified one to allow for continued sand extraction, although within a significantly reduced area, which reflects the area where most of the sand extraction has historically occurred, i.e. Areas 1 and 2. The new application is for a further 2,000,000 m^3 with no more than 150,000 m^3 extracted per annum

[1] Much of the background information in this report is adapted from Beca (2019). The Beca (2019) report is based on a desktop study of a large body of investigation, research and expert and judicial opinions accumulated over many years. The Beca report is not intended to supplant this material, rather to provide a summary of conclusions presented to date, and context regarding the offshore extraction consent application. The conclusions and context of the Beca report are necessarily dependent on this available body of information.

between the 25-30 m isobaths in the Auckland Offshore Sand Extraction Area (Figure 1.2 and Figure 1.3).

Nearshore sand extraction is also undertaken in the Mangawhai-Pakiri embayment, which is briefly summarised here, although it is important to be aware that this surf break impact assessment does not consider the impacts of the nearshore operation. In the nearshore of the Mangawhai-Pakiri embayment, landward of the KEL Coastal Permit, McCallum Brothers Limited (MBL) currently extracts sediment under a package of coastal permits (ARC 28165, 28172, 28173 and 28174), which allows MBL to extract a total of 76,000 m^3/yr of sediment between the 5.0 m and 10.0 m depth contours within four extraction zones (Figure 1.4). These extraction zones extend approximately 500 m either side of Te Arai Point (Figure 1.4). The consents were granted in 2006 for a period of 14 years and expire 20 September 2020. Since the commencement of this nearshore coastal permit, a total of 417,584 m^3 of sediment has been extracted from within the consented areas.

It is important to be cognizant that, as described, sand extraction has been occurring both offshore and nearshore in the Mangawhai-Pakiri embayment for many years. This has potentially resulted in cumulative impacts within the embayment, which means that we do not know what the baseline conditions are with respect to changes and impacts due to sand extraction.

Given that the current consent regime was approved by the Environment Court in May 2006 and expires on 6th September 2020, MBL is seeking a renewal of the existing resource consent with the same extraction volumes and locations, with no additional extraction volumes or areas proposed under the new application.

Many submissions in response to the KEL current resource consent application for the extraction of sand within the Mangawhai-Pakiri embayment between the 25 and 30 m depth contours state concerns with respect to the negative impacts this activity has had, or will have on surf breaks. The main themes of the submissions are presented in the following Section.

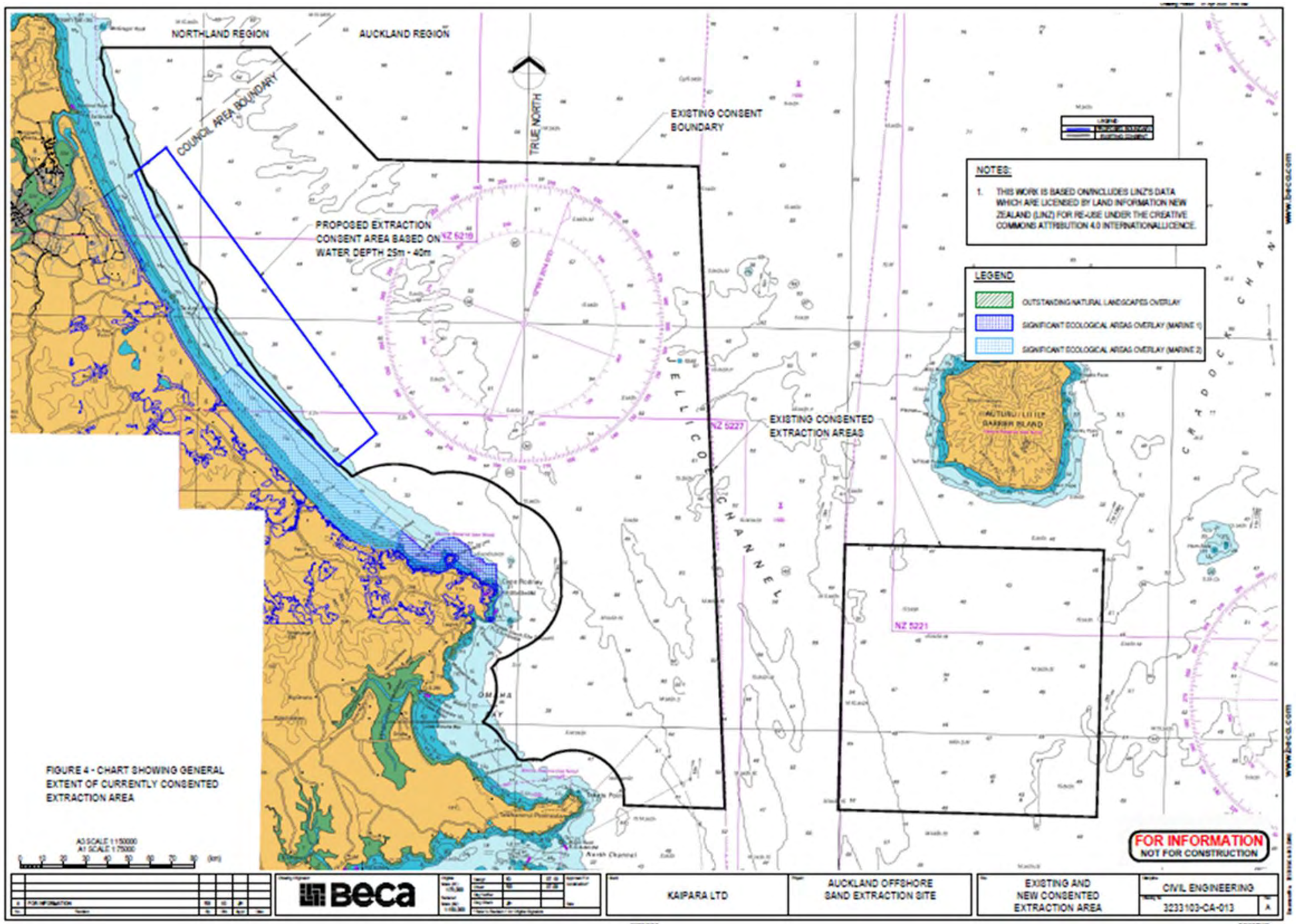

Figure 1.2 The current consented sand extraction area of 636 km^2 (thick black lines) and proposed new consented sand extraction area of ~44.2 km^2 (blue), which is based on the 25 - 40 m water depth isobaths (Beca, 2019).

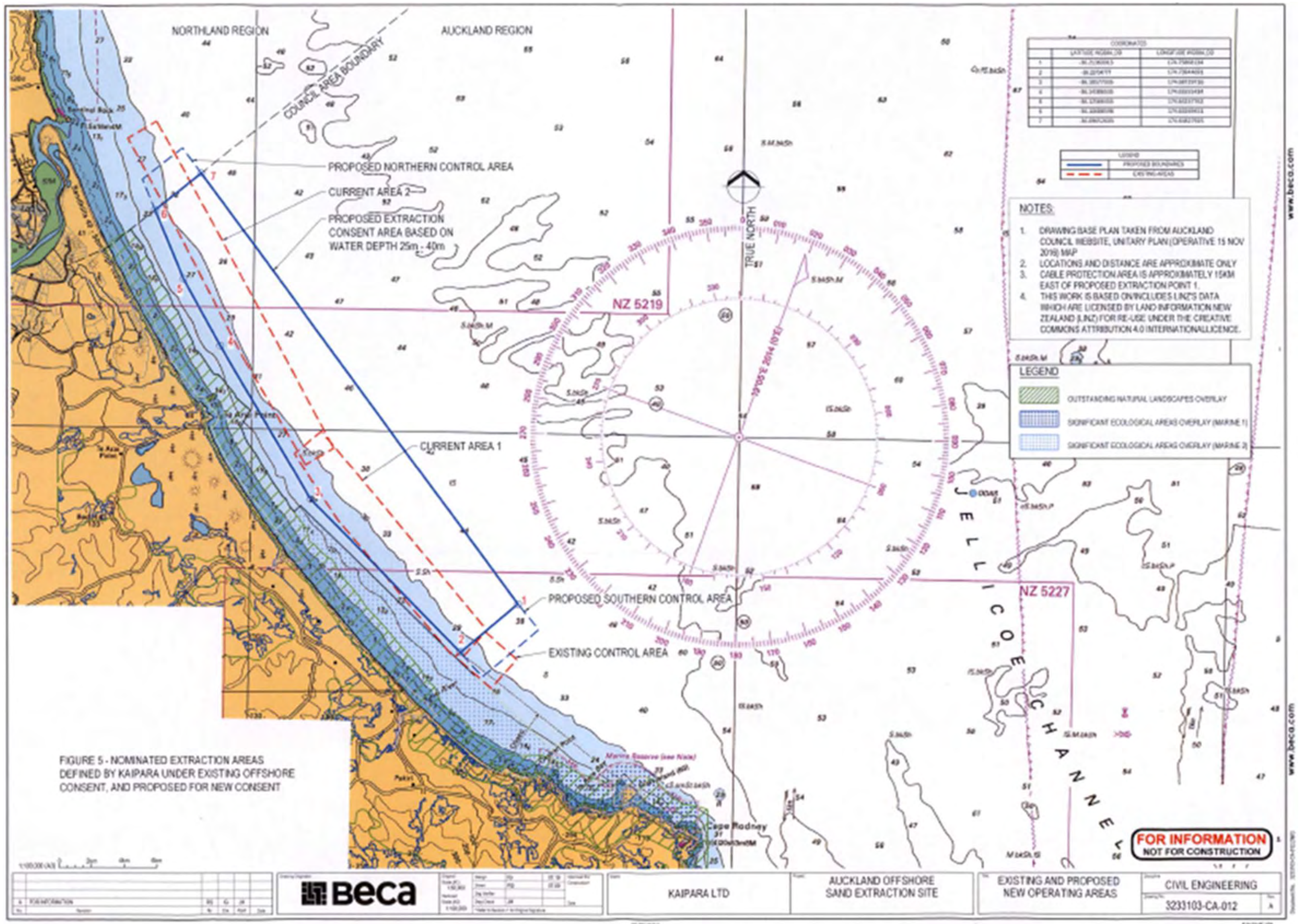

Figure 1.3 Chart showing current consented sand extraction locations, Areas 1 and 2 comprising and area of approximately 21 x 1.1 km^2 (dashed red lines) and proposed new consented sand extraction area (blue), which is based on the 25 - 40 m water depth isobaths and is ~44.2 km^2 (Beca, 2019).

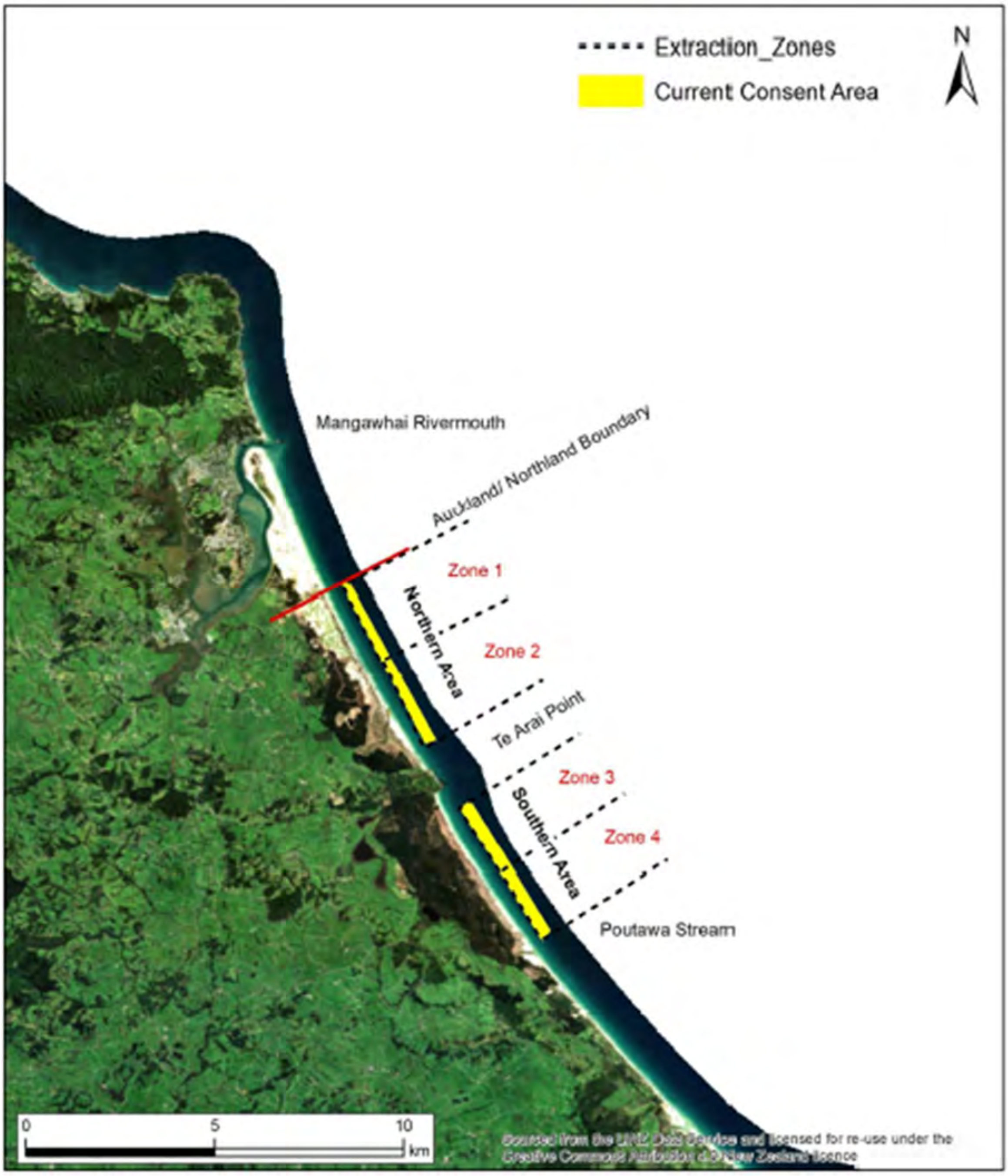

Figure 1.4 Location of McCallum Brothers Ltd sediment extraction zones within the nearshore environment (5.0 to 10.0 m depth contours) of the Mangawhai-Pakiri embayment. It is important to note that this surf break impact assessment does not consider the nearshore dredging operation depicted in this Figure.

1.3 Submissions

Submissions raise public concerns over a range of issues potentially associated with seabed mining – this assessment is focussed on surf break impacts only for the proposed offshore extraction area. The main issues with respect to surf break impacts are encapsulated in the following statements:

- No surf break impact assessment has been undertaken, and no evidence has been presented on what the actual effects on surfing resources will be;
- Dredging/removing sand from the Mangawhai-Pakiri area will impact on the surf wave quality;
- Concerns that the sand-mining will impact on the surfing wave quality;
- Sand mining is ruining the banks and beach profile for surfing;
- Removing sand from close to shore will impact on the surf breaks;
- Sand-mining will potentially impact the swell corridor due to changes to the seabed, and;
- Changes to rips due to sand-mining have affected the surf breaks.

It is noted that the Section 92 request for further information for the resource consent application also identified that "*The coastline adjacent to the proposed extraction area is a surf zone*." and that "*The proposed extraction works fall within the swell corridor of the surf break*." With the associated request to "*Please provide an assessment of how the surf zone will be affected by the proposal*".

Also, of note with respect to the submissions, is that it is evident that there was some confusion between the 2 existing dredging consents, with several submitters referring to nearshore extraction, which is not the subject of the resource consent application.

1.4 Auckland Council Surf Breaks Survey

In 2012, the Auckland Council conducted a 'surf breaks user survey' (McNeil, 2012) to provide evidence for the weighting of values attributed to surf breaks as assessed by users of those breaks, and to gather information around which surf breaks are most popular and the reasons people surf the breaks they do. A total of 39 surf breaks were listed in the survey (reduced to 33 breaks in Appendix 4 of the Auckland Unitary Plan). The survey, which was run online between 27 February 2012 and 18 March 2012, was forwarded to contacts within the surfing fraternity, distributed via social networking sites, and advertised on surf reporting and forecasting websites. A total of 1,452 surveys were completed. The survey consisted of 11 questions with opportunities to make comments about various aspects of the breaks.

Of the top 10 surf breaks out of 39, in terms of those surfed in the last 12 months, Te Arai Point/Beach, including the Pacific Road Access Point ‘Black Swamp’, was ranked number 2 (behind Piha), Pakiri Beach North (Forestry) ranked number 3, and Pakiri Beach South ranked number 9. In terms of favourite surf breaks, Te Arai Point/Beach including the Pacific Road Access Point ‘Black Swamp’ was ranked number 2 (behind Piha), and Pakiri Beach North (Forestry) ranked number 3. It was reported that the highest ranked surf breaks were typified by being easily accessible and that produced surfable and higher quality conditions on a relatively consistent basis.

These data provided clear evidence that the surf breaks within the Mangawhai-Pakiri embayment are regionally significant (Orchard *et al*., 2019), not only from a surfing perspective but also from an economic perspective. This is reflected in the Auckland Unitary Plan:

F2.4.3. (*Dredging*) (4) Manage dredging activities so that they do not: (d) result in adverse effects on significant surf breaks identified in Appendix 4 Surf breaks;

F2.5.3. (*Disturbance of the foreshore and seabed*) 6) Avoid disturbance of the foreshore and seabed that will result in the following: (a) significant changes to natural coastal processes that will have adverse effects on surf breaks identified in Appendix 4 Surf breaks; and (b) cause or exacerbate coastal erosion.

F2.6.3. Policies (*Mineral extraction*) (3) Require applications for petroleum exploration or for mineral extraction to identify the significant adverse effects, and the extent to which they can be avoided, remedied or mitigated, for all of the following: (g) the values of significant surf breaks identified in Appendix 4 Surf breaks;

2 Physical Characteristics of the Mangawhai-Pakiri Embayment

2.1 Mangawhai-Pakiri Geomorphology

The general morphological components of the area moving seaward include inland dunes, foredunes, foreshore, surf zone, nearshore, inner shoreface, inner continental shelf, and middle continental shelf. The beaches along the Mangawhai-Pakiri embayment are typically of the intermediate type (Short, 2020). Intermediate beaches display traits which include flat to cross-shore concave profiles, they change in appearance under different wave conditions; exchange considerable quantities of sand between beach and nearshore bar systems along the length of the beaches; and store about 40% of the sand in the foreshore (dunes to low water), 40% in the surf zone, and 20% in nearshore bars (Beca, 2019).

Beca's (2019) review found that during periods of moderate to high wave activity (during storms) there are large amounts of sediment mobilised and in re-circulation within the embayment. The seaward extent of the sediment transport processes within this embayment, and the sources and transported rates have been presented in some detail throughout the recent Kaipara Excavators Ltd and McCullum Brothers Ltd resource consent applications and despite this, there is currently no definitive consensus on these. The depth of closure (DOC) or approximate outer limit of sediment movement between the continental shelf and the nearshore beach system under all but extreme conditions was established as 25 m depth below MSL (Hume *et al.,* 1999). In their recent desktop investigations using MetOcean Solutions Ltd (2019) wave and current modelling, Jacobs (2020) suggest that that some sediment transport takes place across the DOC. Using ~40 years of offshore hindcast wave data for the Mangawhai-Pakiri embayment and applying the Hallermeier (1981, 1983) closer depth formulae[2], the inner DOC is found to be 7.45 m, and the outer DOC is found to be 27.41 m. Given the rigour and actual field data collection undertaken by Hume *et al*. (1999), an outer DOC of 25 m is potentially the best indicator.

The sediment within the embayment is regarded as a wedge comprising the dunes, beach, and the seabed sands (Beca, 2019). These sands are Holocene (recent) and overlie older Pleistocene sands. The Sand Study (Hume *et al.,* 1999) considers that the band of sediment that lies on the inner shelf is in 25- 40 m water depth is now largely disconnected from the

[2] Hallermeier (1981, 1983) defined three profile zones, i.e. the littoral zone, shoal or buffer zone and offshore zone. This partition defined two closure depths, namely, an "inner" (closer to shore) closure depth h_{in} at the seaward limit of the littoral zone, and an "outer" or "lower" (further from shore) closure depth h_{out} at the seaward limit of the shoal/buffer zone. Both are relevant to mean low water.

beach in terms of sediment transfer. The sediment comprises coarser sediment, which is residual lag as a result of winnowing and shoreward transport of finer material over centuries to supply the beach with sand (Beca, 2019). The thickness of this sediment is estimated to be ~1.0 m thick at the 25.0 m depth contour and tapers out to the 40.0 m depth contour. Beneath these sands, similar textured iron stained sands exist.

It is estimated that the dune field is comprised of 92 -552 Mm^3 of sand[3]. Much of the dune field is covered in pine forest and has been acquired for farmland. These types of activities can lock away sediment for extended periods of time, meaning the dunes tends toward a sediment sink, rather than a store within the sediment budget. In the last 6000 years, the foredunes at Te Arai Point have prograded 150-200 m.

The main driving forces of sediment transport within the embayment are considered to be wind, which help create dunes, while waves and the associated turbulence, currents and set-up, and wind-generated and tidal-generated currents drive beach erosion and/accretion.

Sediments within the embayment are generally quartzo-feldspathic with carbonate, and fine shell which makes up 10% of the total sediment (Beca, 2019). The mineral components are derived from the Waikato River from when it once discharged at Thames and supplied sediment to the East Coast. In general, the sand within the embayment comprises medium grained sand on the inshore bar and beach zones (0.25 mm Ø) and coarser in the 25.0 to 40.0 m depth range (0.3 – 0.8 mm Ø), which is where the offshore extraction area is located.

2.2 Tides

The spring astronomical tidal range at Leigh is approximately 2.3 m (~3.0 m range from lowest to highest astronomical tide). The mean spring and neap tidal range for Leigh are presented in (Table 2.1). Note, these are astronomical, or predicted tides; a number of metocean factors such as wind speed and direction, wave height, period and direction, barometric pressure, etc., influence the actual tidal level at a site at any one time.

Table 2.1 Leigh astronomical tidal heights (m) (Linz, 2020).

	MHWS	MHWN	MLWN	MLWS	MSL
To CD	2.6	2.2	0.8	0.3	1.5
To MSL	1.1	0.7	-0.7	-1.2	0.0

[3] Depending on the method of calculation

2.3 Wave Climate

The north-east coast of New Zealand is somewhat protected from waves origination from the Southern Ocean (Figure 2.1). The results in lower mean wave heights, which based on the wave hindcast of Gorman *et al*. (2003) are ~1.9 m (Figure 2.2). However, while Gorman *et al*. (2003) is useful for a comparison to other coasts of New Zealand (and so is included here), the results are based on data outside the Hauraki Gulf; once waves have propagated into the Gulf, their mean height is <1.0 m. The Mangawhai-Pakiri embayment is further sheltered from waves from the south-east through to the east by the Coromandel Peninsula, Little Barrier Island (Hauturu), Great Barrier Island (Aotea) and the Mokohinau Islands. This sheltering effect is associated with the predominance of waves propagating to the north-east in the waters around New Zealand (Gorman *et al*., 2003), which have predominately lower wave periods of between 6 – 8 secs (Figure 2.3); with respect to wave period, the mean inside the Gulf is higher than Gorman *et al*. (2003) due to lower height wind-generated waves. Thus, the north-east coast of New Zealand has the mildest wave climate on New Zealand's open coast (Gorman *et al*., 2003).

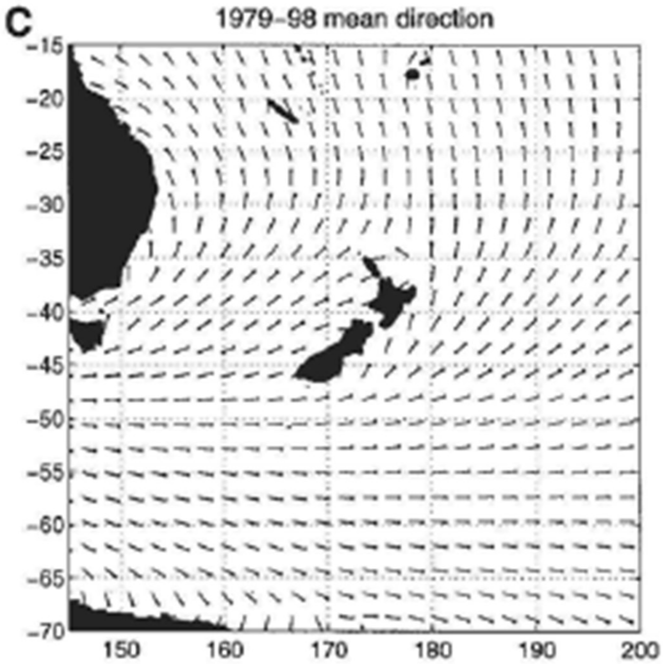

Figure 2.1 Plot shows direction of the vector averaged wave energy transport. Note the north-east coast of New Zealand is sheltered from the southern swells (Gorman *et al.,* 2003).

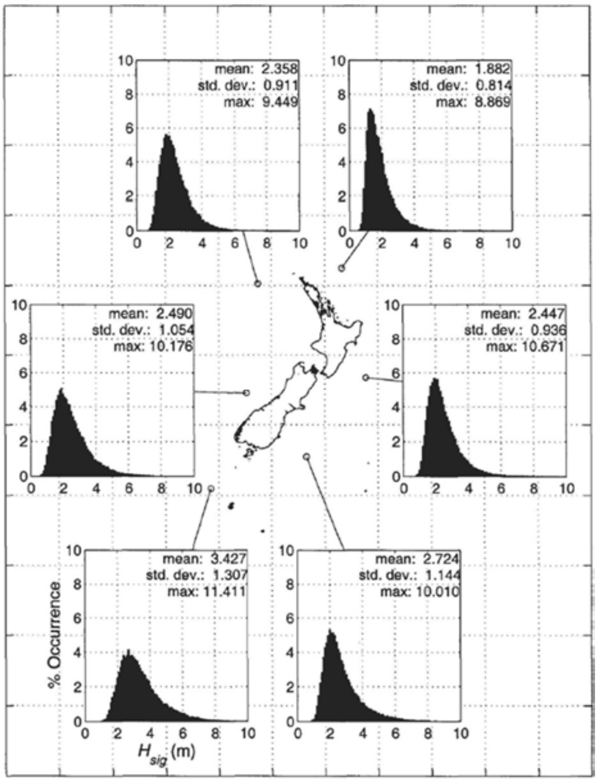

Figure 2.2 Significant wave height derived from the 20-year hindcast at the 6 sites in the New Zealand region. Grid cell NI NE is at the top right of the figure (Gorman *et al*., 2003).

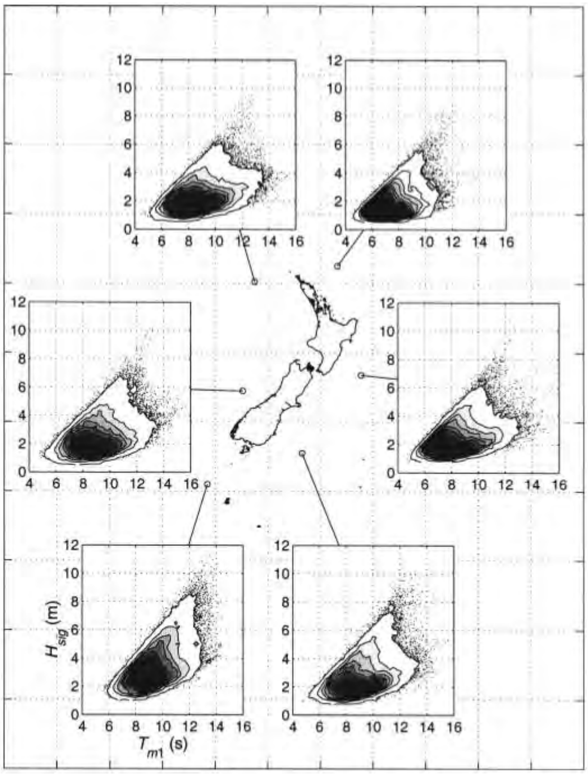

Figure 2.3 Joint distributions of first-moment mean wave period Tm1 and significant wave height Hsig derived from the 20-year hindcast at the 6 sites in the New Zealand region. Grid cell NI NE is at the top right of the figure (Gorman et al., 2003).

As part of the Mangawhai-Pakiri Sand Study Module 4: Technical Report – Oceanography and Sediment Processes (1997), a wave buoy was deployed for a 17-month period (18 March 1995 to 31 August 1996) in 35 m depth (within the Mangawhai-Pakiri embayment) to analyse the wave climate. The results showed that significant wave heights ranged from 0.1 to 5.3 m with a mean significant wave height over the period of 0.71 m. In general, wave heights were below 1.0 m 75% of the time and above 2.0 m only 4% of the time. In terms of wave direction, over 60% of the wave were from the 25-85 ˚ directional bin (i.e., the north to east quarter). The significant wave periods ranged from about 3-18 secs with mean significant period of 6.7 secs. Seasonal trends were not determined due to short length of the study (Hume *et al.*, 1997).

Gorman *et al.*, (2003) considered the annual cycle of monthly mean significant wave height in the north-east of the North Island shows the largest waves of the year occurring in July (Hs ~2.3 m) and the smallest occurring over December to January of around Hs ~1.5 m (Figure 2.4). However, as indicated above, these data were extracted at a location well outside of the Hauraki Gulf – when a 40 years of hindcast data some 40 km offshore of the Mangawhai-Pakiri embayment (i.e., inside the Hauraki Gulf) is considered, spring to early summer (i.e., September through to February) is usually the time of the year when the smallest wave heights occur, with the summer through to early winter period (February through to June/July) having the most frequent and largest swells, the latter associated with early winter NE storms and tropical cyclones during the summer and autumn.

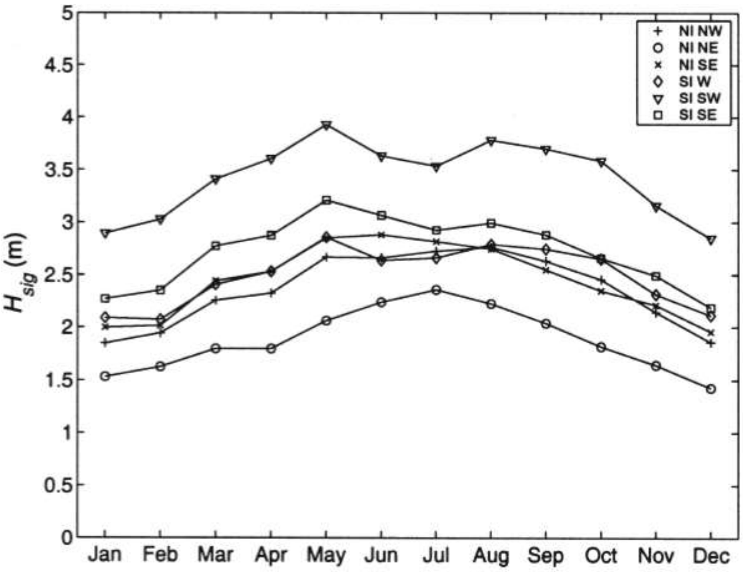

Figure 2.4 Monthly means of significant wave height at the six selected grid cells. (Gorman et al., 2003).

2.4 Currents

The currents within the Mangawhai-Pakiri embayment include both periodic tides and non-tidal forces. The non-tidal forces are generated by a combination of winds, coastally trapped long waves, seiches, wave set-up in the surf zone, vertical density variations, and upwelling oceanic intrusions (Beca, 2019). As part of the Mangawhai-Pakiri Sand Study Module 4, currents were studied to quantify the magnitude and frequency of current speeds and directions to establish the forcing mechanisms upon which the currents were generated. The results of the study identified that the mean currents were relatively low, less than 0.22 m/s for 90% of the time and during storms would the current speeds increase above this. In the nearshore, the current speeds at 15.0 m depth were found to be less than 0.1 m/s. The consequence of low current speeds is that in the absence of waves, there is insufficient energy to mobilise sediment from the seabed (Beca, 2019).

In contrast, wave orbitals in 15.0 m water depth range from 5 – 40 cm/s during calm conditions. This increases to 40 – 70 cm/s during storm events and up to 120 cm/s closer to shore. Wave induced current velocities can have a significant effect on the mobilization and entrainment of sediment and in turn the variability of nearshore profiles (Beca, 2019), while extreme events may leave an impact on the shoreline that lasts a number of years (e.g. the extreme storm event in July 2007 (Jacobs, 2020).

2.5 Sediment Transport

As part of the Mangawhai-Pakiri Sand Study Module 6 (Hume *et al.,* 1999), pathways of sediment transport were examined. In general, there are large transfers and recycling of sand between the dunes, the beach, and the nearshore (to about 10.0 m depth) that are driven largely by waves and wave driven currents. The sediment is transported cross-shore (back and forth) but mainly alongshore near the bars. Large changes in beach and nearshore profiles have been observed, which support these processes (Hume *et al.,* 1999). New sand enters the Mangawhai-Pakiri embayment from cliffs, streams, the inner continental shelf, biogenic production (Bioresearchers, 2019), and around the headlands (Hume *et al.,* 1999).

Around the headlands, there are only narrow and discontinuous pathways of sand transport, which indicates that sand exchange is small. At Bream Tail, a corridor of sand exists, some 200 – 300 m wide among rocks and shelly areas around the toe of the headland in about 10.0 m depth (McCabe, 1985; cited in Hume *et al.,* 1999). At Cape Rodney there is a discontinuous corridor of sand some 500 m wide at the foot of the cliffs in 25.0 m depth. There is a match between the sediment grain size of sand at the southern end of Pakiri Beach and those found within the sand corridor at Cape Rodney, which indicates a linkage between the beach and sand at the foot of the cliffs. Hume *et al.,* (1997) showed evidence, through wave and current modelling, that sand is transport south-east along Cape Rodney, offshore into the deep water of the Jellico Channel, and that some material recirculates back to the shoreface with episodic loss around Cape Rodney taking place during stormy periods.

A modelling study carried out by Black *et al*., (1998) identified eddies both at Bream Tail and particularly at Cape Rodney (Figure 2.5). These eddies are driven by both tides and winds and have the potential to capture sand leakage along the shore and out of the embayment, thus the ability to retain sediment within the embayment (Hume *et al.,* 1999). This suggests that once sediment is transported into the embayment via input mechanisms, little can leave. In turn, this would indicate an accretionary system and potentially prograding dune systems, which has occurred over the last 6,000 years.

The dunes contain an estimated 92-552 Mm^3 of sand while the offshore Holocene sand body contains 82-142 M m^3 (Healy *et al.*, 1996). In addition, there are unconsolidated and mixed sedimentary deposits of the Pleistocene and older. These range in thickness from the 9 m to 40.0 m water depth and comprise 1.7 – 3 Bm^3 of sediment (Healy *et al.*, 1996).

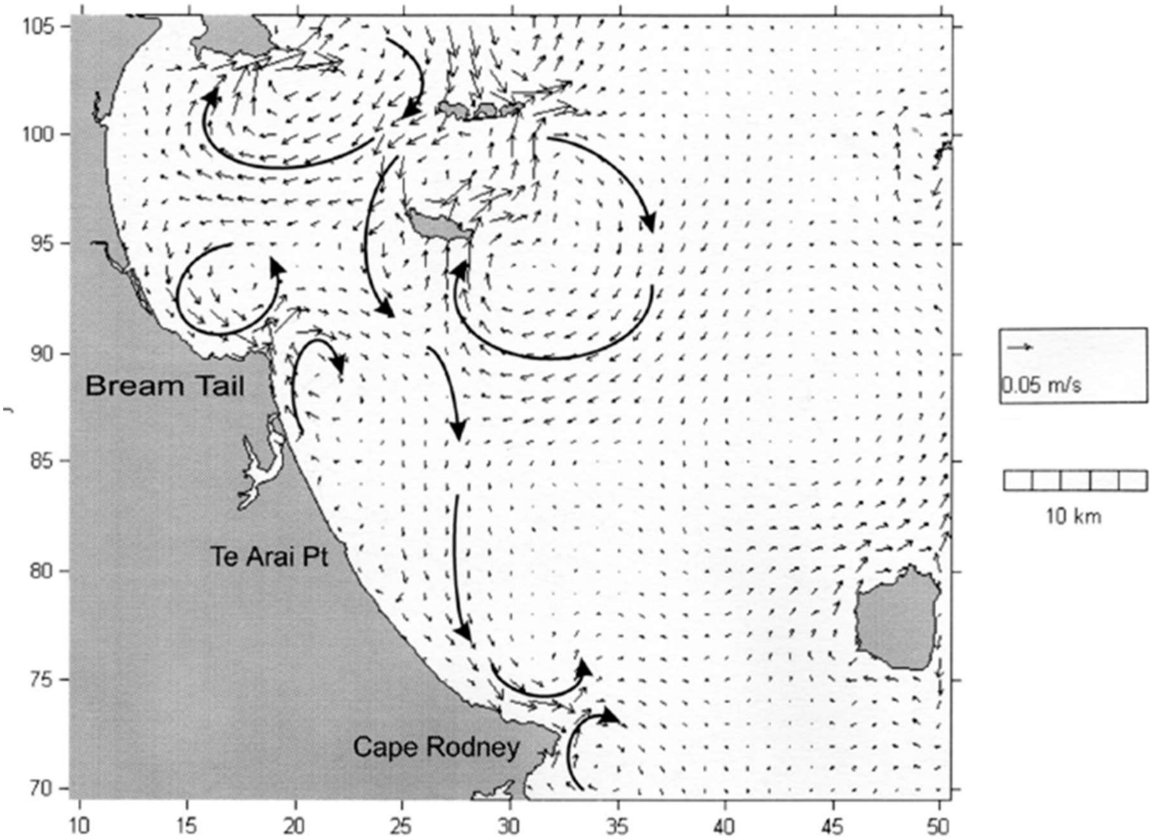

Figure 2.5 Residual currents generated by wind and potential sediment pathways. The residual current is the net current due to the wind averaged over 23-years of wind record and is depth averaged. The current directions (and pathways) are indicated by the arrows and the faster currents speeds by the longer arrows (modified from Hume *et al*., 1999).

2.5.1 Sediment Budget

Sediment budgets are used as a coastal management tool to indicate the different sediment inputs (sources) and outputs (sinks) within coastal cells. Provided the individual components can be quantified adequately, sediment budgets can be used to identify areas of overall sediment accumulation or deficit, and in turn to predict potential morphological change in coastal compartment over time.

The updated sediment budget produced by Jacobs (2020) for the nearshore consent applications renewal (McCallum Brothers Ltd) provides an indication of sediment inputs and losses to the Mangawhai-Pakiri embayment. The sediment budget indicates that a total input of ~131,500 m^3/yr of material enters the nearshore environment. It has been suggested that this input of material offsets the losses from the nearshore environment including the extraction of sediment. The sediment budget inputs are from cliff erosion, rivers, biogenic sources, longshore sources (around Bream Tail), and diabathic sources (the latter being relatively small, an average of 12,000 m^3/yr (Hume *et al*., 1999). The natural losses are due to onshore winds, transport into the Mangawhai inlet, and small losses around Cape Rodney, and sediment extraction (Figure 2.6).

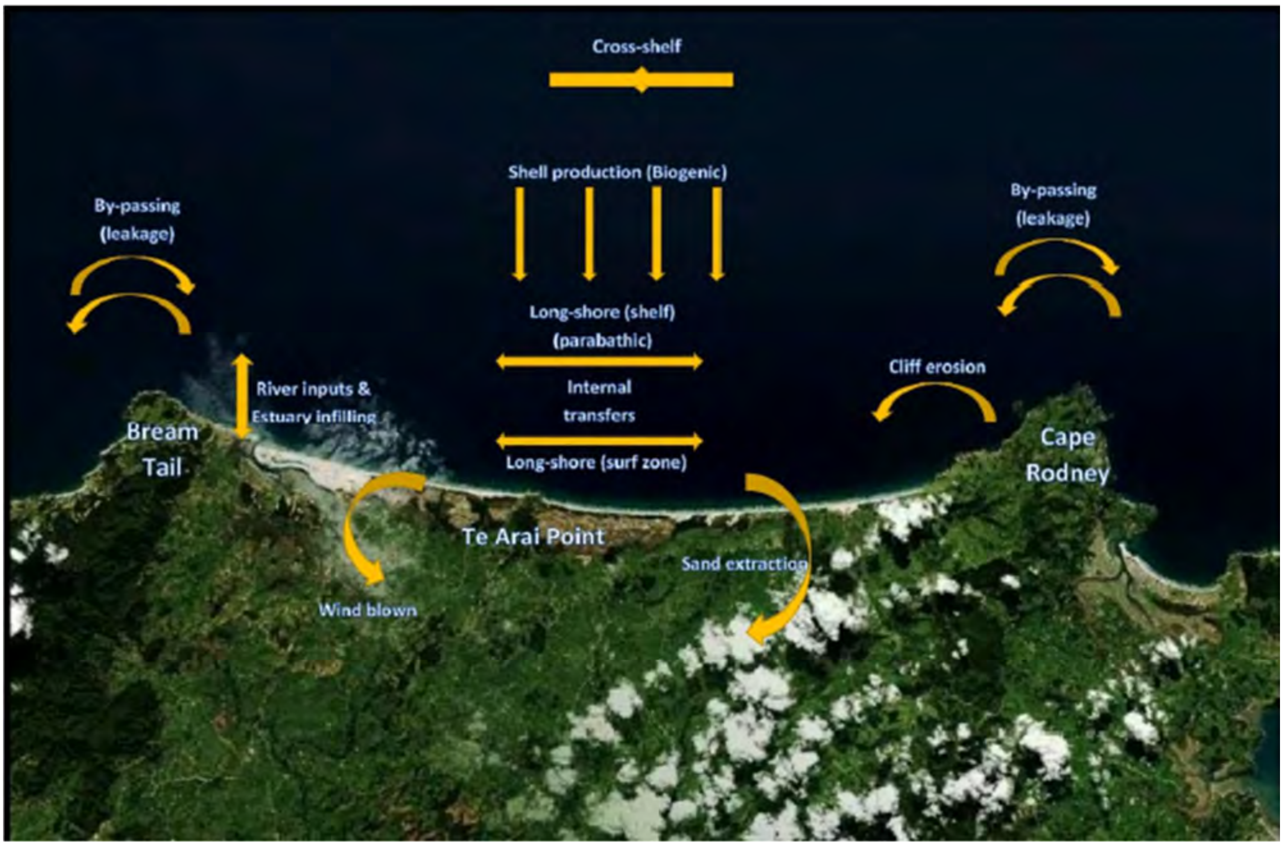

Figure 2.6 Diagrammatic representation of the Mangawhai-Pakiri embayment sediment budget (Beca, 2019, adapted from Hume *et al*., 1999).

The 2003 KEL resource consent was appealed in court (2009). The updated sediment budget produced by Jacobs (2020) is comprised of court adopted figures and scientific investigations carried out for the purpose of the nearshore consent renewal applications (Table 2.2). There remains ambiguity surrounding the inputs from riverine, long-shore, and diabathic sources. Both the riverine and longshore sediment budget volumes were court adopted figures (i.e., not supported by field investigations), whereas the diabathic input inferred in the Jacobs (2020) report is a combination of the ~35,500 m^3/yr from the dune toe (accretion) analysis and ~38,000 – 50,000 m^3/yr from additional accretion north of Te Arai point and accretion despite the effects of SLR, giving a range of 73,500 – 85,500 m^3/yr (Jacobs, 2020). This range is outside of the range estimated by Hume *et al.*, (1999) of 200 – 64,000 m^3/yr and is a minimum of 6 times the average of 12,000 m^3/yr. It should be noted that Jacobs (2020) do not define how they calculated the volume of 76,000 m^3/yr. These calculations indicate that, the extraction volume in the nearshore is 14,000 m^3 greater than is currently extracted from within the nearshore consented area. Therefore, based on this sediment budget estimate the embayment would be in surplus, despite all losses.

Table 2.2 Updated sediment budget out to 25.0 m CD water depth on the basis that inputs exceed losses over the last 50 years due to storage as shoreline accretion (Jacobs, 2020).

Inputs		**Losses**	
Source	**Volume (m^3/yr)**	**Source of Losses**	**Volume (m^3/yr)**
Cliffs	6,000	Onshore winds	2,000
Rivers	17,000	Mangawhai Inlet	3,000
Biogenic from <25 m depth	7,000	Around Cape Rodney	1,000
Around Bream Tail	25,000	Extraction from < 25 m depth	90,000
Diabathic supply (cross-shore from >25 m depth)	76,500	**Total Losses** **Storage/Surplus**	**96,000**
		Storage in dune/beach as accretion	35,500
Total	**131,500**		**131,500**

2.6 Historical Shoreline Change

As part of the assessment of effects on coastal processes for resource consent renewal application (McCallum Brothers Ltd), Jacobs (2020) reviewed past coastal erosion trends up to recent years (Table 2.3). Shoreline movements were analysed via historic aerial photographs between 1961 and 2018, surveys between 2007 and 2019, excursion distance analysis between 2007 and 2019, and beach volume analysis between 2007-2017 and 2017-2019.

Aerial photography between 1961/63 and 2018 was analysed, and the results identified a general embayment wide shoreline advance of 0.4 m/yr. Furthermore, the results identified no evidence of long-term erosion due to sand extraction, as well as no evidence of a difference in rates of movements between extraction and control areas. The nearshore seabed profiles did not show any evidence of extraction effects in either the inshore area of McCallum Brothers Ltd extraction zone or over the general nearshore out to the -30 m CD contour (combined inshore and offshore extraction zones) (Jacobs, 2020). However, there are 2 aspects that may confound these results 1) the recovery of the coast following the 2007 extreme storm event, which may take decades and is a significant factor behind the reported accreting coastline (Jacobs, 2020), and 2) given that the beaches of the embayment are connected due to alongshore sediment transport processes (Figure 2.6), the control sites are unlikely to be relevant, since they are not separate from the area of influence, as control sites should be. Again, it is important to be cognizant that this impact assessment is focussed on the offshore dredging activity. However, an understanding of the nearshore dredging activity is also required, since this activity also has the potential impact on surf breaks, which may then incorrectly be attributed to the offshore activity.

Table 2.3 Summary of shoreline movement from aerial photographs 1961/1963 to 2018 (Jacobs, 2020). The location of the areas is shown in Figure 2.7.

Area	DSAS Transects (1)	Total period 1961/1963 - 2018			Rate 1961/63 – 1982 (m/yr)	Rate 1982 - 2018 (m/yr)
		Envelope of movement (m)	Net Movement (m)	Net Movement Rate (m/yr)		
Northern Extraction Area (2)	110-165	Range: 8.4 – 220 Avg: 68.6	Range: -3.1 – +171.1 Avg: +56.9	Range: -0.05 – +2.98 Avg: +0.99	Range: --3.61 – +3.41 Avg: +0.33	Range: -1.8 – +6.08 Avg: +1.39
Southern Extraction Area (3)	64-106	Range: 6.4 – 56.3 Avg: 30.3	Range: -17.9 – +40.9 Avg: +8.9	Range: -0.31 – +0.71 Avg: +0.15	Range: -2.66 – +1.51 Avg: -0.62	Range: -0.23 – +1.56 Avg: +0.59
Southern Control Area (4)	1-14: North of Pakiri R.	Range: 15.1 – 189.4 Avg: 64.3	Range: 1.6 – 10.3 Avg: +5.7	Range: +0.10 – +0.19 Avg: +0.11	Range: -0.37 – -9.39 Avg: -2.91	Range: +0.38 – +5.23 Avg: +1.77
	50-57: South Poutawa	Range: 14.7 – 48.8 Avg: 29.3	Range -3.8 - -48.8 Avg: -21.2	Range: -0.07 - -0.85 Avg: -0.37	Range: -0.29 - -1.58 Avg: -0.97	Range: -1.19 - +0.45 Avg: -0.05
	1-57: whole control area	(5)				Range: -1.19 - +5.23 Avg: +0.71

Note: (1) See Appendix J for location of DSAS transects.
(2) Northern Extraction Area – Te Arai Point to northern boundary
(3) Southern Extraction Area – north of Poutawa Stream to Te Arai Point
(4) Southern Control Area –Pakiri River to south of Poutawa Stream
(5) 1960's images not available for transects 15-49 in the Southern control area

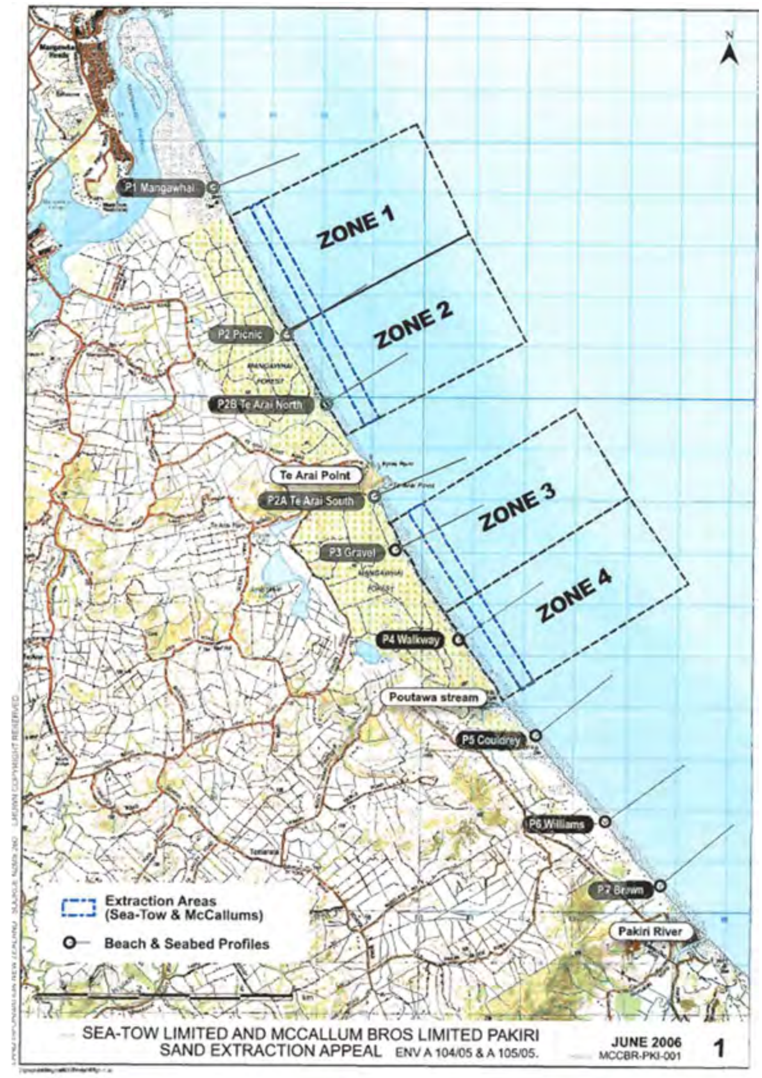

Figure 2.7. Monitoring profiles for the McCullum nearshore dredging licenses. The control sites are P1 (the northern profile) and P5-9 (the southern profiles below Zone 4). Given that the control profiles are within the Mangawhai-Pakiri embayment which is connected through sediment transport processes (Figure 2.6), the efficacy of these sites as controls is debatable.

3 Surf Break Identification and Characterisations

The initial part of a surf break impact assessment requires the characterisation of the surf breaks that could potentially be affected, that is the physical aspects that comprise the breaks (Atkin *et al*., 2019). These include the wave type, optimal tide, swell and wind directions, surfing/skill level, wave rating, wave height range and peel angle.

The Mangawhai-Pakiri embayment includes the regionally significant surf breaks of Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island (Figure 3.1). These surf breaks provide a place of amenity and hauora (wellbeing) for locals and visitors alike. Although Mangawhai Heads is outside the regional jurisdiction of Auckland Council (it is located within Northland), the surf break is likely to be influenced by the processes and consented activities occurring within the embayment. As such, Mangawhai Heads is also included in the surf break characterisations presented below. The following surf break information was retrieved from the New Zealand Surfing Guide (1996), Wavetrack New Zealand Surfing Guide (Morse and Brunskill, 2004), New Zealand Surf Guide (2013) and Surf Seeker New Zealand (2020). See Table 3.1 for a summary of the Mangawhai-Pakiri embayment surf break characterisations.

Figure 3.1 Recognised surf breaks within the Mangawhai-Pakiri embayment.

Appendix A provides a detailed description of the physical parameters that comprise and effect surf breaks. For this assessment, there is no baseline monitoring information available (e.g. remote camera monitoring, GPS tracking, bathymetry surveys, etc.), since the resource consents predate the incorporation of surf breaks into the NZCPS (2010), and the recognition of their intrinsic and socio-economic value. Therefore, information to characterize each break was gained through local knowledge through discussion with local surfers, analysis of existing data (e.g. aerial and satellite images), the descriptions and ratings in the various surf guides, , and through personal knowledge (the lead author of this assessment has frequented and surfed all the breaks within the Mangawhai-Pakiri embayment between the mid-1970's and late 1990's, the latter period when he was based at the Goat Island marine laboratory). Peel angles for each break were estimated through the analysis of images from Google Earth, Retrolens, LINZ and the Auckland Council website. The images provide snapshots in time, and not a full range of conditions (metocean and morphological).

3.1.1 Mangawhai Heads

Mangawhai Heads is located at the northern end of the embayment (Figure 3.1). There are two types of breaks here, beach breaks and a delta break. Sentinel Rock is located on the northern side of the harbour entrance. \ A right-hander breaks on the northern side of Sentinel Rock. On the southern side of Sentinel Rock is a high-angle half delta (Hicks and Hume, 1996). On the seaward, and south-eastern flank of the delta an often long and quality left-hander breaks (Figure 3.2). Right handers are also reported to break on the northern side of the delta, in towards the inlet channel of Mangawhai Estuary (NZ Surf Guide, 2004; Surf Seeker, 2020). The left hander on the bar is described as producing "*sucky pits with nice long rides*". This description indicates that the waves are hollow, and can have a breaking intensity of medium to high (Mead and Black, 2001c). The morphology is variable, with the flood tidal channel having a large impact on the bar's integrity (i.e. the inner part of the break). The optimal swell direction is from the north-east with an optimal wind direction from the west. These breaks are best surfed at low tide when the swell can better interact with the bathymetry (sandbars). The waves typically range between 1.5-10 ft, but are best surfed at heights between 4-6 ft with the wave shape described as being wally and hollow, having peel angles of 35-45°, which is relatively fast. The skill level recommended for this break is of the intermediate level with only experienced surfers recommended at the bar due to dangerous rips and currents. The surf breaks here are rated at 7/10 with crowd levels rated at 7/10 (NZ Surf Guide, 2004; Surf Seeker, 2020).

Figure 3.2. Aerial image of Mangawhai Heads, with Sentinel Rock north of the entrance to the estuary, and the Bar on the southern side of it.

3.1.2 Black Swamp (Canals)

Between the Mangawhai Estuary entrance and Te Arai Point is Black Swamp beach break (Figure 3.3). This beach break offers both left- and right-hand peaks. The wave here is described as 'punchy and hollow' with peel angles of ~50-60°. The optimal swell direction is from the north-east with the optimal wind direction from the south-west. This wave can be surfed during all tidal phases with wave minimum wave heights at around 1 ft, which makes this beach break great for, and popular with, beginners. This wave is rated 4/10 with crowd levels at 7/10 (NZ Surf Guide, 2004; Surf Seeker, 2020).

Figure 3.3. Aerial image of Black Swamp (Canals).

3.1.3 Te Arai Point

Approximately 7.5 km south of Black Swamp is Te Arai Point. On the northern side of this point, the beach often offers both left- and right-hand peaks on the sandy beach, as well as the rocky reef adjacent to the point which is rarely surfed. This area is described as a swell magnet due to its favourable aspect to the northeast, that produces powerful and hollow waves. Measured peel angles (from the available aerial images) were found to be 50-60°, and working well during a range of swell sizes, the waves here are suited to all levels of surfer. The optimal swell direction is from the north-east, although it picks up swells ranging from north to east with the optimal wind component from the south-west. The break works during all tidal phases and holds large swells well. This wave is rated at 8/10 with a crowd level to match (8/10) (NZ Surf Guide, 2004; Surf Seeker, 2020).

Figure 3.4. Aerial image of Te Arai Point.

3.1.4 Forestry

On the south side of Te Arai Point is the surf break Forestry, which consists of a sandy beach break and the left-hand point break at the northern end (Figure 3.5). There are several peaks that work along the beach with both lefts and rights on offer. The best break at this iconic spot is the left-hand point break at the northern end of the beach. This wave is described as powerful and hollow, with peel angles of ~45-55°, and with solid walls on which to manoeuvre but is suited to all levels of surfer, although it is reliant on sufficient sand against the point to work best. These breaks work well during all tidal phases. Surfers who take-off on the right spot can expect over 80 m rides. The optimal swell direction is from the north-east, and like Te Arai Point, this break picks up swells ranging from north to east. The optimal wind direction is from south-west and it holds large swells well, up to 6 ft. This wave is rated at 7/10 and has a crowd level of 8/10, which is indicative of its popularity (NZ Surf Guide, 2004; Surf Seeker, 2020).

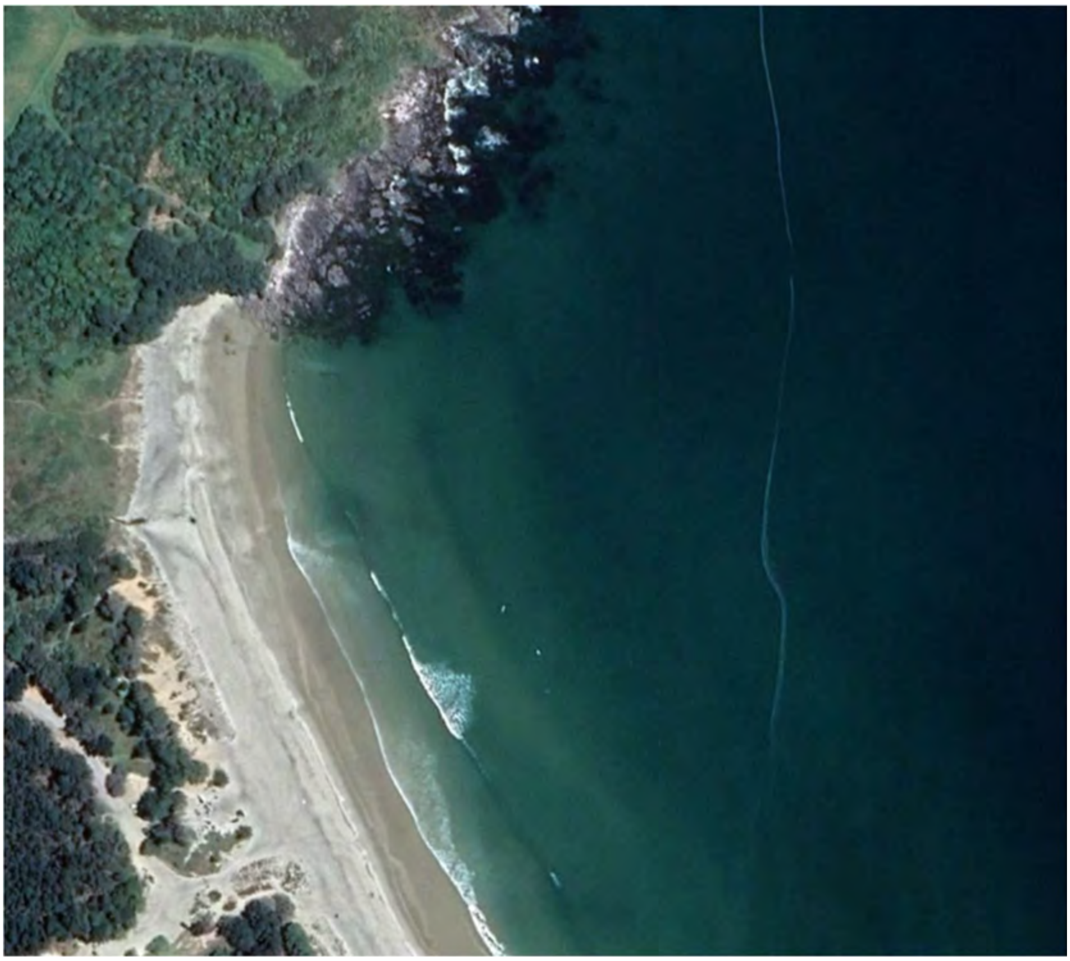

Figure 3.5. Aerial image of Forestry.

3.1.5 Pakiri Beach

North of Leigh is Pakiri Beach, a sandy beach break that can support several peaks going both right and left when it is at its best (Figure 3.6). This wave is described as punchy and hollow, with measured peel angles of ~45-60°, and is suited to all levels of surfer. However, it can be a fickle break, which often has a shore-parallel bar and nearshore trough (i.e., intermediate beach type) that is not conducive to good surfing waves. The area works well during all tidal phases and just to the north of the access to Pakiri Beach is small river/stream bar, which can also produce left and right handers, especially following flood events that break up the shore-parallel bar. It is noted that a sand dredge is often observed dredging the Pakiri pure white sand very close to shore (this is the nearshore dredging activity, which is not the subject of this surf break impact assessment). The optimal swell direction is from the east with swells ranging from north through to east, while the optimal wind direction is from the south-west. This wave is rated at 5/10 with crowd level rated at 8/10 (NZ Surf Guide, 2004; Surf Seeker, 2020).

Figure 3.6. Aerial image of Pakiri Beach.

3.1.6 Goat Island

At the southern end of the Mangawhai-Pakiri embayment and just north of Leigh is the rocky righthand reef break known as Goat Island (Figure 3.7). It is a relatively fickle spot requiring large swell, and the most consistent break is located some 300 m from Goat Island, while during rare large wave events, a walling righthander can peel from just off Goat Island into the back of the reef (Figure 3.7). The wave is described as hollow with steep take-offs and can occasionally produce barrels/tubing waves. Peel angles are ~50-55°, it is regarded as an expert only wave and is particularly popular with local surfers. The main break usually works during big swells between 6-8 ft. On an incoming mid to high tide, the wave wraps around the island and hits the rocky reef producing heavy right-handers. The optimal swell direction is from the east with swells ranging from north-east through to east, with the optimal wind direction from the south-west. This wave is rated at 5/10 (due to its fickle nature) with crowds rated at 7/10 (NZ Surf Guide, 2004; Surf Seeker, 2020).

Figure 3.7. Aerial image of Goat Island. The most consistent break is denoted by the red arrow, however, on rare occasions with large swells, a right-hander can peel from just off Goat Island (top righthand in the image), into the back of the reef inshore.

Table 3.1. Mangawhai-Pakiri embayment surf break characterisation.

	Break	Wave Type	Swell Direction	Wind	Best Tides	Surfing Level	Rating	Comment NZ Guide	Comments by local surfers
1	Mangawhai Heads	Beach break, L & R. River mouth/bar, L	NE	W	LT	Intermediate - Expert	7	Iconic left bar break. Best at 4-6 ft	Sucky pits with nice long rides
2	Black Swamp	Beach break, L & R	NE	SW	All	All	4	Breaks at 1 ft upwards	Can be punchy and hollow
3	Te Arai Beach	Beach break, Rocky reef, L & R	NE	SW	All	All	8	Swell magnet	Powerful and hollow
4	Forestry	Beach break, L & R. Point break, L	NE	SW	All	All	7	Good left point break	Hollow, solid walls
5	Pakiri Beach	Beach break, L & R	NE	SW	All	All	5	Popular local spot	Punchy and hollow, fickle
6	Goat Island.	Rocky reef, R	NE	SW	M to H	Competent to Expert	5	Needs to be big (6-8 ft)	Heavy right handers, fickle

	Break	Wave Height Range	Peel Angle	Skill Rating (Table B1, Appendix B, Atkin *et al.*, 2018))
1	Mangawhai Heads	2-8 ft	35-45°	6 – Surfers able to execute standard manoeuvres consecutively. Execute advanced manoeuvres on occasion.
2	Black Swamp	1-4 ft	50-60°	4 – Surfers are beginning to initiate and execute standard surfing manoeuvres on occasion
3	Te Arai Beach	1-8 ft	50-60°	5 – Surfers able to execute standard surfing manoeuvres consecutively on a single wave
4	Forestry	1-8 ft	45-55°	5 – Surfers able to execute standard surfing manoeuvres consecutively on a single wave
5	Pakiri Beach	1-6 ft	45-60°	5 – Surfers able to execute standard surfing manoeuvres consecutively on a single wave
6	Goat Island.	6-8 ft	55-55°	5 – Surfers able to execute standard surfing manoeuvres consecutively on a single wave

4 Swell Corridors

As described is Section 1, a surf break includes the '**swell corridor**' through which the swell travels, and the morphology of the seabed of that wave corridor, through to the point where waves created by the swell dissipate and become non-surfable. '**Swell corridor**' means the region offshore of the surf breaks where ocean swell travels and transforms to a '**surfable wave**'.

Basic swell corridor mapping (through numerical modelling) was undertaken for the Auckland Region in 2012 (Frazerhurst and Lebreton, 2012), which is presented in Figure 4.1; note, Mangawhai Heads was not included in the assessment due to it being in Northland. The surf breaks within the Mangawhai-Pakiri embayment receive swells from the north-northwest through to the southeast, although not as a continuous swell corridor due to the presence of a number of offshore islands and island groups, including Little Barrier Island (Te-Hauturu-o-Toi), Great Barrier Island (Aotea), the Mokohinau Islands, Taranga Island and the Hen and Chicken Islands (Marotere), Bream Head to the north and the Coromandel Peninsula to the south (Figure 4.1). At the northern end of the embayment Black Swamp (Canals) and Te Arai Beach receive swells from the north through to the east, whereas the surf breaks south of Te Arai Point not only receive swells from north through to the east but also swell from the south-east, as swells are able to propagate between Great Barrier Island and the Coromandel Peninsular. Many of these swells arriving on the shorelines of this embayment refract (wrap) around the nearby Islands and interact with the nearshore bathymetry, which accounts for the uneven outlines of the swell corridors.

Based on these swell corridors, impacts of the proposed offshore dredging have the potential to effect Black Swamp, Te Ari, Forestry and Pakiri surf breaks. Swells propagating into the surf breaks at Mangawhai Heads and Goat Islands will not travel through swell corridors that could be effected by the proposed offshore dredging activity due to the relative close distance to the shore, where the swell corridors narrow markedly (Figure 4.1). As a result, modifications to the seabed through offshore extraction will not directly impact on Mangawhai Head and Goat Island surf breaks. At Pakiri Beach surf break, swells from the southeast, between Aotea and the Coromandel will also not be impacted by modifications to the seabed, since they propagate south of the proposed extraction area.

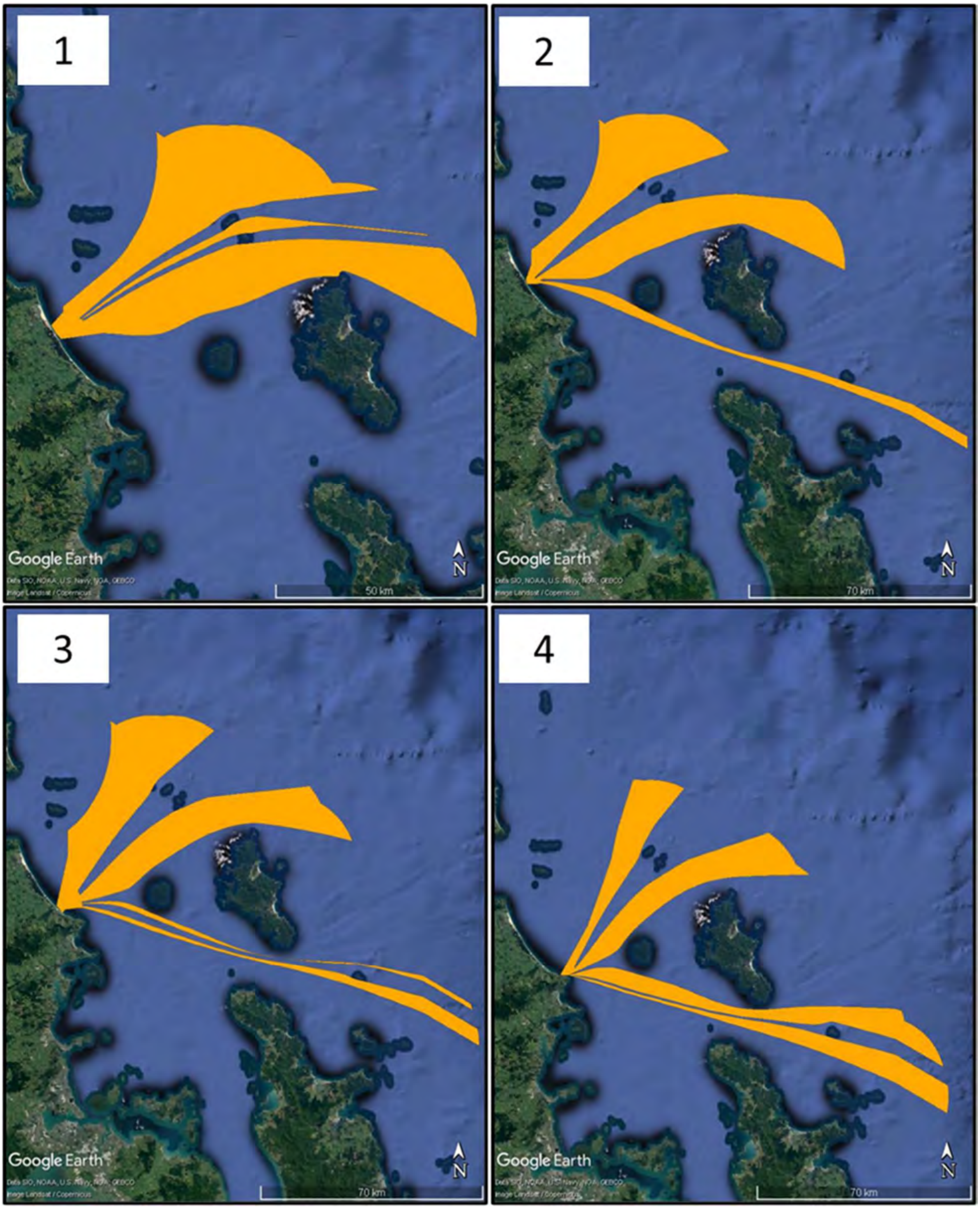

Figure 4.1 Swell corridors for the surf breaks within the Mangawhai-Pakiri Embayment from the 12 nautical mile territorial limit. (1) Black Swamp (Canals) and Te Arai Beach, (2) Forestry (North Pakiri Beach), (3) South Pakiri Beach, and (4) Goat Island. (Frazerhust and Lebreton, 2012)

5 Stakeholder Engagement

No formal stakeholder engagement has been undertaken in the form of a public forum, since came out of the s92 request and submissions. This important aspect of surf break impact assessment will be covered in more detail at the Hearing since engagement is currently ongoing.

To date, based on discussions with a number of long-time local surfers, as well as personal experience:

- Many have noticed the loss of dunes at Pakiri. Possibly due to dune management of this area, where foot traffic impacts on the natural dune vegetation.
- Pakiri is a fickle in terms of quality, often shore-parallel bars. It is better when river breaks through.
- With respect to the breaks between Mangawhai and Forestry (i.e., including Black Swamp and Te Ari) not much change to breaks has been noticed, although changes to the dunes have been noticed.
- There is some uncertainty whether dredging has an impact, although without exception, all are concerned that it may be having an impact and could have negative impacts in the future.
- Some surfers think that these breaks may have been better in the past (15-20 years ago), although most upon reflection cannot be certain (e.g. summers were always sunnier, hotter and longer 20 years ago)
- There are periods when the beaks are good, and others when not so; the is likely due to several factors such as swell direction, variability of swell directions (e.g. West Coast NI, East Coast NSW, El Nino/La Nina, etc.

6 Threats and Risk Assessment

The threats and risk assessment considers the potential to impact on surf breaks under the current management regime, as well as under the proposed management regime (the proposed management and monitoring for the current proposal is further described in Section 7 below). The proposed management regime reduces the level of threats and risk of impact on surf breaks due to the prevention of repeat dredging of the same areas and the consequent reduction in potential dredged channel depths.

It is also important to note, that Goat Island surf break is not at risk of impact due to offshore sand extraction, since it is located within an extensive reef system, more than 3 km south of the southern end of Pakiri Beach and will not be impacted by either changes to waves due to changes to the offshore seabed, or changes to sediment supply.

To determine the Risk of Impacts on the 5 breaks (i.e., excluding Goat Island), the methodology set out in the Management Guidelines for Surfing Resources (Atkin *et al.*, 2019) was followed. This includes determining the Sensitivity of the breaks due to their inherent composition (Section 5 above), the Consequence of the Threat/activity (from Catastrophic to Minor), the Likelihood of the impact occurring (from Highly Likely (permanent/frequent) to Highly Unlikely (rare), and the combination of these factors to determine the Risk (Extreme to Low) (Appendix B).

6.1 Threats

Table 2.4 in the 'Management Guidelines for Surfing Resources' (Atkin et al., 2019) provides a comprehensive list of activities and threats according to their source; whether they originate in the catchment and connecting waterways (rivers or estuaries), in the vicinity of the surf break itself, offshore from the break in the swell corridor, from natural events or social/cultural/technological change. Based on the proposed activity (i.e. sand extraction between the 25 and 30 m contours along a shore-parallel area some 16 km long and covering an area of ~44.2 km^2 (Figure 1.3)), the following potential threats are relevant to the breaks in the Mangawhai-Pakiri embayment:

- Sediment plumes due to dredging impacting on water quality at the break;
- Removal of sand directly from the nearshore bars and leaving (temporary) pits in the seabed. May alter wave refraction;

- Removal of sand creating pits and mounds in/on the seabed may affect waves by refraction/diffraction/reflection. This can result in changes to surfing wave quality either directly by modifying wave climate or;
- Indirectly through changes to sediment transport pathways, which may result in changes to sandbars and beach erosion.

It is noted that impacts due to sea level rise (SLR) are not considered, since SLR is not being caused by the proposed sand extraction. However, it should be recognised that some impacts may exacerbate the effects of SLR. For example, SLR is predicted to result in coastal erosion (MfE, 2017), which may be exacerbated by reduced sediment inputs from cross shore sediment transport and consequently impact on the nearshore beach. However, there is just as much potential that sediment supply will increase due to erosion (e.g. cliff and land erosion due to increased water levels) and increased extreme rainfall events (i.e., more extra-tropical cyclones). The latest IPCC report on climate change (CC) notes that there remains uncertainty with respect to the effects of erosion on beaches due the issues described above.

Similarly, climate change (CC) is predicted to reduce the mean wave height on the north eastern coast, although the number and intensity of extra-tropical cyclones is predicted to increase. It is difficult to determine how these changes, as they progress, will impact on the Mangawhai-Pakiri embayment sediment system, as well as the surf breaks. With respect to SLR and how the increase in water level/depth will impact on the embayment and surf breaks, the likely increase during the 20 year consent period is ~10-20 cm. On the mobile sandy breaks, it is expected that these changes will have negligible and unmeasurable impacts, since they will simply adjust. Reef breaks such as Goat Island are more sensitive to changes in water level/depth since they are rock and cannot adjust to the change. With 10-20 cm SLR in the next 20 years, changes to the Goat Island surf break are expected to be relatively small and likely difficult to detect without extensive monitoring data (e.g. capture of hourly video imagery throughout the 20 year period).

It the present case, given the ‘clean’ nature of the seabed sand being targeted and the distance offshore where the activity is proposed, water issues due to plume formation are not considered a threat. The seabed sand some 2 km offshore is of a coarse grain size, which means it falls to the seabed relatively quickly if it is mobilised (either naturally during extreme wave events, or due to extraction activities), large plumes such as those generated where fine sediments are disturbed, which then extend into a surf break area, will not occur.

Similarly, due to the distance offshore that the proposed activity would take place (~2 km), removal of sand directly from nearshore bars and leaving pits in the seabed at the breaks themselves is not considered to be a threat for the surf breaks in the Mangawhai-Pakiri embayment. There is potential that this type of impact could occur through nearshore dredging, however, that activity is not the subject of this assessment.

The main threat to the surf breaks within the Mangawhai-Pakiri embayment is alteration of the seabed within the swell corridors. This can affect to the way waves propagate to the surf breaks. As described in Section 4, impacts on swell corridors due to the proposed extraction can only occur at 4 of the 6 main breaks within the Mangawhai-Pakiri embayment: Black Swamp, Te Ari, Forestry and Pakiri. The proposed activity would not take place in the swell corridors of Mangawhai Heads and Goat Island.

As noted in Atkin *et al*., (2019), the morphology and dimensions of the seabed changes due to the sand extraction (e.g. pits, mounds, channels) that impact on waves propagating through the swell corridors are important to consider. In this case, based on the application of the historic/existing offshore consent and the conditions of the existing offshore consent, potential negative impacts could occur by the creation of shore-parallel trenches up to 1.5 m deep; i.e., the Kaipara Limited Coastal Permit RCAN 0621 (ARC20795) Environmental Monitoring Management Plan (Healy, 2003)) allows for seabed changes of up to 1.5 m. The creation of 1.5 m deep shore-parallel channels has the potential to impact on the 4 surf breaks in the Mangawhai-Pakiri embayment through 2 processes.

The first process is due to loss of wave height caused by reflection/refraction/diffraction. Loss of wave height due to reflection off changes in the seabed elevation have been considered for surf breaks (Button, 1991) and for many harbour/marina entrance channel developments (e.g., CenterPort, Wellington, channel deepening (MetOcean, 2016)). The location and morphology of the entrance channels has been used specifically to reduce wave heights in marina basins through wave reflection around the world. Button (1991) found that steps in bathymetry of greater than the design wave height can significantly reduce wave height at the shore (i.e., surf break), with a recommendation that steps should not be greater than the 'design' wave height, which in this case can be considered ~1.0 m (i.e., the mean wave height on this coast).

To consider the formation of deeper areas of the proposed extraction zone, Beca (2020) provide a desktop analysis that demonstrates the small and temporary changes to wave direction due to refraction on a modified/deepened seabed in the form of a 700 m wide shore-parallel strip. As noted by BECA (2020), waves with periods of <6 seconds do not 'feel' the seabed in the area of the proposed extraction, since their wavelengths are less than 2x the water depth[4], and waves with periods <6 seconds occur some 75% of the time. However, the

[4] Waves start to 'feel' the seabed at depths of around 50% of their wave length, with 6 second waves having a wave length of ~56 m (i.e., being effected by the seabed at ~28 m depth), and waves of 5 secs having wavelengths of ~39 m (i.e., being effected by the seabed at ~20 m deep).

wave climate data of Gorman *et al*., (2003) is not really relevant to the Hauraki Gulf in terms of surfing waves at the beaches in the Mangawhai-Pakiri embayment, due to the sheltering effects within the Hauraki Gulf; it is useful for putting the northeastern coast's wave climate into a countrywide context (as discussed in Section 2.3 above). It must also be noted that Gorman *et al*. (2003) refer to mean period, which is lower than the peak period, with the latter being indicative of the surfable swell[5].

Extraction of ~40 years of 3 hourly hindcast wave data (1979 to 2019) from ~40 km offshore of the Mangawhai-Pakiri embayment (i.e., inside the Hauraki Gulf), and removal of all data that is not applicable to this coast (i.e., wind-generated waves propagating offshore rather than into the breaks), indicates that only 10% of waves have peak periods of less than 6 seconds in between 1979 to 2019 (Figure 6.1). Therefore, changes to the seabed within the surf breaks swell corridors has the potential to impact on surf breaks for a large proportion of wave events.

An additional artefact of applying the Gorman *et al*., (2003) deep water hindcast data is that the periods overall are reduced, since wind-generated waves propagating offshore due to the predominant SW wind flow are included. Surfing on this part of the NZ coastline is usually undertaken with wave peak periods of 8 to 12 seconds, with occasional longer period swells generated by tropical cyclones (northerly quarter) and deep low pressures in the east to southeast.

[5] For example, for a fully developed wind wave state (i.e. 'seas' rather than a monochromatic swell) mean period (Tm_{02}) = 0.58 of the peak period (T_p), although the mean and peak periods converge as a the sea state tends toward and monochromatic swell; a 'clean' swell in surfer's terminology.

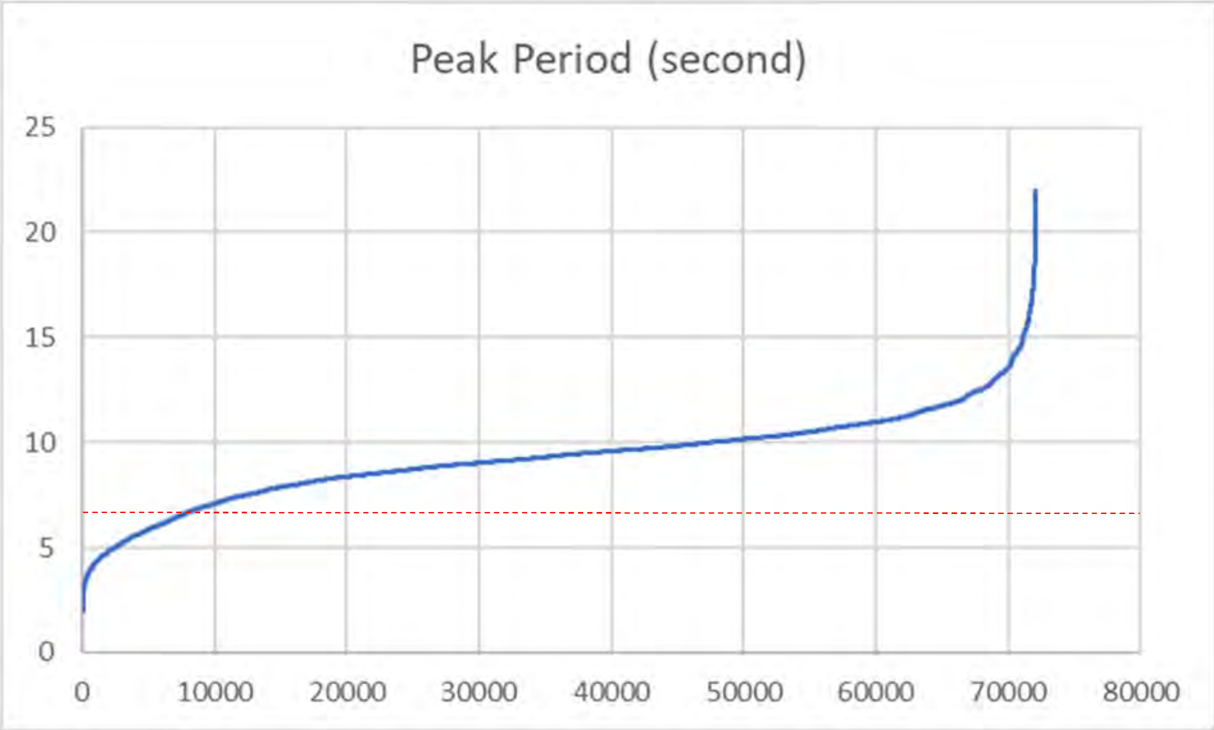

Figure 6.1. Peak period (y-axis) of 40 years of 3-hourly wave data (x-axis) ~40 km offshore of the Mangawhai-Pakiri embayment. Approximately 10% of waves have periods of <6.5 seconds (denoted by the red dashed line).

Button's (1991) work considered shore-parallel steps, that is similar to those that would be created by a shore-parallel channel, while the amount of reflection/wave height reduction lessens as the channel is rotated more shore-normal and processes of refraction/diffraction start to dominate. For example, MetOcean (2016) found that wave heights were reduced by up to 30% on the eastern side of the proposed deepened entrance channel for CenterPort (based on numerical modelling) due to the processes of refraction and diffraction[6].

The effects of reflection/refraction/diffraction of waves due to the creation of >1.0 m shore-parallel channels within the Mangawhai-Pakiri embayment has not been investigated. It is noted that due to the depth of the channels (i.e., >1.0 m) and the relative depth that the channel(s) could occur (i.e. 25 to 40 m deep), means that the reflective impacts are likely to be relatively small (in comparison to the findings of Button (1991)). The small magnitude of impacts due to wave interaction with the seabed is supported by Beca's (2020) application of USACE calculations to consider changes to refraction, where the unmodified seabed is compared to a modified seabed incorporating a 0.5 m shore-parallel depth increase. As noted by Beca (2020), a 0.5 m feature is significantly greater than the ~0.045-0.09 m that the seabed

[6] Note, the situation at Centerport, or indeed any channel deepening project are not directly comparable to offshore sand extraction in the Mangawhai-Pakiri embayment due to the often significant channel depths is relatively shallow water, and is referenced to demonstrates these type of effects to the swell corridor.

would be deepened over the whole proposed area during the 20 year consent period, which is assuming that there is no influx of sand from the surrounding seabed[7]. From this analysis, BECA (2020) concluded:

> "*calculation of the effects of an exaggerated depth change on the swell corridor of the surf break shows that theoretical changes to refraction and shoaling characteristics occur temporarily as waves cross the deeper zone. These changes are negligible and not practically measurable, and the characteristics revert to unmodified conditions once the wave has passed the extraction area.*"

Similar conclusions have been found in previous investigations of the impacts of changes to the seabed on refraction/diffraction processes (not reflection) where the magnitude of the change/distance offshore resulted in only a temporary influence on the propagating waves and no measurable change at the coast (e.g. Mead, 2013).

The Consequences, or magnitude, of potential impacts on wave quality at the 4 central surf breaks in the Mangawhai-Pakiri embayment associated with changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction are considered *Less Than Minor to Negligible* with the current consent. However, since no direct assessment of these impacts has been undertaken, a precautionary approach is required to ensure surf break wave height is not impacted by the proposed activity and shore-parallel channels are not created. The proposed management and monitoring strategy for KEL's current application addresses this potential negative effect, which is an improvement on the existing consent EMMP, and is described in Section 7. Therefore, the potential impacts on wave quality due to changes in seabed morphology at the 4 central surf breaks in the Mangawhai-Pakiri embayment are also considered *Less Than Minor to Negligible* for the proposed resource consent application.

The second potential impact due to the creation of >1.0 m shore-parallel channels is due to interruption of the cross-shore sediment transport pathway, which delivers 'new' sand from the offshore seabed to the inshore seabed/beaches. A shore-parallel channel of >1.0 m would interrupt the shoreward transport of sediment by acting as a sediment trap. Although it is presently unclear how long such channels would persist (i.e., natural filling may occur by slumping, extreme events may 'remove' these features, etc.), sediment that is moved into shore-parallel channels cannot be resuspended and continue its pathway shoreward once

[7] 2,000,000 m^3 from ~44.2 km^2 (or ~44.2 Mm^2)results in 4.5 cm of deepening if the site is considered in isolation (i.e., no new material in and no existing material out of the area being dredged). Beca's (2019) approach to potential deepening of the area considers the long-term average extraction depth for the total extraction volume over 20 years, conservatively assuming that only half the area can be dredged due to ecological habitat, suitability of sand, etc., is 90 mm, or 0.09 m. Hence the range of 0.045-0.09 m.

inside the channel, resulting in a deficit of material at the beach. Unlike the morphological changes to the seabed which only have the potential to impact on the 4 central breaks in the embayment due to the impacts of reflection/refraction/diffraction of waves in the swell corridor, this impact has the potential to also impact on Mangawhai Heads, since it is associated with sediment supply and the beaches of the embayment are connected through longshore sediment transport (Figure 2.6).

In the present case, the average annual supply of cross-shore sediment from the offshore to the inshore for the Mangawhai-Pakiri embayment has been estimated at ~12,000 m^3/yr (Hume *et al*., 1999), which has recently been supported by Bioresearches (2019) assessment of biogenic sand production concluding some 5,790-7,369 m^3/yr is likely to be generated and moved shoreward. Although this indicates that the offshore system (>25 m deep) is somewhat separate from the inshore sediment system due to the relatively low volume of sediment flux, it has the potential to add up to a significant volume over time (e.g. 240,000 m^3 over the 20 year life of the resource consent), which has the potential to result in negative impacts on the surf breaks and beaches within the embayment through erosion, and so requires mitigation. This impact also has the potential to exacerbate the impacts of SLR.

The Consequences, or magnitude, of a reduced cross-shore sediment supply to the beaches in the Mangawhai-Pakiri embayment has the potential to have a *Minor* impact on the regionally significant surf breaks (excluding Goat Island reef, since it is located within an extensive reef system, more than 3 km south of the southern end of Pakiri Beach) over the medium to long term due to the cumulative volume of sediment reduction. The impact is considered *minor* because 240,000 m^3 of sediment not being transported to the nearshore system over the medium to long term is a small amount relative to the amount of sediment stored and influx within the system (Section 2.1 above).

As noted above, the proposed management and monitoring for KEL's current application addresses this potential negative effect, which is an improvement on the existing consent EMMP, and is described in Section 7 below. The proposed management and monitoring plan reduces the likelihood of the creation of >1.0 m deep shore-parallel channels. Therefore, the potential impacts on wave quality at the 5 sand-dependent surf breaks in the Mangawhai-Pakiri embayment due to reduced sediment supply are considered *Less Than Minor to Negligible* for the proposed resource consent application.

6.2 Risks

Although appropriate management and monitoring can be applied to mitigate the impacts of both wave reflection/refraction/diffraction and reduction in sediment supply to the beach (Section 7), a risk assessment in the absence of these measures is considered; as with the Threats assessment above, the risk of impacts on the surf breaks under the current management regime, as well as the risk of impacts under the proposed management regime are considered here.

The first aspect to consider is the sensitivity of the surf breaks (from 1-5, low to high), which are beach and beach point breaks, deltas (Mangawhai Heads), and rock reef (Goat Island[8]). Rock reef breaks have the lowest Sensitivity Rating of 1 since they are made of consolidated material. Sandy point breaks such as the left point at Forestry are Rated 3, since they have a stable base, although are impacted by sediment supply, as is the case with Forestry. Beach breaks are Rated 4, since they are comprised of unconsolidated material which can be changed due to impacts, while delta breaks like Mangawhai Heads are the most sensitive, since they can be impacted by activities both on the open coast and within the estuaries that help to form them (as was seen with the closure of the entrance to Mangawhai Heads in the past).

Next, based on the assessment of the Threats above (i.e., *Negligible to Minor* over the long term), the Consequence of the potential impacts are considered *Minor* (category D) for the existing consents and *Less Than Minor to Negligible* for the proposed resource consent application.

The Likelihood of the impact is then considered, which is also connected with the sensitivity of the breaks. For the existing consent regime, this is considered *Likely* to *Moderate* for all 5 breaks (excluding Goat Island), that is categories B to C, even though Mangawhai Heads is a delta break and so has a sensitivity rating of 5, which would indicate a likelihood of the impact rating of very likely (A). This decision is based on the dominance of southerly directed alongshore sediment transport in the embayment, with Mangawhai Heads being some 4 km north of the northern boundary of the proposed extraction area and updrift of the dominant sediment transport pathway, and because the estuary/tidal prism is likely to have the most influence over the formation of the bar.

To determine the Risk Rating for the 5 surf breaks in the Mangawhai-Pakiri embayment (excluding Goat Island), the Consequence of the proposed activity is associated to the

[8] Note, as stated above, Goat Island reef is not at Risk from the proposed sand extraction, since it is located within an extensive reef system, more than 3 km south of the southern end of Pakiri Beach and will not be impacted by either changes to waves due to changes to the offshore seabed, or changes to sediment supply.

Likelihood of the impact occurring (Table 2.7 in Atkin *et al*., 2019). This results in a likely *Risk Rating* of *Low to Moderate* to the 5 surf breaks in the absence of operational management to minimise the magnitude of changes to the offshore seabed.

When the likelihood of the impact is considered for the proposed consent and management regime, it is considered *Unlikely (Remote) to Highly Unlikely (Rare*) for all 5 breaks (excluding Goat Island), that is categories D to E. This results in a likely ***Risk Rating of Minor to No Risk*** with the application of operational management to minimise the magnitude of changes to the offshore seabed.

Atkin *et al*., (2019) note that threats to surf breaks may also be threats to Māori and Iwi interests in the environment and their role in exercising kaitiakitanga. In this respect the interests of surfers align closely with Māori conservation views (refer to Selby, Moore, & Mulholland, 2010). As noted in Section 5 above, cultural engagement is being undertaken by KEL.

7 Proposed Management and Monitoring

At present, the consent conditions and environmental monitoring and management plan (EMMP) are drafts and have not been finalised. However, these documents, which dictate how the operation will be managed and monitored to ensure that environmental impacts are minimised and mitigated, include important improvements compared to the existing consent conditions.

The existing consent conditions allowed for channel/pits of up to 1.5 m depth to be dredged, which as described in Section 6 has the potential to impact on wave propagation to surf breaks and cross shore sediment transport (i.e. the movement of sand from offshore into surf break areas). However, the proposed conditions and EMMP implements an improved management regime which includes the following:

- The 44.2 km area will be divided into 1,000 m x 200 m cells;
- A maximum of 40,000 m^3/yr can be extracted from any 1,000 m x 200 m cell, giving a maximum extraction depth of 200 mm, averaged over the cell (the cell must remain un-dredged for the following year if this extraction volume is reached).

Trials have indicated the track of the new dredger that would be utilised for future offshore sand extraction is 50-80mm deep (Beca, 2020), where dredging is undertaken thin ‘skims’ and there is progressive movement through the proposed extraction area cell by cell (management cells). This prevents the formation of deep channels/pits/strips and allows for the seabed to recover, which also mitigates the potential effects of changes to wave height and direction and reduced cross shore sediment transport. Dredging cannot be undertaken in the same cell for at least a year so that the seabed can recover to its pre-dredging state (i.e., the return of natural bedforms, similar grain size distribution to the control sites, etc.).

The proposed environmental management is similar to the maintenance dredge disposal environmental management regime applied by Port Otago Ltd. This was developed over a 3-year temporary permit period through a Working Party following concerns of the impacts of increased and continued dredge disposals on 2 of New Zealand’s Surf Breaks of National Significance (Aramoana and Whareakeake). A 20-year resource consent was granted 2 years ago which includes expanded disposal grounds and monitoring/management to ensure that the distribution of the disposed materials does not result in interactions with waves that are detrimental to the surf breaks, while ensuring adequate sediment is supplied to the beaches. Figure 7.1 is an example of the management cell technique applied in Otago. In this case it is mounds that are being managed, rather than channels/pits for the proposed KEL consent.

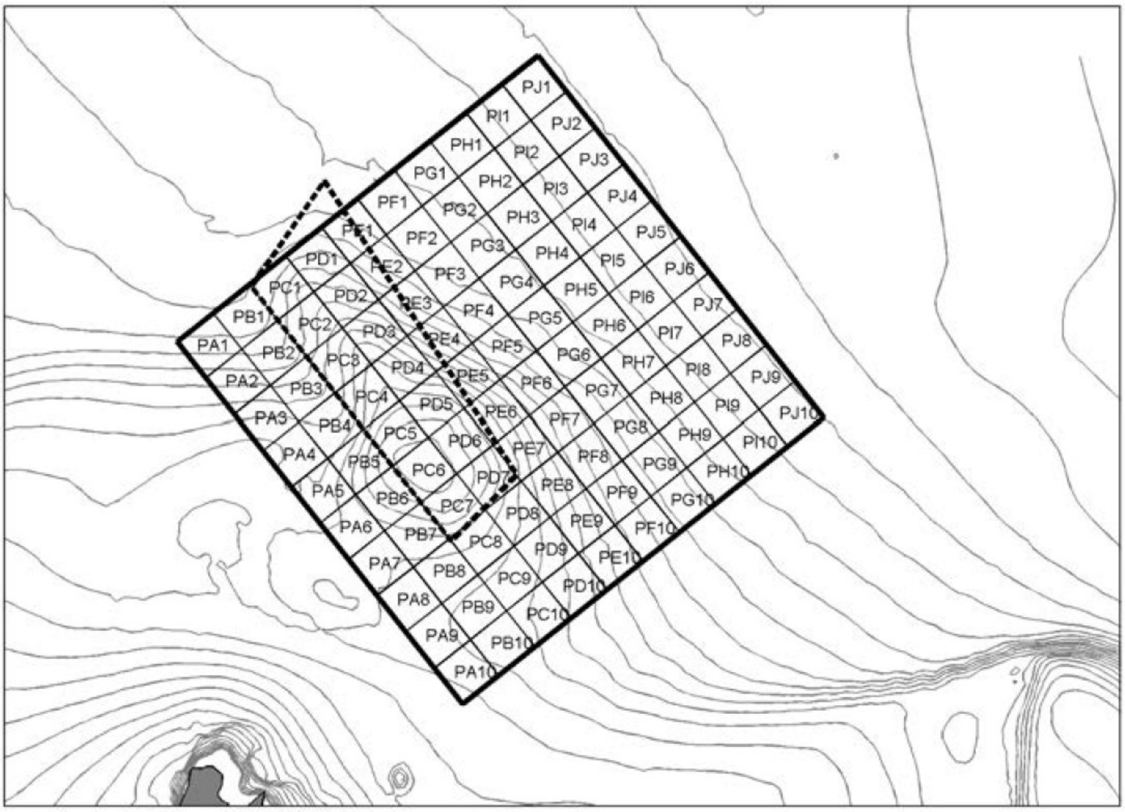

Figure 7.1. Cell delineation of the new Heyward Point disposal ground offshore of Whareakeake (aka Murderers) near the entrance to Port Otago. The original smaller disposal ground is shown as a dashed box. Monitoring through bathymetric surveys allow for planned disposal to ensure that the morphology of the mound does not cause wave interactions (refraction/diffraction and shoaling/breaking) which will negatively impact on the nationally significant surf break, Whareakeake.

8 Summary and Conclusions/Recommendations

1. The 6 regionally significant surf breaks within the Mangawhai-Pakiri embayment which could potentially be impacted by the proposed offshore sand extraction were assessed following the Management Guidelines for Surfing Resources (Atkin *et al*., 2019).
2. The breaks assessed include Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island reef.
3. A significant number of submissions indicate that there is concern that the existing and proposed sand extraction is, and will, have negative impacts on the surf breaks in the Mangawhai-Pakiri embayment. However, it is important to note and differentiate between offshore sand extraction (which this surf break impact assessment is focussed on) and the nearshore sand extraction which also takes place in the embayment.
4. Discussion with local and regularly visiting surfers to these surf breaks indicates that there is mostly uncertainty as to whether or not sand extraction has impacted on them since 2003, although there is a general concern that it will have in the future. Several believe that nearshore sand extraction (which is not the focus of this assessment) impacts on the surfing quality at Pakiri due to the disruption of the banks, and dredges have been observed very close to shore at this surf break. Stakeholder engagement is currently ongoing.
5. Two potential impacts/threats on these surf breaks have been identified, a) changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction (e.g. shore-parallel channels and pits), and b) reduction of cross shore sediment transport delivering sediment to the breaks due to sediment trapping in shore-parallel channels and pits created by sand extraction.
6. Of the 6 regionally significant surf breaks, Goat Island reef is not considered sensitive or at risk from the proposed offshore sand extraction, since it is located within an extensive reef system, more than 3 km south from the southern end of Pakiri Beach, it is very unlikely Goat Island will be impacted by either changes to incident wave climate due to changes in the offshore seabed, or changes to sediment supply.
7. The Consequences, or magnitude of potential impacts on wave quality at the 4 central surf breaks in the Mangawhai-Pakiri embayment associated with changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction are considered *Less Than Minor to Negligible* with the current consent. The potential impacts on wave quality due to

changes in seabed morphology at the 4 central surf breaks in the Mangawhai-Pakiri embayment are also considered *Less Than Minor to Negligible* for the proposed resource consent application.

8. The Consequences, or magnitude, of a reduced cross-shore sediment supply to the beaches in the Mangawhai-Pakiri embayment has the potential to have a *Minor* impact on the regionally significant surf breaks (excluding Goat Island reef) over the medium to long term due to the cumulative volume of sediment reduction. The impact is considered *Minor* because 240,000 m^3 of sediment not being transported to the nearshore system over the medium to long term is a small amount relative to the amount of sediment stored and influx within the system. The potential impacts on wave quality at the 5 sand-dependent surf breaks due to reduced sediment supply are considered *Less Than Minor to Negligible* for the proposed resource consent application and associated management regime.
9. The Likelihood of the impact with the existing consent regime is considered *Likely* to *Moderate* for all 5 breaks (excluding Goat Island), that is categories B to C. When the likelihood of the impact is considered for the proposed consent and management regime, it is considered *Unlikely (Remote) to Highly Unlikely (Rare*) for all 5 breaks (excluding Goat Island), that is categories D to E.
10. Based on the Sensitivity of these surf breaks to the potential impacts, the Consequences of the potential impacts, and the Likelihood of the impacts occurring, the resulting *Risk Rating* through the combination of the various factors indicates a likely *Low to Moderate* risk to the 5 surf breaks in the absence of operational management to minimise the magnitude of changes to the offshore seabed (i.e., the current consent). This results in a likely ***Risk Rating*** of ***Minor to No Risk*** with the application of operational management to minimise the magnitude of changes to the offshore seabed.
11. The proposed resource consent conditions and EMMP are an improvement on the existing consent with respect to managing changes to the seabed due to the activity that could potentially impact on wave propagation and sediment supply.
12. The proposed conditions and EMMP implements an improved management regime where dredging is undertaken in thin ‘skims’ (e.g. <10 cm, rather than repeated dredging of the same area creating deep channels) and there is progressive movement through the proposed extraction area cell by cell (management cells of 1,000 m x 200 m). In addition, a maximum of 40,000 m^3/yr can be extracted from any 1,000 m x 200 m cell, giving a maximum extraction depth of 200 mm, averaged over the cell, and the cell must remain un-dredged for the following year if this extraction volume

is reached. This prevents the formation of deep channels/pits/strips and allows for the seabed to recover, which also mitigates the potential effects of changes to wave height and direction; and reduced cross shore sediment transport.

13. Based on the potential impacts and the proposed management protocols, direct monitoring of the surf breaks within the Mangawhai-Pakiri embayment is not recommended. However, all care should be taken to ensure that dredge run-lines within each cell are distributed evenly and/or randomly throughout the cell in order to reduce the potential for the creation of shore-parallel channels that have the potential to impact on cross-shore sediment transport.
14. In addition, involvement by local surfing representatives and/or the NZ Surfbreak Protection Society in any proposed working parties or consultation groups during the term of the resource consent (should it be granted) should be considered.

References

Atkin, E. A., Gunson, M. and Mead. S. T., 2015. Regionally Significant Surf breaks in the Greater Wellington Region. eCoast technical report for Greater Wellington Regional Council.

Atkin, E., and S. T. Mead, 2016. Regionally Significant Surf Breaks in the Waikato Region. Prepared for Waikato Regional Council, April 2016.

Atkin, E., Bryan, K., Hume, T., Mead, S. T., and Waiti, J., 2019. Management Guidelines for Surfing Resources. Raglan, Aotearoa New Zealand: Aotearoa New Zealand Association for Surfing Research. ISBN: 978-0-473-49540-4.

Aotearoa Surf. (2020). Image of Sentinel Rock at Mangawhai Heads. Retrieved from https://www.aotearoasurf.co.nz/wp-content/uploads/2010/09/mangawhai-heads.jpg.

BECA. (2019). Auckland offshore sand extraction site – Coastal processes monitoring report November 2019. Prepared for Kaipara Ltd. (28 November, 2019).

BECA (2020). Kaipara Limited - Offshore Sand Consent Application - S92 Response- Coastal Processes. Prepared for KEL, April 2020.

Bhana, M., 1996. New Zealand Surfing Guide. Revised ed. Auckland: Reed Books

Bioresearchers Ltd. (2019). Assessment of biogenic sand production. Pakiri Embayment. Prepared for McCallum Brother Ltd. (October 2019).

Black, K. P., Oldman, J. W., & HUME, T. (1998). *Mangawhai-Pakiri Sand Study*. Module 5: Technical Report. Numerical Modelling. Prepared for the working party, ARC Environment, Auckland Regional Council. 66p.

Buckley, R. (2002). Surf tourism and sustainable development in Indo-Pacific Islands. I. The industry and the islands. Journal of sustainable tourism, 10(5), 405-424.

Butt, T. (2017). Madeira: Bring back the dream? The cleanest line (Blog).

Button, M., 1991. Laboratory Study of Artificial Surfing Reefs. Unpublished Thesis, Bachelor of Engineering, Department of Civil and Environmental Engineering, University of Western Australia, 1991.

Coombes, K. and Scarfe, B., 2010. Draft Auckland Regional Policy Statement Background Report – Surf Breaks. Auckland Regional Council. http://www.surfbreak.org.nz/wp-content/uploads/2014/06/APPENDIX_I_Surf-breaks-schedule-and-background-report-v2-final-2010-03-08.pdf

Frazerhurst, J., and L. Lebreton, 2012. Swell Corridor Modelling of the Auckland Region (GIS shapefiles only). Prepared for Auckland Regional Council, 2012.

Hallermeier, R. J., 1981. A Profile Zonation for Seasonal Sand Beaches from Wave Climate. Coastal Engineering, Vol. 4, 253-277.

Hallermeier, R. J. (1983). Sand Transport Limits in Coastal Structure Design, Proceedings, Coastal Structures '83, American Society of Civil Engineers, pp. 703-716.

Henry, W. W. (2016). Photographic images of Madeira surf breaks.

Healy, T. R., Nichol, S., Hume, T., Immenga, D., & Mathew, J. (1996). *The Mangawhai-Pakiri sand study*. Module 2: Technical Report. Marine Sands. Prepared for the working party, ARC Environment, Auckland Regional Council. 111p.

Hicks, D. M. and Hume, T. M., 1996. Morphology and Size of Ebb Tidal Deltas at Natural Inlets on Open-Sea and Pocket Bay Coasts, North Island, New Zealand. Journal of Coastal Research, Volume 12, pp. 47 - 63.

Hume, T. M., Black, K. P., Oldman, J. W., & Vennell, R. (1997). Signatures of wave and current forcing on the seabed about a large coastal headland. In *Pacific Coasts and Ports' 97: Proceedings of the 13th Australasian Coastal and Ocean Engineering Conference and the 6th Australasian Port and Harbour Conference; Volume 1* (p. 308). Centre for Advanced Engineering, University of Canterbury.

Hume, T. M., Bell, R. G., Black, K. P., Healy, T. R., & Nichol, S. L. (1999). Sand Movement and Storage and Nearshore Sand Extraction in the Mangawhai-Pakiri Embayment. *Mangawhai-Pakiri Sand Study Final Report, NIWA Client Report ARC60201/10, National Institute of Water and Atmospheric Research Limited, Hamilton*.

Gorman, R. M., Bryan, K. R., & Laing, A. K. (2003). Wave hindcast for the New Zealand region: Deep-water wave climate. *New Zealand Journal of Marine and Freshwater Research*, *37*(3), 589-612.

Gorman, R. M., Bryan, K. R., & Laing, A. K. (2003a). Wave hindcast for the New Zealand region: nearshore validation and coastal wave climate. *New Zealand Journal of Marine and Freshwater Research*, *37*(3), 567-588.

JACOBS. (2020). Pakiri sand extraction resource consents: Assessment of effects on coastal Processes. Ref: Iz111900-NM-RPT-0001.

LINZ. (2020). Offset/Secondary port timetables. Retrieved from https://www.linz.govt.nz/sea/tides/tide-predictions.

Lopes, J. T., & Bicudo, P. (2017). Surfing Tourism Plan: Madeira Island Case Study. European Journal of Tourism Research, 16, 45-56. Mead, S. (2003). Keynote address—surfing science. Artificial Surfing Reefs, 1-36.

McNeil, 2012. Surf breaks provisions in the Auckland Unitary Plan. Internal report prepared for Auckland Council.

Mead, S., & Black, K. (2001b). Field Studies Leading to the Bathymetric Classification of World-Class Surfing Breaks. Journal of Coastal Research, 5-20.

Mead, S., & Black, K. (2001c). Functional component combinations controlling surfing wave quality at world-class surfing breaks. Journal of Coastal Research, 21-32.

Mead, S. (2003). Keynote address—surfing science. Artificial Surfing Reefs, 1-36.

Mead, S. T., 2013. Potential Effects of Trans-Tasman Resources Mining Operations on Surfing Breaks in the Southern Taranaki Bight. Report prepared for NIWA, October 2013

MetOcean (2016). Summary of the Predicted Physical Effects of Dredging the Harbour Entrance Channel and Disposing of the Capital Volume in an Offshore Ground. Prepared for CenterPort Ltd, April 2016.

MetOcean Solutions Ltd. (2019). Pakiri Hindcast Metocean Study: wind, wave and current ambient and extreme statistics.

Morse and Brunskill, 2004. Wavetrack New Zealand Surfing Guide. Greenroom Surf Media Ltd, Mount Maunganui.

Nelsen, C., Pendleton, L., & Vaughn, R. (2007). A socioeconomic study of surfers at Trestles Beach. Shore and Beach, 75(4), 32.

Ngara, P., and M Airey, 2004. Spot X. Surfing New Zealand. 1st edition. ISBN 978-1-8773784-67-8

NZ Surf Guide, 2013. NZ Surf Guide. [online] Available at: <http://www.nzsurfguide.co.nz>.

O'Brien, D., and J. Ponting, (2017). Initiating sustainability certification in surf tourism. In: Routledge Handbook of Sport and the Environment. ISBN: 9781138666153Orams, M. (1999). Marine tourism: development, impacts and management. Psychology Press.

Orchard, S., Atkin, E.A., and Mead, S.T., 2019. Development of the regional significance concept for surf break management in Aotearoa New Zealand. In: Bryan, K.R. and Atkin, E.A. (eds.), Surf Break Management in Aotearoa New Zealand. Journal of Coastal Research, Special Issue No. 87, pp. 23-34. Coconut Creek (Florida), ISSN 0749-0208.

Peryman, P. B. (2011). Identification of surf breaks of national significance.

Perryman, P. B., & Orchard, S., 2013. Understanding the Values and Management Needs of New Zealand Surf Breaks. Lincoln Planning Review, 4(2).

Rainger, T., 2011. The New Zealand Good Beach Guide: North Island. Raglan: Clean Media Ltd.

Rosier, J., 2004. Independent Review of the New Zealand Coastal Policy Statement. A report prepared for the Minister of Conservation. Accessed 1 October 2014 from http://www.doc.govt.nz/upload/documents/conservation/marine-and-coastal/coastal-management/nzcps-review-2004.pdf

Rosier, J., 2005. Towards better national policy statements: NZCPS review. Planning Quarterly, March 2005: 26-28.

Ross, B. C., 2007. They Dared the Impossible And Won: The Spirit of Mangawhai Story February 1991 - June 1996

Scarfe, B. E., Healy, T. R., Rennie, H. G., & Mead, S. T. (2009a). Sustainable management of surfing breaks–An overview. Reef Journal, 1(1), 44-73.

Scarfe, B. E., Healy, T. R., Rennie, H. G., & Mead, S. T. (2009b). Sustainable management of surfing breaks: case studies and recommendations. Journal of Coastal Research, 684-703.

Selby, R., Moore, P., & Mulholland, M. (eds.). 2010. Māori and the environment: kaitiaki. Wellington: Huia Publishers.

Short, A., 2020. Wave-dominated, tide-modified and tide-dominated continuum. Chapter 16, In: Sandy Beach Morphodynamics, Eds. Jackson, D. W. T., and A. D. Short. Elsevier ISBN: 978-0-08-102927-5

TRC, 2010. Regional Policy Statement for Taranaki, Taranaki Regional Council. http://www.trc.govt.nz/assets/Publications/policies-plans-strategies/regional-policy-statement/rps-full.PDF

Wilson, P. (2013). Death of another wave: Paul Do Mar, Madeira. The cleanest line (Blog).

Young, D., 2003. Monitoring the Effectiveness of the New Zealand Coastal Policy Statement: Views of Local Government Staff. Wellington: Department of Conservation, Conservation Policy Division.

Appendix A. PHYSICAL SURF SCIENCE (Sourced from Atkin *et al*., 2019)

A. Introduction

Since the first relevant surfing specific studies back in the 1970’s (Walker, 1972; Kelly, 1973), the collective global knowledge regarding the multiple disciplines of the surfing consciousness has grown considerably. While social, cultural and economic (“Surfonomics”) studies are imperative to an understanding of surfing resources, the following describes the physical science which forms the foundation for surf breaks characterisation and management.

The history of physical surf science is firmly embedded in oceanographic research and classic surface wave theory; and for that reason, some basic oceanographic concepts are presented. The rest of this appendix is presented to give the reader a basic understanding of surf break composition; quantification of surfing waves; and, factors effecting surfing wave processes. “Understanding and quantifying the various features that combine to produce a surfing break at a particular location are implicit to the determination of the impacts of any potential alterations to a particular break” (Mead and Borrero, 2017).

B. Basic Oceanographic Concepts

Some basic surface wave theory is provided to provide an appreciation of the processes occurring at surf breaks

At most surf breaks, the waves that are ridden are wind generated. Some exceptions include those surf breaks that rely on boat wakes (which, at time of writing, there were none known of in New Zealand) and standing/river waves

Surface waves, at least in deeper water, are characterised in the same classical way as that of transverse, sine waves (Figure B-1). Wave height is the distance, or the change in vertical height, between the peak or crest and trough of the wave; (where the crest is the top, or most elevated part of the wave, and the trough is bottom or lowest part) in-between consecutive wave crests. Wave amplitude is half the wave height. Wavelength is the horizontal distance between consecutive crests (or troughs). Wave period is the time interval for two successive peaks (or troughs) to pass a fixed point in space.

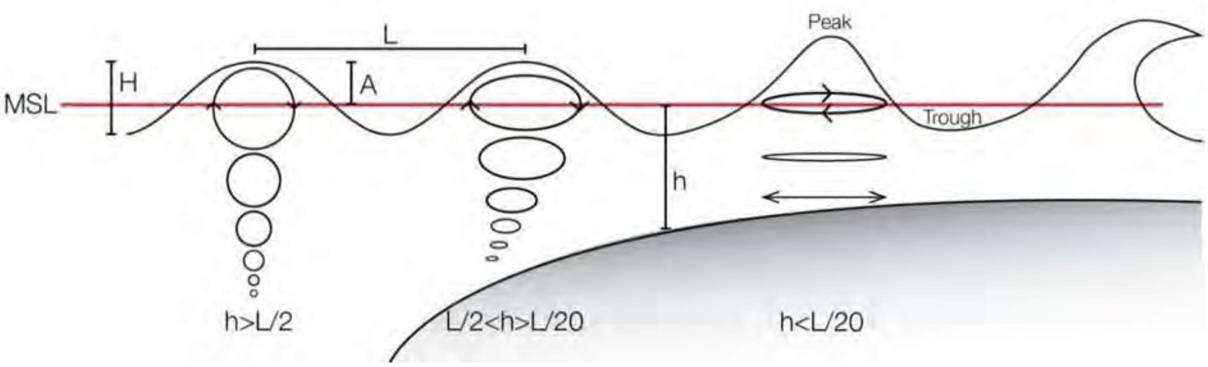

Figure B-1: Simplified, not to scale diagram of basic wave theory and nomenclature; showing wave height (H) relative to mean sea level (MSL), wave amplitude (A), wavelength (L), depth (h) and the characteristics of wave orbits.

Waves are generated by wind blowing over a water bodies surface. Surfing waves can be generated by weather systems several 1000’s of kilometres away from the surfing location; or they can be surfed with in the same weather system that generates them.

Regardless of the generation source and location, the fundamental processes are:

1) propagation - the movement of energy through the medium of water as waves.
2) refraction – the modification and often redistribution of wave energy as the waves interacts with the seabed.

3) shoaling – reduction in the speed of waves, resulting in increases in wave height steepness.
4) breaking – the dissipation of wave energy as it becomes unstable.

Processes 2, 3 and 4, for the most part in terms of surfing, and with a number of caveats, are reliant on the configuration of the seabed. This is because the energy within an individual wave is not just present with in the surface but is transferred down through the water column at all times to a depth that is representative of the wavelength (Figure B-1).

Wave orbitals are the common, theoretical interpretation of this energy transfer down through the water column. When a wave is in a depth of water that is shallow enough for the wave orbitals to interact with the seabed, which is taken as being less the half of a wavelength, it will start to transform.

These transformations are governed by the way a wave interacts with the seabed because this interaction moderates the speed at which can travel; wave speed (celerity) is dependent of water depth, the shallower the water, the slower the wave speed. Changes along a wave's crest in the speed it can travel results in refracting (or bending; Figure B-2). These same interactions control the extent of shoaling a wave undergoes, and the shape of the seabed in profile is responsible for the style and shape in which a wave will break.

Wiegel (1964) and later Galvin (1968) described wave breaking type as one of four terms: spilling, plunging, collapsing or surging (Figure B-3). Battjes (1974; after Galvin (1968); after Iribarren and Nogales, 1949) presented critical transitional values for each breaker type where the seabed slope (S), the offshore wavelength ($L\infty$) and the offshore or inshore wave height (Hb or $H\infty$) can be used to predict the dimensionless Iribarren number (or surf similarity parameter): $\zeta = S/(H/L)0.5$

The seabed slope is critical in the Iribarren number. Of the different types of breaking waves prescribed it is those that are spilling and plunging that are most useful for surfing, with those in the plunging category most sort after by surfers. It should be noted though that there is significant interested in collapsing waves, or at least surfing breaks that have a collapsing section of element to them.

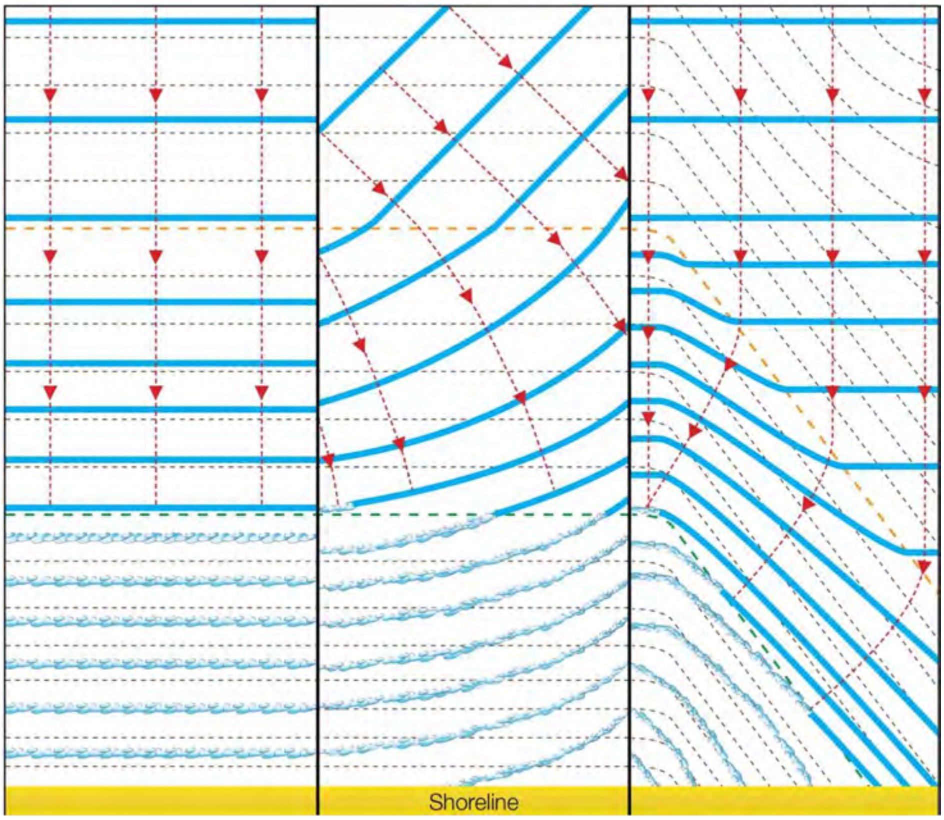

Figure B-2: Illustration of wave refraction, wave rays and breakpoints. Solid blue lines represent waves approaching the coast, red dashed lines are wave rays. Gray dashed lines are isobaths, decreasing in depth toward the shoreline. Orange dashed line represents the isobath at which deepwater waves start the transition to shallow water waves and begin to refract. Green dashed line represents an isobath equal to 0.78Hb, the wave breaking depth. Left: Waves approaching the coast parallel to the local isobaths, no refraction occurs. Wave rays remain parallel and the wave breaks simultaneously along its length. Middle: Obliquely incident waves refract on shore parallel isobaths, the break point translates laterally across the wave face. Right: Waves approaching shore normal but refraction occurs as the isobaths are oblique to the wave crest (From Atkin, 2010).

This subsection provides a simplified description of the processes that occur as waves travel to a Surf Break Area (SBA). It delivers two fundamental concepts:

- **Waves for surfing come from a range of sources**
- **The seabed, not just with in SBA, is imperative to the processes that create surfing waves**

Butt and Russel (2002) provides some digestible details on surface wave theory

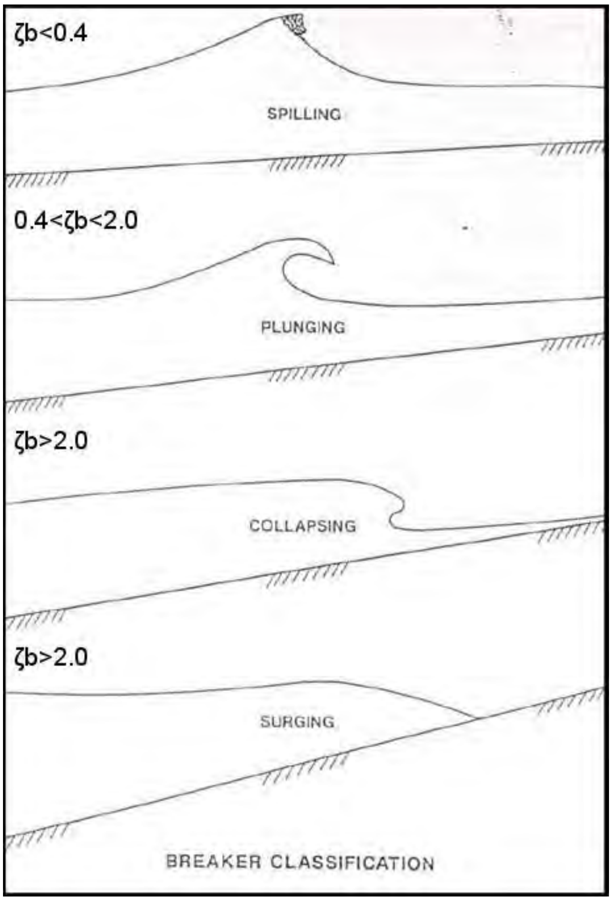

Figure B-3: Breaker type classification (adapted from Battjes, 1974)

C. Measurements of Surfing Waves

Wave breaking characteristics are critical to the surfing experience. The body of literature regarding surf science is largely concerned with the wave shape and the speed at which a wave breaks along its crest. When discussing surfing waves, wave shape is referred to as breaking intensity; and, the speed at which a wave breaks is quantified as peel angle. These factors are discussed concisely in Mead and Borrero (2017).

The fundamental concept of wave breaking is that the peak or crest of the wave becomes unstable and is projected forward in the direction of wave travel. This instability is a result of shoaling, where wave height increases, and the wave front becomes steeper; and there is an inequality in the speed at which different parts of the wave are travelling – the drag imposed by the seafloor is greatest close to the seafloor and decreases at the peak/crest causing the top part of the wave to pitch forward and the wave to eventually break.

I. Peel Angle

Good surfing waves break in a ‘peeling’ manner whereby the breaking part of the wave translates laterally along a wave crest. The peel angle is defined as the angle between the trail of broken white water and the crest of the unbroken part of the wave (Walker *et al*., 1972, Figure B-4). Peel angle is directly related to the rate at which the breaking part of the wave translates, or the speed at which a wave is breaking.

If a wave breaks along the length of its crest simultaneously the peel angle is zero degrees. This scenario is termed a ‘close-out’ in surfing culture. If the breaking part of the wave does not translate along the crest at all then the peel angle is 90 degrees. Small peel angles indicate waves that break faster than those with a high peel angle.

Walker (1972) and later Hutt *et al*. (2001) categorised surfing waves in terms of difficulty based on the peel angle. The Hutt *et al*.’s (2001) scheme considers skill levels from absolute beginner to waves beyond the current highest skill level (Table B-1)

Mead and Borrero (2017) note that “while the modern classification scheme is a useful tool… it is based upon a single peel angle value for a particular surf break. In reality, surf breaks can have several ‘sections’ with different surfing characteristics”. Moores (2001) considered the length and peel angles of wave sections for a single surf break using videography techniques. Moores’ work validated the scheme of Hutt *et al*. (2001). While the understanding of surf break dynamics was increased, a void on how peel angle changes over space and time still remains.

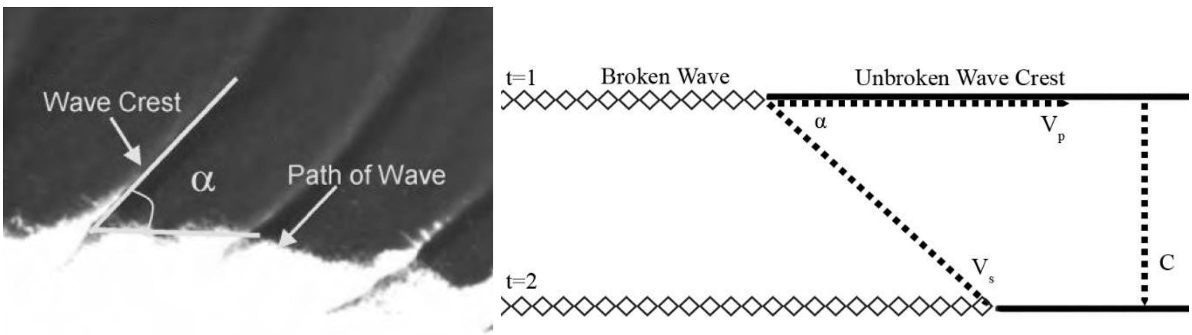

Figure B-4: Annotated aerial photograph (left) and schematic diagram of wave peel angle (α), peel rate (Vp), down the line velocity (Vs) and wave speed (c) (adapted from Walker, 1972; van Ettinger, 2005). (right).

Table B-1: Rating of the skill level of surfers. Ratings are independent of surf break quality or the degree of difficulty of waves (Hutt *et al*., 2001).

Rating	Description of Rating	Peel Angle Limit (deg)	Min/Max Wave Height (m)
1	Beginner surfers not yet able to ride the face of a wave and simply moves forward as the wave advances.	90	0.70 / 1.00
2	Learner surfers able to successfully ride laterally along the crest of a wave.	70	0.65 / 1.50
3	Surfers that have developed the skill to generate speed by 'pumping' on the face of the wave.	60	0.60 / 2.50
4	Surfers beginning to initiate and execute standard surfing maneuvers on occasion.	55	0.55 / 4.00
5	Surfers able to execute standard maneuvers consecutively on a single wave.	50	0.50 / >4.00
6	Surfers able to execute standard maneuvers consecutively. Executes advanced maneuvers on occasion.	40	0.45 / >4.00
7	Top amateur surfers able to consecutively execute advanced maneuvers.	29	0.40 / >4.00
8	Professional surfers able to consecutively execute advanced maneuvers.	27	0.35 / >4.00
9	Top 44 professional surfers able to consecutively execute advanced maneuvers.	Not reach	0.30 />4.00
10	Surfers in the future	Not reach	0.3 / >4.00

II. Breaking Intensity

Mead and Black (2001a,b,c) recognised that there is a wide range of wave shapes in the plunging category (Wiegel, 1964; Galvin, 1968; Battjes, 1974; Iribarren and Nogales, 1949). Mead and Black's (2001a,b,c) work considered wave conditions and sea floor shape, or bathymetry, of more than 40 international surf breaks. Mead and Black (2001c) showed that a plunging wave's 'vortex ratio' (after Sayce, 1997; Sayce *et al*., 1999) can be predicted using the seabed gradient. The vortex ratio is the length to width ratio of the area underneath the breaking part of the wave (Figure B-5), and indicates the 'roundness' of a wave as it breaks. As the vortex ratio approaches 1, the tube shape becomes more circular and less elongated and breaking is more intense. Breaking waves with smaller vortex ratios are more likely to collapse… Waves with vortex ratios larger than 3, are gently plunging or spilling (Mead and Borrero, 2017).

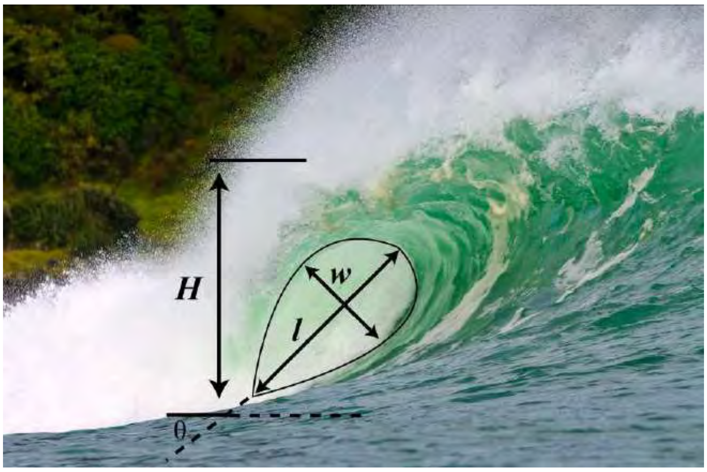

Figure B-5: Curve fitting is applied to the forward face of a crest parallel wave image and used to calculate the vortex length (l), width (w) and angle (q). H is the estimated wave height (from Mead and Borrero, 2017).

Mead and Black (2001c) showed that the orthogonal seabed gradient; which is the gradient along a wave's direction of travel, or perpendicular to the waves crest, and not the contour normal seabed gradient, is most readily applicable to predict breaking intensity. The relationship Mead and Black (2001c) established between the orthogonal seabed gradient (X) and breaking intensity (Y) is:

$$Y = 0.065X + 0.821$$

Table B-2 presents the work of Mead and Black (2001) and relates the shape of different categories of surfing waves with surfing terminology and provides examples of surf breaks fitting each breaking intensity.

Table B-2: B Breaking intensity and vortex ratio with descriptive breaking intensity terms and examples surf breaks (modified from Mead and Black, 2001c)

Intensity	Extreme	Very High	High	Medium/High	Medium
Vortex Ratio	1.6-1.9	1.91-2.2	2.21-2.5	2.51-2.8	2.81-3.1
Descriptive Terms	Square, spitting	Very hollow	Pitching, hollow	Some tube/barrel sections	Steep face, but rarely tubing
Example	Pipeline; Shark Island	Backdoor; Padang Padang	Kirra; Off-the-wall	Bells Beach; Bingin	Manu Bay; Whangamata

III. Ride length

The time that a surfer spends up and riding is incredibly important to some users, while others would rather have short wave with a very high breaking intensity. Regardless of this subjectivity, it is important to be able to measure the length of surfable waves to establish a baseline characteristic.

Consideration should be given to measuring waves both linearly and in a piecewise fashion. Historical aerial and satellite images provide the most readily accessible resource for measuring ride length. However, comprehensive characterisation from aerial and satellite images may be difficult in some locations as the number of images, and therefore points in time, may be limited; indeed, the images that are available may not have been taken at times of surfable conditions. Remote camera monitoring sites, if set up suitably can provide a large, high temporal and spatial resolution dataset that will capture all conditions. Any images need to be georeferenced and orthorectified to a reasonable degree of accuracy – sub-5 m.

The geographical position of surfers utilising GPS (the Global Positioning System) can provide a range of data products (Borrero *et al*., 2018). There are several commercially available surfing specific products as hardware (e.g. RipCurl GPS Watch, Trace, Garmin) and mobile phone apps (e.g. WavesTracker, Surf Track) that record a surfer's position during a surfing session. The data collected from these products can be used to characterise waves that are actually surfed – as opposed to hypothetically surfable waves from (most) imagery. There are some issues associated with interpreting the GPS based data. The data is reliant on surfers being capable of completing rides that are representative of the conditions – e.g. not falling off. However, if enough data is collected, filtering methods can be used and statistical characterisation employed to 'clean up' the data (e.g. Borrero *et al*., 2018).

A combination of historical aerial and satellite imagery, remote camera images and GPS mapping of surf rides can be used to develop a comprehensive understanding of where the surfers take-off, ride and finish waves at surf breaks. This information provides critical baseline data when coastal developments and activities are proposed with respect to identifying any changes that may or do occur (potential and actual impacts).

D. Surf Break Composition

The NZCPS describes a swell corridor as the region offshore of a surf break where ocean swell travels and transforms to a “surfable wave” (DoC, 2010). Atkin and Mead (2017) and Atkin and Greer (2018) suggest the swell corridor is an offshore extension of a Surf Break Area. Much of the work concerning swell corridors in New Zealand has limited a feature’s extent to the Territorial Sea (Atkin *et al*., 2015; Atkin and Mead, 2017; Atkin and Greer, 2018). This spatial restriction is based on the jurisdictional limitation of individual authorities at a regional level. The reality is, in theory, that a swell corridor can be described from the seaward edge of an SBA across an entire ocean basin, because the area offshore that influences a surf break does not stop at the edges of an SBA, nor does it stop directly adjacent to or inland from it.

This subsection introduces the functional surf break components of Mead and Black (2001b); covers the role of offshore preconditioning; and introduces the geomorphic types of surf beak and provides details on how they are created, maintained and their associated sensitivity.

I. Functional Surf Break Components

The work of Mead and Black (2001a,b) exposed a series of commonly occurring meso-scale geomorphic components from which all surfing breaks are comprised. The components are shown in Figure B-6 and named, ramp, platform, wedge, ledge, focus, ridge and pinnacle. Mead and Black (2001a) categorized the components by those which precondition the wave prior to breaking and those that break the wave (Table B-3). The functional order of components relates to their size (Figure B-7); larger offshore components align waves prior to breaking while smaller inshore components only modify a small section of the wave (Mead and Black, 2001b).

Table B-3: Functions of surfing reef components (modified from Mead and Black, 2001b).

Component	Function	Details
Ramp, Focus	Preconditioning	Modify for other components before breaking
Platform		Convey waves without change
Wedge, Ledge	Breaking	Break waves
Ridge, Pinnacle		Modify breaking waves

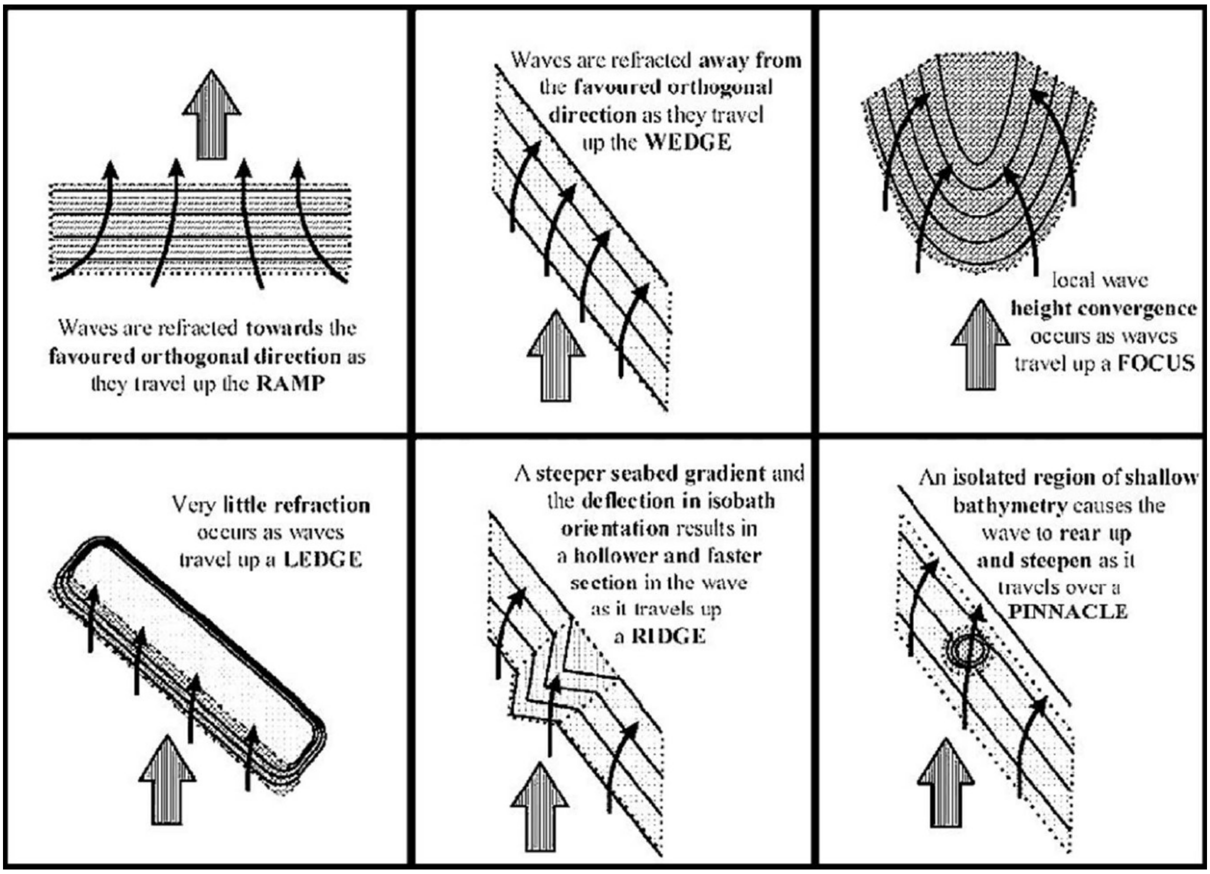

Figure B-6: Functional surf break seabed components. Isobaths of components become shallower in the direction of wave propagation (up the page). The large arrows represent the 'favoured orthogonal direction' (see Mead and Black, 2001a,b,c) and the small arrows represent the orthogonals. Note, the platform has not been included here because it is essentially a horizontal component that does not refract waves that pass over it (from Mead and Black, 2001b).

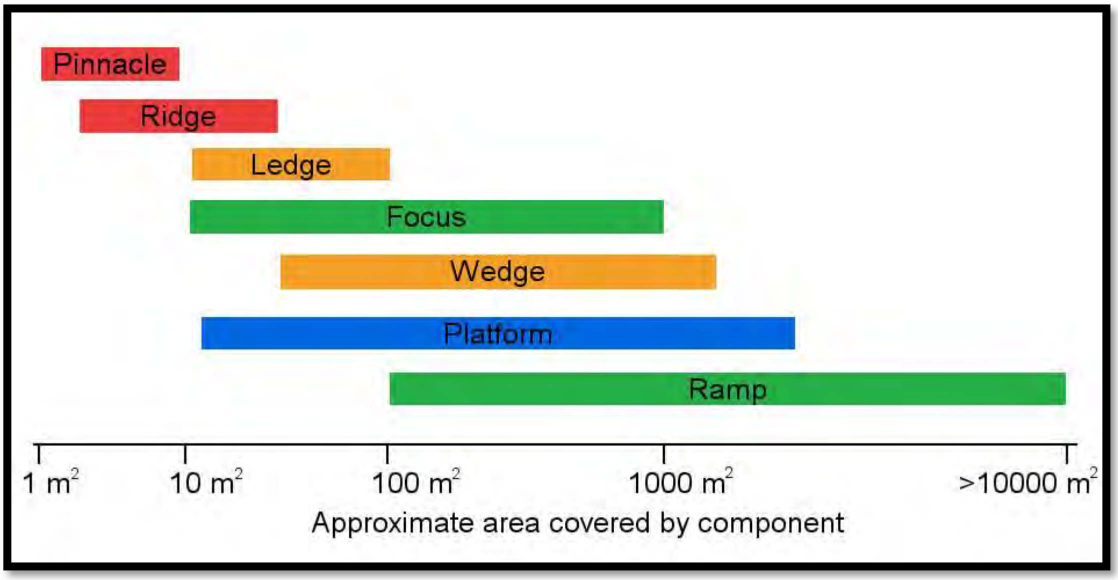

Figure B-7: The functional scales of surfing reef components (modified from Mead and Black, 2001b).

II. The Importance of Offshore Preconditioning

Atkin and Mead (2011) and Atkin *et al*. (2018) propose a spectrum of preconditioning associated with the focus components; and the role of an offshore feature, that does not induce breaking, can range from disruptive preconditioner to focussing preconditioner. Fully focussing preconditioners have the effect of increasing wave height in their lee, and wave breaking conditions are associated with, often singular, consistent, localised peaks. Whereas a disruptive preconditioner, whilst still resulting in wave height increases, creates chaotic wave-wave interactions through extensive bifurcation of wave crests. The result is numerous, random peaks at the shore.

Both ends of this spectrum create wave height gradients which allow waves to peel in a manner conducive to surfing even when on a planar, featureless beach. Where a particular feature lies on the spectrum will be a function of incident wave conditions, relative to the size of the seabed feature and its ambient bathymetry.

Preconditioning within a surf break's swell corridor can occur at significant distances (kilometres) from an SBA. Offshore ridges, sea mounts, the edges of canyons, ebb tidal deltas, large scale offshore banks, to small scale reefs can all contribute to the conditions within an SBA. The influence of these type of features often go unaccredited, as they are not readily observed, and can be a long way from the SBA and often in relatively deep water.

Examples in New Zealand that depend on offshore focussing features include the Nationally Significant Aramoana and Whareakeake, which benefit from focussing and disruption across the ebb tidal delta at the entrance to Ōtākou/Otago Harbour and a dredge spoil disposal ground adjacent to Heyward Point, respectively.

III. Geomorphological Types of Surf Breaks

Mead (2000) recognised and provided descriptions for 6 geomorphic types of surf break, namely: coral reef, rocky reef, point break, rock ledge, river/estuarine delta and sand beach. Scarfe (2008) presented expanded descriptions for 5 geomorphic types, choosing to group coral reef and rocky reef together as reef breaks. Scarfe (2008) notes that there is no clear delineation between types. Indeed, it is not only possible for different surf break types to be present in a Surf Break Area, but a single surfable wave could break in association with several different geomorphological types. Furthermore, a surf break of a certain type may be reliant on a seabed feature that is not involved in the breaking of waves but is from a different geomorphic type (e.g. preconditioning from a coral atoll).

Of note is that coral reef, rocky reef, rock ledge and sand beach describe the seabed substrate; whereas point break and river/estuarine delta do not. A point break and river/estuarine could be made up of a mix of rock, boulders or sand; and a point break could be in part made up of coral reef (for example). The concise descriptions of Scarfe (2008) are modified here to provide details on formation, processes and associated sensitivity of the different break types. Examples from New Zealand are provided.

Point Break

Also referred to as headland break, waves refract around a point before breaking. The refraction of waves around a point filters out high frequency waves, which travel past the headland, leaving the longer period waves which are generally more conducive to good surfing conditions. A consequence of refraction is that the direction of the waves in an SBA is usually significantly different to the direction of waves offshore – however, this is not always the case.

A point or headland presents a discontinuity in a stretch of coastline and are often associated with large terrestrial outcrops (Mead and Black, 2001b). They result from being made of harder and less erodible substrate than the adjacent coastline. Whilst a headland itself maybe robust and relatively static, the coastal processes, including sediment transport around such features can be complex (Mead 2000; Phillips *et al.*, 2003; Scarfe, 2008).

Point breaks are often characterized by the existence of a mobile sandy substrate at the toe of the rocks, the dynamic nature of which can have an important influence on surf quality. The dependency of surfing wave quality on the sandy substrate will vary at each site. Therefore, point breaks can be considered hypersensitive. At Shipwreck Bay for instance the transgressive dune field across the headland is critical to sand supply to the break. Designating point breaks as hypersensitive could be a conservative designation for some sites, but a prudent one as the mobility of the sandy substrate is very dependent on local coastal processes at a site, and hence individual sites requires studies to determine sediment transport regimes and their relation to surfing wave quality (e.g. Phillips *et al*., 2003; Philips, 2004).

Examples of point breaks in New Zealand include 10 of the 17 Surf Breaks of National Significance: Whareakeake and Karitane (Otago); Indicators, Whale Bay, Manu Bay (Waikato); {Pines, Supertubes, Mukie 2, Mukie 1}, {Peaks and Shipwreck Bay} (Northland); Stent Road (Taranaki); Makorori Point (Gisborne); and, Mangamaunu (Kaikoura).

Beach Break

At a beach break, waves break in peaks along the beach caused by offshore wave focusing and/or nearshore sand bars and rips. Successive waves can break in different locations depending on the beach morphology, offshore wave spectra (direction, height, period) and wave peakiness. Often good beach breaks have control features offshore or nearshore that stabilise the position of sand bars or dictate wave focusing.

A prerequisite to being a beach break is the presence of mobile sediment. A beach break’s overall natural morphology will be a function of incident wave conditions. Morphological change will be bound in part to the presence of consolidated features, such as offshore reefs, headlands and landward boundaries. By default, the presence of mobile sediment contributing to the composition of a surf break means it is a sensitive environment that can be altered very readily.

Examples in New Zealand include 2 of the 17 Surf Breaks of National Significance: Wainui Beach (Gisborne) and The Spit (Aramoana; Otago). Other known, truly world class beach breaks in New Zealand include Matakana Island (see Delta Breaks and Offshore Focussing) and an extensive list of Coromandel Beaches;

Delta Breaks

Mead (2000) refers to river/estuarine delta breaks, and Scarfe (2008) to river or estuary entrance bar breaks. Surfers often refer to this typology simply as (the) bar. The formation of material at the seaward end of a river or tidal inlet is known as an Ebb Tidal Delta (ETD). This type is therefore referred to simply as a delta break.

The ebb tidal delta is a body of sand that accumulates where outflowing estuarine or river waters and waves interact to form sand banks over which surfable waves develop. Tidal inlets are influenced by processes such as wave energy, tidal range, tidal prism, direction and rates of longshore sediment transport, sediment supply and nearshore slope, and are subject to change (Scarfe, 2008 and references there in).

The complex, dynamic nature of the ETD environments, combined with the dependence on inland/enclosed waters, which can be subject to all manner of external factors, that are not necessarily associated with nearshore processes, means that delta breaks are considered to be ultrasensitive.

Examples in New Zealand include 3 of the 17 Surf Breaks of National Significance: Karitane (Otago), Waiwhakaiho (Taranaki) and Whangamata (Waikato). Other high-quality delta breaks in New Zealand include Okiwi Bar (Great Barrier Island) and Whakatane Heads (Bay of Plenty). A case could be put forward for a site such as Matakana Island as a delta break, where waves are pre-conditioned by a very large ebb tidal delta, but not broken on or near the pro delta slope. The result is improved surfing conditions inshore. This is discussed in Offshore Focussing.

Reef Breaks

Many highly regarded surf breaks are reef breaks. This is because the consolidated material of a reef provides consistent wave breaking patterns. The consolidated material can also provide steeper seabed gradients than those possible with unconsolidated material (e.g. angle of repose) resulting in waves that break with a high intensity. Mead (2000) refers to both coral and rocky reefs. Coral reefs are not found in New Zealand, but there are plenty of rocky reefs. The formation of surfable reef breaks can be from numerous processes. In the tropics, coral reef surf breaks can be offshore, isolated, intertidal seabed features with footprints and shapes ideal for surfing (e.g. Cloudbreak - Fiji); other coral reef surf breaks will have been modified by freshwater streams that “cut” sections of reef away creating discontinuities in the coastline (e.g. Teahupo‘o - French Polynesia).

Rocky reefs for surfing are often the convenient result of geological processes, and rocky reef breaks are often associated with an outcrop. Reef breaks are similar to point breaks, except, in general, there is no subaerial land mass, and the processes of refraction compensation, low-pass filtering and crest-straightening are not so apparent, if at all; which is a result of the orientation of geomorphic components to incident wave crests.

Both rocky and coral reef surf breaks are made up of consolidated material which makes them relatively robust in some respects. In Aotearoa New Zealand, rocky reef surf breaks can be considered robust in terms of physical coastal processes. Examples are Tuamoto Island in Gisborne and Papatowai in the Catlins, both Surf Breaks of National Significance. Other regionally significant examples in Aotearoa New Zealand include Daniel's Reef, Goat Island, Kuaotunu and the many quality reef breaks along Taranaki's Surf Highway 45.

Ledge Breaks

In the surfing community, ledge breaks are often referred to as a "slab". While no particular origin to this idiom can be identified, it is assumed the term slab refers to the relatively flat, table top like appearance of inshore reef structure. Ledges share many of the attributes of a rocky reef break.

Scarfe (2008) states that steep rock ledges interrupt wave propagation, although this is essentially true of all surf breaks, and coastlines in general. Scarfe (2008) also states that waves come from relatively deep water into very shallow water, modifying the way that the waves break, which is a better description of the sharp seabed transition caused by ledge breaks.

It should be noted that a ledge is also a functional surf break component (Mead and Black, 2001a); and that ledges are readily seen as part of functional component configuration (Mead and Black, 2001b). Wave breaking shape associated with ledge breaks and sections is one of very high intensity (Mead and Black, 2001c), with many globally recognised slabs pushing the boundary from plunging to collapsing. When considering a standalone ledge break, the difficulty and dangers associated with surfing this type means that they are utilised by the few and will often fall in to category of secret spot. It is for this reason that no known slab locations are provided here.

New Zealand examples of where a ledge makes up part of a surf break composition are the Nationally Significant Manu Bay – "The Ledge" (Waikato), and Takapuna Reef (Auckland; Mead and Black, 2001b)

E. Other Physical Factors

I. Wave Parameters

Height

Atkin and Greer (2018; after Atkin and Mead, 2017) discuss wave height for surfable conditions in the context of numerical modelling, where thousands of wave conditions are simulated and a suitable threshold to filter the conditions was required. The value used of 0.75 m and was reached by evaluating a range of largely grey literature. In detailed characterisation, minimum wave height for a surf break to become surfable must be evaluated on a case by case basis, since there are a variety of factors that may make a break surfable at smaller or larger wave heights than 0.75 m.

There are some breaks, such as featureless, planar beaches ideal for learning – nursery breaks, that will be surfable in very, very small wave heights. There are other breaks, especially big wave spots, where the surf has to be a significant distance from shore for the surf break to be safely navigated, or simply the wave has to be large enough for the wave orbitals to 'feel' deep seabed features (see Section 2) that compose the surf break, and require ocean swell several meters height before they are considered surfable. Other surf breaks 'max out' if the wave heights are too large.

Period

Waves with periods of 20 seconds begins to feel the seabed at the edge of the continental shelf (200 m deep) and so begin to change direction and focus/de-focus (through the processes of refraction/diffraction) often 10's of kilometres offshore. Waves with periods of 10 seconds will to begin to feel the seabed and start refracting until the water depth is 55 m.

As a result, period can limit how much wave energy is delivered to a surf break. Long period swell can refract into breaks that are orientated more than 180° away from the offshore direction of the swell, although short period swell cannot. A good example of this effect is at Ahipara on the west coast in the far North Island. Here the breaks are orientated to the northeast, which is 180° around the headland from the direction of the southwest swell, and no matter how large the waves are on the open coast, if they do not have long enough period they simply pass by up the coast without refracting into Ahipara.

Low period waves will refract less than high period waves, and the result will be a filtering or cleaning (Mead, 2000) of the wave spectra. For the coral reef break of Restaurants in Fiji, the complex bathymetry offshore can result in high wave period swells not propagating in to the SBA as readily as lower period waves.

Wave period has an effect on the surfing experience with longer wave periods delivering higher breaking intensities often providing more powerful, ‘heavy’ and exciting conditions with steep and/or hollow wave faces. Short period swells are often termed ‘fat’ by surfers because they lack power/breaking intensity and have less steep faces making it more difficult for participants to execute certain manoeuvres or progress through certain sections.

This is reflected in the Iribarren number, where wave length is incorporated into the calculation (see Section 2), where wave height (H) over wave length (L) is included; H/L is the wave ‘steepness’ parameter, which is counter intuitive to a surfer, since ‘steeper’ waves have shorter wave lengths/periods and so have less steep wave faces than less ‘steep’ (longer wavelength/period) waves. This is further complicated by the wave height also effecting the breaking intensity of waves, which can be simply explained as “for a particular wavelength/period, as the wave height increases, the breaking intensity decreases”.

Direction

Wave direction is interesting when considered in terms of a surf break, particularly when considering dendritic coastlines and/or distant wave generation sources. Surfers will regularly consider the direction of offshore waves at a regional or national scale, some consider the general direction of the generating source, such as a cyclone tracking south in to the Pacific Ocean from the tropics. Like the cyclone, swell direction is constantly changing in time, but may be characterised. Indeed, some surf breaks require certain swell directions, others will work on a wide range of swell direction, but the quality of surfing waves can change.

Characterising a surf break in terms of wave direction is complex, and requires consideration of wave directions at multiple points in both space and time, from generation source through to the SBA. The requirement for this holistic view is particularly evident at SBA’s associated with headlands and peninsulas where wave direction can be significantly different depending on whereabouts it is examined.

II. Wind

Winds play an important role in both generating and grooming waves for surfing. The best surfing waves are long period waves generated by winds in distant locations. Local winds can play an important role in creating or destroying surfing waves (Pratte *et al*. 1989). The ideal wind is light to non-existent for the cleanest conditions.

When considering winds for surfing, the direction is relevant to wave crest. Despite this relevance, the terms used to describe wind directions in surfing are relevant to the shoreline; which can be parallel to the wave crest, but not in all cases. A wind that blows directly offshore (perpendicular) is conducive to clean conditions and can allow the wave to steepen by delaying breaking. A light offshore wind is also said to groom the wave face to make it smoother (Schrope, 2006). Very strong offshore winds can make the waves difficult to catch, even blow the rider off the back of a wave.

Onshore and cross shore winds can ruffle the water surface. These wind directions can introduce high frequency signals to the surfing area, which along with white-capping can encourage the onset of wave breaking, which can occur randomly. The result is often undesirable sections that reduce the overall length of the wave and surfers ride. The traditional view of onshore and cross shore winds has been that they are unwanted. However, there has been a shift in the performance level of surfing with one of the most advance manoeuvres, the aerial, benefiting directly from the surfing conditions provided by onshore or cross shore winds. Indeed, advanced surfers, particularly those who surf in a competitive capacity, will target certain wind conditions to train for specific manoeuvres.

There are some surf breaks that are utterly dependent on the wind having blown onshore to create a surfable wave, and when the wind changes direction of subsides the waves follow suit. This often occurs in sheltered and fetch limited areas, such as channels and lakes. A prime example in New Zealand is the Firth of Thames where there are several point breaks and delta breaks that rely on the short wavelength wind waves driven by northly winds. Titahi Bay in Porirua is also a good example, where strong northerlies generate waves and the winds often swing suddenly to the south and quickly clean up the surfing conditions.

In terms of defining a surf break, wind strength and direction are not limiting factors. They can affect the experience, with many participants preferring clean and calm conditions, however if the wave height is large enough to surf, the local wind conditions are ultimately irrelevant (Atkin and Mead, 2017; Atkin and Greer, 2018).

III. Tides and Currents

This section is concerned with how tides and currents effect surfing waves directly. This section does not consider the complex processes of how tides and currents effect seabed morphology in detail. The tides result in modulation of both water level and currents. Non-tidal currents to consider are those driven by rivers and those driven by the waves themselves (i.e. rip currents).

Water level

As described in Section 2, the processes of wave propagation, refraction and breaking are tightly linked with seabed shape and wavelength. Changes in water level can alter the way in which a surf break functions on a range of scales.

If wave height, period and direction are constant, and wave direction is oblique to depth isobaths, then a lower water level (i.e. low tide) will invoke a greater degree of refraction than a higher water level (i.e. high tide). The result can be that more wave energy is delivered to an SBA (see Section 5.1). Conversely, if an offshore feature, such as a submerged breakwater, bar or coral reef dissipates or redirects wave energy, the influence of the feature will be less at a higher water level and more wave energy can be delivered to an SBA.

Tidal modulation of surfing wave quality within an SBA itself is a frequently discussed topic for surfing enthusiasts. The changes in water level can result in large horizontal changes in the breaking position, with breaking possibly occurring on very different seabed features between high and low tide. The result is that surf breaks become known for working best on a specific tidal phase (e.g. high, low, mid, dropping, rising, etc.), however this designation is very subjective as it is down to user requirements and preference.

There are other phenomena associated with tides that are known by surfers, but not well understood scientifically. For example, the ‘mid-tide push’ is known of on open coasts world wide and there are data to confirm the occurrence of an increase in wave height during the mid-incoming tidal phase along some coasts. However, why this occurs is unknown, although it is expected that it may in part be due to interaction between the shore-parallel tidal currents and wave propagation which is more shore-normal.

Currents

Surfers will use rips to run which facilitate paddling back to the take-off zone. At river mouths and delta breaks, outgoing flows will assist in quickly transporting a surfer further offshore. This can in fact can become quite hazardous with currents overpowering surfers and moving them away from a desired position on the break.

Where current direction opposes wave direction, wavelength will tend to decrease (period remains constant) and wave height will increase. The result is often waves with steeper (than usual) faces. This can be quite sought after by some surfers, much like particular water levels. However, these counter currents can also lead to less desirable conditions by making the surface and face of the wave choppy and making it difficult for surfers to maintain position. Yet, it is these currents that contribute to maintaining the seabed features that break the waves in a manner that is conducive to surfing. At delta breaks the currents, in a dynamic equilibrium with waves, will shape the ebb tidal delta; where rip-currents are persistent on open beach breaks they help to maintain the adjacent sand bar.

The effects of tidal currents on wave height at surf breaks is not well understood, however, such impacts need to be considered when characterising a surfing break. An important feature of the surf along the western coast of the Firth of Thames is the effect of the tidal current on wave height and direction (and likely wave directional spreading). This is likely similar to the phenomena that occurs along the Florida coast due to wave/current interactions with the Gulf Stream (e.g. Wang *et al*., 1994) where, the offshore location of the Gulf Stream can greatly affect surfing conditions (e.g. waves at the coast can be significantly larger than expected given the wave heights at the offshore buoys).

Surfers that frequent the western Firth of Thames are aware of this phenomenon (which is sometimes described as reflection off the eastern coast of the Firth, although this is not likely to be physically possible). The importance and magnitude of this kind effect can only be tested through well designed measurement.

An interesting aspect of the effects of tidal height and tidal currents is that tides are mostly driven by the moon, with spring tides occurring at full and new moons (i.e. larger tidal ranges and consequent larger tidal currents). An often-postulated phenomenon is that new swells arrive with the full and new moon. But the moon has no impact on the generation of waves, so this is not likely. However, the spring tides that occur during full and new moons do increase the tidal levels and tidal current speeds, which in turn can have the effect of delivering waves into breaks and focussing wave energy and increasing wave heights at some breaks. In locations where there are strong tidal currents, “full moon swells” are well known (e.g. parts of Indonesia).

IV. Natural Variability and Sensitivity

Surfers say that one of the factors that makes surfing such a challenging and interesting activity is that “no two waves are the same”. This natural variability in wave quality results from any combination of factors including variations in the wave height, period, direction, directional spread, all along with the state of the tide. The factors controlling wave quality can change at seasonal or monthly time scales as when weather events pass through, within a day to hours as swells rise and drop to within minutes to hours as the wind direction changes and the tide rises and falls.

Less obvious is the role that mobile sediments on the sea floor make to the natural variability of a surf break. The movement of seabed material and incident wave conditions is a constant feedback loop with each influencing the other. The most readily observed is the annual change from summer to winter profiles (Wright and Short, 1984)

The introduction of tidally driven currents, riverine input and wind driven sand transport makes for a consistently changing environment. Point breaks and particularly reef breaks, where the seabed is potentially less mobile, may exhibit less natural variation and more consistent wave quality for surfing. However, Phillips and Mead (2008) showed that large changes to the seabed offshore from sand moving along the coast or around headlands can have profound effects on surfing wave quality.

Sensitivity, or the robustness of a surf break to change is a function of the relative complexity of processes and forces maintaining surfable conditions. On top of the seabed configuration, the factors that need to be considered regarding sensitivity are:

- Incident wave climate and exposure.
- Tides and associated currents.
- Sediment transport pathways (including aeolian).

Management considerations:

- Surf breaks located on exposed, high energy coastlines may be, relatively, more robust.
- Surf breaks that rely on sediment transport to maintain surfing wave quality, such as beach breaks, delta breaks and some point breaks will tend to be more sensitive than consolidated rocky reefs.
- Surf breaks located proximal to enclosed waters and waterways, occurring in and around tidal inlets may well be ultrasensitive to change.

References

Atkin, 2010. The Impact of an ASR on Breaking Wave Conditions at Boscombe, UK. Thesis: University of Southampton, UK.

Atkin, E.A and Greer D., 2018. A Comparison of Methods for Defining a Surf Break's Swell Corridor. Submitted to Journal of Coastal Research.

Atkin, E.A. and Mead, S.T., 2017. Surf Breaks of Regional Significance in The Waikato Region. Waikato Regional Council Technical Report 2017/19. 64pp.

Atkin, E. A., Gunson, M. and Mead. S. T., 2015. Regionally Significant Surf breaks in the Greater Wellington Region. eCoast technical report for Greater Wellington Regional Council.

Atkin, E.A., Mead, S.T. and Phillips, 2018. Preliminary Investigations of Offshore Wave Preconditioning. Manuscript in preparation.

Atkin, E., and S. T. Mead, 2011. Literature Review and a Preliminary Investigation of Offshore Focussing Reefs. Prepared for Unitec Institute of Technology, August 2011.

Battjes, J. A., 1974. Surf Similarity. Proc. 14th Coastal Engineering Conference. ACSE p.466-480.

Borrero, J., Rifai, J. and O'Day, C., 2018. Scientific and Commercial Applications of Rip Curl Search GPS Watch Data. Manuscript in preparation. xx check this

Butt, T. and Russel, P., 2002. Surf Science: An Introduction to Waves for Surfing. Penzance: Alison Hodge.

Department of Conservation, 2010. New Zealand Coastal Policy Statement 2010. Wellington: Department of Conservation.

Galvin, C. J., 1968. Breaker Type Classification on Three Laboratory Beaches. Journal of Geophysical Research 73, 3651-3659.

Hutt, J. A., Black, K. P. and Mead, S. T., 2001. Classification of Surf Breaks in Relation to Surfing Skill. In: Black, K.P. (ed.) Natural and Artificial Reefs for Surfing and Coastal Protection, Journal of Coastal Research, Special Issue No. 29, pp. 66-81.

Iribarren, C. R., and Nogales, C., 1949. Protection des Ports. Section II, Comm. 4, XVIIth Inter. Naval Cong., 31-80.

Kelly, J., 1973. Surf parameters: Final report part II: Social and historical dimensions. Honolulu: University of Hawaii James K. K. Look Laboratory of Oceanographic Engineering.

Mead, S. T., 2000. Incorporating High-Quality Surfing Breaks into Multi-Purpose Reefs. PhD thesis, University of Waikato, New Zealand. Pp 209 + appendices.

Mead, S. T., Atkin, E.A., and Phillips, D., 2012. Design Optimization of Offshore Focusing MPR's, ASBPA 2012 National Coastal Conference. San Diego, October 2012.

Mead, S. T. and Black, K. P., 2001a. Field Studies Leading to the Bathymetric Classification of World-Class Surfing Breaks. Journal of Coastal Research, Special Issue No. 29, pp. 5-21.

Mead, S. T. and Black, K. P., 2001b. Functional Component Configurations Controlling Surfing Wave Quality at World-Class Surfing Breaks. Journal of Coastal Research, Special Issue No. 29, pp. 22-32.

Mead S. T. and Black, K. P., 2001c. Predicting the Breaking Intensity of Surfing waves. Journal of Coastal Research, Special Issue No. 29, pp. 51-65.

Mead, S.T. and Borrero, J., 2017. Surf Science and Multipurpose Reefs. In Green, D.R. and Payne, J.L. (Eds.), Marine and Coastal Resource Management: Principals and Practice. (pp. 288–311). Abingdon: Routledge.

Moores, A., 2001. Using Video Images to Quantify Wave Sections and Surfer Parameters. MSc ? Thesis: University of Waikato, New Zealand.

Philips, D., 2004. Sediment Dynamics of a Shallow Exposed Surfing Headland. PhD thesis, University of Waikato, New Zealand.

Philips, D., Black, K. and Healy, T., 2003. Sandy Seafloor Volume Changes Off A High Energy Headland Boulder Beach, Raglan, New Zealand, Coasts & Ports Australasian Conference 2003.

Sayce, A.J., 1997. Transformation of Surfing Waves Over Steep and Complex Reefs. MSc thesis, University of Waikato, New Zealand.

Sayce, A.J., Black, K.P., and Gorman, R., 1999. Breaking Wave Shape on Surfing Reefs. Proceedings Coasts and Ports '99, Vol. 2, 596-603.

Scarfe, B., 2008. Oceanographic Considerations for the Management and Protection of Surfing Breaks. PhD thesis, University of Waikato, New Zealand.

van Ettinger, E., 2005. Artificial Surf Reef Design: Dutch Swell Conditions. MSc Thesis, Delft University of Technology, Netherlands.

Walker, J.R., Palmer, R.Q. and Kukea, J.K., 1972. Recreational Surfing on Hawaiian Reefs. Proceedings of the 13th Coastal Engineering Conference.

Wiegel, R. L., 1964. Oceanographical Engineering. N.J: Prentice-Hall.

Wright, L.D. and Short, A.D., 1984. Morphodynamic Variability of Surf Zones and Beaches. Marine Geology. 56, 93–118.

Appendix B THREAT AND RISK MATRICES (Sourced from Atkin *et al*., 2019)

Table 2.5: Surf Break Sensitivity Rating. It is commonplace in the marine environment for the seabed to be made of a range of particle sizes. These guidelines have not considered mud bottom breaks.

	Potential Break Type	General Material Size	Wave Quality Reliance on Sediment Transport Regime
1	Rock Ledge; Reef	Consolidated Rock	Low
2	Reef; Point		
3	Point; Beach; Delta		
4	Beach; Delta		
5	Delta	Fine Sand	High

Table 2.6: Consequence of activity

Consequence of activity	Category	Definition	Example
Catastrophic	1	Permanent/irreparable damage to/loss of the whole surf break(s)	Occupation of SBA Major reclamation Port construction
Major	2	Activity permanently effects access to and/or enjoyment of a surfing resource; and/or activity results in on-going health and safety issues; and/or potential for physical changes to a large part of the SBA; and/or a permanent change to the natural character, aesthetic or wilderness attributes of the surfing resource.	Complete loss of access to break (except by sea) Reduced ride length. Reduced wave quality Wastewater outfall Coastal protection works Coastal landscape altered by coastal development
Significant	3	Activity temporally effects, for sustained periods of time, access to and/or enjoyment of a surfing resource; and/or activity results in health and safety issues. No physical impacts	Turbid water Contamination Regulated access Ski-lane
Minor	4	Activity temporally effects access and/or enjoyment to a surfing resource for relatively short periods of time (e.g. <24 hours). No physical impacts	Beach closure for sporting events/surf carnival

Table 2.7: Likelihood of impact

Likelihood of impact	Category	Definition
Very Likely (Permanent/ Frequent)	A	Will obviously occur frequently and/or permanently, activity being undertaken in SBA; examples exist of impact; and/or a sensitivity rating: 5
Likely (Frequent)	B	Potential for activity to occur frequently, activity being undertaken in or near to SBA; and/or similar examples exist; and/or sensitivity rating: 3-4
Moderate (Occasional)	C	Potential for activity to occur, activity being undertaken near to SBA or within catchment; and/or examples exist; and/or sensitivity rating: 2-3
Unlikely (Remote)	D	Activity unlikely to occur, activity being undertaken outside of catchment and/or embayment; no examples exist; and/or sensitivity rating: 1-2
Highly Unlikely (Rare)	E	Activity high unlikely to occur, activity being undertaken outside of catchment and/or swell corridor no examples exist; and/or sensitivity rating: 1

Table 2.8: Risk Rating

Risk Rating Table					
		Catastrophic-1	Major-2	Significant-3	Minor-4
Very Likely	A	Extreme	Extreme	Extreme	High
Likely	B	Extreme	Extreme	High	Moderate
Moderate	C	Extreme	Extreme	High	Low
Unlikely	D	Extreme	High	Moderate	Low
Highly Unlikely	E	High	High	Moderate	Low

Colin Hopkins

From: Colin Hopkins <Colin.Hopkins@aucklandcouncil.govt.nz>
Sent: Friday, 11 September 2020 9:52 AM
To: Colin Hopkins
Subject: FW: Kaipara Ltd - Additional Reasons for Resource Consent
Attachments: Assessment of Objectives and Policies.pdf; M Slyfield Letter 10 September 2020.pdf

Colin Hopkins
Principal Project Lead, Premium | Resource Consents
Resource Consents
35 Graham Street
Private Bag 92300, Auckland 1142
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Url: www.aucklandcouncil.govt.nz

From: David Hay <david@osbornehay.co.nz>
Sent: Friday, 11 September 2020 9:34 AM
To: Colin Hopkins <Colin.Hopkins@aucklandcouncil.govt.nz>
Subject: Kaipara Ltd - Additional Reasons for Resource Consent

Good-morning Colin,

As discussed last week, please find attached the letter form Legal Counsel for Kaipara Ltd and a supporting assessment of objectives and policies.

The photographs have now been undertaken and I hope to have them to you by the end of today or early next week.

I have chased up McCallums for the latest version of the Marine Mammal Management Plan and hope to have that to you shortly.

Regards,

David Hay
Planning Consultant

Osbornehay
Resource Management Practice

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Morgan Slyfield
BARRISTER

10 September 2020

Auckland Council

Attention: Mr Colin Hopkins

By email

Dear Mr Hopkins

Kaipara Limited / CST60343373 / Discharges

1. I act for Kaipara Limited, the applicant in relation to CST60343373.

2. I write to bring to your attention an interpretation of the provisions of the AUPOP that is relevant to Council's processing of the application.

3. As you know, Kaipara's application is to continue sand extraction from the seabed in an offshore area of the Mangawhai-Pakiri embayment. A more fulsome description of the activity is contained in the application documents, assessments of effects and further information filed by Kaipara.

4. Kaipara's application identifies that its proposed activities involve "coastal marine area disturbance for mineral extraction", which is a discretionary activity under F2.19.4 (A28).

5. As has been described in Kaipara's application[1] and further information,[2] the proposed sand extraction activity includes ancillary discharges to water.[3] First, oversize material, such as coarse shell, will be separated by filters on board the vessel, piped to a moon pool, and discharged underwater beneath the vessel. Second, as material is added into the

---

[1] Assessment of Environmental Effects at pages 4-5.
[2] Bioresearches Memorandum (30 March 2020) at page 6, provided as part of Kaipara's further information response on 14 April 2020.
[3] NB. The descriptions evolved between the application and further information to reflect refinements to the design of the vessel.

STOUT STREET CHAMBERS
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hopper, water containing very small amounts of silt and clay will overflow the weir boards into several moon pools, and be discharged underwater beneath the vessel.

6. Kaipara's application is formulated on the basis that these discharges are incidental to the sand extraction, and therefore are covered under (A28). This is consistent with the final bullet point in Note 1 to F.2.19.4 (added by Plan Change 15), which states that the Table covers "discharges of contaminants … into water, incidental to the activity". This approach is also supported by the breadth of activities listed in Note 1, which suggests the intention behind the drafting is that components or consequences of the "disturbance" — such as diversion of water, deposition on the seabed or discharges to water — are all captured under the disturbance rule.

7. Kaipara has asked me to review this approach taking into account F.2.19.2(A15), on the basis that (A15) might also apply to its proposal.

8. (A15) applies to "Disposal or storage of waste or other matter directly arising from, or related to, the exploitation and associated offshore processing of seabed mineral resources".

9. At face value, the discharges of oversize material and very small amounts of silt and clay that are ancillary to Kaipara's proposed extraction activity would fall within the plain and ordinary meaning of (A15).

10. In my opinion, it is not clear from the drafting in the AUPOP whether the intention is for (A28) and (A15) to overlap in respect of such discharges (i.e. for both provisions to apply), or whether the intent is that one provision would displace the other. However, whichever of those is the right approach, Kaipara's application remains the same. It is an application for a coastal permit that includes both the extraction of seabed material and discharges of material into water. The application already incorporates descriptions and assessments of both those aspects to a level of detail that corresponds with their scale and significance; and regardless of which provision applies (or whether both potentially apply), the activity status remains the same (i.e. discretionary).

11. It is, however, desirable to ensure that Council's processing of the application takes account of the relevant plan provisions, and that consent is granted on a correct understanding of the provisions that apply.

12. For that reason, Kaipara wishes to adopt an appropriately conservative approach, and I therefore request on Kaipara's behalf that Council process the application on the basis that both provisions apply. For the reasons given above, this does not require any amendment to be made to the application itself: it always included the discharges, and it still does.

13. For completeness, I add that none of this impacts on notification, as the notified application included the full descriptions of the discharges as per Kaipara's assessment of effects and further information.

14. I also observe that it would be open to Council to proceed in this manner with or without this request from Kaipara. It is ultimately for the consent authority to determine what rules under the relevant plan apply, and process an application in accordance with those rules and the Act. In fulfilment of that obligation a consent authority may even grant consent on the basis of an activity status different from the status that the applicant has assessed (i.e. to correct an error on the applicant's part).[4] While that is not required here, it indicates the breadth of discretion available to a consent authority, and the importance of correctly assessing which rules apply.

15. In these circumstances I have asked Kaipara's planning consultant, Mr Hay, to provide an additional assessment of the proposal against relevant objectives and policies for discharge and disposal, and against the requirements of sections 105 and 107 of the Act. His assessment is contained within a separate letter dated 31 August 2020, attached.

16. If you have any queries about any aspect of this, or wish to discuss these matters, please do not hesitate to contact me.

Yours sincerely

Morgan Slyfield

Morgan Slyfield
Barrister

direct 04 915 9277
mobile 021 915 927
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mjs200910c

[4] Resource Management Act 1991, s 104(5).

osbornehay
Resource Management Practice

31 August 2020

Auckland Council
(by Email)

Attn. Mr Colin Hopkins

Dear Colin

Re: Kaipara Ltd Application – Assessment of Discharges and Disposal

It has been identified by Counsel for the applicant that consent may also be required under Rule F2.19.2(A15) of the Auckland Unitary Plan – Operative in Part for the discharge from the sand extraction operation. The requirement for this consent has not been identified earlier by Council and it remains unclear if consent is required under this rule or not. This has been addressed in the letter from Mr Slyfield, Legal Counsel for the applicant.

For completeness the applicant is now requesting that its application is assessed on the basis that Rule F2.19.2(A15) applies in addition to Rule F2.19.4(A28) and the following is an assessment of the proposal against the relevant objectives and policies of the Auckland Unitary Plan – Operative in Part (AUPOP). Consideration is also given to those matters addressed under s105 and 107 of the Resource Management Act 1991.

The nature and effects of the discharge along with a detailed description of the receiving environment have been assessed in the lodged application (and subsequent s92 responses) and no additional assessment is required.

It is considered the only additional Regional Policy Statement objectives and policies that require consideration are those listed under B7.4. Coastal water, freshwater and geothermal water

B7.4.1. Objectives

(2) The quality of freshwater and coastal water is maintained where it is excellent or good and progressively improved over time where it is degraded.

(4) The adverse effects of point and non-point discharges, in particular stormwater runoff and wastewater discharges, on coastal waters, freshwater and geothermal water are minimised and existing adverse effects are progressively reduced.

(6) Mana Whenua values, mātauranga and tikanga associated with coastal water, freshwater and geothermal water are recognised and provided for, including their traditional and cultural uses and values.

B7.4.2. Policies

(7) Manage the discharges of contaminants into water from subdivision, use and development to avoid where practicable, and otherwise minimise, all of the following:

(b) adverse effects on the quality of freshwater and coastal water;

(d) adverse effects on Mana Whenua values associated with coastal water, freshwater and geothermal water, including wāhi tapu, wāhi taonga and mahinga kai; and

<u>Assessment</u>

During the sand extraction process, excess seawater, and oversized material (ie shell etc) along with a very small amount of clay/silt is discharged back into the coastal waters underneath the barge. These discharges do not contain any introduced or foreign contaminants etc. By discharging

Osborne Hay (North) Limited

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underneath the barge, the material disperses rapidly with the bulk of the material sinking to the seafloor. This occurs within a short-period of time.

This discharge does not degrade the water quality with any plume only lasting a matter of minutes. No potential significant ecological effects have been identified from this process. Water quality effects were addressed in detail in the ecological response to the s92 questions.

Turning to the relevant regional coastal objectives and policies, the following additional objectives and policies are considered relevant and are assessed:

E1.3. Policies [rp/rcp/dp]

Other discharges

(26) Prevent or minimise the adverse effects from construction, maintenance, investigation and other activities on the quality of freshwater and coastal water by:

- *(a) adopting best management practices and establishing minimum standards for the discharges; or*
- *(b) where Policy E1.3(26)(a) is not practicable, have regard to the following:*
  - *(i) the nature, volume and concentration of the contaminants in the discharge;*
  - *(ii) the sensitivity of the receiving environment to the contaminants in the discharge;*
  - *(iii) other practicable options for the discharge, including reuse or discharge to the trade sewer; and*
  - *(iv) practicable measures to reduce contaminant concentrations prior to discharge or otherwise mitigate adverse effects.*

<u>Assessment</u>

Owing to the nature of the discharge (seawater, sand and shell with a small amount of clay/silt), less than minor adverse effects on the coastal water quality arise.

It is considered that the proposed discharge method is the best practicable option. The discharge underneath the barge ensures that the sediment disperses quicker and there is less visual effect from a plume.

There are no practicable alternatives to the discharge.

No treatment of the material to be discharged is required prior to the discharge occurring.

F2.3. Depositing and disposal of material

F2.3.2. Objectives [rcp]

(1) Depositing of material in the coastal marine area is undertaken in appropriate locations to provide for public benefit including erosion management or habitat enhancement and the beneficial use of dredged material.

(2) Areas identified as having significant values are not adversely affected by material being deposited or disposed of in the coastal marine area.

(3) The adverse effects from the disposal of material, particularly any contaminated material, are minimised, where reasonably practicable, or otherwise avoided, remedied or mitigated.

(4) The depositing or disposal of material in the coastal marine area must not have significant adverse effects on the ecological, recreational, cultural, and amenity values of the Hauraki Gulf.

(5) The depositing and disposal of material in the coastal marine area must avoid, remedy or mitigate the spread of harmful aquatic organisms.

F2.3.3. Policies [rcp]

(3) Avoid the disposal of material in the Hauraki Gulf Marine Park other than where it is part of:

(a) an approved reclamation;

(b) a rehabilitation or restoration programme in degraded areas of the coastal marine area; or

(c) provided for in accordance with section 15B of the Resource Management Act 1991 or Part 3 of the Resource Management (Marine Pollution) Regulations 1998.

(4) Avoid the disposal of material in the coastal marine area where it will have significant adverse effects on any of the following:

(a) sites scheduled in the D17 Historic Heritage Overlay or scheduled in the D21 Sites and Places of Significance to Mana Whenua Overlay; or

(b) significant surf breaks identified in Appendix 4 Surf breaks.

(5) Avoid the disposal of material where it will have adverse effects on significant navigation channels.

(7) Avoid significant adverse effects from the disposal of material, other than the disposal of material in approved reclamations and determine the appropriateness of proposals by taking into account all of the following:

(a) the volume of material;

(b) the degree of contamination and resulting effects on water quality, sediment quality and ecology;

(c) the presence of harmful aquatic organisms in the material to be disposed of and the risk of introducing these into areas where they are not present;

(d) the sensitivity of the receiving environment, with particular reference to natural character and ecological values;

(e) the public use of the area;

(f) the characteristics of the disposal area, with particular reference to the potential for contaminants to be released from the area, and the potential for re-suspension of the material;

(g) the disposal technique, and for dredged material, the water content or solidity of the material at the time of disposal;

(h) available alternative disposal techniques, including stabilisation, use as mudcrete, or disposing of the material on land; and (i) the other matters contained in Schedule 3 of the Resource Management (Marine Pollution) Regulations 1998.

(9) Require the disposal of material to be undertaken in an area that will minimise the spread or loss of sediment and other contaminants to the surrounding seabed and coastal waters, or demonstrate that the site is the best practicable option given the type of material to be disposed of.

(10) Require proposals to dispose of material in a dispersive environment to ensure that the adverse effects associated with the release and spread of contaminants and sediment can be avoided, remedied or mitigated.

(11) Require any disposal of material to be undertaken at a location and time that will avoid, remedy or mitigate adverse effects on all of the following:

(a) the ecological function of the area, such as the growth and reproduction of marine and coastal fauna and flora, including feeding and spawning habitats and migratory pathways;

(b) other established activities, including recreational and commercial use; and

(c) water quality, including any contributing factors which may lead to or promote algal blooms.

Assessment

The disposal and depositing of the discharges from the sand extraction is undertaken during and in the same location as the sand extraction operation. It is not practical for the discharge and disposal to be undertaken at a different location and/or post the sand extraction operation.

No contamination of the discharge occurs during the sand extraction process. The extraction site is not within an area identified as having any significant values or within an area of identified surf breaks or sites scheduled under D17 or D21 of the AUPOP.

The William Fraser is more efficient in terms of sand extraction than the former Coastal Carrier and therefore the equivalent discharge volumes are reduced. By using a moon pool rather than pipes over the side of the barge, the discharge now occurs underneath the barge and reduces the plume. No significant adverse effects from this discharge have been identified in the various assessments undertaken.

Owing to the nature of the discharge there is no risk that it will result in the spread of harmful aquatic organisms.

The disposal will not impact on any significant navigation channels.

Given that the discharge and disposal is required as part of the sand mining operation and has been assessed as part of the overall application, and that no significant adverse effects have been identified it is consider that the discharge and disposal is appropriate. It is not practical to undertake sea-based sand extraction without a discharge and disposal.

No mitigation, including the timing or location of the disposal has been identified as necessary to avoid, remedy or mitigate adverse effects on those specific matters listed under Policy 11.

F2.11. Discharges

F2.11.2. Objectives [rcp]

(1) Water and sediment quality in the coastal marine area is maintained where it is excellent or good and progressively improved over time in degraded areas.

(2) The life-supporting capacity and resources of the Hauraki Gulf are protected and, where appropriate, enhanced.

F2.11.3. Policies [rcp]

(1) Avoid the discharge of contaminants where it will result in significant modification of, or damage to any areas identified as having significant values.

(2) Require any proposal to discharge contaminants or water into the coastal marine area to adopt the best practicable option to prevent or minimise adverse effects on the environment, having regard to all of the following:

(a) whether it is practicable or appropriate to discharge to land above mean high water springs;

(b) whether there is a wastewater network in place that should be used;

(c) whether the receiving environment has the capacity to assimilate the discharged contaminants after reasonable mixing, particularly within areas identified as degraded or as having significant ecological value;

(d) the extent to which present or foreseeable future adverse effects have been avoided, remedied or mitigated on:

(i) areas of high recreational use;

(ii) relevant initiatives by Mana Whenua established under regulations relating to the conservation or management of fisheries;

(iii) the collection of fish and shellfish for consumption; and

(iv) areas associated with maintenance dredging;

(e) high ecological values;

(f) cleaner production methods are used where practicable to minimise the volume and level of contaminants being discharged; and

(g) the discharge after reasonable mixing, does not either by itself or in combination with other discharges results in any or all of the following effects:

(i) oil or grease films, scums or foams, or floatable or suspended materials;

(ii) conspicuous change in the colour or visual clarity;

(iii) any emission of objectionable odour;

(iv) any significant adverse effects on aquatic life; or

(v) any significant effects of aesthetic or amenity values

Assessment

The discharge will not affect the water quality of the Pakiri embayment (or the wider Hauraki Gulf) due to the nature and manner of the discharge. Likewise, there will no or negligible effect on the life supporting capacity of the Hauraki Gulf from the discharge. The manner of discharge has been changed for the William Fraser with the discharge now occurring underneath the boat with the discharge being directed downwards and thereby reducing the plume.

There are no practicable alternatives to the discharge. The ability to immediately discharge back to the sea floor the screened material is considered to be appropriate.

Given the location and form of the discharge, it is considered there is unlikely to be any effects on recreational activities, including recreational fishing.

No potential risks to human health have been identified.

Section 105 and 107 Matters

1 The nature of the discharge and a detailed description of the receiving environment has been addressed in the AEE.

2 The discharge of screened material back into the coastal waters is the only practical method. Given the nature of suction dredging, it is not possible to undertake the sand extraction without extracting seawater and oversized material/shells etc.

3 There are no possible alternative methods,

4 The discharge will not give rise to the production of any conspicuous oil or grease films, scums or foams or floatable material. Suspended materials dissipate rapidly.

5 The localised plume will only last for a few minutes and does not result in any long-term charges in water colour or visual clarity.

6 There are no emissions or objectionable odour.

7 There will be no significant effects on aquatic life from the discharge.

If you have any queries in respect to these matters then please do not hesitate to contact me.

Sincerely,

David Hay
Planning Consultant
Ph: *09 425-9844*
Mobile: *027 425-0234*

Copy to: -

Attachments: -

(Panorama comprising 3 photos taken with 50mm equivalent lens at 12.45pm on the 9th September)

ATTACHMENT 1A.

VIEWPOINT 1.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR (PANORAMA)

Looking from near Pakiri Stream, south Pakiri, towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 12.45pm on the 9th September)

ATTACHMENT 1B.

VIEWPOINT 1.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR (SINGLE PHOTO)

Looking from near Pakiri Stream, south Pakiri, towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Panorama comprising 3 photos taken with 50mm equivalent lens at 12.30pm on the 9th September)

ATTACHMENT 2A.

VIEWPOINT 1.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (PANORAMA)

Looking from near the Pakiri River on south Pakiri Beach towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 12.30pm on the 9th September)

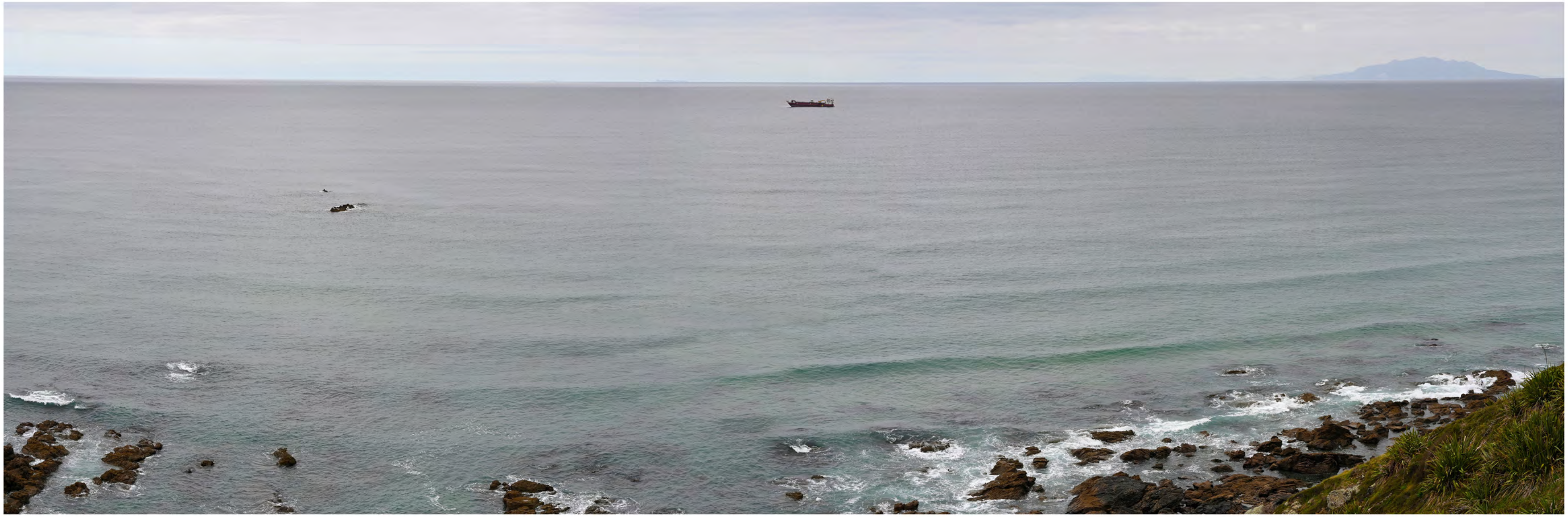
ATTACHMENT 2B.

VIEWPOINT 1.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (SINGLE PHOTO)

Looking from near the Pakiri River on south Pakiri Beach towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020



(Panorama comprising 3 photos taken with 50mm equivalent lens at 3.10pm on the 9th September)

ATTACHMENT 3A.

VIEWPOINT 2.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR PANORAMA)

Looking from the walking Track on Te Arai Point towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 3.10pm on the 9th September)

ATTACHMENT 3B.

VIEWPOINT 2.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR (SINGLE PHOTO)

Looking from the walking Track on Te Arai Point towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Panorama comprising 3 photos taken with 50mm equivalent lens at 3.20pm on the 9th September)

ATTACHMENT 4A.

VIEWPOINT 2.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (PANORAMA)

Looking from the walking Track on Te Arai Point towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 3.20pm on the 9th September)

ATTACHMENT 4B.

VIEWPOINT 2.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (SINGLE PHOTO)

Looking from the walking Track on Te Arai Point towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020

(Panorama comprising 3 photos taken with 50mm equivalent lens at 3.00pm on the 9th September)

ATTACHMENT 5A.

VIEWPOINT 3.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR (SINGLE PHOTO)

Looking from near the Pakiri Stream on north Pakiri Beach towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 3.00pm on the 9th September)

ATTACHMENT 5B.

VIEWPOINT 3.

KAIPARA LTD SAND EXTRACTION APPLICATION - 28m CONTOUR (SINGLE PHOTO)

Looking from near the Pakiri Stream on north Pakiri Beach towards the William Fraser at 28m contour

Brown NZ Ltd
September 2020

(Panorama comprising 3 photos taken with 50mm equivalent lens at 2.30pm on the 9th September)

ATTACHMENT 6A.

VIEWPOINT 3.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (PANORAMA)

Looking from near the Pakiri Stream on north Pakiri Beach towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020

(Single photo taken with 50mm equivalent lens at 2.30pm on the 9th September)

ATTACHMENT 6B.

VIEWPOINT 3.

KAIPARA LTD SAND EXTRACTION APPLICATION - 25m CONTOUR (SINGLE PHOTO)

Looking from near the Pakiri Stream on north Pakiri Beach towards the William Fraser at 25m contour

Brown NZ Ltd
September 2020

Colin Hopkins

From:	David Hay <david@osbornehay.co.nz>
Sent:	Thursday, 10 September 2020 1:28 PM
To:	Colin Hopkins
Subject:	Kaipara Ltd - Cultural Effects Assessment from Te Uri of Hau
Attachments:	Environs Cultural Effects Assessment for Kaipara Ltd August 2020 Final.pdf

Afternoon Colin

Please find attached the CEA from Te Uri o Hau. We are in dialogue with them in respect to their recommended conditions etc and our updated set of conditions which I will send to you once we get the final Council feedback on our queries will include any updates covering these.

Regards,

David Hay
Planning Consultant

Osbornehay
Resource Management Practice

Phone: 09 425-9844
Mobile: 027 425-0234
Skype: osbornehay01
Postal: PO Box 16, Warkworth 0941
Web: www.osbornehay.co.nz

TE URI O HAU
ENVIRONS HOLDINGS LTD

CULTURAL EFFECTS ASSESSMENT

RESOURCE CONSENT HOLDER: KAIPARA LIMITED

PROPOSAL: RENEWAL OF SAND EXTRACTION APPLICATIONS

RESOURCE CONSENT 20795/COASTAL PERMIT 0621

EXTRACTION ZONE: OFFSHORE MANGAWHAI – PAKIRI

AUGUST 2020

Environs Holdings Limited
Tai Tokerau Māori Trust Board Building
Level 2 3-5 Hunt Street
Whangarei
Phone F/P 0800 438 894, P: 09 459 7001
Email rma@uriohau.o.nz
Website: www.uriohau.com

Whakataukī

Tupu te Toi

Whanake te Toi

He Toi ora

He Toi he Toi i ahu mai i Hawaiki

To tau muri ki te Atua

No te mea

Ko taku taha tera

Knowledge that grows

Knowledge that expands

Knowledge that survives

Knowledge that comes from Hawaiki

Knowledge that comes from patience and tolerance

Knowledge that comes from God for that is wisdom

Whakapapa

Ko te tūpuna taketake o Te Uri o Hau, Ko Haumoewaarangi.

Ka moe a Haumoewaarangi i a Waihekeao,

Ka puta ki waho ko a raua tamariki tokowhitu: ko Makawe, ko Mauku, ko Whiti,

ko Weka, ko Ruinga, ko Rongo me Hakiputatomuri.

Ka puta i a Hakiputatomuri ko nga uri matinitini e mohiotia nei i tenei wa,

Ko Te Uri o Hau.

According to the traditions of Te Uri o Hau, the eponymous ancestor

of Te Uri o Hau is Haumoewaarangi.

From the marriage of Haumoewaarangi with Waihekeao came seven offspring:

Makawe, Mauku, Whiti, Weka, Ruinga, Rongo and Hakiputatomuri.

From Hakiputatomuri came many descendants known to this day as

Te Uri o Hau.

DOCUMENT CONTROL				
DATE	VERSION	PREPARED BY	REVIEWED BY	AUTHORISED BY
30/06/2020	Draft V1	S. Worthington		
	Peer Review		F Kemp	
	Planner Review		Barker & Associates (Planning Review)	
30/07/2020	Draft V2	S. Worthington		
	Peer Review		F Kemp	
04/08/2020	Draft V2 – Planner Review		Barker & Associates (Planning Review)	
12/08/2020	Final Draft	S. Worthington		
18/08/2020	Planner Review		Barker & Associates (Planning Review)	
20/08/2020	Final Peer Review		F Kemp	
27/08/2020	Release		F Kemp	

Report Co Writer:

Shereen Worthington
Te Uri o Hau Kaitiaki - Aotearoa Marae (Otamatea)
Cultural Resource Consultant (Environs)

Authorised by

Fiona Kemp B.A
Environs Manager
Environs Holdings Limited

Cover Photo: Taken from above Te Arai Point looking north east
Credit: Aotearoasurf.co.nz

TABLE OF CONTENTS

1. Activity Details

Applicant:	Kaipara Ltd
Agent:	Osborne Hay (North) Limited PO Box 16, Warkworth 0941 C/- David Hay - Planning Consultant E: david@osbornehay.co.nz P: 0.9 425 9844, M: 027 425 0234
Proposed Activity:	Replacement consent to allow for the continued sand extraction within a reduced sand extraction area
Sand Extraction Site	Outer Hauraki Gulf – Pakiri - Mangawhai
Proposed Consent Duration	20-year term
Existing Consents	Resource Consent 20795 (Coastal Permit RCAN 0621) • Extraction of up to 2,000,000 cubic metres of sand (including shelly gravel lag) but no more than 150,000m³ annually; • Discharge of excess sea water, shell and sand associated with dredging; and • Temporary occupation of the coastal marine area while dredging. Duration: 20-year term from 2003 to 2023
Site Location	Northern territorial boundary from Mangawhai - Pakiri to Auckland
Auckland Unitary Plan Operative in Part	General Coastal Marine Zone - Discretionary activity
Te Uri o Hau Associated Interests	• 1840 Tiriti o Waitangi • Te Uri o Hau Claims Settlement Act 2002 • Te Uri o Hau Settlement Historical Claims Schedules 2000 • Te Uri o Hau Statutory Acknowledgement's for Mangawhai Harbour Coastal Area and Mangawhai Marginal Strip • Te Takutai Moana Act 2011 - Takutai Moana: Te Uri o Hau Customary rights in the marine and coastal area (foreshore and seabed) from Te Arai Point to Langs Beach and extending out to 12 nautical miles
Environs Holdings Limited	Level 2, 3-5 Hunt Street PO Box 657, Whangarei p: 09 459 7001 or 0800 438 894 e: rma@uriohau.co.nz

Co-Writer	Shereen Worthington m: 021 231 4649 e: shereenw@xtra.co.nz
Co-Writer /Peer Review	Fiona Kemp Environs Manager P: 0800 438 894 Ext 208 e: fkemp@uriohau.co.nz

2. Introduction

This Cultural Effects Assessment (CEA) documents the special relationship of Te Uri o Hau as Mana whenua with association to Mangawhai as acknowledged in the Te Uri o Hau Settlement Clams Act 2002, also Mana moana customary interests and protected customary rights in the Outer Hauraki Gulf under the provisions of the Marine and Coastal Area (Takutai Moana) Act 2011.

The CEA provides information from a Te Uri o Hau cultural values perspective for Kaipara Limited (Kaipara Ltd) who seek renewal of resource consent application to continue sand extraction operations offshore from Pakiri to Mangawhai.

3. Proposal

Kaipara Ltd is the consent holder for existing consent application 20795 (RCAN0621) for the extraction of 2,000,000 m^3 of sand from the seabed within an extraction area located offshore in the outer Hauraki Gulf (refer to figures 1 to 4). The proposed consent will limit the extraction rate to 150,000 m^3 per annum from between the western boundary (being the 25 m isobath) and the 30 m isobath.

The consent duration by which Kaipara Ltd has been operating from is for a 20-year term effective from February 2003 and due to expire on February 2023.

Kaipara Ltd seeks replacement consent for another 20-year period to allow for the continued sand extraction within a reduced sand extraction area.

Under the Auckland Unitary Plan – Operative in Part, the proposal is a discretionary activity and therefore requires a coastal permit from Auckland Council.

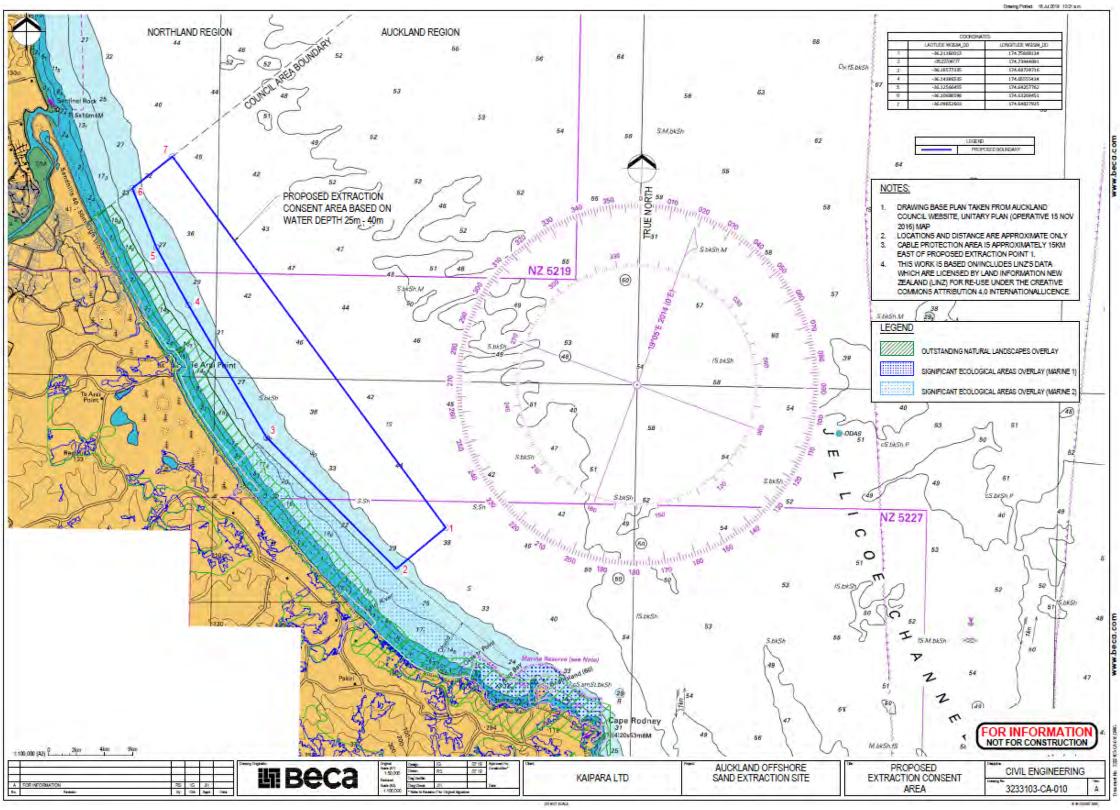


Figure 1: Auckland Offshore Sand Extraction Site - Proposed extraction consent area

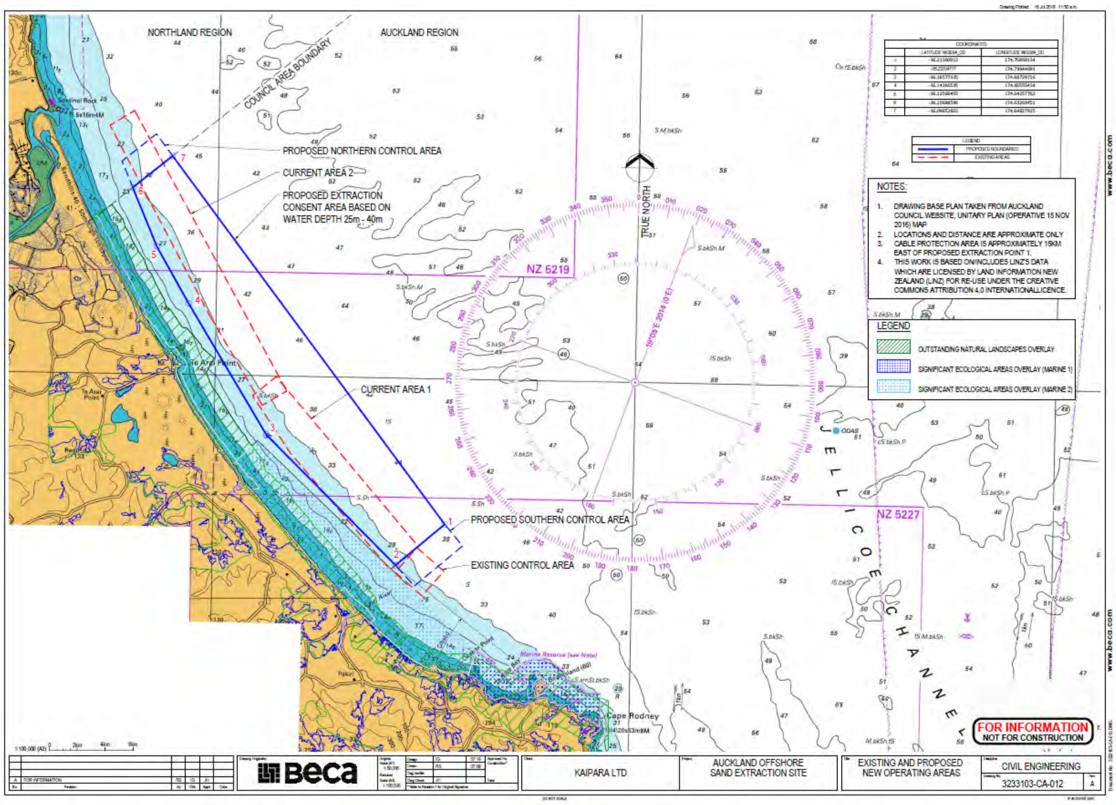


Figure 2: Existing and proposed new operating areas

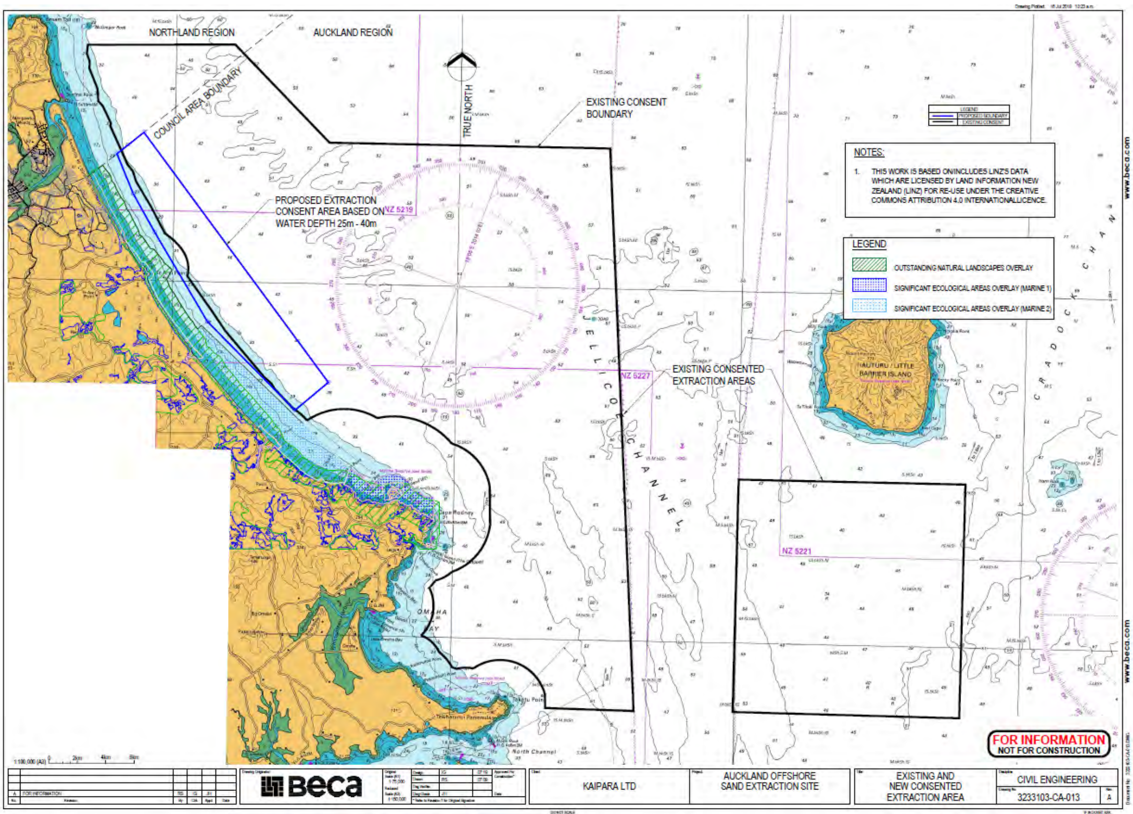


Figure 3: Existing and new consented extraction area

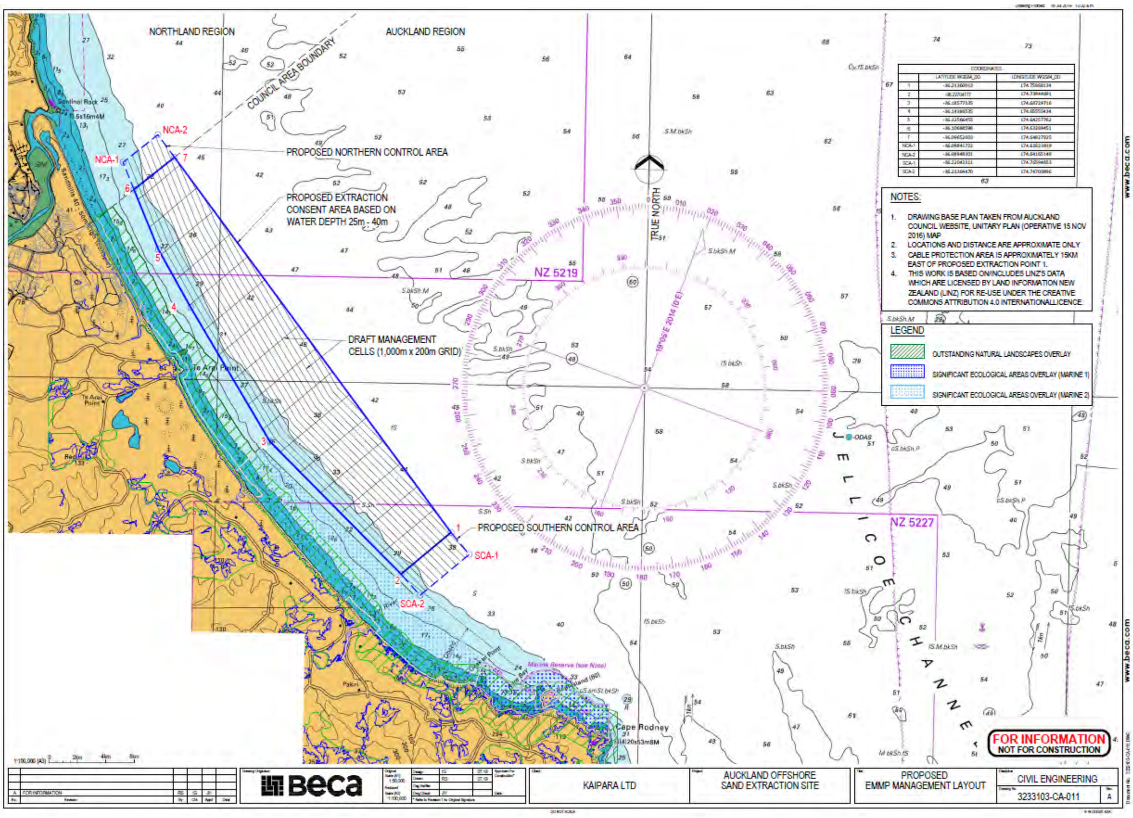


Figure 4: Proposed EMMP Management layout
Source: Beca Group Ltd

4. Iwi Engagement

Coastal Resource Ltd (CRL), the parent company to Kaipara Ltd, engaged with Environs on the 8 May 2017 to provide professional services to complete a Cultural Effects Assessment (CEA). A period of time passed between the initial contact and mid-September 2018[1] where CRL were in the stages of further refining its proposal which was ongoing.

A meeting was held on 20 November 2019[2] at the Te Uri o Hau Settlement Trust office attended by S. Brown (Environs previous Manager), J. Rishworth (current CEO of the Te Uri o Hau Settlement Trust), David Hay (planning consultant for CRL), Steve Riddell (Kaipara Ltd) and Mary-Ellen Stitchbury (Kaipara Ltd).

Environs draws attention to the significant delay on receiving the final drafting of this assessment.

When considering the statutory requirements under Part 2 of the RMA, Council need to recognise Environs capacity issues due to successive staffing changes which created sporadic communication[3] with Kaipara Ltd and Council planners. Moreover, capacity hindered consultative processes to hold hui with marae, which was further hindered with COVID-19 restricting tikanga processes to hold hui to complete a robust consultative process with whanau/marae.

The composition of this CEA is primarily based on precedent CEA within and surrounding the area. A consultative process to facilitate the understanding of the proposal with whanau/marae and to collate feedback on the potential impacts of the proposal will be held on 13th August 2020. Kaipara Ltd had been extended an invitation to attend. Unfortunately, a further lockdown on the 12 August prevented this hui taking place.

All communications received from Kaipara Ltd have been supportive in relation to the delays whilst completing the components of the CEA. Kaipara Ltd recognises the importance of engaging with mana whenua, particularly kaitiakitanga relationships between mana whenua, the marine environment and its resources as a relevant 'existing interest'. Therefore, the cultural, historical, traditional and spiritual elements of kaitiakitanga and the connection of those to Te Uri o Hau with regard to cultural values from activities of the consent application are to be considered.

- **Previous Consultation - Ngati Wai Trust Board**

In 1998, Kaipara Excavators Ltd (KEL) engaged in consultation with Ngati Wai who were representing Ngati Manuhiri for a deep-water sand project under the liaison of the late Laly Haddon. Ngati Wai provided a Cultural Impact Assessment and entered into a signed formal Memorandum of Understanding (MoU) arrangement with KEL.

[1] Email comms 17 September 2018: Hay to Clarke.
[2] Email comms 02 December 2019, S. Brown to S. Worthington.
[3] Environs previous Manager, Mr S. Brown in Whangārei on 20 November 2019. (email comms 02 December 2019, S. Brown to S. Worthington).

It is worth noting that Environs has not viewed the CIA report written by Ngatiwai.

For the current sand extraction proposal, Kaipara Ltd as the current consent holder, has engaged in consultation and requested new Cultural Impact Assessment reports from both Te Uri o Hau and Ngati Manuhiri. Te Uri o Hau have a strong relationship with Ngati Manuhiri and acknowledge their area of interest and are supportive of their position as a matter of tikanga.

5. Brief Cultural Background

Te Uri o Hau is a Northland hapu of Ngati Whatua whose descendants are from Haumoewaarangi through Hakiputatomuri, who is the tribe's founding ancestor, and includes whanau who affiliate to nga marae tuturu: Otamatea, Waikaretu, Oruawharo, Arapaoa[4].

The Crown acknowledged that Te Uri o Hau has suffered injustices which impaired Te Uri o Hau economic, social and cultural development. On 17 October 2002 the Historical Claims of Te Uri o Hau were settled by way of the Te Uri o Hau Claims Settlement Act 2002.

Environs was formed as the environmental subsidiary of the Te Uri o Hau Settlement Trust and tasked to advocate, protect, maintain, and preserve the kaitiakitanga and rangatiratanga rights of Te Uri o Hau within its area of interest.

Mangawhai is within Te Uri o Hau Estates and Territory: Statutory Area of Interest (refer appendix 2) as defined in the Te Uri o Hau Settlement Act 2002. Te Uri o Hau area rohe covers land and the marine and coastal area of the Kaipara and Mangawhai harbour's - Northern Kaipara region, and embraces areas north of Wellsford to east Te Arai Point to Bream Tail north then west to Pikawahine (south of Whangarei), across to Mahuta Gap on the West Coast south to Pouto and across the harbour east to Okahukura and Taporapora.

6. Purpose

- To provide a documented record of consultation for Te Uri o Hau hapu, Kaipara Ltd, and Auckland Council.
- Assist Auckland Council in meeting their statutory obligations under the principles of the Tiriti o Waitangi 1840: Treaty of Waitangi[5], the Resource Management Act 1991 (RMA), the Local Government Act 2002 and the Te Uri o Hau Claims Settlement Act 2002.
- Give recognition to statutory acknowledgments and of Te Uri o Hau as Mana Whenua in Mangawhai.
- Identifying potential or actual effects and assess whether those effects identified as more than minor can be avoided, remedied or mitigated.

[4] Te Uri o Hau Settlement Trust website: https://www.uriohau.com
[5] The principles of **partnership, participation and protection** underpin the relationship between the Government and Māori. These are fundamental to developing relationships with government agencies with involvement of Maori in planning and policy.

- Consider appropriate conditions of consent under s108 of the RMA on ways to avoid, remedy or mitigate actual or potential impacts on cultural values and interests.

7. Te Uri o Hau Interests - Mangawhai

Te Uri o Hau have two statutory acknowledgements in the Mangawhai area i.e. Mangawhai Harbour Coastal Area and Mangawhai Marginal Strip.

Councils must consider statutory acknowledgements when making decisions on whom to involve in resource consents and hearings. They also help address concerns where councils have processed consent applications that relate to an area of significance for certain claimant groups, without consultation or their written approval, and where claimant groups have been adversely affected.

a) Mangawhai Marginal Strip

Under the Te Uri o Hau Claims Settlement Act 2002, Schedule 6 Statutory Acknowledgment relates to Mangawhai Marginal Strip. Mangawhai Marginal Strip adjoins the coast in an area legally described as Part Lot 1 DP 138524 adjoining Lot 1 DP 138524 situated in Block IV Mangawhai Survey District.

This area was traditionally used by Te Uri o Hau as one of the many areas where kaimoana (seafood) was gathered during certain periods of the year. Mahinga kai and Nohoanga sites are prevalent throughout the Mangawhai area. Te Uri o Hau traditionally participated in many fishing expeditions from the coastline.

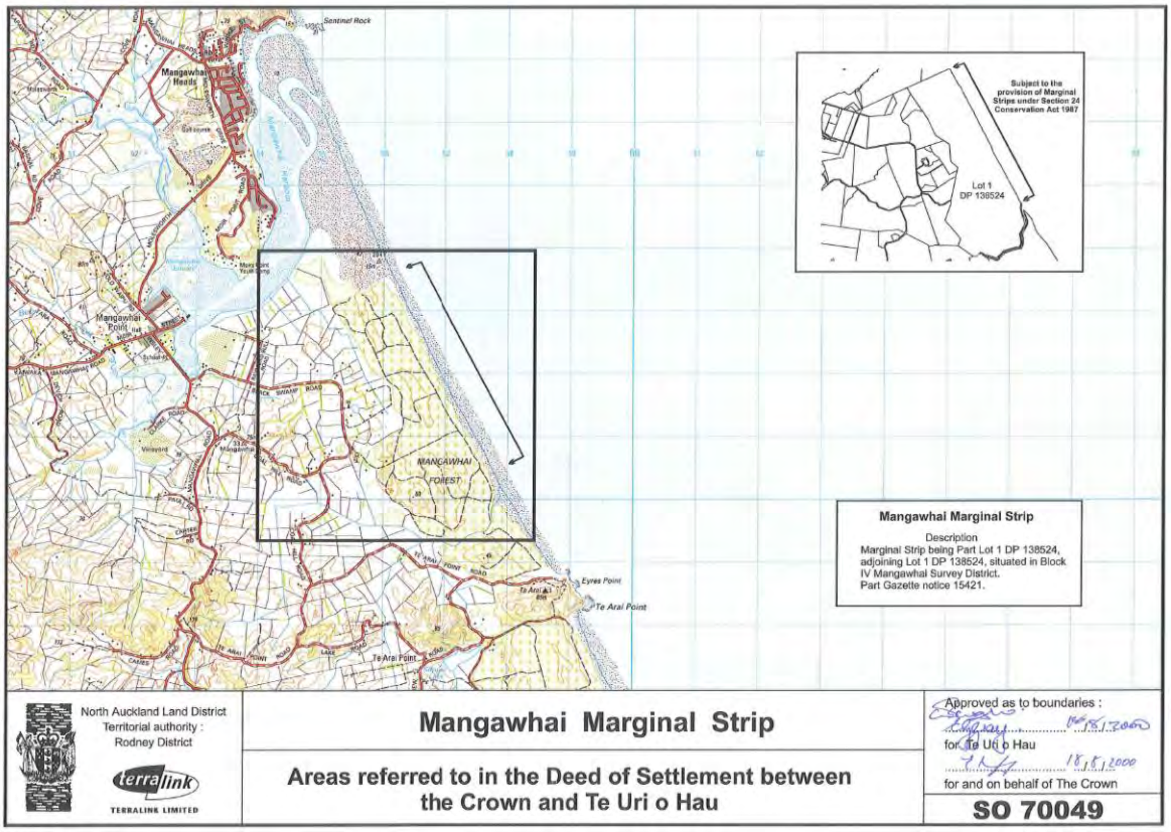


Figure 5: SO70049 Mangawhai Marginal Strip

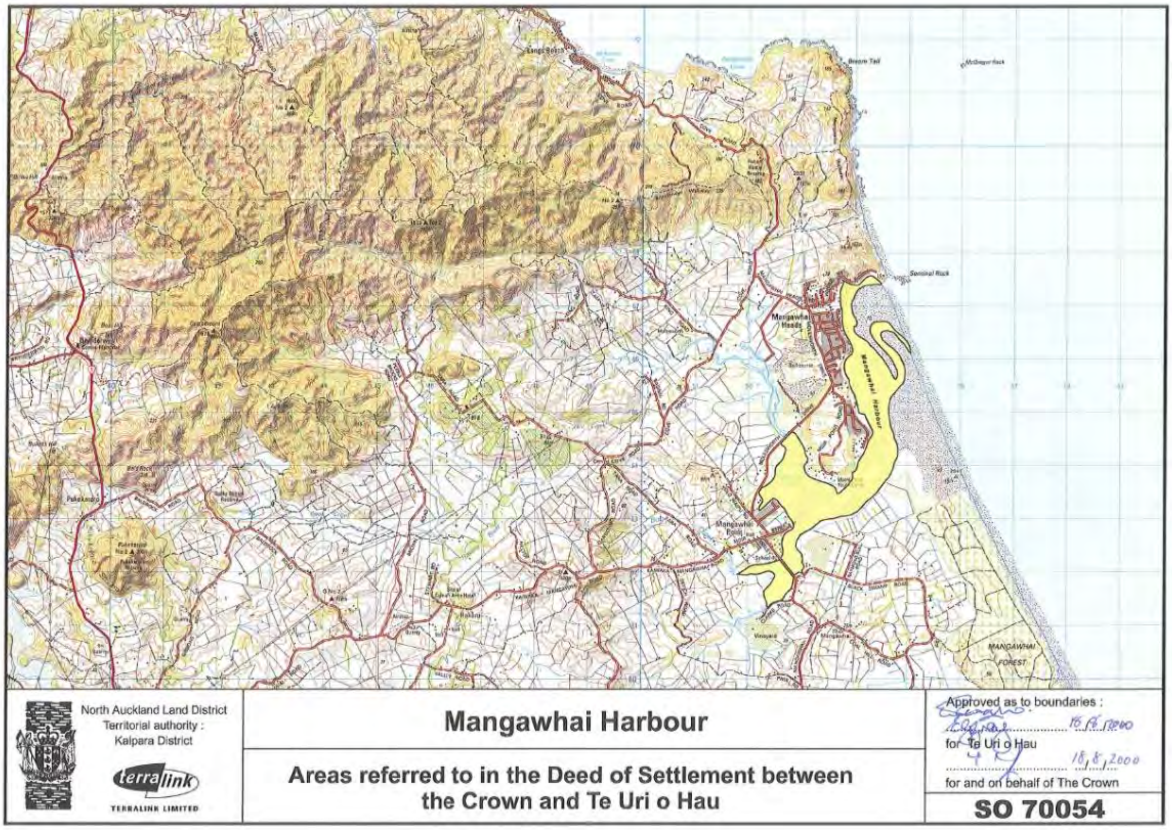


Figure 6: SO70054 Mangawhai Harbour Coastal Area

Te Uri o Hau has an important spiritual relationship with Mangawhai Harbour due to the many wāhi tapu sites in the area. Traditionally, prior to the battle of Te Ika a Ranganui, Te Uri o Hau gathered kaimoana from the harbour. Te Uri o Hau also gathered materials for making tools for tattooing and cutting hair, flax fibres for use in certain types of weaving, and coastal grass species for tukutuku panels (woven panels) from the harbour and surrounding area.

There are many Te Uri o Hau traditional nohoanga within the Mangawhai area, where Te Uri o Hau would camp to enable them to gather what was required. Te Uri o Hau would then travel back to their kainga (villages) beside the Kaipara Harbour. The Mangawhai Harbour is on the eastern rim within the statutory area of Te Uri o Hau and played a role as a major resource kete (food basket).

In 1825 the battle known as Te Ika Ranganui began in this area. A large proportion of Te Uri o Hau died during this battle. As a result of this battle, Te Uri o Hau consider that the area from and including the Mangawhai Harbour to Kaiwaka and beyond is tapu.

b) Marine and Coastal Area (Takutai Moana) Act 2011

Te Uri o Hau have lodged an application[6] with the office for Māori Crown Relations – Te Arawhiti in recognition of its customary marine title and protected customary rights which covers the following application areas (refer to figure 7):

1) From Te Arai Point to Langs Beach and extending out to 12 nautical miles;
2) The northern part of Kaipara Harbour from Karaka Point to midway between the harbour mouth, seaward for 12 nautical miles, north and then back to the coast at Mahuta Gap.

Te Uri o Hau application area under the Marine & Coastal Area Act 2011 covers part if not all the area subject to the current consent and the proposed new application by Kaipara Ltd. Kaipara Ltd is aware of the various customary marine title claims covering the sand extraction area. Te Uri o Hau have been advised of this application as required under the Marine and Coastal Area (Takutai Moana) Act 2011.

Appendix 1 – Map of area covered by application

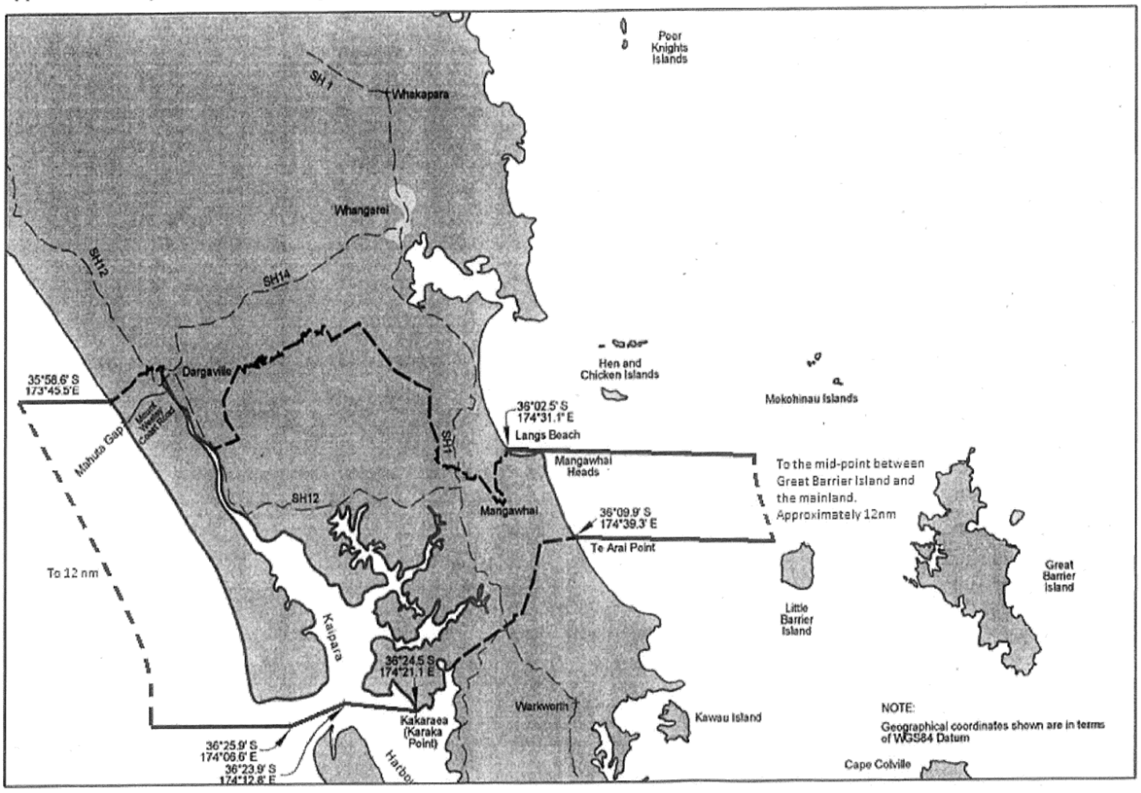


Figure 7: Te Uri o Hau customary marine title and protected customary rights area

[6] Office for Māori Crown Relations – Te Arawhiti. Marine and Coastal Area (Takutai Moana) Act 2011, Te Uri o Hau Settlement Trust Application MAC-01-01-143.

8. Methodology

As part of preparing this CEA, the following specialist documents / reports were desktop reviewed:

Table 8.1 Reports list

Title	Author	Date
Application Form A	Steve Riddell Director Kaipara Ltd	07 August 2019
Resource Consent Application and Assessment of Effects on the Environment for the continuation of sand extraction (Final)	Osborne Hay	July 2019
Sand Extraction Area Plans	BECA	Various
Draft Environmental Monitoring Management Plan	Osborne Hay	24 July 2019
Auckland Offshore Sand Extraction Site - Review of Coastal Processes Effects (Final)	BECA	15 July 2019
Assessment of Ecological Effects (Version Final)	Bioresearches	24 July 2019
The Economic Contribution and Impact of Pakiri Sand Extraction Report (Final)	m.e. consulting	7 August 2019
Heritage Assessment – Deep Sand Dredging from Hauraki Gulf	Clough and Associates	2011
Coastal Permit RCAN0621 (ARC20795)	Signed by the Minister of Conservation - Honourable Chris Carter	13 February 2003
Consultation document with Tangata Whenua and Pakiri Land owners prepared by	Laly P Haddon	August 1998

9. Legislative Interests

9.1 Te Tiriti o Waitangi 1840: Treaty of Waitangi Principles

Te Tiriti o Waitangi (The Treaty of Waitangi) is Aotearoa's (New Zealand's) founding document. Over 500 Māori Chiefs, including approximately more than five women, signed the Treaty in 1840. It is an agreement drawn up between representatives of the British Crown and representatives of Māori, Iwi and Hapū. It is named after the place in the Bay of Islands where the Treaty was first signed, on 6th February 1840, although, in fact, it was signed all over Aotearoa. Like all treaties it is an exchange of promises: the promises that were exchanged in 1840 were the basis on which the British Crown acquired New Zealand. The Tiriti o Waitangi agreed the terms by which Aotearoa would become a British Colony.

The Treaty is in two languages, Māori and English. The Treaty was intended by Great Britain to be an exchange of sovereignty to be in return for a guarantee of the authority of the chiefs and the protection of Māori land and resource rights. The Treaty also extended to Māori the same rights and privileges of British citizens.

The principles of the Te Tiriti o Waitangi being **Partnership, Participation and Protection** underpin the relationship between the Government and Māori. These principles are fundamental to developing relationships with government agencies, including involvement and participation in statutory policies and plans regarding the management of natural resources within Te Uri o Hau Estates and Territory: Statutory Area of Interest.

9.2 Te Uri o Hau Claims Settlement Act 2002

The purpose of this Act is to—

(a) record the apology given by the Crown to Te Uri o Hau in the deed of settlement executed on 13 December 2000 by the Minister in Charge of Treaty of Waitangi Negotiations, the Honourable Margaret Wilson, for the Crown, and Sir Graham Stanley Latimer, Morehu Kena, Jimmy Maramatanga Connelly, William Harry Pomare, Russell Rata Kemp, Rawson Sydney Ambrose Wright, and Tapihana Shelford, as mandated negotiators for Te Uri o Hau; and

(b) to give effect to certain provisions of that deed of settlement, being a deed that settles Te Uri o Hau historical claims.

- **Section 63 - Recording of statutory acknowledgements on statutory plans**

(1) Local authorities with jurisdiction in respect of a statutory area must attach information recording the statutory acknowledgement to—

(a) all regional policy statements, regional coastal plans, other regional plans, district plans, and proposed plans (as defined in section 2 of the Resource Management Act 1991) that—

(i) cover, wholly or partly, the statutory area; and

(ii) are prepared under the Resource Management Act 1991; and

(b) all proposed policy statements of the kind referred to in Schedule 1 of the Resource Management Act 1991 that—

(i) cover, wholly or partly, the statutory area; and

(ii) are prepared under the Resource Management Act 1991.

(2) The attachment of information under subsection (1) to a document referred to in that subsection—

(a) may be by way of reference to this Part or by setting out the statutory acknowledgement in full; and

(b) is for the purpose of public information only, and the information is neither part of the document (unless adopted by the relevant regional council or district council) nor subject to the provisions of Schedule 1 of the Resource Management Act 1991.

- **Under Section 59 of the Te Uri o Hau Claims Settlement Act 2002 the Crown acknowledges:**

...the statements made by Te Uri o Hau of the particular cultural, spiritual, historic, and traditional association of Te Uri o Hau with the statutory areas, the texts of which are set out in Schedules 5 to 10.

- Schedule 5 Pouto Stewardship area;
- Schedule 6 Mangawhai Marginal Strip;
- Schedule 7 Oruawharo River stewardship area;
- Schedule 8 Pukekaroro Scenic Reserve;
- Schedule 9 Kaipara Harbour Coastal Area; and
- Schedule 10 Mangawhai Harbour Coastal Area.

- **Section 64: Distribution of applications to Te Uri o Hau governance entity**

(1) The Governor-General may, by Order in Council made on the recommendation of the Minister for the Environment, make regulations, as contemplated by clause 5.2.8 of the deed of settlement, —
(a) providing for consent authorities to forward to Te Uri o Hau governance entity a summary of any applications received for resource consents for activities within, adjacent to, or impacting directly on statutory areas; and

(b) providing for Te Uri o Hau governance entity to waive its rights to be notified under those regulations.

(2) Nothing in regulations made under this section affects in any way the discretion of a consent authority as to—

(a) whether to notify an application under sections 93 to 94C of the Resource Management Act 1991; and

(b) whether Te Uri o Hau governance entity may be adversely affected under those sections.

9.3 Resource Management Act 1991 (RMA)

Under the RMA the proposed activity is to be assessed in terms of Section 104 and 117 (application to carry out restricted coastal activity).

Historically sand extraction was administered respectively by the Ministry of Transport and then the Department of Conservation under the provisions of the Harbours Act (1950).

Under the Resource Management Act ("RMA") consent is required in terms of:

Section 12 (1)(c), for the disturbance of the seabed;

Section 12 (1)(e), for the disturbance of the seabed;

Section 12 (2)(b), for the removal of sand

Section 12 (3), for the extraction activity and

Section 15 (1), for the discharge of contaminants (excess sea water, shell, and sand) to water in the coastal marine area

Part II of the RMA contains a number of specific provisions relating to mana whenua that must be considered in the RMA process:

- Sections 6(e),6(f) and 6(g) require that "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga", the protection of historic heritage from inappropriate subdivision, use and development" and "the protection of protected customary rights" is recognised and provided for.
- Section 7(a) sets out 'other matters' which persons exercising functions and powers under the Act must 'have particular regard to'. This includes section 7(a) kaitiakitanga
- Section 8 requires that the principles of the Treaty of Waitangi are taken into account.

9.4 New Zealand Coastal Policy Statement 2010

The New Zealand Coastal Policy Statement (NZCPS) is a national policy statement under the Resource Management Act 1991 ('the Act'). The purpose of the NZCPS is to state policies in order to achieve the purpose of the Act in relation to the coastal environment of New Zealand.

The coastal environment has characteristics, qualities and uses that mean there are particular challenges in promoting sustainable management:

- the coastal environment varies in nature and extent around the country;
- most existing towns and cities are in or close to a coastal location;
- the coastal environment contains established infrastructure connecting New Zealand internally and internationally such as ports, airports, railways, roads and submarine cables;
- natural and physical resources important to the economic and social wellbeing of the nation and communities, such as high-quality coastal water, fresh water, renewable
- energy, and minerals are found within the coastal environment, including in areas
- with high natural character, landscape and amenity values;
- the natural and recreational attributes of the coast and its attraction as a place to live
- and visit combine with an increasingly affluent and mobile society to place growing
- pressure on coastal space and other resources;
- activities inland can have a major impact on coastal water quality;
- activities in the coastal environment are susceptible to the effects of natural hazards
- such as coastal erosion and tsunami, and those associated with climate change;
- there is continuing and growing demand for coastal space and resources for
- commercial activities as diverse as aquaculture and sand mining; and
- the coast has particular importance to tangata whenua, including as kaitiaki.

Objective 1
To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;
- protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and
- maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.

Objective 2
To preserve the natural character of the coastal environment and protect natural features and landscape values through:
- recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;
- identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and
- encouraging restoration of the coastal environment.

Objective 3
To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:
- recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;
- promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;
- incorporating mātauranga Māori into sustainable management practices; and
- recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.

Objective 4
To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:
- recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;
- maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and

- recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.

Objective 5
To ensure that coastal hazard risks taking account of climate change, are managed by:
- locating new development away from areas prone to such risks;
- considering responses, including managed retreat, for existing development in this situation; and
- protecting or restoring natural defences to coastal hazards.

Objective 6
To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:
- the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;
- some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;
- functionally some uses and developments can only be located on the coast or in the coastal marine area;
- the coastal environment contains renewable energy resources of significant value;
- the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;
- the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;
- the proportion of the coastal marine area under any formal protection is small and therefore, management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and
- historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use, and development.

Objective 7
To ensure that management of the coastal environment recognises and provides for New Zealand's international obligations regarding the coastal environment, including the coastal marine area.

9.5 Auckland Unitary Plan (Operative in Part)

Auckland Council is responsible for deciding whether to grant resource consents to people wishing to undertake activities that may impact the environment.

The Auckland Unitary Plan Operative in Part (AUPOP) articulates Auckland Council's commitment to Māori by acknowledging the special relationship as Mana whenua to their respective areas of interest, through provisions relating to proposals that may interest or concern mana whenua or mana whenua values. Present District Plans contain general provisions regarding the consideration of mana whenua interests and values in resource consent proposals.

a) Mana Whenua

Mana Whenua participation in resource management decision-making and the integration of mātauranga Māori and tikanga into resource management are of paramount importance to ensure a sustainable future for Mana Whenua.

Issues of significance to Māori and to iwi authorities in the region include:
(1) recognising the Treaty of Waitangi/Te Tiriti o Waitangi and enabling the outcomes that Treaty settlement redress is intended to achieve;
(2) protecting Mana Whenua culture, landscapes and historic heritage;
(3) enabling Mana Whenua economic, social and cultural development on Māori Land and Treaty Settlement Land;
(4) recognising the interests, values and customary rights of Mana Whenua in the sustainable management of natural and physical resources, including integration of mātauranga and tikanga in resource management processes;
(5) increasing opportunities for Mana Whenua to play a role in environmental decision-making, governance and partnerships; and
(6) enhancing the relationship between Mana Whenua and Auckland's natural environment, including customary uses.

B6.2. Recognition of Treaty of Waitangi/Te Tiriti o Waitangi partnerships and participation

B6.2.1. Objectives
(1) The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are recognised and provided for in the sustainable management of natural and physical resources including ancestral lands, water, air, coastal sites, wāhi tapu and other taonga.
(2) The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are recognised through Mana Whenua participation in resource management processes.
(3) The relationship of Mana Whenua with Treaty Settlement Land is provided for, recognising all of the following:

(a) Treaty settlements provide redress for the grievances arising from the breaches of the principles of Te Tiriti o Waitangi by the Crown;
(b) the historical circumstances associated with the loss of land by Mana Whenua and resulting inability to provide for Mana Whenua wellbeing;
(c) the importance of cultural redress lands and interests to Mana Whenua identity, integrity, and rangatiratanga; and
(d) the limited extent of commercial redress land available to provide for the economic wellbeing of Mana Whenua.

(4) The development and use of Treaty Settlement Land is enabled in ways that give effect to the outcomes of Treaty settlements recognising that:
(a) cultural redress is intended to meet the cultural interests of Mana Whenua; and
(b) commercial redress is intended to contribute to the social and economic development of.

B6.2.2. Policies
(1) Provide opportunities for Mana Whenua to actively participate in the sustainable management of natural and physical resources including ancestral lands, water, sites, wāhi tapu and other taonga in a way that does all of the following:
(a) recognises the role of Mana Whenua as kaitiaki and provides for the practical expression of kaitiakitanga;
(b) builds and maintains partnerships and relationships with iwi authorities;
(c) provides for timely, effective and meaningful engagement with Mana Whenua at appropriate stages in the resource management process, including development of resource management policies and plans;
(d) recognises the role of kaumātua and pūkenga;
(e) recognises Mana Whenua as specialists in the tikanga of their hapū or iwi and as being best placed to convey their relationship with their ancestral lands, water, sites, wāhi tapu and other taonga;
(f) acknowledges historical circumstances and impacts on resource needs;
(g) recognises and provides for mātauranga and tikanga; and
(h) recognises the role and rights of whānau and hapū to speak and act on matters that affect them.

(2) Recognise and provide for all of the following matters in resource management processes, where a proposal affects land or resources subject to Treaty settlement legislation:
(a) the historical association of the claimant group with the area, and any historical, cultural or spiritual values associated with the site or area;
(b) any relevant memorandum of understanding between the Council and the claimant group;
(c) any joint management and co-governance arrangements established under Treaty settlement legislation; and
(d) any other specific requirements of Treaty settlement legislation.

(3) Where Mana Whenua propose an activity on Treaty Settlement Land, the benefits for the wider community and environment provided by any property specific protection mechanism, such as a covenant, shall be taken into account when considering the effects of the proposal.

(4) Enable the subdivision, use and development of land acquired as commercial redress for social and economic development.

(5) Enable Mana Whenua to access, manage, use and develop cultural redress lands and interests for cultural activities and accessory activities.

B6.3. Recognising Mana Whenua values

B6.3.1. Objectives

(1) Mana Whenua values, mātauranga and tikanga are properly reflected and accorded sufficient weight in resource management decision-making.

(2) The mauri of, and the relationship of Mana Whenua with, natural and physical resources including freshwater, geothermal resources, land, air and coastal resources are enhanced overall.

(3) The relationship of Mana Whenua and their customs and traditions with natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, natural resources or historic heritage values is recognised and provided for.

B6.3.2. Policies

(1) Enable Mana Whenua to identify their values associated with all of the following:
(a) ancestral lands, water, air, sites, wāhi tapu, and other taonga;
(b) freshwater, including rivers, streams, aquifers, lakes, wetlands, and associated values;
(c) biodiversity;
(d) historic heritage places and areas; and
(e) air, geothermal and coastal resources.

(2) Integrate Mana Whenua values, mātauranga and tikanga:
(a) in the management of natural and physical resources within the ancestral rohe of Mana Whenua, including:
(i) ancestral lands, water, sites, wāhi tapu and other taonga;
(ii) biodiversity; and
(iii) historic heritage places and areas.
(b) in the management of freshwater and coastal resources, such as the use of rāhui to enhance ecosystem health;
(c) in the development of innovative solutions to remedy the long-term adverse effects on historical, cultural and spiritual values from discharges to freshwater and coastal water; and
(d) in resource management processes and decisions relating to freshwater, geothermal, land, air and coastal resources.

(3) Ensure that any assessment of environmental effects for an activity that may affect Mana Whenua values includes an appropriate assessment of adverse effects on those values.

(4) Provide opportunities for Mana Whenua to be involved in the integrated management of natural and physical resources in ways that do all of the following:
(a) recognise the holistic nature of the Mana Whenua world view;
(b) recognise any protected customary right in accordance with the Marine and Coastal Area (Takutai Moana) Act 2011; and
(c) restore or enhance the mauri of freshwater and coastal ecosystems.

(5) Integrate Mana Whenua values, mātauranga and tikanga when giving effect to the National Policy Statement on Freshwater Management 2014 in establishing all of the following:

(a) water quality limits for freshwater, including groundwater;
(b) the allocation and use of freshwater resources, including groundwater; and
(c) integrated management of the effects of the use and development of land and freshwater on coastal water and the coastal environment.

(6) Require resource management decisions to have particular regard to potential impacts on all of the following:
(a) the holistic nature of the Mana Whenua world view;
(b) the exercise of kaitiakitanga;
(c) mauri, particularly in relation to freshwater and coastal resources;
(d) customary activities, including mahinga kai;
(e) sites and areas with significant spiritual or cultural heritage value to Mana Whenua; and
(f) any protected customary right in accordance with the Marine and Coastal Area (Takutai Moana) Act 2011.

9.5 Marine and Coastal Area (Takutai Moana) Act 2011

The Marine and Coastal Area (Takutai Moana) Act 2011 (MACA)[7] was executed by law to replace the controversial Foreshore and Seabed Act 2004. Both relate to the area from the line of the mean high-water springs 'to the outer limits of the territorial sea (12 nautical miles). This includes the subsoil and airspace (but not the air or water contained therein). The Bill proposes that no person can own the marine and coastal area. Instead, the coastal and marine area is to be held as a common area and the Act recognises Māori customary rights and customary title to the marine area.

The MACA acknowledges the importance of the marine and coastal area to all New Zealanders and provides for the recognition of the customary rights of iwi, hapū and whānau in the common marine and coastal area. Public access to the common marine and coastal area is guaranteed by the Act

The purpose of MACA is to *"recognise the mana tuku iho exercised in the marine and coastal area by iwi, hapū, and whānau as mana whenua; and provide for the exercise of customary interests in the common marine and coastal area; and acknowledge the Treaty of Waitangi (te Tiriti o Waitangi)."*

Under MACA developers have duties to customary marine title applicant groups to notify and seek the views of any group that has applied for recognition of customary marine title in the area.[8]

Iwi, hapū or whānau group can get recognition of two types of customary interest under the MACA:
- customary marine title
- protected customary rights

[7] The Office of Maori Crown Relations, NZ Government, Wellington. Te Kāhui Takutai Moana (Marine and Coastal Area). Retrieved from: https://tearawhiti.govt.nz/te-kahui-takutai-moana-marine-and-coastal-area/
[8] Ministry of Justice (2017). Maori land & Treaty. Marine & Coastal Area – Takutai moana Act. Information for developers. Retrieved June 2017 from: https://justice.govt.nz/maori-land-treaty/marine-and-coastal-area/information-for-developers/.

Customary marine title recognises the relationship of an iwi, hapū or whānau with a part of the common marine and coastal area. Customary marine title can't be sold and free public access, fishing and other recreational activities are allowed to continue in customary marine title areas.

If a group has customary marine title recognised over an area, it will hold these rights:

- a Resource Management Act permission right which allows the group to say yes or no to activities that need resource consents or permits in the area
- a conservation permission right which allows the group to say yes or no to certain conservation activities in the area
- the right to be notified and consulted when other groups apply for marine mammal watching permits in the area
- the right to be consulted about changes to Coastal Policy Statements
- a wāhi tapu protection right which lets the group seek recognition of a wāhi tapu and restrict access to the area if this is needed to protect the wāhi tapu
- the ownership of minerals other than petroleum, gold, silver and uranium which are found in the area.
- the interim ownership of taonga tūturu found in the area.
- the ability to prepare a planning document which sets out the group's objectives and policies for the management of resources in the area.

Protected customary rights can be granted for a customary activity like collecting hāngi stones or launching waka in the common marine and coastal area.

9.6 The New Zealand Coastal Policy Statement 2010:

The New Zealand Coastal Policy Statement (NZCPS) is a national policy statement under the Resource Management Act 1991 ('the Act'). The purpose of the NZCPS is to state policies in order to achieve the purpose of the Act in relation to the coastal environment of New Zealand.

Objective 3 of the NZCPS is to take account of the principles of the Treaty of Waitangi, recognising the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment.

Objective 3 - To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:

• recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;

• promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;

• incorporating mātauranga Māori into sustainable management practices; and

• recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.

Policy 2 - The Treaty of Waitangi, tangata whenua and Māori heritage

In taking account of the principles of the Treaty of Waitangi (Te Tiriti o Waitangi), and kaitiakitanga, in relation to the coastal environment:

(a) recognise that tangata whenua have traditional and continuing cultural relationships with areas of the coastal environment, including places where they have lived and fished for generations;

(c) with the consent of tangata whenua and as far as practicable in accordance with tikanga Māori, incorporate mātauranga Māori in regional policy statements, in plans, and in the consideration of applications for resource consents, notices of requirement for designation and private plan changes;

(e) take into account any relevant iwi resource management plan and any other relevant planning document recognised by the appropriate iwi authority or hapū and lodged with the council, to the extent that its content has a bearing on resource management issues in the region or district.

Te Uri o Hau has mana whenua and tangata whenua links to Mangawhai as previously illustrated. Te Uri o Hau practices involve kaitiakitanga and have traditional and continuing cultural relationships with areas of the coastal environment traditionally used where kaimoana (seafood) was gathered during certain periods of the year, and as mentioned, mahinga kai and nohoanga sites are prevalent throughout the Mangawhai area.

9.7 Te Uri o Hau Kaitiakitanga o Te Taiao (Environmental Management Plan) 2011

Te Uri o Hau Kaitiakitanga o Te Taiao (2011) is an environmental management plan to support Te Uri o Hau kaitiakitanga (guardianship) and rangatiratanga (authority) responsibilities in natural resource management within Te Uri o Hau Estates and Territory: Statutory Area of Interest.

Te Uri o Hau Kaitiakitanga o te Taiao plan provides the policies that the Crown and representative agencies, resource consent practitioners, applicants and research institutions take into account and give effect to, when preparing or reviewing regional and national statements, plans, policies and strategies.

The plan proposes a direction that contributes and shapes the work of Te Uri o Hau hapū natural resource management. The main objectives are:

- Long Term Integrated Catchment Plan for the Kaipara Harbour
- Mangawhai and Kaipara Harbour Management Plan
- Kaipara District Plan review
- Maintenance and enhancement plan for cultural redress properties
- Ngā marae tūturu environmental participation and kaitiakitanga roles
- Resource consent participation
- Maintain and enhance fresh water quality, quantity and access
- Sustainable coastal development (and water use and allocation)
- Property development
- Marae and cultural heritage
- Utilisation of Māori land and papakāinga development

- ❖ Forestry
- ❖ Fisheries and aquaculture marine plans
- ❖ Indigenous flora, forest and fauna protection and restoration to pre-European contact
- ❖ Marine mammal protection and management
- ❖ Devolution of resource management responsibilities to mana whenua/ahi kā through the marae

10. Te Uri o Hau Cultural Values and Practices

Māori values are principles by which Māori people view, interpret and make sense of the world. The universal values and beliefs are centred around land, water, and air as the essential ingredients of life that are to be respected, cherished, and sustained.

- **Spiritual and Cultural Connectedness**

Tangata whenua (people of the land) are connected to both the spiritual and physical dimensions, inherent of cultural values with responsibilities abound. As tangata whenua, Te Uri o Hau Ngāti Whātua has an inherent relationship and responsibility within the natural environment and specifically, to that part of Papatuanuku who lies within their tribal area.

At the heart of this relationship is the philosophy of holistic management. Holistic management demands the respect of humans to all divine creations of natural environment. The concept of mauri is essential to respecting each and all creation. All taonga possess a mauri: an intangible life force that unites all creatures and enables them to flourish.

The principles of holistic management acknowledge that human interactions with the natural environment impose a reaction to the mauri of nga taonga. The same principles are equally associated to the energy of life in an ecosystem. An ecosystem is a set of organisms living in an area, their physical environment, and the interactions between them. Likewise, to te mauri o nga taonga, human interaction with one part of an ecosystem necessitates a reaction to the whole.

- **Tikanga: Cultural Practice**

Tikanga Māori (cultural best practice) is dynamic and capable of responding to the changing world. Tikanga Māori forms the basis of how Te Uri o Hau live in a relationship with all living things and their environment, and how we manage those natural and physical resources and all things mauri. Tikanga Māori is defined under Section 2 of the Resource Management Act 1991 and Section 3 of Te Ture Whenua Māori Act 1993 as Māori customary values and processes, which are practiced to this day.

- **Taonga: Valued Treasures**

Taonga are those things considered culturally valuable to Te Uri o Hau which may be a tangible or intangible element. Article 2 of the Treaty of Waitangi acknowledges taonga as being lands, estates, forests, fisheries and other properties. Taonga represents an element of the Māori philosophical worldview and all living things representing mauri. All living and non-living things contain a life force, one cannot live without the other, all intricately living in harmony to sustain their being and existence on earth.

- **Kaitiakitanga: Guardianship**

Te Uri o Hau as Kaitiaki, acknowledge customary lore to include the protection of all living things, natural resources, culture and people. In this regard Kaitiaki are universal. The protection of our natural resources and culture require a commitment through the whole of Māori society which is constantly evolving. Kaitiakitanga not only relates to the environment and the management of natural resources but also extends to the socio-economic well-being of future generations.

- **Mana Whenua and Mana Moana: Power from and Rights to the Land and the Waters**

A return to one's marae is also a return to the land, to one's tūrangawaewae (place where one has rights of residence and belonging through kinship and whakapapa). After the birth of a child their pito (umbilical cord) and the whenua (afterbirth) are buried in the ground or placed up in a tree. The whenua is also the word for land and the burial of the umbilical cord and the afterbirth ensures a strong link with one's own land.

The land is also linked to the spiritual powers, to the children of Ranginui and Papatuanuku. Each Matariki/ New Year, at one place on the upper Wanganui River, hangi (earth ovens) are set aside for Tane and Tangaroa and offerings are made to them. This recognises that Tane is responsible for the forests and its foods and Tangaroa is responsible for the sea and its foods. Te Uri o Hau continue to carry on these responsibilities within their own rohe, as taught by our ancestors.

Te Uri o Hau values ancestral land based on our responsibilities and relationships with the land. It is important that how we value land i.e. not on monetary value or productive capacity. Māori land is often considered undeveloped or underutilised and therefore considered of little value by Europeans because Māori values are not recognised or understood.
Te Uri o Hau has mana moana over their customary fishing areas. Traditional chiefs determined the harvesting of kaimoana ensuring the protection and management through traditional customary methods.

- **Mana Atua: Spiritual Powers**

One with the people, one with the land, we also become one with the Atua (the spiritual powers). The spiritual powers are our immediate source of mana (inherited status); they are a source of our tapu.

- **Tapu and Noa: Sacred and Profane**

Traditionally, Māori life was organised in all its aspects through the intricate interplay of two states of being, tapu and noa, which were complementary and of equal importance. In numerous contexts a person, place or thing would be said to be either tapu or noa. The word tapu indicated that the person, place or object could not be freely approached, that restrictions had been placed upon access, and in this way the term referred not only to the tapu entity but also to the restricted relationship others might have with it. In many contexts it can be translated as restricted, forbidden, or sacred. The word noa indicated unrestricted access and can generally be understood as ordinary, everyday, common, and profane.

- **Wairuatanga: Spirituality**

In the cosmological myths of Māori, we are told that the universe was brought into being through Io, the supreme-being. It was he who willed the earth to appear; he was the primal origin of all things; everything on earth or in the heavens could be traced back to one cause, the sole origin, Io, the parent of the eternal.

In one of these curious evolutionary formulae, conception was given as the forebear of growth, who produced energy; then followed thought, mind, and desire. Various phases of Po and other conditions of chaos began, until at least one in conjunction with Atea (space) produced the heavens. The sky (personified in Ranginui), took Papatuanuku (the earth mother) as a wife, and begat seventy offspring, all males, and all supernatural beings.

Many of these personified lights, the sun, moon, darkness, wind, rain, clouds, and lighting. Some were described as originating beings, tutelary beings and parents of fish, birds, stars, and stones, while yet others were denizens of the uppermost heavens. From among these offspring were selected many of the poutiriao, or guardians, appointed by the supreme-being to watch over and preserve the welfare of the different realms of the universe. The following are the best-known members of the numerous offspring of the primal parents, Ranginui (sky father) and Papatuanuku (earth mother):

- **Tane** who is the (personified form of the sun), the fertiliser, he who fertilised the earth and caused it to produce trees and herbage, and also man who was born of the earth-formed maid;
- **Rongo** who represented the moon, as shown in Hawaiian myth, was the patron of peace and the art of agriculture;
- **Tu** who is the patron of war and death, personified the setting sun;
- **Whiro** personified darkness, evil, and death;
- **Tangaroa** was the origin and personification of all marine life;
- **Tawhirimatea** personified wind;
- **Ngana** or **Uru-te-ngangana**, was the origin of stars;
- **Kiwa** was the guardian of the ocean;
- **Te Ihorangi** personified rain; and
- **Ruaumoko** was the origin of earthquakes and all volcanic disturbances.

11. Mana whenua

The Kaipara hapū referred to collectively as Te Uri o Hau, have several lines of descent particularly to Ngāti Whātua and Tainui.

With the arrival of the Tainui waka at Ngunguru on Northland’s east coast around 1250 AD, came Hotunui, a principal rangatira of the waka. After a failed attempt to build a wharenui during the night, he named his three sons after this incident. The tuakana he named Tahuhu after the ridge pole, the second eldest son Tahinga, after the rafters and the potiki, Kura, after the red sunrise in the morning. Fourteen generations later, the descendants of the three sons migrated south to the Kaipara as Ngāti Tahuhu under the mana of Tahu Karangarua, Ngāti Tahinga under the mana of Tahinganui, and Ngāti

Kura under the mana of Kura Mangotini.

Their migration came through Mangakahia to Marohemo near Otamatea, where Ngāti Kura decided to live on the Hukatere Peninsula. Ngāti Tahinga decided to live on the southern side of the Oruawharo River around the Topuni /Wellsford area, and Ngāti Tahuhu decided to live in the area from Te Arai to the Waipu inlet and across to the Arapaoa River.

Approximately at the same time the Tainui waka landed at Ngunguru, the Ngāti Whātua waka, Mahuhu ki te Rangi landed at Taporapora in the middle of the Kaipara. Ngāti Awa was living in the Kaipara when Ngāti Whātua arrived. With the death of Rongomai, the captain of the Mahuhu ke te Rangi waka, Te Po Hurihanga his son, took the waka north to Rangaunu Harbour after blaming the drowning of his father on the witchcraft of the Ngāti Awa people. Ngāti Whātua lived on the fertile Victoria Valley just south of Kaitaia for three centuries before migrating south to the Hokianga.

The death of Taureka was the catalyst for this migration. Ngāti Whātua sought "utu" for Taureka being murdered so they attached and defeated the Ngatu Kahu-mate-ika from the Hokianga. After living in the Hokianga area, the lack of fertile land for an expanding iwi was the cause of migrating south into the Kaihu Valley and eventually down the Pouto Peninsula, reconnecting with their Ngāti Whātua relatives they had separated from 350 years previously after the drowning of Rongomai[9]. At this time, Ngai Tahuhu, Ngāti Kura and Ngāti Tahinga were living on the eastern side of the Kaipara. Ngāti Awa was living in the centre and Ngāti Whātua was living on the north western side and the Kawerau-a-Maki people were living on the south western side of the Kaipara.

A pakanga arose between Ngāti Awa and Ngāti Whātua over the Te Arawa, Ngāti Awa princess Te Hana who lived on the Pouto Peninsula. A series of battles took place where Ngāti Awa was defeated by Ngāti Whātua and they eventually left the Kaipara. Ngāti Whātua Rangatira, Haumoewaarangi, was killed by the Kawerau-a-Maki people for raiding their kumara pits. Ngāti Whātua were to eventually drive the Kawerau-a-Maki people from the Kaipara and occupied their lands for the killing of Haumoewaarangi (tupuna of Te Uri o Hau), and Kawharu, the Tainui giant and great toa (warrior) who assisted Ngāti Whātua inflict a number of defeats upon the Kawerau-a-Maki people.

Haukapaia II (uncle) and Nehu (nephew) were of Ngāti Tahuhu descent. They had a disagreement over the fishing grounds so a battle ensued in Ngāti Kura rohe at Te Komiti in the battle called Puakahikatoa (the blossom of the manuka tree)[10]. Nehu, mother of Hinewaiuru, was of Te Uri o Hau descent so he called upon his Te Uri o Hau relatives and Ranginui, Raki, More, and others to assist him defeat his Ngai Tahuhu relatives. Conflict soon arose between Nehu, Ngai Tahuhu people and Te Uri o Hau over land taken in the raupatu of Haukapaia II and his Ngāti Tahuhu people. Maungarongo marriages took place over several generations to maintain peace[11]. Through the Maungarongo marriages, the raupatu of Ngāti Tahuhu by Te Uri o Hau became kore. Tainui and Ngāti Whātua bloodlines were connected in arranged marriages.

In 1805, a war started between Ngā Puhi and Ngāti Whātua which had its origins in a love story. Ngā Puhi chief Pokaia was in love with Karuru, Hongi Hika's sister, however, she married a much older chief

[9] Wright, W. (1996) Te Uri o Hau o Te Wahapū o Kaipara Mana Whenua report, Waitangi Tribunal Submission Wai 271.
[10] Kaipara Minute Book 9, Pg 18.
[11] Kaipara Minute Book 9, Pg 115-116.

to be rid of him. Another story suggests that Karuru was seduced by a Te Uri o Hau man. Whatever the truth is, Pokaia was so enraged that he attacked Taoho, Te Roroa chief from Kaihu and killed about twenty of his people. Taoho sought utu at Mataraua near Kaikohe and killed the same number of people.

In 1807, Pokaia mustered about 500 Ngā Puhi warriors believing to make an easy conquest. Ngāti Rongo, Ngāti Whātua (south Kaipara), Te Uri o Hau and Te Roroa gathered at Moremonui where they defeated Pokaia invading taua. Over 150 Ngā Puhi warriors were killed including Pokaia and two Hongi Hika brothers. Hongi Hika managed to escape and eventually inflicted his wrath upon Kaipara Hapū.

- **1825 Battle known as Te Ika a Ranganui - Ko Te Whawhai i te Waimako**

In the early beginning of the nineteenth century, the northern Kaipara district was the battleground between two large confederations: Ngā Puhi and Ngāti Whātua. Hostilities began around 1807 with a clash between Ngā Puhi and Te Roroa, who were supported by their Ngāti Whātua allies, including Te Uri o Hau.

The battle, known as Te Kai a te Karoro (the seagull's feast), was fought at Moremonui, on the coast north-west of Dargaville. This was a serious defeat for Ngā Puhi, who lost several of their leaders during battle. The Ngā Puhi confederation, led by Hongi Hika, acquired guns after 1814, and asserted monopoly status in dealings, with Pākehā traders and missionaries in the Bay of Islands. In contrast, Kaipara Māori had little contact with Pākehā before the 1830s.

On February 1825, Mangawhai and Te Hakoru (known today as Hakaru) became the site of one of New Zealand's great battles, known as the Battle of Te Ika a Ranganui. A combined hapū of Ngā Puhi, armed with approximately 300 muskets journeyed from their northern lands and landed their waka at Mangawhai. They travelled and met a confederation of Kaipara hapū consisting of Tainui, Te Uri o Hau, Ngāti Rongo, Ngāti Whātua and Te Roroa at Te Hakoru at the Te Waimako stream between Mangawhai and Kaiwaka.

The following account is based on extracts taken from the combined korero (stories) of the local chiefs who fought against Ngā Puhi at Te Waimako, as told to Percy Smith:

> *"As Ngā Puhi was expected; we met then at the head of Te Manga Kaiwaka. A hui was held to discuss the best method to meet our foes and Te Murupaenga proposed that we meet Ngā Puhi at Te Mangawhai and attack them when they attempted to land. Rewharewha of Te Uri o Hau overruled this saying; "Nawai I mea pena te matenga mo Hongi Hika": What an absurd idea to suppose that Hongi Hika could be caught like that." So, the plan was abandoned and we decided to meet our foe at the place we later named Te Ika a Ranganui.*
>
> *When the first division of Ngā Puhi arrived at the right bank of the Te Maunga Waimako they met our left flank barring passage over the stream extending towards Kaiwaka. We attacked Ngā Puhi by crossing Te Manga Waimako forcing Ngā Puhi to retreat. We caught the first fish: "Kei au te mataika! anana! Mate rawa! Mate rawa!" Then Hongi's main division arrived and we were met with a storm of bullets, which drove us back cross the Te Waimako stream to our lines.*

Again, we charged down to the stream, only to be driven back by the guns and losing a large number of our men, but we stood our ground fighting hand to hand against Ngā Puhi. We rallied, 'Korahi, Korahi!" but 120 of us fell in one heap before the guns of Ngā Puhi. Seeing that the battle was lost, we retreated to our waka and escaped.

We would have perished that day but for the foolishness of Ngā Puhi. That day the waters of Te Waimako ran reed with our blood and its waters are tapu our people none of whom will drink its waters, however thirsty they may be. We later returned to the Kaipara with a "taua hiku toto" war party and surprised a taua of Te Parawhau and killed them. Hongi's army was then at Otamatea." (Source: Te Puriri, ratou Paikea Te Hekeua, Te Toko, Tieke, Hauraki Paore me etahi atu 1860).

According to transcripts, the confederation of Kaipara hapū possessed a small number of muskets. Many of the Kaipara people were killed during that period of time and the area was declared tapu. For the next decade, Tāmaki, Mangawhai and most of the Kaipara remained largely unoccupied as a result of the battle. Ngā Puhi were victorious in this conflict, where Tainui survivors fled to the Waikato, Te Uri o Hau to the Tangihua ranges south west of now known town of Whangarei, Mareretu, and Waikeikei forests, Ngāti Whātua fled to the Waitakere ranges, Ngāti Rongo to their Parawhau relatives whilst other survivors sought refuge with their Te Roroa and Ngāti Hine relatives. By the 1830's, Ngāti Whātua began moving back to the Kaipara and surrounding areas.

The Tapu was eventually lifted in 1991.

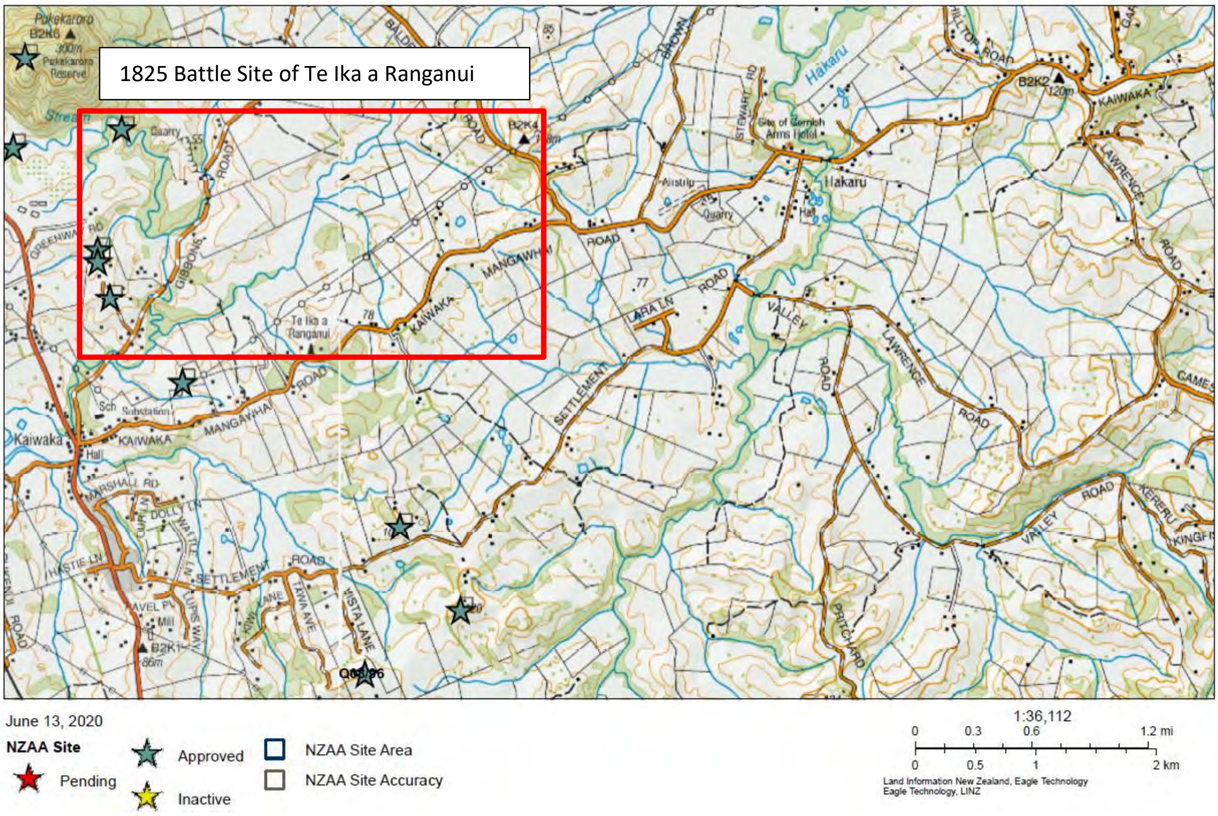


Figure 8: Site of the 1825 Battle of Te Ika a Ranganui (marked in red)
Source: NZAA ArchSite map

Figure 9: 1825 Battle of Te Ika a Ranganui - battle site
Source: Mangawhai Museum

- **Te Mangawhai or Mangawai**

Mangawhai means “Stream of the (Sting) Rays. The name is ancient and relates to the evil that will be returned if anyone should harm the stingrays within the harbour. In the early 1800’s Mangawhai Harbour was the home of Chief Te Whai. The Pa is situated on a property south of the subject site.

Mangawhai was of strategic significance as an important route and canoe portage between the eastern coastline and the Kaipara Harbour. The strategic importance of Mangawhai Harbour is reflected by the fact that its entrance was defended by two pā. Te Ārai ō Tāhuhu (Te Ārai Point) and further to the south Te Whetumakuru was a tribal boundary marker.[12]

The Māori occupation of the district was severely disrupted by the battle of Te Ika ā Ranganui (1825) that resulted in the decimation of the local people. Following the battle, the Ngāpuhi force scoured the district for survivors some of who were killed and later buried, on the coastline between Mangawhai and Pākiri. Ngāhoroa, which is located at the southern end of the Mangawhai North Block, was one such place.[13]

From this time the land between Kaiwaka and Mangawhai became tapu and permanent occupation of the area ceased. It is for this reason that the documentary record relating to the occupation of the area around 1840 is minimal and that the sale of the large Mangawhai block to the Crown in 1854 involved a number of tribal groups who sought collective security.[14]

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[12] Murdoch, G. (2008). A brief history of the human occupation of the Mangawhai Block and its environs. Report prepared for the Auckland Regional Council.
[13] Campbell, M. (2000). New Zealand Archaeological Association Journal 25, The Archaeology of Omaha. Pg 121-157.
[14] Ngāti Mauku & Ngāti Tahinga ki Kaipara WAI 721 Claim Report 2000.

- **Te Arai**

Te Arai is named after the prominent rocky feature known as Te Arai-o-Tahuhu, the landing place of the waka Moe Kakara of the chief Tahuhunui-a-rangi who erected an altar to the gods. It formed part of the sale of the Te Mangawhai block, which included part of Te Arai.

In the Kaipara minute books, Anaru Wi Apo, a Rangatira from Otamatea stated that the two main chiefs of that time who sold the land were Te Kiri Patuparaoa and Arama Karaka Haututu. After the arrival of the British Government in 1840, the people returned to their lands and Ngati Manuhiri re-established Ahikaroa in the area of Te Arai and Te Mangawhai by placing the descendants of Nga Whetu on the land.

George Graham records the history of this tuahu, which now rests near the tea kiosk at Cornwall Park, Auckland. It has a brief inscription referring to it as a 'Kumara god' of the Waiohua tribe. It appears that Sir John Campbell had the stone removed to Cornwall Park. Graham records that in 1909 he secured a definite account of this stone from the Kaipara chiefs assembled at a festival at Paremoremo. At the assembly he noted down the speech made by Eru Maihi, a Ngati-Whatua chief of high rank who stated:

> *"Now let me speak of one other of our ancestral canoes, Moe-kakara. Tahuhu was the chief. He landed near Te Arai, so-called because Tahuhu set up a temporary shelter (Arai). He there also set up this stone found there as a Tuahu (altar) and made the ceremonial offerings to the spirits of the land, so as to prevent offending them, as also to safeguard his folk against the witchcraft of the people of Kupe and Toi, who already lived thereabouts"*

This stone was known as Te Toka-tu-whenua and became an uruuruwhenua (a place of offerings and ceremonies). Tahuhu came to Tamaki and lived for some time at Otahuhu. His descendants were the Tahuhu came to Tamaki, and lived for some time at Otahuhu, hence the name of that place. His children were the Ngai Tahuhu. They coveted the territory of their neighbours and quarrelled with the descendants of Te Kete-ana-taua who lived at Te Tauoma (Tamaki West district). Tahuhu died at the pa at Mount Richmond, Otahuhu. He was interred at Te Arai (circa. A.D. 1375).

Tahuhu's hapu then returned to Te Arai, leaving some of their people inter-married with the Wai-o-hua of Tamaki, who were known also as Ngai-Tahuhu.[15]

- **1854 Land Purchases**

On 3 March 1854, the Crown purchased from the confederation Kaipara hapū; land in excess of 33,000 acres for European settlement at Te Mangawhai for £1060. Paikea Te Hekeua, Arama Kakaka Haututu (tupuna of the co-writer Worthington), Te Kiri Patuparaoa, Te Urunga, Wiremu Tipene, Makoare Hawaiiki, and others represented the tribes. The Crown's purchase in 1854 in the Mangawhai block was notable in that the Deed stated, "ten per cent or the proceeds of the sale of this block of land by

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[15] Journal of The Polynesian Society Volume 34 1925 > Volume 34, No. 134 > Te Toka-tu-whenua. A relic of the ancient Waiohua of Tamaki, by George Graham, p 175-179. Te Toka-Tu-Whenua. A Relic of the ancient Waiohua of Tamaki. By George Graham. http://www.jps.auckland.ac.nz/document/Volume_34_1925/Volume_34,_No._134/Te_Toka-tu-whenua._A_relic_of_the_ancient_Waiohua_of_Tamaki,_by_George_Graham,_pg175-179

the Queen is to be expended for the benefit of the Natives". There was performance of this clause up to 1874. No further payments were made after this date.

Ngai Tahuhu/Te Uri o Hau claimed the Crown failed to protect their interests. They say the Crown failed to ensure that the block was properly surveyed prior to sale, did not pay a fair price, and failed to provide reserves for Ngai Tahuhu/Te Uri o Hau within the block. When the Crown on-sold the land, it failed to ensure that Ngāi Tahuhu /Te Uri o Hau received their share of the 10 per cent of the proceeds, as provided for in the Mangawhai deed. The alleged failure of the Crown to fulfil its obligations was one of several grievances made by Te Uri o Hau. Grievance was sought that required redress, which led to a series of settlements between Ngāti Whātua, Te Uri o Hau and the Crown.

As described in a recent archaeological assessment[16], European settlement in the Mangawhai area began before the signing of the Treaty of Waitangi in 1840 although there is little evidence, historical or physical for this. William Mayhew, a settler of Te Wahapū in the Bay of Islands claimed 20,000 acres at Mangawhai in February 1841 (Figure 20). Mayhew had purchased the land from Henry Greensmith who had himself purchased it from James Reddy Clendon. Clendon had bought the land from Pomare and others of Ngā Puhi on 1 November 1839, presumably on the basis of the Ngapuhi victory at Te Ika-a-Ranganui in 1825, for £167 4s.[17]

The Mangawhai purchase was investigated during by the Land Claims Commission on 26 September 1842 with Mayhew testifying first and Māori and other Pakeha testifying later. It was found that there was no survey and no description of boundaries but the various payments were agreed upon. Commissioners Richmond and Godfery, in reporting on the claim, suggested that Pomare had no right to sell the land and that the actual payment had not occurred until after Governor George Gipps's proclamation forbidding such purchases on 14 January 1840. No grant was allowed but in recognition of Mayhew's outlay, a separate grant was made to him. There was some attempt by a subsequent claimant James Williamson in the course of the Bell Commission of the mid-1850s but by 1880 the claim had lapsed and Commissioner Heaphy declared it abandoned.[18]

Negotiations for the purchase of the so-called Mangawhai Block by the Crown began in late 1853. Land Commissioner John Grant Johnson began negotiations with Chief Tirarau who had fought with Ngapuhi at Te Ika a Ranganui in 1825, and continued with Ngāti Whātua interests at Pakiri. Tirarau's interests in the block were ultimately settled with a payment of £200.[19].

The deed to Mangawhai dated 3 March 1854 contained no formal survey and only descriptive boundaries, no Māori reserves, and no total acreage. The land was sold for £1060, however, a provision that 10% of any future sale by the Crown would be expended for the benefit of Māori was included[20]. This provision continued until 1874, when £419 13s. 2d was distributed to the last Māori owners of the Mangawhai Block[21]. The wording of the Mangawhai deed describes the land involved as follows:

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[16] Geometria Ltd (2019). Unpublished Archaeological Assessment for Kaipara District Council for an All Tides Coastal Walkway, Mangawhai Esplanade Reserve, Mangawhai, Northland, New Zealand.
[17] Wai 674, 2006.
[18] Bergan 2006, Rigby 1998, Carpenter 2016.
[19] Carpenter 2015.
[20] Turton, 1877
[21] Turton 1883: 8; Wai 674, 2006

"The boundaries of the land are these: commencing at Te Arai, thence along the sea coast to the mouth of Mangawai thence to Paepae-o-tu, thence to Kohekohe thence to Wairahi, Wakatarariki, Waipu, te Boundaries. Uritete thence inland to Poherangi, Pukehinau, Pohuenui, Pukeramarama thence in a southerly direction to the Raka, Puketotara, Rotomoeho, thence along the ridge to the source of Taotaoroa, the source of Te Haronga, the source of Waionepu, thence to Taumatatuhi, the source of Kaupare, thence to Kohiraunui thence along the ridge to Kapewhiti to Uriowhetau Waka Tararihi, thence to Mairiroai Taumatatirotiro Pukekohe thence to te Hakuru, and in the course of that stream to Kaparaunui thence to the sea, Wakaraurangi, Rauawe, Papawi, Waitete, Ngarakauewha and by the side of the lake to te Arai, where it ends".

The names of 63 owners were listed in the original deed, 23 of whom were chiefs, with the principals of the sale being Arama Karaka of Ngai Tahuhu (tupuna of the writer) and Eramiha Paikea of Te Uri o Hau.

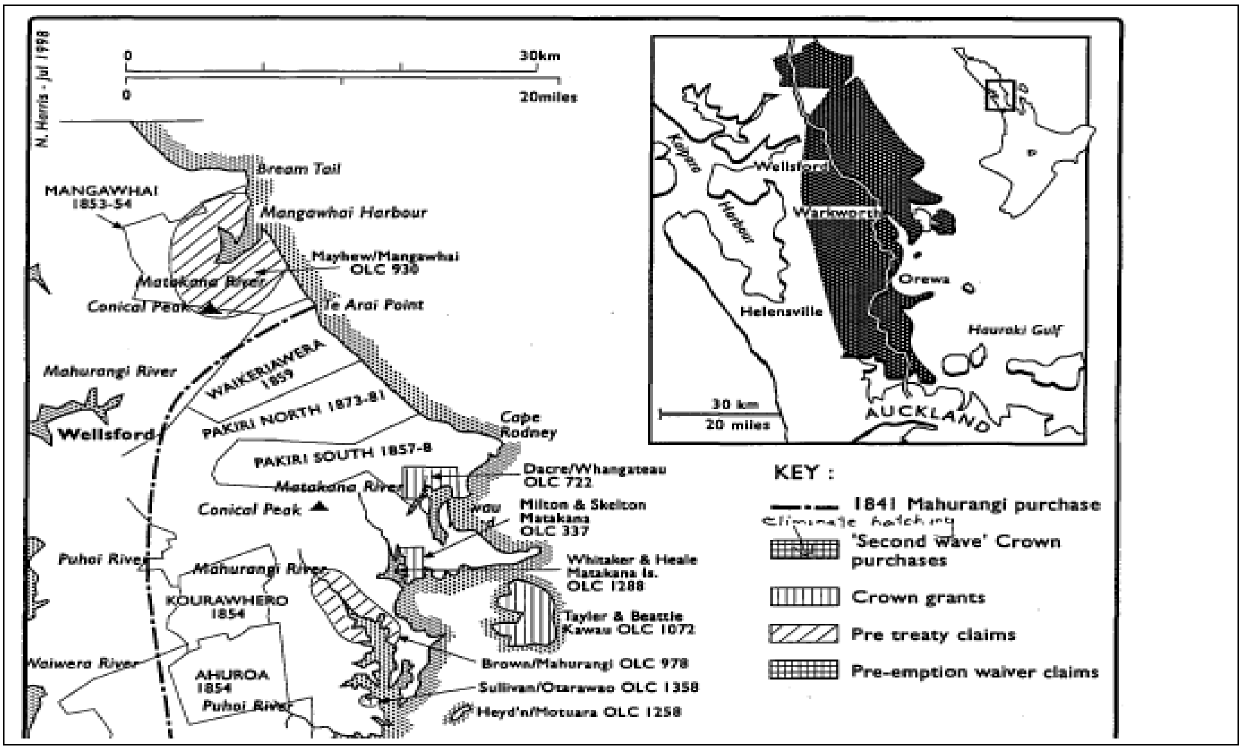


Figure 10: 1839 (Mayhew) and 1854 (Crown) purchases at Mangawhai
Source: Rigby (1998: 3)

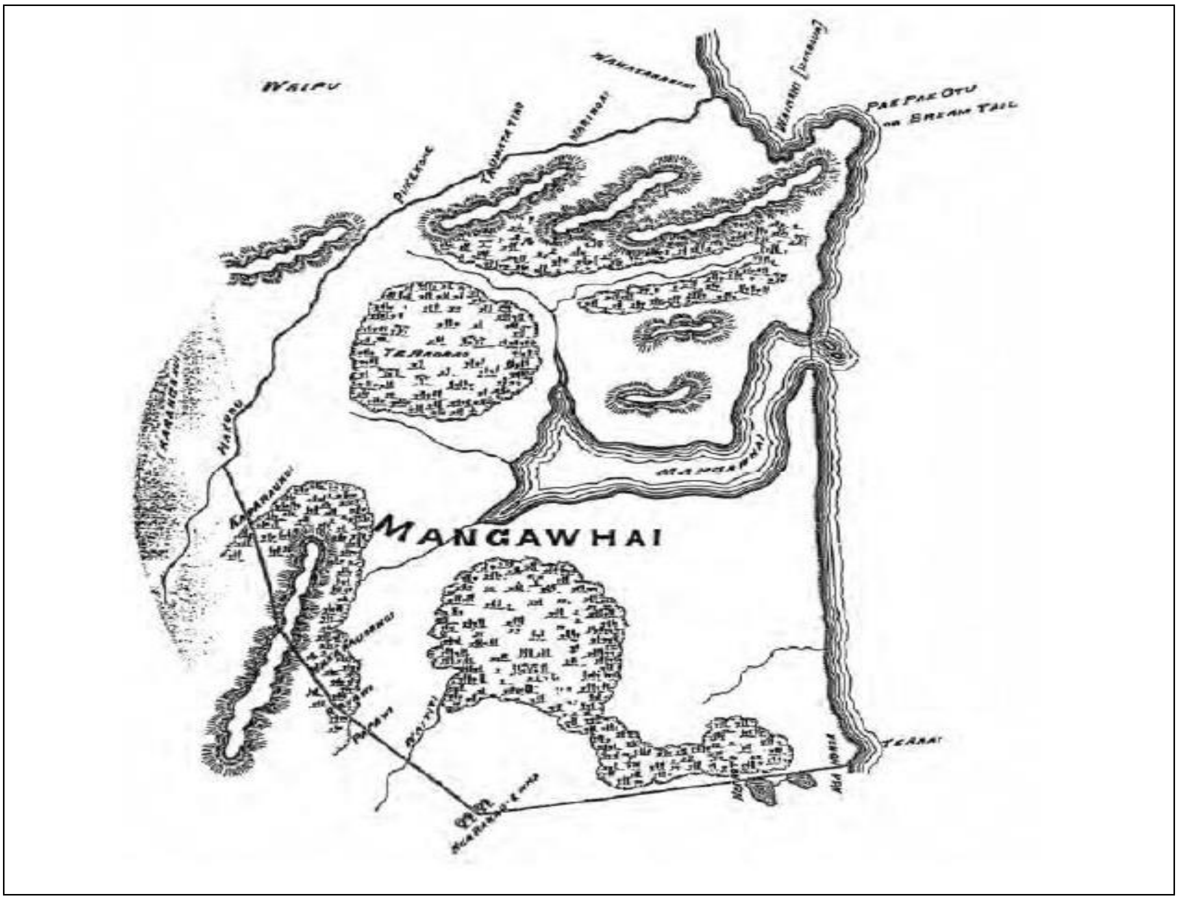


Figure 11: Crown Mangawhai Block Purchase of 1854
Source: Turton, H. H. (1877). Map of Old Land Purchases in Mangawhai. George Didsbury, Government Printer, Wellington, New Zealand

- **Te Uri o Hau Claims Process**

On March 1997, Dame Augusta Wallace was appointed presiding officer for the Waitangi Tribunal's inquiry into the Kaipara district and the remaining members of this Tribunal were appointed in June 1997.[22] The records of inquiry of various claims relating to the Kaipara region were combined under the reference number Wai 674 in July 199B7[23]. The inquiry district was divided into stages 1, 2, and 3. The main Te Uri o Hau claims (Wai 229 and Wai 271) were heard by the Tribunal in stage 1.

Te Uri o Hau claimants began negotiations with the Crown. The Crown recognised the mandate of Te Uri o Hau negotiators in June 1999, and the two parties then entered into negotiations for the settlement of Te Uri o Hau historical claims. Heads of agreement were signed in November 1999, and the proposed settlement was approved by 82.6 per cent of the participating adult members of the claimant community who were eligible to vote. On December 2000, the Crown and Te Uri o Hau signed the Te Uri o Hau Deed of Settlement Historical Claims Schedules 2000 and the Te Uri o Hau Claims Settlement Act 2002.

[22] Direction appointing Dame Augusta Wallace presiding officer for claims in Kaipara area, 10 March 1997 (Wai 674 ROI, paper 2.71); direction constituting Tribunal to hear Kaipara claims, 9 June 1997. (Wai 674 ROI, paper 2.84).
[23] Direction concerning consolidation and aggregation of Wai 674 record of inquiry, 21 July 1997. (Wai 674, ROI, paper 292).

Table 11.1 Te Uri o Hau Treaty Claims Process

1840	Signing of the Tiriti o Waitangi (Treaty of Waitangi).
1839 - 1841	Investigation of early "sales". A surplus of 6,000 acres was retained by the Crown.
1842	Approximately 8000 acres at Te Kopuru was ceded to the Crown under duress.
1854	Mangawhai Block was sold to the Crown with a 10% clause inserted for the benefit of Ngāti Whātua but was never upheld by the Crown.
1854 - 1865	Approximately 300,000 acres was alienated from Te Uri o Hau.
1871 - 1900	Native Land Court began title investigations in the Kaipara area. Henana Whiti and his whanau are evicted from their land and their property destroyed.
1905 - 1930	Tai Tokerau District Land Board and then the Board of Māori Affairs set up to assist Te Uri o Hau, but much of the control of those lands were placed in those departments.
1940	Kaipara Development Schemes were operating in the rohe, with very little benefit received by Te Uri o Hau.
1991 - 1997	Te Uri o Hau lodged claims Wai 229 and Wai 271 with the Waitangi Tribunal, on behalf of Te Uri o Hau. Several other whanau had also lodged claims. Te Uri o Hau presented the claims to the Waitangi Tribunal at Aotearoa Marae at Otamatea and Waikaretu Marae at Pouto.
1998 - 1999	Te Uri o Hau claimants began negotiations with the Crown. The Crown recognised the mandate of Te Uri o Hau negotiators in June 1999 and a 'Heads of Agreement' was signed on the 20th November. The Crown accepted that it had breached the Treaty of Waitangi and its principles in relation to Te Uri o Hau.
2000	On 12th September, Te Uri o Hau and the Crown initiated a "Deed of Settlement" setting out the full settlement offer for ratification by its people. In December, Te Uri o Hau Claims Settlement, later known as the Te Uri o Hau Claims Settlement Act 2002 was enacted into legislation.

12. CULTURAL VALUES AND EFFECTS ASSESSMENT

For mana whenua, engaging in the resource consent process allows for cultural values to be recognised where they otherwise they would not have been considered by Councils or are lesser known by applicants.

Two intertwined values are of particular importance to mana whenua for engagement in the resource consent system: Ahikā and Whakapapa.

12.1 Ahikā & Whakapapa

Ahikā refers to the political and spatial dimensions of mana whenua engagement and connectiveness, referring to "burning fires of occupation, continuous occupation, whereby, through the use of whakapapa, a tribal group is able to trace back to primary ancestors who lived on the land or in the area. Whakapapa refers to awareness of the temporal and interconnected nature of social and environmental systems. Mana whenua are able to engage holistically because of the authority provided by Ahikā and the nondualistic knowledge provided by Whakapapa.

These definitions show how Ahikā and Whakapapa merges from the practices of relating to an area and with the people of that area. Ahikā provides a basis for the interconnectedness of mana whenua references to whakapapa, rangatiratanga, whanaungatanga, and kaitiakitanga.

Assessment

For mana whenua, underpinning engagement is the use of Ahikā and involves creating relationships with applicants, contractors, and Councils. As such, in terms of the sand extraction renewal of consent process, and for future application renewals, Kaipara Ltd and Te Uri o Hau Environs shall liaise to:

- create, grow and foster meaningful relationships through ongoing engagement that is both continuous and constructive.
- undertake proactive engagement that allows Te Uri o Hau to practice whakapapa, rangatiratanga, whanaungatanga, and kaitiakitanga values;
- discuss the establishment of a formal partnership through a Memorandum of Understanding as a relationship guiding document that recognises Te Uri o Hau mana whenua, mana moana and interests in the marine and coastal area of the te Takutai moana.
- explore specific project related agreements that sets out the specifics of the relationship in terms of the project, specifically Kaipara's Ltd responsibility to any agreements signed by Te Uri o Hau.
- ensure any project related agreements and MOU sit alongside conditions of consent for the project and remains effective throughout the proposed consent duration and renewable for any future sand extraction consents.

12.2 Sites of Spiritual and Cultural Significance

The Heritage New Zealand Pouhere Taonga Act 2014 defines an archaeological site as a place associated with pre-1900 human activity, where there may be evidence relating to the history of New Zealand. A place associated with post-1900 human activity may be declared by gazettal as an archaeological site under the Act.

Coastal permit RCAN 0621 (ARC20795) Condition of Consent required an assessment of effects of the project on heritage sites that may exist in the permitted extraction zone prior to extraction work commencing. Condition 10A (iii) (Pg 4) stated that the Consent Holder was required to:

"Include an archaeological assessment by a recognised heritage consultant as to the potential for dredging on the Proposed Dredging Area (PDA) to disturb or destroy a site or sites of spiritual or cultural importance and/or any archaeological site (within the meaning if the Historic Places Trust Act 1993 (now the NZ Pouhere Taonga Act 2014").

A desktop review of the Assessment on Archaeological Values (AAV) commissioned by Rod Clough (2011) was conducted to measure the level of effects (if any) of the proposed dredging activity on archaeological values.

The methodology undertaken by Clough at that time involved reviewing relevant documentation, search of the Auckland Councils Heritage Inventory for recorded heritage sites in the area, and an assessment of results from a Side Scan Sonar analysis of the sea and ecological assessment (2003). In addition to, the review of a Cultural Impact Assessment (CIA) written by Ngātiwai. The CIA identified Ngati Wai traditional relationship and interest in the area. However, Clough noted the CIA did not provide any information on specific cultural sites which would be impacted on from sand extraction activities.

The AAV had details where (1) shipwrecks would be the only type of physical remains to be found; and (2) lives were lost from ships that travelled historically in the area but the survival of skeletal remains was unlikely. The AAV concluded that: ‘A *search of records and a review of sonar analysis of the extraction area failed to identify any remains relating to human activity, as it is unlikely that the extraction process and the technology employed will have any impact on heritage sites. From a heritage perspective there are no constraints on sand extraction proceeding from within the identified location. Furthermore, in the absence of direct detection of artefacts by side scan sonar, it is anticipated that a similar conclusion will be likely for all other specific areas that may be dredged in future within the permitted area’.*

Assessment

Cloughs AAV and the N.Z. Archaeological Associations Online website ArchSite shows no evidence that would lead to the presence of cultural sites offshore in the sand extraction zone. Te Uri o Hau are not aware of any sites of spiritual or cultural significance or any other cultural deposits being present within the current and proposed sand extraction site.

- Due to the distance from shore, it is unlikely for sand extraction activities to disturb or destroy sites of spiritual or cultural significance or any other cultural deposits in the current and proposed sand extraction site within the context of Te Uri o Hau cultural values, te Takutai Moana or the NZ Pouhere Taonga Act 2014.

12.3 Kaitiakitanga

Te Uri o Hau claim a level of relationship with the Mangawhai coastal area – that of kaitiaki. As kaitiaki, we are responsible for both the knowledge (matauranga) and the practice (tikanga) of kaitiakitanga in relation to the resource. Te Uri o Hau reflect that this responsibility is not a right, but a duty bound by tikanga.

Kaitiakitanga requires the recognition and empowerment of kaitiaki as the implementers. The role of kaitiaki would traditionally belong with a particular whānau or person or where tribal processes nominate kaitiaki in relation to a particular resource. The taiapure system is one where the equivalent of a kaitiaki group is appointed to carry out management functions.

Te Uri o Hau seek to ensure that policies and plans enable the practice of kaitiakitanga. This requires clarifying the meaning, function and effect of the practice of kaitiakitanga in natural resource management.

a) Cultural Monitoring

Te Uri o Hau has a special physical and spiritual relationship with the marine and coastal area, and both the Kaipara and Mangawhai Harbours'. Te Uri o Hau is committed to the holistic management of the marine and coastal area and both harbours.

The marine and coastal area, harbours and their estuaries are the main breeding areas of mahinga mataitai, and are the life support of the entire marine and coastal area. The marine and coastal area, and harbours have provided a traditional food source, natural materials for tools, customary practices and transportation for trade and barter.

Te Uri o Hau maintains a long traditional relationship with the marine and coastal area, and the Kaipara and Mangawhai Harbours and the many catchments of the rivers that enter these harbours. Ngāti Whātua and their associated hapū have held mana over both land and water through numerous generations of occupation.

Te Uri o Hau continue to apply customary techniques to protect the mauri of the marine and coastal area and harbours through maintaining tikanga Māori. Today, tikanga for Te Uri o Hau evolves to adjust to change. Understanding the marine environment is an underlying principle when defining tikanga Māori values in any relationship to the marine and coastal area and harbours.

Assessment

The recognition of the role and function of kaitiaki is consistent with the sustainable management of resources and in particular the sustaining the mauri of a resource. Education, training and employment of Te Uri o Hau people and Kaitiaki are components that play an integral part of their social, cultural and economic well-being.

Cultural monitoring is necessary to track the effectiveness of incorporating Māori values, tikanga, and mātauranga Māori values for the consent application by Kaipara Ltd. It enables Te Uri o Hau to carry out its Kaitiakitanga responsibilities, integral to maintaining and effectively managing its resources and economic benefits for its people into the future.

Any future project related agreement entered into between Kaipara Ltd and Te Uri o Hau shall look towards incorporating cultural monitoring of sand extraction operations to align with Environs existing and/or updated protocols and procedures.

In addition, Kaipara Ltd and Te Uri o Hau Environs shall engage in discussions surrounding potential job-based opportunities that may arise from sand extraction operations (i.e. openings for on the job training).

12.4 Reporting & Pre-works notification

A review of the Environmental Monitoring Management Plan (EMMP) and the existing conditions of consent (2003) requires the preparation of an Environmental Monitoring Management Plan (EMMP), a living document which outlines the monitoring methodologies, the approved sand extraction areas (within the consented sand extraction site) and is the depository for the required Pre-Sand Extraction Assessment Reports (PSEAR), and the Sand Extraction Monitoring Reports (SEMR), EMMP updates, and any subsequent Recovery Monitoring Reports (RMR).

Assessment:

For Environs to keep abreast of information regarding the sand extraction process once the proposed renewal of consent application has been granted, Environs requests:

- that information be made available to Te Uri o Hau Environs such as copies sent of the PSEAR, SEMR, RMR, and EMMP updates as they become available.
- to be notified by email and or in writing at least 20 working days prior to sand extraction commencing under the renewed consent.

12.5 Assessment of Biodiversity of the Marine and Coastal Area

A desktop review of various Assessment of Ecological Effects (AEEs) and ecological monitoring reports was conducted to gauge the level of ecological effects of the proposed dredging activity.

A substantial number of studies have been commissioned by Kaipara Ltd. associated with the sand dredging activity including assessment of ecological effects and monitoring studies. Those studies were commissioned both at the resource consent application phase prior to the commencement of sand extraction activities, and subsequent to the commencement of the activity. This review focusses on the most recent studies, assessments and reports that include information and data produced in earlier reports.

From a tangata whenua perspective, ecological features including plants and animals living on the seabed and in the water column are considered to be culturally important as components of the overall ecosystem that includes people also. All of the ecological features within the Te Uri o Hau rohe are considered to have importance to Te Uri o Hau, and so potential ecological effects are necessarily considered as part of any Cultural Effects Assessment.

For the purposes of this review it is useful to consider ecological effects under four broad categories:

1. Effects to the biotic communities living on and in the seabed (benthic fauna)
2. Effects to finfish
3. Effects on marine mammals
4. Effects to the coastal processes (movement of sand and geography of the seabed) that could potentially affect habitats such as sand dunes and estuaries, and associated ecological communities.

- **Effects on benthic fauna**

An assessment of ecological effects prepared by Bioresearches (2018) provides the most comprehensive summary of surveys and studies conducted to date. It presents a comparative analysis of the benthic biota data collected by ASR and the University of Waikato in 2003 before dredging, and by Bioresearches in 2017 after dredging within and adjacent to Area 1. Both comparisons assessed against the changes observed in the control area to the south of Area 1 surveyed in 2011 and 2017 by Bioresearches.

It should be noted that considerable useful data has been collected in the course of the surveys and studies listed above, but (as made explicit in the Bioresearches report) the absence of consistent sampling methods and the lack of a balanced before, after, control, impact (BACI) design among surveys means that robust statistical comparisons cannot be made between the successive surveys, although broad comparisons are possible.

The assessment of effects stated that:

"Apart from the wide spread, patchily distributed scallops, no additional important or sensitive species were identified in the benthic macrofauna of the sand mining Area 1 or the Control area, nor were any benthic macrofauna or communities of particular conservation value or significance identified."

However, a subsequent statement in that report says:

"Horse mussels (Atrina zelandica) were present on the seabed during the 2003 survey of Area 1, but absent from subsequent surveys. A. zelandica are sensitive to small increases in suspended sediment concentrations, even for short term periods (less than 3-day periods) such as storm events. The disturbance of the seabed by dredging is likely to have increased the suspended solids concentrations in and around the area. This, combined with the seabed disturbance in the sand mining areas, is the likely the cause of the lack of A. zelandica in later surveys."

Horse mussels are known to provide various ecosystem functions (e.g. Morrison et al 2014) including:

- filtration and sequestering of sediment from the water column (improved water quality),
- supporting increased biodiversity by providing settlement surfaces for other benthic organisms and 3-dimensional structure on the seabed
- provide a nursery function for juvenile snapper and trevally in Northern New Zealand

Thus, the loss of horse mussel beds, if caused by the dredging activity, can be considered as a significant effect.

Apart from the loss of horse mussels in a portion of the dredged zone, effects of the sand dredging activity detected were more subtle changes in relative abundance of organisms such as an increase in percentage abundance of crustacea and gastropods while the percentage abundance of bivalves has decreased. Such changes observed in a mobile sand habitat would not be considered significant.

Cole (1998) conducted a field study comparing the community of seabed organisms present inside and outside of the track of the dredge immediately following dredging activity. He concluded that the dredge path provides for rapid recolonization by seabed organisms, so provided there is sufficient time between dredging of the same patch or area of seabed, there should only be limited impact on species abundance and diversity.

- **Effects on Finfish**

The Bioresearches report (2018), considers how fish may potentially be affected by factors related to the operation of the sand dredge, including;

- noise effects.
- Entrainment.
- sub lethal effects from suspended sediment.
- food source reduction.

That report states that noise effects on fish are expected to be transient and minor. Most fish will easily avoid entrainment (being sucked up) by the dredge head, except for fish living within the sediment such as opalfish (*Hemerocoetes monopterigius*). The percentage of fine sediments in the seabed of the sand extraction area is low (0 – 3%) so the amount of fine sediment discharged from the sand dredge that remains suspended will be relatively small and unlikely to adversely affect fish present. Studies indicate that there are only subtle changes in relative abundance of polychaetes, crustaceans and other benthic food sources for fish in dredged areas and that the dredge path is likely to be rapidly recolonised.

- **Marine Mammals**

Marine mammals certainly do transit through the area proposed for sand extraction but there was no evidence that marine mammals are resident within the sand extraction site. The noise and turbidity effect produced by the dredging activity may result in avoidance of the immediate area while the dredge is operating but the intermittent operation of the sand dredge is unlikely to have significant adverse effects on any marine mammals present within the dredging area.

- **Effects on Coastal Processes**

A report produced by BECA consultants (BECA 2019) states that assessments of the Depth of Closure for the Mangawhai-Pakiri embayment using specific observation of physical characteristics, and theoretical methods based on wave climate and sediment grainsize, identified an offshore limit of exchange between inner shelf and nearshore of 25 m water depth. Therefore, extraction of sand from seaward of this depth will not affect nearshore beach and coastal processes through the transfer of sediment to or from the active nearshore system which is much more mobile and responsive to swell and current conditions.

In terms of the seabed biota, studies have shown that the seabed habitat in the area proposed for sand extraction is adapted to disturbance by natural hydrodynamic forces from periodic large swells or storm events, and that the seabed communities subjected to disturbance from the dredging activity may recover within a period of between 6 months to several years.

However, there is evidence suggesting that effects of the sand extraction may have caused significant decline of horse mussel beds which are considered to have value as biogenic habitat.

This review concludes that effects of continued sand extraction on **benthic biota** are likely to be minor to moderate depending on the location and habitat affected.

Effects on finfish are likely to be no more than minor, and any effects on marine mammals should only be transient and the barge and dredging activity should be easily avoided by those animals.

Due to the distance from shore, most studies indicate that the proposed sand extraction will occur offshore from the widely accepted 25 m Depth of Closure beyond which effective interchange of seabed sediments between nearshore beach processes and the inner continental shelf is minimal. This means that extraction of sand from this offshore site will effectively be independent of the nearshore processes

The location of the offshore extraction zone is such that it will be largely independent of coastal sediment transport pathways identified for the Mangawhai-Pakiri embayment, and thus not likely to affect nearshore and beach processes. Monitoring of offshore sand extraction between 2003 and 2019 has not identified significant effects on bathymetry, geomorphology or coastal processes,

Assessment

Overall, in our assessment, ecological effects from the proposed dredging activity can be considered to be minor to moderate at most. In the context of this Cultural Effects Assessment, because of the connection of tangata whenua to the plants and animals residing in the ocean (te moana) and in and on the papa Moana (the seabed), it may be considered that the level of ecological effect translates directly as a cultural effect. In this context the level of cultural effect of the seabed dredging activity proposed can be considered to be minor to moderate.

a) Conditions of Consent (2003): Special Condition 5 - Shellfish Beds

A review of the Resource Consent and Assessment of Effects on the Environment (AEE) written by Osborne Hay (2019) was conducted to assess for effects of the proposed sand extraction activity on cultural values, with some matters already addressed in this report (i.e. iwi consultation, archaeological heritage, etc.)

Page 41 of the AEE under 10 Conclusion recognises that "*areas of significant shellfish beds may be located within the proposed consented sand extraction area and the location of these may change over time. The pre-sand extraction assessment monitoring is to identify if these are present and to exclude such areas from the approved sand extraction areas".*

The Conditions of Consent (2003): Special Condition 5 - Shellfish Beds provides details on the process for the discovery of shellfish beds within the current sand extraction areas and contact details for Auckland Council.

Assessment:

- Te Uri o Hau shall engage in discussions with Kaipara Ltd, in support of cultural monitoring during the pre-sand extraction assessment monitoring as a means of giving effect to Te Uri o Hau customary interests in the common marine and coastal area in accordance with section 7 (te Tiriti o Waitangi) and part three (Customary interests) of the Marine and Coastal Area (Takutai Moana) Act 2011.

- Te Uri o Hau Environs seek to be included on the contact list for notification in the event shellfish beds be encountered during the exercise of the proposed new consent.

13. CONCLUSIONS & RECOMMENDATIONS

CONCLUSIONS

The principles of Te Tiriti o Waitangi 1840, being **Partnership, Participation and Protection,** underpin the relationship between the Government and Māori. These principles are fundamental to developing relationships with government agencies, including involvement and participation in statutory policies and plans regarding the management of natural resources within Te Uri o Hau Estates and Territory: Statutory Area of Interest.

Part II of the RMA contains a number of specific provisions relating to mana whenua that must be considered in the RMA process:

- Sections 6(e),6(f) and 6(g) require that "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga", the protection of historic heritage from inappropriate subdivision, use and development" and "the protection of protected customary rights" is recognised and provided for.
- Section 7(a) sets out 'other matters' which persons exercising functions and powers under the Act must 'have particular regard to'. This includes section 7(a) kaitiakitanga
- Section 8 requires that the principles of the Treaty of Waitangi are taken into account.

The NZCPS and Auckland Unitary Plan contain a range of directive objectives and policies that require the principles of the Treaty of Waitangi to be taken into account, recognition of the role of tangata whenua as kaitiaki, and provision for tangata whenua involvement in management of the coastal environment.

This assessment has considered the potential effects of the proposal in the legislative context summarised above. Section 12 provides an assessment of the potential effects on cultural values of importance to Te Uri o Hau, with the following conclusions being made:

Ahikā & Whakapapa
For mana whenua, underpinning engagement is the use of Ahikā and involves creating relationships with applicants, contractors, and Councils. As such, in terms of the sand extraction renewal of consent process, and for future application renewals, Te Uri o Hau Environs seek agreement from Kaipara Ltd to:

- create, grow and foster meaningful relationships through ongoing engagement that is both continuous and constructive.
- undertake proactive engagement that allows Te Uri o Hau to practice whakapapa, rangatiratanga, whanaungatanga, and kaitiakitanga values;
- discuss the establishment of a formal partnership through a Memorandum of Understanding (MOU) as a relationship guiding document that recognises Te Uri o Hau mana whenua, mana moana and interests in the marine and coastal area of the te Takutai moana.

- explore specific project related agreements that sets out the specifics of the relationship in terms of the project, specifically Kaipara's Ltd responsibility to any agreements signed by Te Uri o Hau.
- explore job-based opportunities that may arise from sand extraction operations (i.e. openings for on-the-job training).

It is acknowledged that the above predominately sit outside of the Council process for consideration of the current consent application. However, in the interests of taking a partnership approach with Kaipara Ltd more broadly, Te Uri o Hau seek that a commitment from Kaipara Ltd to achieving the above be formally recorded in the consent decision.

Sites of Spiritual and Cultural Significance

Te Uri o Hau are not aware of any sites of spiritual or cultural significance or any other cultural deposits being present within the current and proposed sand extraction site. Due to the distance from shore, it is unlikely for sand extraction activities to disturb or destroy sites of spiritual or cultural significance or any other cultural deposits in the current and proposed sand extraction site within the context of Te Uri o Hau cultural values, te Takutai Moana or the NZ Pouhere Taonga Act 2014.

Kaitiakitanga

The recognition of the role and function of kaitiaki is consistent with the sustainable management of resources and in particular the sustaining the mauri of a resource. Education, training and employment of Te Uri o Hau people and Kaitiaki are components that play an integral part of their social, cultural and economic well-being.

Cultural monitoring is necessary to track the effectiveness of incorporating Māori values, tikanga, and mātauranga Māori values for the consent application by Kaipara Ltd. It enables Te Uri o Hau to carry out its Kaitiakitanga responsibilities, integral to maintaining and effectively managing its resources and economic benefits for its people into the future.

Biodiversity

Overall, in our assessment, ecological effects from the proposed dredging activity can be considered to be minor to moderate at most. In the context of this Cultural Effects Assessment, because of the connection of tangata whenua to the plants and animals residing in the ocean (te moana) and in and on the papa Moana (the seabed), it may be considered that the level of ecological effect translates directly as a cultural effect. In this context the level of cultural effect of the seabed dredging activity proposed can be considered to be minor to moderate.

Overall, Te Uri o Hau considers that the potential effects of the proposal on cultural values will be acceptable subject to the imposition of the recommended conditions of consent outlined below. To ensure an acceptable outcome is achieved, Environs requests that the Council provide an electronic copy of the draft consent conditions for review and feedback prior to the consent decision being issued.

RECOMMENDED CONDITIONS OF CONSENT

1. Within five (5) working days of this consent being granted, the Consent Holder shall forward a copy of the granted consent conditions and approved plans to Environs Holdings Ltd (via email to rma@uriohau.co.nz).

2. At least twenty (20) working days prior to the commencement of any sand extraction commencing under this consent, the Consent Holder, in partnership with a Te Uri o Hau assigned Kaitiaki (and at the Consent Holder's full expense), shall develop a Cultural Monitoring Plan ("CMP") to outline:

    a. The specific circumstances where cultural-based environmental monitoring of sand extraction operations is necessary, for example, in the event that shellfish beds are encountered during the exercise of the consent; and
    b. The specific requirements of cultural monitoring under the circumstances identified above. The requirements shall include, as a minimum, the methodology, agreed timeframes for completion of the monitoring, reporting requirements and the cost recovery mechanism.

3. The CMP referred to in Condition [1] of this consent shall be agreed in writing between the Consent Holder and Te Uri o Hau prior to the commencement of any sand extraction commencing under this consent.

4. The activities authorised under this consent shall be undertaken in accordance with the agreed CMP.

5. In the event that shellfish beds are encountered during the exercise of this consent, work should cease immediately and the tangata whenua of Te Uri o Hau shall be contacted so that the requirements of the CMP can be followed.

6. The Consent Holder shall ensure that Te Uri o Hau are provided with the most up to date copies of the following documents at all times:

    a. Environmental Monitoring Management Plan (EMMP);
    b. Pre-Sand Extraction Assessment Reports (PSEAR);
    c. Sand Extraction Monitoring Reports (SEMR); and
    d. Recovery Monitoring Reports (RMR)

Advice Notes:

In taking a partnership approach to this proposal, and future similar proposals of interest to Te Uri o Hau, it is noted that Te Uri o Hau Environs and Kaipara Ltd have agreed to:

- create, grow and foster meaningful relationships through ongoing engagement that is both continuous and constructive.
- undertake proactive engagement that allows Te Uri o Hau to practice whakapapa, rangatiratanga, whanaungatanga, and kaitiakitanga values;
- discuss the establishment of a formal partnership through a Memorandum of Understanding (MOU) as a relationship guiding document that recognises Te Uri o Hau mana whenua, mana moana and interests in the marine and coastal area of the te Takutai moana.
- explore specific project related agreements that sets out the specifics of the relationship in terms of the project, specifically Kaipara's Ltd responsibility to any agreements signed by Te Uri o Hau.
- explore job-based opportunities that may arise from sand extraction operations (i.e. openings for on-the-job training).

Appendix 1: Assessment of Ecological Effects review by S. Brown

Coastal Resources/Kaipara Ltd resource consent renewal and variation for sand extraction: Te Arai Coast:

Review of Ecological Issues, Environs Holdings Ltd, Te Uri o Hau Settlement Trust

From a tangata whenua perspective, ecological features including plants and animals living on the seabed and in the water column are considered to be culturally important as components of the overall ecosystem that includes people also. All of the ecological features within the Te Uri o Hau rohe are considered to have importance to Te Uri o Hau, and so potential ecological effects are necessarily considered as part of any Cultural Effects Assessment. A desktop review of various Assessment of Ecological Effects (AEEs) and ecological monitoring reports was conducted to gauge the level of ecological effects of the proposed dredging activity.

A substantial number of studies have been commissioned by Kaipara Ltd. associated with the sand dredging activity including assessment of ecological effects and monitoring studies. Those studies were commissioned both at the resource consent application phase prior to the commencement of sand extraction activities, and subsequent to the commencement of the activity. This review focusses on the most recent studies, assessments and reports that include information and data produced in earlier reports.

For the purposes of this review it is useful to consider ecological effects under four broad categories:

5. Effects to the biotic communities living on and in the seabed (benthic fauna)
6. Effects to finfish
7. Effects on marine mammals
8. Effects to the coastal processes (movement of sand and geography of the seabed) that could potentially affect habitats such as sand dunes and estuaries, and associated ecological communities.

1. Effects on benthic fauna

An assessment of ecological effects prepared by Bioresearches (2018) provides the most comprehensive summary of surveys and studies conducted to date. It presents a comparative analysis of the benthic biota data collected by ASR and the University of Waikato in 2003 before dredging, and by Bioresearches in 2017 after dredging within and adjacent to Area 1. Both comparisons assessed against the changes observed in the control area to the south of Area 1 surveyed in 2011 and 2017 by Bioresearches.

It should be noted that considerable useful data has been collected in the course of the surveys and studies listed above, but (as made explicit in the Bioresearches report) the absence of consistent sampling methods and the lack of a balanced before, after, control, impact (BACI) design among surveys means that robust statistical comparisons cannot be made between the successive surveys, although broad comparisons are possible.

The assessment of effects stated that:

"Apart from the wide spread, patchily distributed scallops, no additional important or sensitive species were identified in the benthic macrofauna of the sand mining Area 1 or the Control area, nor were any benthic macrofauna or communities of particular conservation value or significance identified."

However a subsequent statement in that report says:

"Horse mussels (Atrina zelandica) were present on the seabed during the 2003 survey of Area 1, but absent from subsequent surveys. A. zelandica are sensitive to small increases in suspended sediment concentrations, even for short term periods (less than 3 day periods) such as storm events. The disturbance of the seabed by dredging is likely to have increased the suspended solids concentrations in and around the area. This, combined with the seabed disturbance in the sand mining areas, is the likely the cause of the lack of A. zelandica in later surveys."

Horse mussels are known to provide various ecosystem functions (e.g. Morrison et al 2014) including:

- filtration and sequestering of sediment from the water column (improved water quality),
- supporting increased biodiversity by providing settlement surfaces for other benthic organisms and 3 dimensional structure on the seabed
- provide a nursery function for juvenile snapper and trevally in Northern New Zealand

Thus, the loss of horse mussel beds, if caused by the dredging activity, can be considered as a significant effect.

Apart from the loss of horse mussels in a portion of the dredged zone, effects of the sand dredging activity detected were more subtle changes in relative abundance of organisms such as an increase in percentage abundance of crustacea and gastropods while the percentage abundance of bivalves has decreased. Such changes observed in a mobile sand habitat would not be considered significant.

Cole (1998) conducted a field study comparing the community of seabed organisms present inside and outside of the track of the dredge immediately following dredging activity. He concluded that the dredge path provides for rapid recolonization by seabed organisms, so provided there is sufficient time between dredging of the same patch or area of seabed, there should only be limited impact on species abundance and diversity.

Effects on Finfish

The Bioresearches report (2018), considers how fish may potentially be affected by factors related to the operation of the sand dredge, including;

- noise effects
- entrainment
- sub lethal effects from suspended sediment
- food source reduction

That report states that noise effects on fish are expected to be transient and minor. Most fish will easily avoid entrainment (being sucked up) by the dredge head, except for fish living within the sediment such as opalfish (*Hemerocoetes monopterigius*). The percentage of fine sediments in the seabed of the sand extraction area is low (0 – 3%) so the amount of fine sediment discharged from the sand dredge that remains suspended will be relatively small and unlikely to adversely affect fish present. Studies indicate that there are only subtle changes in relative abundance of polychaetes, crustaceans and other benthic food sources for fish in dredged areas and that the dredge path is likely to be rapidly recolonised.

Marine Mammals

Marine mammals certainly do transit through the area proposed for sand extraction but there was no evidence that marine mammals are resident within the sand extraction site. The noise and turbidity effect produced by the dredging activity may result in avoidance of the immediate area while the dredge is operating but the intermittent operation of the sand dredge is unlikely to have significant adverse effects on any marine mammals present within the dredging area.

Effects on Coastal Processes

A report produced by BECA consultants (BECA 2019) states that assessments of the Depth of Closure for the Mangawhai-Pakiri embayment using specific observation of physical characteristics, and theoretical methods based on wave climate and sediment grainsize, identified an offshore limit of exchange between inner shelf and nearshore of 25 m water depth. Therefore, extraction of sand from seaward of this depth will not affect nearshore beach and coastal processes through the transfer of sediment to or from the active nearshore system which is much more mobile and responsive to swell and current conditions.

Conclusions regarding ecological effects:

In terms of the seabed biota, studies have shown that the seabed habitat in the area proposed for sand extraction is adapted to disturbance by natural hydrodynamic forces from periodic large swells or storm events, and that the seabed communities subjected to disturbance from the dredging activity may recover within a period of between 6 months to several years.

However there is evidence suggesting that effects of the sand extraction may have caused significant decline of horse mussel beds which are considered to have value as biogenic habitat.

This review concludes that effects of continued sand extraction on **benthic biota** are likely to be minor to moderate depending on the location and habitat affected.

Effects on finfish are likely to be no more than minor, and any effects on marine mammals should only be transient and the barge and dredging activity should be easily avoided by those animals.

Due to the distance from shore, most studies indicate that the proposed sand extraction will occur offshore from the widely accepted 25 m Depth of Closure beyond which effective interchange of seabed sediments between nearshore beach processes and the inner continental shelf is minimal. This means that extraction of sand from this offshore site will effectively be independent of the nearshore processes

The location of the offshore extraction zone is such that it will be largely independent of coastal sediment transport pathways identified for the Mangawhai-Pakiri embayment, and thus not likely to affect nearshore and beach processes. Monitoring of offshore sand extraction between 2003 and 2019 has not identified significant effects on bathymetry, geomorphology or coastal processes,

Overall in our assessment, ecological effects from the proposed dredging activity can be considered to be minor to moderate at most. In the context of this Cultural Effects Assessment, because of the connection of tangata whenua to the plants and animals residing in the ocean (te moana) and in and on the papamoana (the seabed), it may be considered that the level of ecological effect translates directly as a cultural effect. In this context the level of cultural effect of the seabed dredging activity proposed can be considered to be minor to moderate.

References

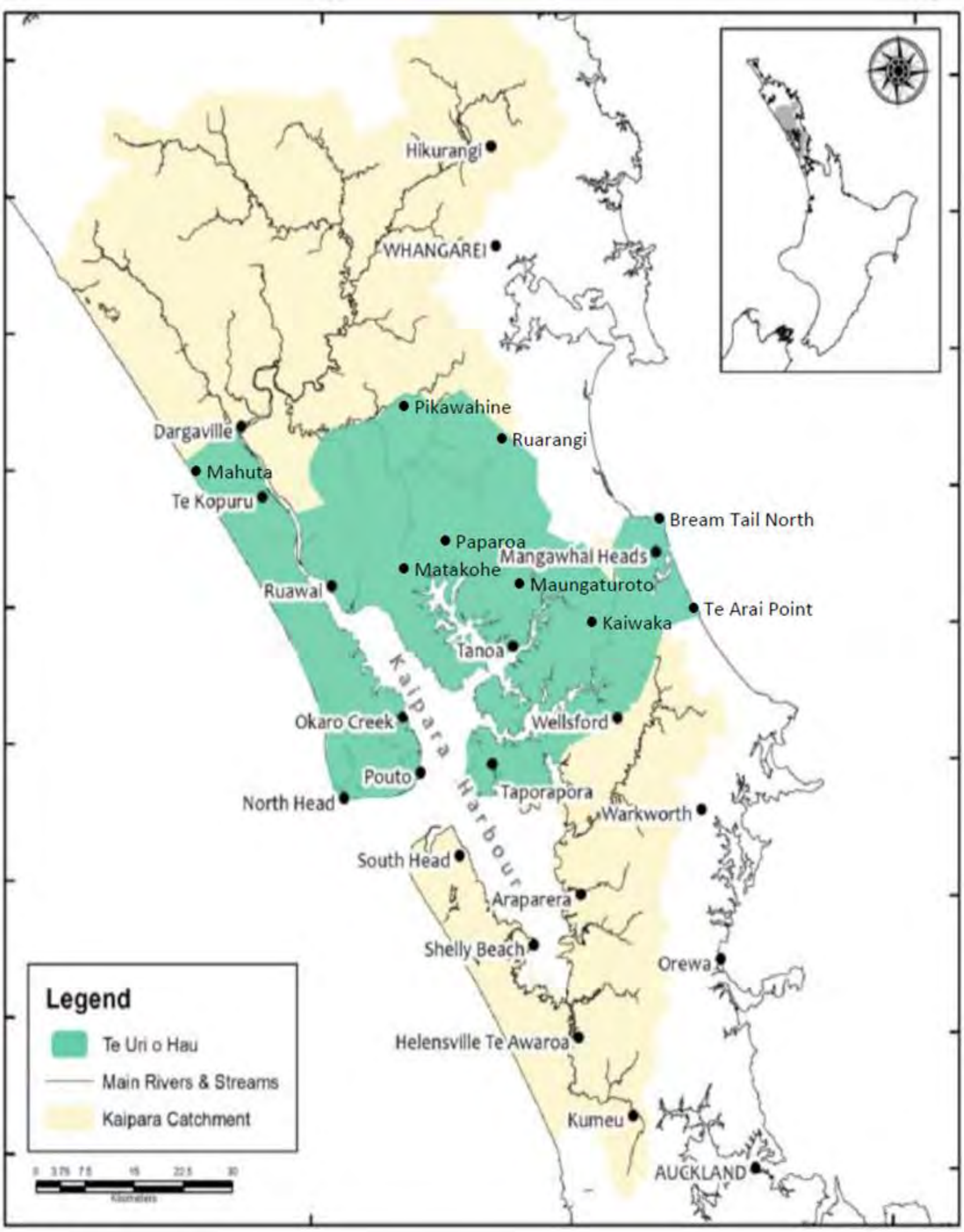
BECA (2019) Auckland Offshore Sand Extraction Site - Review of Coastal Processes Effects. Report prepared for Kaipara Ltd. 27 pp.

Bioresearches (2019). Assessment of Ecological Effects: Following Sand Extraction from the Auckland Offshore Sand Extraction Site. Report for Kaipara Ltd. pp 93

Cole, R. G., Stevenson, M (1998). Ecological effects of proposed dredging in Hauraki Gulf. NIWA Report KEL80401. Report for Kaipara Excavators Ltd

Morrison, M.A.; Jones, E.; Consalvey, M.; Berkenbusch, K. (2014). Linking marine fisheries species to biogenic habitats in New Zealand: a review and synthesis of knowledge. New Zealand Aquatic Environment and Biodiversity Report No. 1

Appendix 2: Te Uri o Hau Statutory Area of Interest (in green)



Appendix 3: Glossary

Battle of Te Ika a Ranganui	1825 Battle between Ngapuhi and Ngāti Whātua at Hakaru, Mangawhai
Hapū	Sub-tribe
Haumoewaarangi	Eponymous ancestor of Te Uri o Hau
Iwi	Tribe
Iwi authority	The authority that represents an iwi or hapū
Kaitiaki	To guard; to keep guardian over
Kaitiakitanga	Exercise of guardianship; and in relation to a resource includes the ethic of stewardship based on the nature of the resource itself
Kai Moana	Seafood
Karakia	Prayer
Koiwi	Human skeletal remains
Mahinga kai	Customary food /resources
Marae	Meeting house
Pa / Paa	Fortified settlement /village/site
Papatuanuku	Earth Mother
Tiro Rangatiratanga	Sovereignty, chieftainship, right to exercise authority, chiefly autonomy, self-determination, self-management, ownership
Ranginui	Sky Father
Rohe	Region of Interest
Mana whenua	People belonging to any particular place – indigenous people
Tane Mahuta	Guardian spirit of the forest
Tangaroa	Guardian of the sea
Te Uri o Hau	The descendants of Haumoewaarangi
Tupuna	Ancestor
Wāhi Tapu	Sacred areas/Reserved ground/cemetery
Wāhi Taonga	Sacred treasures
Wairoa	Water body

Appendix 4: References

BECA Group Ltd (2019). Auckland Offshore Sand Extraction Site – Sand Extraction Plan Set (4).

BECA Group Ltd (2019). Auckland Offshore Sand Extraction Site - Review of Coastal Processes Effects. Report prepared for Kaipara Ltd. 27 pp.

Bioresearches (2019). Assessment of Ecological Effects: Following Sand Extraction from the Auckland Offshore Sand Extraction Site. Report for Kaipara Ltd. pp 93

Cole, R. G., Stevenson, M (1998). Ecological effects of proposed dredging in Hauraki Gulf. NIWA Report KEL80401. Report for Kaipara Excavators Ltd

Clough and Associates (2011). Unpublished Archaeological Assessment for Deep Sea Dredging from Hauraki Gulf, Mangawhai Heads to Te Arai Point, Heritage Assessment.

Daniel Manders Beere Collection. Alexander Turnbull Library. Schoolhouse and wharenui, Te Arai, Rodney District. 1890 – 1899. Retrieved 14 May 2016. Wellington, New Zealand.

Department of Conservation. New Zealand Coastal Policy Statement 2010. Copyright November 2010, New Zealand Department of Conservation, PO Box 10420, The Terrace, Wellington 6143, New Zealand.

Enright, N. J and M. J. Anderson. Recent evolution of the Mangawhai Spit dunefield. 1988. *Journal of the Royal Society of New Zealand*. 18(4): 359-367

Environs Holdings Limited. (2011). Te Uri o Hau Kaitiakitanga o Te Taiao Environmental Management Plan. Environs Holdings Limited: 3/5 Hunt Street, Whangarei, Northland, New Zealand.

Haddon. P. Haley (1997). Unpublished Consultation Document with Tangata Whenua and Pakiri Land owners fir Deep Water Sand Project, Kaipara Excavators Ltd dated December 1997.

Journal of The Polynesian Society Volume 34 1925 > Volume 34, No. 134 > Te Toka-tu-whenua. A relic of the ancient Waiohua of Tamaki, by George Graham, p 175-179. Te Toka-Tu-Whenua. A Relic of the ancient Waiohua of Tamaki. By George Graham. http://www.jps.auckland.ac.nz/document/Volume_34_1925/Volume_34,_No._134/Te_Toka-tu-whenua._A_relic_of_the_ancient_Waiohua_of_Tamaki,_by_George_Graham,_pg175-179

Mabbett, H. (1977). The Rock and the Sky; *The Story of Rodney Count,* Wilson and Horton Ltd, Auckland.

Morrison, M.A.; Jones, E.; Consalvey, M.; Berkenbusch, K. (2014). Linking marine fisheries species to biogenic habitats in New Zealand: a review and synthesis of knowledge. New Zealand Aquatic Environment and Biodiversity Report No. 130. 156 p.

Minister of Conservation (2003). Coastal Permit RCAN0621 (ARC 20795). Auckland Regional Council Conditions of Consent for Kaipara Ltd, Signed by the Right Honourable Chris Carter, Minister of Conservation, PO Box 10420, The Terrace, Wellington 6143, New Zealand.

Office for Māori Crown Relations – Te Arawhiti. Marine and Coastal Area (Takutai Moana) Act 2011, Te Uri o Hau Settlement Trust Application MAC-01-01-143.

Osborne Hay (2019). Environmental Monitoring Management Plan (EMMP) for Kaipara Ltd, Auckland Offshore Sand Extraction site, Outer Hauraki Gulf Mangawhai – Pakiri, Northland, New Zealand.

Osborne Hay (2019). Assessment OF Effects on the Environmental for Auckland Offshore Sand Extraction site, Outer Hauraki Gulf Mangawhai – Pakiri, Northland, New Zealand.

Rigby, B., 1998. The Crown, Māori and Mahurangi, 1840-1881. Waitangi Tribunal, Wellington.

Marine and Coastal Area (Takutai Moana) Act 2011. NZ Government, Wellington, New Zealand: New Zealand Government. http://www.legislation.govt.nz/act/public/2011/0003/latest/DLM3213131.html

Te Uri o Hau Claims Settlement Act (2002). NZ Government, Wellington, New Zealand: New Zealand Government.

Treaty of Waitangi Act (1975). NZ Government, Wellington, New Zealand: New Zealand Government.

Turton, H. H., 1877b. Plans of Old Land Purchases. George Didsbury, Government Printer, Wellington.

Turton, H. H., 1878. Māori Deeds of Old Private Land Purchases in New Zealand, From the Year 1815 to 1840, with Pre-Emptive and Other Claims. George Didsbury, Government Printer, Wellington.

Waitangi Tribunal. 2006. Wai 674. The Kaipara Report. Legislation Direct. Waitangi Tribunal, Wellington.

Wright, W. (1996) Te Uri o Hau o Te Wahapū o Kaipara Mana Whenua report, Waitangi Tribunal Submission Wai 271.

Marine Mammal Management Plan (December 2020)

Introduction

This Management Plan sets out management practices and protocols in relation to certain aspects of the sand extraction activities proposed by McCallum Bros. Ltd **(MBL)** in the Mangawhai-Pakiri embayment. The objective of the Plan is to avoid or mitigate the possibility of adverse effects to marine mammals from sand extraction activities and during transit movements of the dredge vessel or vessels MBL will use to carry out extraction. The Plan is largely the product of assessments and recommendations in expert reports on the potential effects on marine mammals of sand extraction at Mangawhai-Pakiri; Clement and Johnston 2019 and 2020. The Plan is also, in part, a product of MBL's voluntary acceptance of a number of practices and protocols in relation to aspects of its operations that are beyond the scope of conditions that could otherwise be imposed on the consents sought. as in the case of effects during transit movements.

The following potential effects on marine mammals were identified:

1. Underwater noise generated by the dredging activity;
2. Vessel strike while dredging in the extraction area and in transit between the extraction area and the Port of Auckland;
3. Vessel lighting;
4. Entanglement in debris, plastic or other waste lost overboard.

In all cases, the likelihood of adverse effects arising from these factors was assessed as low or, in the case of the potential for vessel strike on Bryde's whales in the Hauraki Gulf during transit trips, moderate. Recommendations were made as to operational and management practices which would avoid or minimise such risks as might arise to nil, negligible or less than minor. These recommendations have been accepted by MBL. They are outlined below.

Underwater Noise

Underwater mechanical noise generated by the vessel or dredging equipment has the potential to adversely affect marine mammals in relation to their behaviour (orientation, surfacing and diving patterns), communications (type or timing of vocalisations) and physiological responses (e.g. auditory threshold).

To ensure that underwater noise levels are minimised, all dredging vessels and equipment will be maintained to high standards (e.g. lubrication and repair of winches, generators etc.). Noise suppression equipment such as mufflers and ventilation baffles will be maintained in good working order. Maintenance records will be kept up to date and made available to the Council on request.

Underwater noise levels of any new vessel or new and substantially different dredging equipment will be measured to ensure that they do not significantly exceed the underwater noise generated by the vessel or equipment being replaced.

Vessel strike

The risk of vessel collision with a marine mammal, and the likelihood that it will result in in severe injury or death, substantially increases at vessel speeds over 11 knots. For this reason, the principal risk of vessel strike arises in the Hauraki Gulf during transit trips to and from the extraction area rather than during dredging and other sand extraction activities. As the *William Fraser* has a top speed of 9.5 knots, and is small in comparison with most commercial shipping, the risk of vessel strike to most marine mammal species is low. The risk is higher for the Bryde's whale which tends to rest or remain not far below the water's surface (<13m) for long periods making sightings more difficult.

In order to reduce vessel strike in the Gulf, Ports of Auckland introduced in 2013 the Hauraki Gulf Transit Protocol for Commercial Shipping **(the Protocol).** The Protocol is voluntary but is widely observed. It includes a recommended speed limit of 10 knots, identified navigation routes, sighting and look-out procedures, avoidance manoeuvres and reporting requirements including the immediate reporting of whale sightings. The Protocol is credited with having reduced vessel strike on whales from an average of 2 per year before 2013 to nil in the last 7 years.

MBL accepted and has generally been operating in accordance with the recommendations of the Protocol since its introduction. However, the company is prepared to formalise its commitment to a somewhat more detailed suite of measures in this Plan. They are:

<u>General</u>

Train skippers and all crew in marine mammal identification and best practice for the conduct of personnel and vessels in proximity to marine mammals. Training is to include familiarisation with DOC guidelines (as per the Marine Mammals Protection Act 1978 and the Marine Mammals Protection Regulations 1992) for the avoidance of marine mammals and procedure following vessel strike or injury or mortality to a marine mammal.

<u>In Transit</u>

In accordance with or in addition to the requirements of the Protocol.

a) Appoint a designated lookout to scan ahead for whales while transiting Gulf waters during daylight hours;
b) Immediately report whales sighted to the Port of Auckland Harbour Control in accordance with the Protocol;
c) Maintain a log of all marine mammal sightings, the log to be available the Council and DOC on request;

d) The sightings log to include details of
    - date and time of sighting
    - species sighted (if identifiable)
    - heading and distance of the marine mammal from the vessel
    - the absence of sightings on any trip
    - observer name and designation
    - avoidance or mitigation action taken
    - weather and sea conditions

e) Report and record any incident which results in injury or mortality to a marine mammal to the Council and DOC as soon as practicable.

<u>At the extraction area and during dredging</u>

a) skippers and all crew to keep an eye out for marine mammals within the vicinity of the vessel;

b) maintain a log of all sightings of marine mammals within approximately 300 metres of the vessel;

c) the sightings log to include
    - date and time of sighting
    - dredge activity at the time of sighting (eg. preparing to dredge, dredging, departing site)
    - species sighted (if identifiable)
    - heading and distance of the marine mammal from the vessel
    - the behaviour of the marine mammal in relation to the vessel and dredge equipment after sighting
    - avoidance or mitigation action taken
    - weather and sea conditions
    - the absence of sightings during operations on any day

d) in accordance with DOC guidelines and, to the extent consistent with safety and operational requirements, take all reasonable action to avoid contact with any marine mammal which comes within close proximity to the vessel;

e) Report and record any incident which results in injury or mortality to a marine mammal to the Council and DOC as soon as practicable.

Vessel lighting

In addition to complying with any conditions of consent concerning vessel lighting, the minimum level of lighting consistent with regulatory, operational and safety requirements will be used to minimise the attraction of prey fish which might in turn attract marine mammals. Minimisation measures shall include appropriate shielding to control light spill.

Debris management

To avoid the risk to marine mammals of entanglement, debris and waste management practices will include:

a) Avoiding the use of continuous looping lines;
b) Avoiding free floating or slack lines and keeping lines under tension where practicable;
c) Secure storage and disposal of waste plastic and other wastes especially in high wind condition.

Management plan review and reporting

This Plan will be reviewed by MBL 12 months after the consent commences with a view to assessing its effectiveness and making any changes that might assist in better achieving its purpose. The review will be undertaken in consultation with the Cawthron Institute (Deanna Clement) and will extend to the operational and reporting processes which MBL has adopted in meeting the requirements of this Plan.

Consent Holder:	Kaipara Limited
Permit:	(TBC)
Site:	Auckland Offshore Sand Extraction Site
Report Title:	Environmental Monitoring Management Plan (EMMP)

Report Date:	15/09/2020
Report Version:	Final Draft

CONTENTS

GLOSSARY

ASEA	Approved sand extraction sub-area.
Management Cell	The sand extraction management areas defined on the approved plan (Beca Drawing 3233103-CA-011)
EMMP	Environmental Monitoring Management Plan
Extraction Area	The consented sand extraction area.
PSEA	Proposed Sand Extraction Area
PSEAR	Pre-Sand Extraction Assessment Report
SEMR	Sand Extraction Monitoring Report.

1. INTRODUCTION

Kaipara Limited holds Coastal Permit (TBC) (included in Appendix One) for sand extraction from the Auckland Off-Shore Sand Extraction Site (Appendix Two). The consent was granted on (TBC) and expires on (TBC). This consent allows for sand extraction of:

1 Up to 2,000,000m^3 of sand from the approved sand extraction areas over the life of the consent; and

2 Limited to 150,000m^3 of sand from approved sand extraction areas between the westward boundary of the sand extraction area (being the 25m isobath) and the 30m isobath every 12 months. There is no annual volume limit for the remainder of the Extraction Area.

Condition (TBC) of the Coastal Permit requires the preparation of an Environmental Monitoring Management Plan (EMMP). This is a living document which outlines the monitoring methodologies, the approved sand extraction areas (within the consented sand extraction site) and is the depository for the required Pre-Sand Extraction Assessment Reports (PSEAR) and Sand Extraction Monitoring Reports (SEMR) and any subsequent Recovery Monitoring Reports (RMR).

The first version of this EMMP is to be submitted to Auckland Council for certification. This certification was received on the (TBC). Section 2 of this EMMP records the subsequent updates to this EMMP.

Prior to sand extraction commencing in any management cell within the sand extraction site, a Pre-Sand Extraction Assessment Report (PSEAR) is to be undertaken. This PSEAR then identifies the approved sand extraction sub-areas (ASEA) (and including those management cells which it covers). The following sections of this EMMP are relevant to that process:

- Section Four outlines the Pre-Sand Extraction Monitoring methodology.
- Appendix Three includes the maps of those areas where a PSEAR has been undertaken and a PSEA confirmed.
- Appendix Four records the expected and actual sand extraction volumes from each PSEA.
- Appendix Five includes approved PSEAR.

As required under Condition (TBC) of the Coastal Permit, a Sand Extraction Monitoring Report (SEMR) is to be prepared within six months of the completion of each 500,000m^3 (+/- 20,000m^3) of sand extraction or every five years if monitoring has not been triggered. The following sections of this EMMP are relevant to that process:

- Section Five outlines the Sand Extraction Monitoring methodology
- Appendix Six includes any submitted SEMR

2. EMMP UPDATES

This section records the dates and nature of the EMMP updates. All updates, including any changes to monitoring methodology are required to be provided to Auckland Council for certification prior to any changes being implemented.

The inclusion of certified Pre-Sand Extraction Assessment Reports, approved sand extraction sub-areas and updating sand extraction volumes, do not require certification but are to be provided to Auckland Council so Auckland Council can maintain an updated copy of this EMMP.

All updates are also to be provided to Environs Holdings Ltd (for the Te Uri o Hau Settlement Trust) so that the Trust can also maintain an updated copy of this EMMP.

Update Number	Date of Update	Nature of Updated	Certification from AC required	Certification Date

Appendix Three includes the Site Extraction Plan showing those cells where:

1 Approved Sand Extraction Sub-Areas (ASEA) (green)

2 Cells where sand extraction has not been approved (red)

3. ENVIRONMENTAL MONITORING OBJECTIVES AND RATIONALE

The objectives of the environmental monitoring of the Auckland Offshore Sand Extraction Site are:

1 Pre-Sand Extraction Area Assessment Report

- To identify those sub-areas within a Proposed Sand Extraction Area suitable for sand extraction.
- To provide the baseline information for the subsequent sand extraction monitoring.

2 Sand Extraction Monitoring Report

- To identify over time the expected recovery period of an approved sand extraction sub-area after sand extraction has ceased.
- To identify any changes required to the sand extraction method and timing to further minimise any identified significant adverse effects on the environment.

3 Sand Extraction and Vessel Tracking Monitoring

- To retain a record of sand extraction volumes, locations (i.e. management cells), timing, water depth and sea conditions during extraction and confirmation that the permitted sand extraction volumes are being complied with.
- To identify when the sand extraction monitoring is required to be undertaken.
- To retain a record of where sand extraction has been undertaken and confirmation that sand extraction has only been undertaken within approved sand extraction sub-areas.

3.1 Monitoring Rationale

The monitoring rationale is based on a "cause" and "effect" basis, as well as an accumulative effects basis:

1. Cause is defined as sand extraction.

2. Effects are those changes in the bathymetry, bed forms, grain size or benthic macrofaunal communities in the sand extraction area that are greater than the natural fluctuations recorded at the control sites.

3. Accumulative effects are assessed after significant sand extraction volumes have been reached (the post-sand extraction monitoring).

3.2 Management Cells and Control Areas

To aid in the monitoring and management of the sand extraction, the consented sand extraction area has been divided into management cells orientated along-shore in the general direction of the dredging runs. The plan showing these cells is included in Appendix Two.

Two control areas will be established each covering the same depth range and be divided into similar management cells. One control area will be located adjacent to the south and the other control area will be located adjacent to the north. Both areas will be at least 1000 m long.

The plan in Appendix Two includes these control areas.

4. PRE-SAND EXTRACTION AREA ASSESSMENT

Prior to sand extraction commencing with in an approved sand extraction sub-area (ASEA) the following pre-sand extraction area assessment must be undertaken in accordance with conditions (TBC). This assessment is to be recorded in a Pre-Sand Extraction Assessment Report (PSEAR) which, based on that assessment, is to identify the approved sand extraction sub-area (ASEA) within the PSEA (and the management cells which it covers).

1. A multibeam hydrographic survey of the PSEA, immediately adjoining management cells and the similar (depth) management cells in the two control sites will be undertaken to achieve an accuracy of MB2 or greater. At the current time the survey is undertaken using using a WASSP WMB 3250 Multibeam and SMC IMU108 motion sensor mounted on the vessel Ten Seventy.

2. Within each management cell within the PSEA and at the similar (depth) control site cells, one sample location will be subjected to:

   a) Seabed imagery from a scale referenced drop camera, the images will be suitable to assess changes in fine scale (< 1m) bed forms, provide indications of larger biota and as confirmation of the multibeam interpretations.

   b) Seabed Ponar grab samples of sediment, will be subjected to a sediment textural analysis using an optical volume-based analysis.

   c) Seabed Ponar grab samples for biota, samples of at least 2 L, will be washed through 1.0mm sieves, live biota retained preserved and identified and enumerated.

3. Within every third cell offshore and every third cell along shore epibenthic dredge tows (with a minimum length of 200m) will be conducted to assess for the presence of larger biota.

The following areas will be excluded from the ASEA (owing to being unsuitable for sand extraction):

- The sediment in those areas having an average proportion of mud (grain size finer than 0.063 mm) exceeding 20% by volume; and/or
- The presence of significant benthic communities or benthic macrofauna (including shellfish beds).

5. SAND EXTRACTION MONITORING

To determine any potential changes in the seabed conditions or ecology as a potential result of longer-term accumulative causes, monitoring will be undertaken at the conclusion of the extraction of every 500,000m³ (+/- 20,000m³) of sand from the extraction area as a whole or every five years if monitoring has not otherwise been triggered. This will form the basis for the Sand Extraction Monitoring Report which is to be submitted to Auckland Council within six months of the requirement for the monitoring being triggered (condition TBC).

The following monitoring programme is to be undertaken:

(All sampling locations are to be approximately the same as those used in the PSEA (within 50m of each other) across the following sampling studies.)

Geomorphological Monitoring

1. A multibeam hydrographic survey of the PSEA surveyed as part of any previous PSEAR, the adjoining management cells and the similar (depth) management cells in the two control sites.

2. Single drop camera images will be recorded from:

   a) within each control area management cell;

   b) within each management cell of an ASEA where sand extraction has occurred within the 500,000m³ total which has triggered the monitoring; and

   c) every second cell within the PSEA where sand extraction has not occurred within the 500,000m³ total which has triggered the monitoring.

   The images will be used assess changes in fine scale (< 1m) bed forms and as confirmation of the multibeam interpretations.

Sediment Texture

1. Seabed Ponar grab samples of sediment will be collected from:

   a) One location within each control area management cell;

   b) One location within each management cell of an ASEA where sand extraction has occurred within the 500,000m³ total which has triggered the monitoring; and

   c) One location from every second cell within the PSEA where sand extraction has not occurred within the 500,000m³ total which has triggered the monitoring.

   Each sample will be subjected to a sediment textural analysis using an optical volume-based analysis.

Benthic Monitoring

1. Seabed Ponar grab samples of sediment will be collected from:
   a) One location within each control area management cell;
   b) One location within each management cell of an ASEA where sand extraction has occurred within the 500,000m³ total which has triggered the monitoring; and
   c) One location from every second cell within the PSEA where sand extraction has not occurred within the 500,000m³ total which has triggered the monitoring; and

   (d) epibenthic dredge tows will be conducted:
      (i) within the control areas at every third cell; and
      (ii) within the extraction area at every third cell offshore and third cell along shore.

Notes:

Samples will be collected with a Standard Ponar Grab sampler, with a sample area of 229 x 229 mm, and a bite depth of about 100 mm, producing sample volumes of 1 - 4 L. If the sample volume is less than 2 L the grab sample will be discarded and repeated.

Each grab sample will be sieved as soon as practicable by washing each whole sample through 1.0mm mesh sieves with seawater. All samples will be stored in a cool shaded location until sieving, which will occur within six hours of collection. The material retained on the sieves will be transferred to a polyethylene 'zip lock'-type bag, and the samples preserved in a solution of 10% glyoxal, 70% ethanol sea water solution, sealed, placed in a second polyethylene 'zip lock'-type bag and packed into a labelled plastic container, for transportation to the laboratory.

Prior to sorting, the samples will be rinsed through a 1.0 mm sieve with freshwater and placed in a white sorting tray. All organisms will be picked out of the samples and placed in a labelled vial of 70% ethanol solution prior to taxonomic identification, to the lowest taxonomic group possible and counting. Only animals with heads intact will be counted and identified.

In order to survey larger macrofauna that the grab sampler may not adequately sample the seabed photographs recorded in the geomorphological monitoring will be assessed for the presence of larger biota.

Each epibenthic dredge tow will consist of lowering a 600 mm wide dredge fitted with a 35 mm mesh bag, to the seafloor and towing it for approximately 200 m in an along shore direction. All species captured during each tow will be removed and immediately sorted. All larger macrofauna such as bivalves, hermit crabs and starfish, will be identified, photographed, counted, measured and returned to the sea.

<u>Reporting</u>

Within six months of the conclusion of this monitoring, the SEMR report (prepared by a suitably qualified specialist) is to be submitted to the Auckland Council.

This is to include an analysis on whether any significant sediment and biological change has occurred in the area surveyed as a result of the extraction of sand. That analysis will require comparison of the sediment texture and biological survey data gathered during the initial survey(s) for the PSEAR and from previous accumulative studies.

6. SAND EXTRACTION AND VESSEL TRACKING RECORDS

Under Conditions (TBC) the following information is to be retained and submitted to Auckland Council:

1. Daily records of the volume of sand loaded into the barge and the management cells where the sand has been extracted from;
2. Date, time, water depth and sea conditions during the period of extraction; and
3. The track of the sand extraction vessel shall be electronically recorded and mapped using a differential global positioning system ("DGPS").

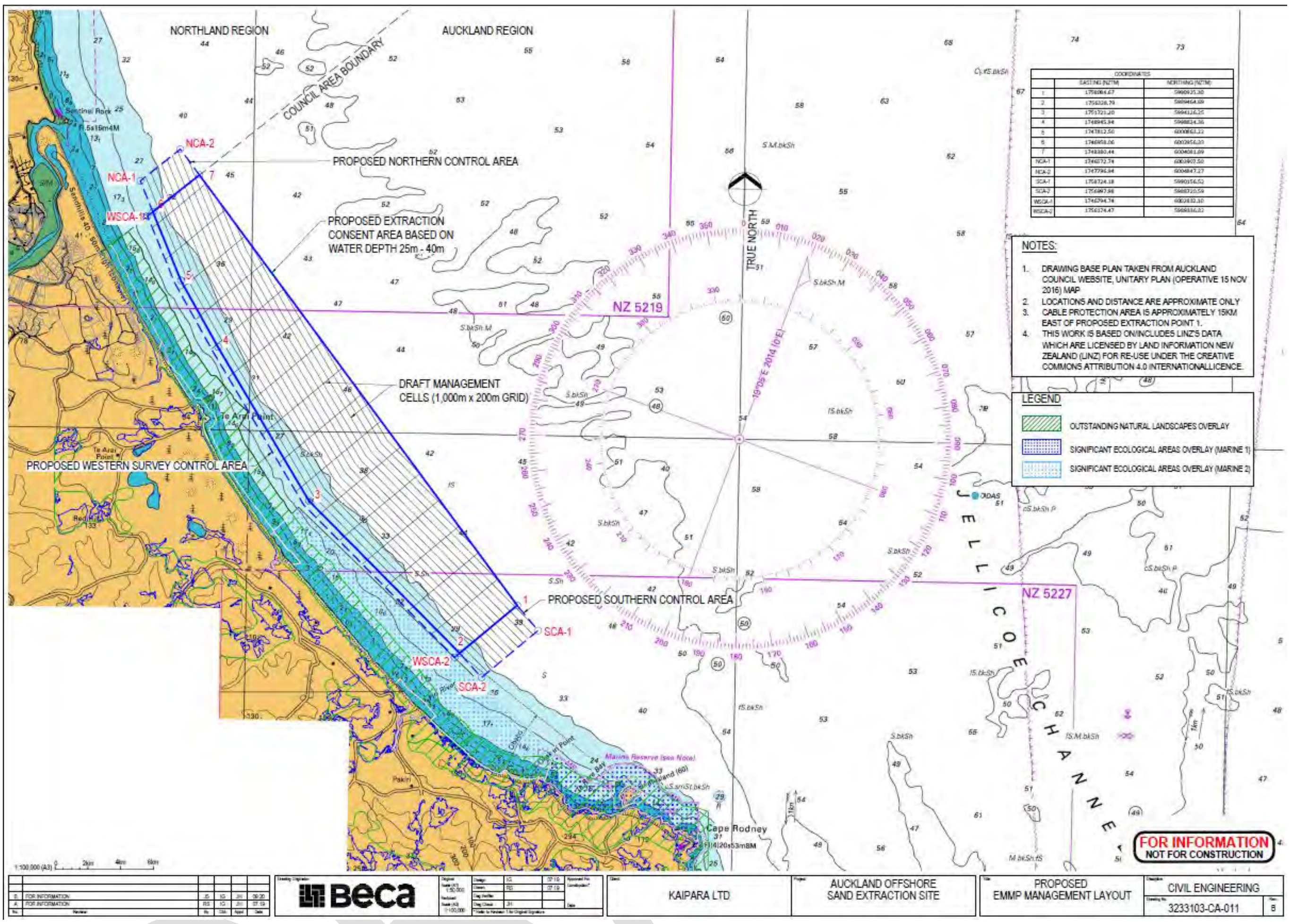
<u>Reporting Requirements</u>

The Consent Holder shall provide a copy of the above information and the vessel track map to the Team Leader North-West Monitoring, annually (commencing one year after the consent has been given effect to). The reporting form to be used is included in Appendix Seven.

If no sand extraction has occurred during that 12-month period then a statement to that effect will be provided to the Team Leader North-West Monitoring.

APPENDIX ONE: COASTAL PERMIT

APPENDIX TWO: CONSENTED SAND EXTRACTION AREA MAP (INCLUDING THE MANAGEMENT CELLS)



APPENDIX THREE: APPROVED SAND EXTRACTION SUB-AREAS MAP

APPENDIX FOUR: PROPOSED AND EXPECTED SAND EXTRACTION VOLUMES

Last Updated:

Management Cell	Date Sand Extraction Started	Date Sand Extraction Ceased	Estimated Sand Extraction Volume	Actual Sand Extraction Volume	Notes

APPENDIX FIVE: CERTIFIED PRE-SAND EXTRACTION ASSESSMENT REPORTS

APPENDIX SIX: SUBMITTED SAND EXTRACTION MONITORING REPORTS

APPENDIX SEVEN: SAND EXTRACTION INFORMATION RECORDING SHEET

ATTACHMENT 5

SUBMISSION SUMMARY TABLE

No	Name	Physical address	Issues raised	Relief sought	To be heard
1	David Otene Joyce	6 Karumba Street	1, 2, 3	A	Yes
2	Michael Bradford	17a Craven Street	1, 2, 3	A	No
3	Philippa Muller	15/161 Tara Road	1	A / B	No
4	Blake Zuill	8 Stanley Avenue	1, 2, 3	A	No
5	Josie Gritten	18a Blackswamp Road	1, 2, 3	A	No
6	Catherine Ryan	17B Craven Street	1	A	No
7	Jess Sodo	272 Scenic Drive	1, 2, 3	A	No
8	Jack Gordon	12a Phillip Parade	1	A	No
9	Alex flavell-Johnson	63 Lawrence road	1, 2, 3, 4, 7	A	Yes
10	Tony Baker for Mangawhai Board Riders / Independent	11 Spinifex Road	1, 2, 3, 4	A	Yes
11	Brendon van de lagemaat	13 Insley Street	1, 2, 3	A	No
12	Camilo Martinez	10 Cross Street	1	A	Yes
13	Freddie Cleverley	40 Wanganui Avenue	1, 2, 3, 4	A / B	No
14	Basil Rademakers	269 Mahurangi West Road	4	A	No
15	Nara Mailin TORRES RAMIREZ	269 Mahurangi West Road	4	A	No
16	Jude Burton	11 Wainoni Place	1	A	No
17	Steve Diprose	11 Fifth Avenue	1	A	Yes
18	Richard Ostmo Scott	17A Totara Road	1	A	Yes
19	Larissa Chelsea Long	28 Amorino Drive	1	A	No
20	Sinclair Dominikovich-Murray	22 Bannerman Road	1, 3	A	No
21	Mikaila Anne Hudson	111 Hauiti Drive	1, 2, 3, 4	A	No
22	River Jones Gardner	PO Box 300275	1, 2, 3, 4	A	No
23	Julia Carr	23 Devich Road	1, 2, 3, 5	A	No
24	Anna Victoria Hislop	989 Pakiri Road	1, 2, 3, 5	A	No

25	Ewa Bednarczyk	6A Helvetia Driveq	1	A	No
26	Peter Richards for Te Arai Boardriders	6 Charis Lane	1, 4	A	Yes
27	Michael Innes	10 Otahuri Crescent	1, 4	A	No
28	James Brunt	2/149J Glengarry Road	1	A	No
29	James McGirr	29 Cambrae Road	4	A	No
30	Dan Redman	31 Calypso Place	1	A	No
31	Joseph Hassell	494C Wainui Road	1, 2, 3	A	Yes
32	Oscar Gunn	31A Park Rise	1	A	No
33	Michael Ripley	8 Darroch Slope	1, 2, 3, 4	A	No
34	Vivien Kennerley	3 West Glade Crescent	1	A	No
35	Geer Iseke	PO Box 33928	1, 2, 4	A	Yes
36	Matthew Scott	67 Coal Hill Road	1, 2, 4	A	No
37	Gordon Phillip Hosking	PO Box 169	1	A	No
38	Michael Kevin George Long	1 Darmah Lane	1, 2	A	No
39	Andrew Martin	203A Titirangi Road	1	A	No
40	Ethan Carson-Groom	72 Island Bay Road	1, 2, 3	A	No
41	Ronen Lahav	13 Raleigh Road	1, 2, 3	A	No
42	Craig Mathieson	20A Vanesse Crescent	1, 4	A	No
43	Michael Guy Cook	11 Aldred Road	1	A	No
44	Margaret Estall	48 Lake Road	1	A	No
45	Kate Matheson	23 Devich Road	1, 2, 3, 4	A	No
46	Helen Smith	1025 Pakiri Block Road	1	A	No
47	Jerem McLay	35 Spinifex Street	1	A / B	No
48	Leslie Paul Francois	76 Simpson Road	1, 2, 4	A / B	No
49	Nick Molloy and Frankie Hofland for Pakiri Landcare	256 Pakiri River Road	1	A	Yes
50	Fraser Falconer	195 Rodney Street	1	A	No

51	Adriane Swinburn	121 West End Road	1	A	Yes
52	Alex McLean	Unknown	1, 4	A	No
53	Tom McCarthy	179 Landscape Road	4	A	No
54	Julie Marie Atkinson	798 Matakana Valley Road	1, 3	A	No
55	Grace Vujnovich	57 Tongue Farm Road	1	A	Yes
56	Zoe Gimring	166 Ashton Road	1	A	No
57	Diane Greenwood	873 Pakiri Road	1	A / B	No
58	Megan Browne	PO Box 186	1	A	No
59	Sammy Eric Dean Williams	15 Castledine Crescent	1	A	Yes
60	Zak Samuel Smith	Unknown	1, 2, 4	A	No
61	Sharon Amelia Williams	15 Castledine Crescent	1	A	Yes
62	Grass Esposti	15 Omaha Flats Road	1	A	No
63	Holly Stevens	2 Laguna Place	1, 2, 3, 4, 5, 6	A	No
64	Xavia Healey-Diaz	230 Govan Wilson Road	1, 3	A	No
65	Sharley Haddon	317 Rahuikiri Road	1, 2, 3	A	Yes
66	Lydia Green	951 Matakana Road	1	A	No
67	Kelly Norton	3 Bathgate Road	1	A	No
68	Nick Molloy and Frankie Hofland for Pakiri Landcare	256 Pakiri River Road	1, 2	A	No
69	Helen Jamieson	976 Matakana Valley Road	1	A	Yes
70	Helena Cullen	960 Whangaripo Valley Road	1, 2, 3, 7	A	No
71	Greg Askey	95 Haverstock Road	1, 2, 3	A	No
72	Frankie Hofland	256 Pakiri River Road	1	A	No
73	Fynn Pilkington	97 Lawrence Road	1, 2	A	No
74	Vanessa Askey	95 Haverstock Road	1, 2, 4	A	No
75	Chris Jamieson	976 Matakana Valley Road	1, 2, 3	A	No

76	Debra Seachfield	7 Pentland Avenue	1	A	Yes
77	Clifton Hart	6 Echo Valley Road	1	A	No
78	Fi Jamieson	256 Govan Wilson Road	1	A	Yes
79	Troy Williams	64 Kennington Park Drive	1,3, 8	A	No
80	Jo Ealand	95a Haverstock Road	1	A	No
81	Sasha Jamieson	PO Box 252	1, 2, 3	A	Yes
82	Cherie Williams	956 Pakiri Road	8	A	No
83	Corinne Callinan	12 Moir Street	1, 2, 3	A	No
84	Megan Bennett	Unknown	1, 2, 3	A / B	No
85	Alison Baird	39 Old Waipu Road	1, 2, 4	A	No
86	Tim Kidd	48B Valley Road	1, 2, 3, 4	A	No
87	Kirsty Millar	2 Sand Dune Lane	1	A	No
88	Lou Dennis	3/204 Main Highway	1, 2, 3, 8	A	No
89	Emma-jean Joyce	6 Karumba Street	1	A	No
90	Kathryn Williams	400 Chapel Road	1	A	Yes
91	Tangi Holt	5 Amanda Place	1, 2, 3, 8	A	No
92	Marama Rawhiti	28 Snowy Avenue	1, 8	A	No
93	Shaun Williams	15 Castledine Crescent	1, 8	A	No
94	Ariana Brown	400 Chapel Road	1	A	No
95	Moana Robson	24 Coral Crescent	1, 8	A	No
96	Kurt Williams	2 Tainui Street	1	A	Yes
97	Lisa Foden	187 Rahuikirir Road	1, 2, 3	A	No
98	Teagan Greenwood	873 Pakiri Road	1, 2, 3	A	No
99	Margaret Fishlock	356 Ocean View Road	1, 2, 3, 4	A	Yes
100	Robin Morris	32 Rustybrook Road	9	A	No
101	Glenys McBain	60 Cotton Lane	1, 2, 3	A	No

102	Vivienne Patricia Martens	77 Avocado Lane	1	A	No
103	David Reid	PO Box 303424	1, 2, 3	A	Yes
104	Susan Wiehahn	83 Devich Road	1, 3	A	No
105	Leigh Samuel	87 Angelo Ave	1, 2	A	No
106	Wayne Scott for Aggregate and Quarry Assc. of New Zealand	PO Box 10-668	11	C	No
107	Corlene Greenwood	71 Te Henga Road	1, 3	A	Yes
108	Svenja Gerth	15 Rona Avenue	1	A	No
109	Zofia Seymour	61 Waitea Road	1, 2, 3, 4	A	No
110	Melanie Scott	PO Box 206	1, 2, 3, 10	A	Yes
111	Greg and Davin Bradford	571 Rahuikiri Road	1, 2, 3, 10	A	Yes
112	Marion and David Pilmer	32 Cullen Street	1	A	No
113	Olivia Watkins	873 Whangaripo Valley Road	1, 2, 3	A	No
114	Alan Greenwood	10 Aries Place	1, 2, 3	A	No
115	Sue Clayton	44A Jack Boyd Drive	1, 2, 3, 5	A	Yes
116	Glenn Pope	11 Kedge Drive	1, 2, 3, 4, 10	A	No
117	Collin Juneau	1/32 Sydney Street	1, 2, 4	A	No
118	Maxwell Norman Rollo Kidd	56 Red Hill Road	1	A	Yes
119	Helen Margaret Parkes	PO Box 53	1, 2, 3	A	No
120	Keziah Gallagher	2 Tara Rod	1	A	No
121	Matthew Holdsworth	13 Northcoast Place	1	A	Yes
122	Tony Enderby	PO Box 139	1	A	No
123	Nichelle Phillips	5 Cumberland Street	1, 2, 3	A	No
124	Amanda Tunstall	10 Kauri Loop Road	1, 3	A	No
125	Gillian Kaye Cottrell	94 Avocado Lane	1, 2, 3	A	No
126	Courtney Henley-Smith	1281 Whangaripo Valley Road	1, 2, 3	A	No

127	Lorraine Brien	307 School Road	1, 2, 3, 4, 5, 7	A	No
128	Myles Williams	1 Rahuikiri Road	1	A	No
129	Devon Taylor	3 Domain Crescent	1	A	No
130	Troy Jordan Williams	260 Pakiri River Road	8	A	Yes
131	Kathrine Norman	964 Matakana Valley Road	1	A	Yes
132	Damon Clapshaw	779 Pakiri Block Road	1, 2, 3, 10	A	Yes
133	Martin Graham Johanson	113 Churchill Road	1, 3	A	No
134	Bridgette Rademakers	269 Mahurangi West Road	1, 2, 3, 4	A	Yes
135	Paul Shanks for Surfbreak Protection Society	PO Box 2	1, 2, 3, 4, 7	A	Yes
136	Kutumi Lefferts	20 Prime Road	1	A	No
137	Kara Stones	39 Kahurangi Lane	1, 2, 3, 4	A	No
138	Vanessa Vujcich	790 Durham Road Upper	1	A	No
139	Ryan Vujcich	PO Box 213	1, 2, 3, 4	A	No
140	Christopher Patterson	525 Te Arai Point Road	1, 2, 3, 10	A	No
141	Thomas Rutherford	PO Box 40	1, 2	A	No
142	Sherie Wikaira	40 Line Road	1	A	Yes
143	Isaac Reid	13 Salisbury Street	1, 2, 3, 10	A	No
144	Gary Iseke	PO Box 33928	1, 2, 3, 10	A	No
145	Jannine Wilkinson	63 Brigantine Drive	1, 2, 3	A	No
146	Arne Hilke	305/85 Daldy Street	1, 2, 3	A	No
147	Elizabeth Mulligan	12 Peterhouse Place	1	A	No
148	Heugh Kelly	PO Box 207	1, 2, 3	A	No
149	Hala Nasr	1/8 Knightsbridge Drive	1, 2, 3	A	No
150	Lisa Barrington	54 Douglas Street	1, 2, 3, 10	A	No
151	Paul and Louise Hendricks	19 Eveline Street	1, 2	A	No

152	Philip Faulkner	6 Towbridge Place	1, 2, 3, 10	A	No
153	Derek Moffat	7 Miccol Avenue	1, 2, 3	A	No
154	Ian Plater	16 Waiau Street	1	A	No
155	Rosie Davidson	103 Hamilton Road	1, 2, 3	A	No
156	Cherry Clements	1 Riverlea Drive	1, 2, 3, 10	A	No
157	Dell Thrasyvoulou	48 Moir Point Road	1	A	No
158	Kirsty Campbell	16 Mariposa Crescent	1, 2, 3, 10	A	No
159	Emily Parker	79 Bishop Lane	1, 2, 3, 10	A	No
160	Grant Montgomery	PO Box 18485	1, 2, 3, 10	A	No
161	Sarina Pitkethley	69B Bailey Street	1	A	No
162	Tom Bevan	38 Stanmore Road	1, 2, 3, 10	A	No
163	Michael John Hughes	23 Bramber Street	1, 2, 3, 10	A	No
164	Jane Ward	28 Mariposa Crescent	1, 2, 3	A	No
165	Scott Rooney	Dam Holme 11	1, 2, 3, 10	A	No
166	Ben Parsons	10 Egremont Street	1, 2, 3, 4	A	No
167	Robyn Minson	40 Jamieson Road	1, 2, 3	A	No
168	Jana Harrison	13 Telstar Place	1, 2, 3, 10	A	No
169	Catherine Cumming	43 Melrose Avenue	1, 2, 3, 10	A	No
170	Sara Kulins for I speak for the Sea	PO Box 404012	1, 2, 3, 10	A	No
171	Kirstie Hilke	305/85 Daldy Street	1, 2, 3	A	No
172	Kirsty Clapshaw	779 Pakiri Block Road	1, 2, 3, 10	A	No
173	Melissa Gunn	75 Verbena Road	1, 2, 3	A	No
174	Margie Thomson	175 Richmond Road	1, 2, 3, 10	A	No
175	Michael Gerard Sweetman	PO Box 252	1, 2, 3, 10	A	No
176	James Mackay for Mackay Management Ltd	310A Glenvar Road	1, 2, 3, 10	A	Yes
177	Maria Collins	240 Govan Wilson Road	1, 2, 3, 10	A	Yes

178	Mitchel Versey	2B Pohutukawa Avenue	1, 2, 3, 10	A	No
179	Donna Marie Flavell	PO Box 239	1, 2, 3, 10	A	No
180	Ben d'Anvers	27 Smale Street	1, 2, 3, 10	A	No
181	Joseph David Hassell	494C Wainui Road	1, 2, 3, 10	A	Yes
182	Laura Mash	22 Taioma Crescent	1, 2, 3, 4, 10	A	No
183	Seong Min Kim	49 Ellice Road	1, 2, 3, 10	A	No
184	Casey King	68 Ferry Parade	1, 2, 3, 10	A	No
185	Sue Clayton	44A Jack Boyd Drive	1, 2, 3	A	Yes
186	Teina Anitini Katipa Nimmo	34 Tarata Crescent	1, 2, 3	A	No
187	John Christopher Lawrence	7 Dingle Road	1, 2	A	Yes
188	John Alexander Bowman	20 Thomas Street	1, 2, 3, 10	A	No
189	David William Pallett for Allied Plumbing	26B Verbena Road	1, 2, 3, 10	A	No
190	Thomas Barker	38 Willjames Aveune	1	A	Yes
191	Sarah Marie Lindsay	22 Worker Road	1	A	No
192	Maria Gumennaya	148 Old Oneahi Road	1, 2, 3, 10	A	No
193	Hugo Clapshaw	779 Pakiri Block Road	1, 2, 3, 10	A	No
194	Kim Chamley	279 Konini Road	1	A	No
195	Robert Wade McLean	28 Bathgate Road	1	A	No
196	Katrina Rose Greenwood	28 Bathgate Road	1	A	No
197	Gabrielle Buchanan	2 Eastcliffe Road	1	A	No
198	Amanda Fenwick	13 Surfdale Road	1	A	No
199	Jenna Vaughn	56 School Road	1	A	No
200	Linda Bowman	26 Fairleigh Avenue	1	A	No
201	Charles Clark	10 Bell Road	1, 2, 3, 10	A	No
202	Sally Willis	11 Balmer Lane	1, 2, 3, 10	A	No
203	Pamela Beattie	98 Avocado Lane	1	A	Yes

204	Kyla Covic	42 Lloyd Avenue	1, 2, 3	A	No
205	Paul Thomson	57 Mountain Road	1	A	No
206	Christine Baines	3 Wimbledon Crescent	1	A	Yes
207	Christine Baines for Pakiri G Trust	3 Wimbledon Crescent	1	A	Yes
208	Hannah Goffeney	25 Anchorage Road	1, 2, 3, 10	A	No
209	Scott Millar for Hermpac	2 Sand Dune Lane	1	A	No
210	Clair McEntegart	844 Matakana Valley Road	1	A	No
211	Gabrielle Connor	11 Ward Road	1	A	No
212	Alaina George	57 Hauraki Road	1	A	Yes
213	Jannene Alexander	74 Selwyn Road	1, 2, 3, 10	A	No
214	Corrine Callinan	12 Moir Street	1, 2, 3, 10	A	No
215	Rhiannon Morris	20 Matheson Road	1, 2, 3, 10	A	No
216	Peter Nie for RJ Riverop	1 Anich Road	9	D	Yes
217	Carley Hammond	1683 Mangawhai Road	1, 2, 3, 10	A	No
218	Renata Blair for Evitan	45B Kitemoana Street	1, 2, 3, 8		Yes
219	Tessa Williams	619B Tara Road	1, 2, 3, 10	A	No
220	Heidi Parlane	9 Te Ruru Way	1, 3	A	No
221	Sachith Samaradiwakera Wijesundara	11 Jubaea Place	1, 2, 3, 10	A	No
222	Gabrielle O'Malley	3-23 Napier Street	1, 2, 3, 10	A	No
223	Kerry O'Malley	3-23 Napier Street	1, 2, 3, 10	A	No
224	Darren Mangelsdorf	7-23 Napier Street	1, 2, 3, 10	A	No
225	Allistair Shepherd	67 Wakapirau Road	1, 2, 3, 10	A	No
226	Erin O'Malley	7-23 Napier Street	1, 2, 3, 10	A	No
227	Ryan O'Malley	16 Shearwater Lane	1, 2, 3, 10	A	No
228	Rachel O'Malley	16 Shearwater Lane	1, 2, 3, 10	A	No

229	Michael Mackay	1604 Mangawhai Road	1, 2, 3, 10	A	No
230	Kyran Gillespie	70 Baylys Coast Road	1, 2, 3, 10	A	No
231	Samuel Dale Bradford	571 Rahuikiri Road	1, 2, 3, 10	A	Yes
232	Fiona Gorinas	34A Meadowbank Road	1, 2, 3	A	No
233	Grant Renall	85 Kings Road	1, 2	A / B	No
234	Susan Jones	8 Coastview Lane	1, 2, 3	A	No
235	Marcus Robins	1024A Takatu Road	1, 2, 3, 10	A	No
236	Stephen Mackay	206 Cames Road	1, 2, 3, 10	A	Yes
237	Vince Moores	Te Arai Lodge, 51 Lake Road	1, 2, 3, 4	A	No
238	Luke Holliday	2 Marellen Drive	1	A	Yes
239	Stefan Marks	22A Sunnyvale Road	1, 2, 3, 10	A	No
240	Ken Marment	125 Tara Road	1, 2, 3, 10	A	No
241	Nick Romanes	2-17 Baker Rise	1, 2, 3, 4	A	No
242	Jane Raybould	13 Burrell Road	1, 2, 3	A	No
243	Bryan May	PO Box 401144	1	A	No
244	-	-	-	-	-
245	Sioux Plowman	212 Staniforth Road	1, 2, 3, 10	A	Yes
246	J A Baretta Fernandes	Poplar Road	1	A	No
247	Marina Maccartney	PO Box 175	1, 2, 3	A	No
248	Sam Bowden	37 Braemar Road	1, 2, 10	A	No
249	Dylan Gera	9B Tainui Street	1	A	No
250	Susan Barbara Henry	63 Athol Place	1, 2, 3, 10	A	No
251	Vladislav Kholostiakov	23/4 Rotomahana Terrace	3	A	No
252	Emma Crowther	2 Peacock Street	1, 2, 3	A	Yes
253	Simon John Walkden	13 Township Road	1, 3, 8	A	No
254	Alastair Cameron	18 Woodley Avenue	1	A	No

255	Kelly Screen	Logan Road	1, 2, 3, 10	A	No
256	Erin Hall	48 Ferry Parade	1, 3	A	No
257	Karen Ramsay	3/50 Onepoto Road	1, 2, 3, 10	A	No
258	Christian Waddingham	8 Captains Close	1,3	A	No
259	Richard Mayne	55 Staniforth Road	1, 3	A	No
260	Kate Hewitt	309/35 Albert Road	1	A	No
261	Andrea Edwards	44 Onepoto Road	1, 2, 3, 10	A	No
262	Rhiannon Schroder	11 Quiet Street	1, 2, 3, 10	A	No
263	Briana	0910 Mangawhai	1	A	Yes
264	Nadja Parker	PO Box 278	1, 2, 3, 6,10	A	Yes
265	Maria Glavish	455 Pakiri Block Road	1	A	No
266	Clint Lewis	24B Simon Ellice Drive	1	A	No
267	Julianne de Wet	32 Stanley Avenue	1, 2, 3, 10	A	No
268	Jacinta Ryan for Jardenez Holdings Limited	15 Lawson Way	1	A	No
269	Katherine Norman	0972 Wellsford	1	A	Yes
270	Winnie Charlesworth	38 Paturoa Road	1	A	No
271	Marc Warrington	8 Fairsea Place	1, 2, 3, 10	A	No
272	Tim Parker	PO Box 278	1, 2, 3, 10	A	Yes
273	Mark I Perry	PO Box 180	1, 2, 3, 10	A	Yes
274	Maureen Perry	1482 Mangawhai Road	1, 2, 3, 10	A	No
275	Jeffrey Colin King	7 Simmonds Avenue	1, 2, 3	A	No
276	Colin Watts	3 de luen Aveune	1	A	No
277	Andrew Reid	9 Sea View Road	1, 2, 3, 10	A	No
278	Leesa Wright	5 Rooseville Mews	1	A	Yes
279	Josie Hendry	43/15 Puriri Street	1	A	No
280	Janette Miller	6 Clarence Road	1	A	No

281	Adam Minoprio	25 Lincoln Street	1, 2, 3	A	No
282	Brendon Lagemaat	13 Insley Street	1	A	Yes
283	Robet Paul Cameron	46 De Boer Lane	1	A	No
284	Paul Michael Gledhill	4 Kingwell Street	1, 2, 3, 10	A	No
285	Tim Merkens	93 Lancaster Road	1	A	No
286	Stephen Michael McDonald	1530 Mangawhai Road	1	A	No
287	Simon Hardley	37 Cheviot Street	1	A	No
288	Daniel Hawes	296 Molesworth Drive	1, 2, 3, 4	A	No
289	Grainne Tayu	17 Atkin Road	1	A	No
290	Michael Harkins	18 Kettlewell Drive	1, 2, 3, 4	A	No
291	John Darby	14A Ngatira Road	1	A	Yes
292	Arna Newman	368 Settlement Road	1	A	No
293	Faisal A	25A Cairngrom Place	1	A	No
294	Chanel Paul	353 Tara Road	1, 2, 3, 10	A	No
295	Olivia Rynne	15 Surrey Street	1	A	No
296	Daniel Tohill	364 Oneriri Road	1, 2, 3, 10	A	No
297	Tobi Muir	152 Bethells Road	1, 2, 3	A	Yes
298	Annie Baines for Taumata B - Tangata Whenua	74 Beechdale Crescent	1, 2, 8	A	Yes
299	Christine Hardy	105 Kohimarama Road	1, 2, 3, 10	A	No
300	Christine Bull	96 Rosetta Road	1, 2, 3, 10	A	No
301	David Henry	153 Mangawhai Road	1, 2	A	No
302	Glenn Altman	12 Martin Crescent	1	A	Yes
303	Rhys Gwilliam	7/38 Kitchener Road	4, 5	A	No
304	Sharie Sheffield	33A Titoki Street	1	A	No
305	KASM	PO Box 193	1, 2, 3, 4	A	Yes
306	Fryderyk Kublikowski	1/225 Ponsonby Road	1, 2, 3, 5	A	No

307	Daniel Gerrard	134 Hobsonville Point Road	1	A	No
308	Elysia Green	9 Kendale Drive	1, 2, 3, 10	A	No
309	Robyn Greenwood	116 Thompson Street	1, 2, 3, 10	A	No
310	James Hislop	38 Raymond Bull Road	1	A	No
311	Ivy Dickson	3/4 Miro Street	4	A	No
312	Peter Mayo for Mackenzie Mayo Limited	24 Moira Street	1, 2, 3, 10	A	No
313	Ben Jackson	93A Dickson Road	1, 2, 3, 10	A	No
314	Annette Moana Baines	74 Beechdale Crescent	1, 2, 3, 7, 8	A	Yes
315	Jessica Bluck	2/225 Ponsonby Road	1	A	No
316	Melanie Jackson	93A Dickson Road	1, 2, 3, 10	A	No
317	Louise Mary Fowler	31 Rangiwai Road	1, 2, 3, 10	A	No
318	Thomas Gibbs	1009 Beach Road	1, 2, 3, 10	A	No
319	Moira Adelaide Brown	301 Pakiri River Road	1	A	No
320	David Pilmer	32 Cullen Street	1, 2, 3	A	No
321	Mark Emmett Osborne	10 Bridgens Avenue	1, 3	A	No
322	Renay Kung	125 Cook Street	1	A	No
323	Sarah Quinlan	4 Moreton Drive	1, 2, 3, 10	A	No
324	Simonne Butler	27 Bathgate Road	1, 2, 3, 10	A	No
325	Dr Mels Barton	PO Box 60203	1, 2, 3, 10	A	No
326	Bridget O'Malley	13 Salisbury Street	1, 2, 3, 10	A	No
327	Oliver	0985 Rodney	1	A	Yes
328	Lorraine Tong	476 Te Arai Point Road	1, 2, 3, 10	A	Yes
329	Carolyn Reid	5 Ryle Street	1, 2, 3, 10	A	Yes
330	Ben Green	27 St Albans Avenue	1, 2, 3, 10	A	No
331	Toby Mangelsdorf	3-23 Napier Street	1, 2, 3, 10	A	No
332	Brent Pascoe	6 Waimiri Road	1, 2, 10	A	No

333	Arash Barzin	31 Taikata Road	1, 2, 3	A	Yes
334	Aaron McConchie	530B Kaiwaka Mangawhai Road	1, 2, 3, 4	A	Yes
335	Petrus van der Schaaf	476 Te Arai Point Road	1, 2, 3, 4	A	No
336	Andrew Turner for AWT	PO Box 62	1, 2, 3	A	No
337	Paul Reid	1409D Mangawhai Road	1	A	No
338	Jess Barnett	1 Amber Glen	1, 2, 3, 10	A	No
339	Trish Harkins	41 Ashwood Aveune	1, 2, 3, 4	A	No
340	Vanessa Mutu	97 West End Road	1, 2, 3, 10	A	Yes
341	Juan Miguel Hamber	12 Kanuka Place	1, 2, 3, 10	A	No
342	Dawson Mutu	97 West End Road	1, 2, 3, 10	A	Yes
343	Kelly Moanna Klink	PO Box 252, Port Fitzroy	1	A	No
344	Mark Estall	48 Lake Road	1, 2, 3, 4, 10	A	No
345	Kate O'Malley	51 Aldersgate Road	1, 2, 3, 10	A	No
346	Geoffrey MacRae	89 Granville Road	1, 2, 3, 10	A	No
347	Rowan Evan Smiley	264 Pakiri Block Road	1, 2, 3, 10	A	No
348	Marina MacRae	29 Muritai Road	1, 2, 3, 10	A	No
349	Tommy Foster Gustafsson	21 Allenby Avenue	1	A	No
350	Logan Batts	2/244 Victoria Avenue	1	A	No
351	Jacob Clarke Smith	182 Station Road	1, 2, 3, 10	A	No
352	Samantha MacRae	89 Granville Road	1, 2, 3, 10	A	No
353	Jody Greenleaf	689 Rahuikiri Road	1, 2,3	A	No
354	Marie Alpe	21 Ocean View Road	1, 2, 3	A	No
355	Danielle Norrie	10 Bayfield Road	1, 2, 3, 10	A	No
356	Richard Stuart Hodder	11/14 Fowlds Avenue	1	A	No
357	Te Maia Pihema	21 Rushden Terrace	1	A	No
358	Kevin Plumpton	644 Rahuikiri Road	1, 2, 3, 5, 6, 7	A	Yes

359	Maria King	62B Campbell Road	1, 2	A	No
360	David Reece	PO Box 4208	1, 2, 3, 10	A	Yes
361	Marama Gossage	362 Rahuikiri Road	1, 2, 3, 8, 10	A	No
362	Star Gossage	362 Rahuikiri Road	1, 2, 3, 7, 8, 10	A	No
363	Simon Pengelly	10 Armadale Road	1, 2, 3, 10	A	No
364	Elena Keith	32 Rawene Ave	1, 2, 3, 10	A	No
365	Nicky Spencer	437a Point Chevalier Road	1, 2, 3, 10	A	No
366	Louise Garlick	7 Hibiscus Avenue	1	A	No
367	James Carnie for Mangawhai Harbour Restroration Society Inc.	C/- Clendons, PO Box 1305	1, 2, 3	A	Yes
368	Sam Whiddett	53B Aberdeen Road	1	A	No
369	Adie Glover	75 Cemetry Road	4	A	Yes
370	Katherine Elizabeth Moss	13 Westmere Park Avenue	1, 2, 3, 10	A	No
371	Martin Charles Greenleaf	PO Bpx 34050	1, 2, 3, 4,	A	Yes
372	Michelle Gimblett	61 Millenial Way	1, 2, 3, 10	A	No
373	Catherine King	68 Coal Hill Road	1	A	No
374	Kelly Dean	1013 Great North Road	1, 2, 3, 10	A	No
375	Aroha Gossage	17 Arahia Street	1, 2, 8	A	No
376	Juliet Staveley Andrews	246 Pakiri River Road	1, 2, 3	A	No
377	Craig Peirce	16 Fairview Road	1, 2, 3, 10	A	No
378	John Andrews	246 Pakiri River Road	1, 2, 3	A	No
379	Jasmine Channing	14 Park Avenue	1, 2, 3, 10	A	No
380	Anita Toi	PO Box 401094	1, 2, 3, 10	A	No
381	Eric Bernard Allan	9B Aldred Road	1, 2, 3, 10	A	No
382	Elizabeth Allen for Whangateau Harbour Care Group	474 Leigh Road	1, 2, 3, 10	A	No

383	Sharnelle Came	356 Tomarata Valley Road	1, 2, 3, 10	A	No
384	Matt Bennie	50 Fairway Drive	1	A	No
385	Holly Boyd	80 Greys Avenue	1, 5	A	No
386	Maria Mugica	9 Sea View Road	1	A	No
387	Josephine Miller	777 Pakiri Block Road	1, 2, 3, 10	A	No
388	Scarlett Harradine-Stevenson	883 Scenic Drive	1	A	No
389	Hallam Holloway	30 Doment Crescent	1, 4	A	No
390	Richard Reid	50 Hauraki Road	1, 2, 3, 10	A	No
391	Jessie Stanley	2 Halston Road	1, 2, 3, 10	A	No
392	Ross Stanley	2 Halston Road	1, 2, 3, 10	A	No
393	Rebecca ter Borg	41 Waipani Road	1	A	No
394	Francesca Purcell	34 Tara Road	1, 2, 3, 10	A	No
395	Esther Herold-Sabbah	Muenchberger Str. 21a, 81549, Fasangarten	1, 2, 3, 10	A	Yes
396	Lulu Stanley	2 Halston Road	1, 2, 3, 10	A	No
397	Nathan Mark Purcell	34 Tara Road	1, 2, 3, 10	A	No
398	Bruno Stanley	2 Halston Road	1, 2, 3, 10	A	No
399	Rania Sabbah	Muenchberger Str. 21a, 81549, Fasangarten	1, 2, 3, 10	A	Yes
400	Richard Kidd	49 Vista Lane	1	A	Yes
401	Tai Flavell	37 Gill Avenue	1	A	No
402	Emily Williams	19 Sea View Road	1, 2, 3, 10	A	No
403	Rainer Togel	Grillparzer Str. 7, Bavaria	1, 2, 3, 10	A	No
404	Sonya Bloomfield	13 Kitchener Road	1, 2, 3, 10	A	No
405	Hannah Jensen	62 Celia Street	1, 2, 3, 10	A	No
406	Grace Crawshaw-McLean	11/14 Fowlds Avenue	1	A	No
407	Paul Sprinz	7 Albany Road	1, 2, 3, 10	A	No
408	Jack Halpin	16B Fancourt Street	1	A	No

409	Ryan Biddulph	1 Telford Avenue	1	A	No
410	Campbell Ivory	15 Parkfield Terrace	1	A	No
411	Gabriel Ritchie	73A Greenlane East	1	A	No
412	Shona Brock	9 the Heights	1, 4, 5	A	No
413	Karl Bayly	33 Summer Street	1	A	No
414	Georgia Warren	14 Stanley Avenue	1, 2, 3, 4, 5	A	No
415	Marco Ermerins	96A Cook Street	1	A	Yes
416	Mike Forbes	25 Buchanan Street	1	A	No
417	Francesca Hills	86 Dalwhinnie Parade	1	A	Yes
418	Veronica Bouchier for Taumata B - Marine and Coastal Act 2011 Application Group	456 Speargrass Flat Road	1, 2, 3, 8, 10	A	Yes
419	Sue Williams Warren	14 Stanley Avenue	1	A	Yes
420	Jamie Piggins	70 Seaview Road	1	A	No
421	Sam MacDonald	Kurow	1	A	No
422	Dave Tobeck	89A Verran Road	1	A	No
423	Todd Rice	9 Totara Road	1, 2, 4	A	No
424	Lisa Hopwood	9 Braemer Terrace	1, 2, 3, 10	A	No
425	Wendy Sheffield	292 Staniforth Road	1, 2, 3, 10	A	Yes
426	Greg Iremonger	313 Blind Bay Road	1	A	Yes
427	Ella Rei Mildren-Sheath	10 McKay Place	1, 2, 3, 4	A	No
428	Michael Marris	917 Pakiri Block Road	1, 2, 3, 10	A	Yes
429	George Bradshaw	29 Blockhouse Bay Road	4, 9	A	No
430	Gabrielle Therese Wilson	917 Pakiri Block Road	1, 2, 3, 10	A	Yes
431	Dorothy Power	4 Market Road	1, 2, 3, 10	A	No
432	Marie Alpe	21 Ocean View Road	1, 2, 3, 4, 5, 10	A	Yes
433	Louis Sammons	25G Garnet Road	1	A	No

434	Olivia Nash	323 Airfield Road	1	A	No
435	Wayne Greenwood	16 Halberg Street	1, 2, 8	A	Yes
436	Ashley Best	59 Woodcock Road	1	A	No
437	Not Stated	-	1	A	Yes
438	Danielle Warrington	-	1, 2, 3, 10	A	No
439	Hannah Jones	50 Union Street	1	A	No
440	Silke Rosemarie Pranzetti	9 Fairsea Place	1, 2, 3, 10	A	No
441	Phillippa King	698 Te Arai Point Road	1, 2, 3	A	No
442	Kourtney Kerr	175 Shakespear Road	1, 2, 3, 10	A	No
443	Bridget Asmus	36A Regina Street	1	A	No
444	Marty Jones	80A Mays Road	1, 2, 3, 10	A	No
445	David Hay	75 Carr Road	1, 2	A	Yes
446	Jordan Legros	45 Home Street	1, 2, 3, 4, 5	A	No
447	Ella Carvajal	20 Vanderbilt Parade	1, 2, 3, 10	A	No
448	Matthew Hay	39 Woodside Road	1, 2	A	Yes
449	Richard Tyler	913 Pakiri Block Road	1, 2, 3, 4	A	No
450	Semele Robertson	1102/18 Beach Road	1, 2, 3, 10	A	No
451	Sarah Hamilton	73 Jack Boys Drive	1	A	No
452	Rachel Wood	133 Forest Hill Road	1, 2, 3, 10	A	No
453	Stu Robertson	1102/18 Beach Road	1	A	No
454	Julia Helen Tyler	913 Pakiri Block Road	1, 2, 3	A	No
455	Cushla Leonard	21 Moir Point Road	1, 2, 3, 10	A	No
456	Tom McGarry	3/3 Waitati Place	1, 2, 3	A	No
457	Lyn Mayes	Private Bag 68908	1, 2, 3, 5, 8,	A	Yes
458	Phillida Reid	5 Ryle Street	1, 2, 3, 10	A	No
459	David Lourie	Cullen Road	1	A	Yes
460	Mike Newdick	400 Lake Road	1, 2, 3, 4	A	Yes

461	Simon Anderson	Seagate place	1	A	No
462	Andrea Ata	195 Whangaparaoa Road	1, 2, 3, 10	A	No
463	Ambrose William OMeagher	3 Third Avenue	1	A	No
464	Lydi Naguib	26 Onetaunga Road	1	A	No
465	Dana Graham	51 Spencer Road	1	A	No
466	Bjorn Hilke	19 Caldera Drive	1, 2, 3, 10	A	Yes
467	Talen Willox	22b Tui Glen Rd	1	A	Yes
468	Caitlin Gillespie	31 Carole Crescent	1, 2	A	No
469	Thomas Kibblewhite	5/28 Anvil Rd	1	A	No
470	Elizabeth Wright	9B Aldred Road	1, 2, 3, 10	A	No
471	Jayden Hodgson	1440 Statehighway 1	1	A	No
472	Nicole Barratt	6 Brussels Place	1, 2, 3, 10	A	No
473	Jason Dockery	12 Great North Road	1	A	No
474	Danielle Peffers	15 Kawerau Avenue	1	A	No
475	Hollie Vesetolu	Unit 3 9 Moana Avenue	1, 8	A	No
476	Caspian Smith	64 William Bayes Place	1, 2, 3, 10	A	No
477	Hannah Galbraith	204 Church Street	1	A	No
478	Ella Kohn-Taylor	90 Rattray Street	1	A	No
479	Emily Cayford	12 St Leonard’s Rd	1	A	No
480	Not Stated	99 Hurstmere Road	1	A / B	No
481	Crighton Bone	PO Box 308	1	A	Yes
482	Ramari Heperi	36 Curd Road	1, 2	A	Yes
483	Lidya Ke	16 Liverpool Street	1	A	No
484	Aria Zhang	110/1 Parliament street	1	A	No
485	Kristen Wonch	353 Motutara Road	1	A	No
486	Alexander Morison	21 Anglesea Street	1, 2, 3, 10	A	No
487	Andrew Krukziener	1341 Pakiri Road	1, 2, 3, 10	A	No

488	Louise Ford for Friends of Pakiri Beach	Floor19, 48 Emily Place	1, 2, 3, 4, 9, 10	A	Yes
489	Melvin Chong Wei Howe	110/1 Parliament street	1	A	No
490	Shayne Elstob for McCallum Bros. Ltd	PO Box 71-031	11	C	Yes
491	Howard Dixon	36 John Street	1	A	No
492	Hayley Gillespie	157b Paritai Drive	1, 2, 3, 4, 10	A	No
493	Hayley MacDonald for The Ngātiwai Trust Board	PO Box 1332	1, 2, 3, 8	A	Yes
494	Patrick Cable	16B Mayfield Rd	1	A	No
495	Lisa Cher	3-24 Beswick Place	1	A	No
496	Zach	607 Rosebank Road	1	A	No
497	Joel Taylor	21 Mont Le Grand Road	1, 2, 4	A	Yes
498	Rolf Hilke	9a Churchouse Road	1, 2, 3	A	No
499	Chris Ewart	22 Clive Howe Road	3, 4	A	Yes
500	Sophie Journee	1b Tetrarch Place	1	A	Yes
501	Arlin bowmast	50 Simon Ellice Drive	1, 5	A	No
502	Petrouchka Steiner-Grierson	1/62 Tenby Street	1	A	No
503	Daniel Mayer	19 Ewen Street	1	A	No
504	Jonathan Stuart Drucker	PO Box 166	1, 2, 3, 4	A	Yes
505	Fergus Mcconnell	20A Kipling Avenue	1, 2, 3, 10	A	Yes
506	Jerusha for Keep Wellsford Beautiful	401 Port Albert Rd	1	A	Yes
507	Alya Malcolm-Marx	53b Cemetery Road	1	A	No
508	Sophia Hawkins	100 St Stephens Ave	1, 2, 3	A	No
509	Feargus Mcconnell	20A Kipling Avenue	1, 2, 3	A	Yes
510	Olivia Haddon for Te Whanau o Pakiri	317 Rahuikiri Road	1, 2, 3, 8	A	Yes
511	Michael Gunson	211 Bucklands Beach Road	1, 2, 3, 4	A	Yes

512	Karthigan Paramananthasivam	43 Coniston Ave	1	A	No
513	Liz Eglinton	294 Jervois Rd	1, 2, 3, 10	A	No
514	Bram Smith for Kayasand Ltd	18 Mexted Place	9	A	Yes
515	Lee Skinner for AML Ltd	P.O Box 12749	11	C	Yes
516	Xiuqing Yu	19 Nicholls Lane	1	A	No
517	Gysbert William Sieger Denee	7 Grove Road	1	A	No
518	Ella Louise Fitzgerald Walton	22 Marine Parade	1, 2, 3, 10	A	No
519	Ben Bowden	37 Braemar Road	1	A	No
520	Gabriele Horn-Waldeck	22 Kahu Drive	1, 2, 3, 10	A	Yes
521	Emmylou Wellacott	PO Box 54066	1, 2, 3, 10	A	No
522	Tamara Bullock	30 Waitemata Road	1	A	No
523	Drew Tracey	68 McBreen Avenue	1	A	Yes
524	Katy Chamley	7 Vinceroy Place	1	A	No
525	Louise Ford for Te Arai South Partners Ltd	Floor19, 48 Emily Place	1,9	A	Yes
526	Louise Ford for Te Arai Residents Assc Inc	Floor19, 48 Emily Place	1, 9	A	Yes
527	Louise Ford for Tara Iti Golf Club	Floor19, 48 Emily Place	1, 9	A	Yes
528	Louise Ford for Te Arai South Holdings Ltd	Floor19, 48 Emily Place	1, 9	A	Yes
529	Louise Ford for Te Arai North Ltd	Floor19, 48 Emily Place	1, 9	A	Yes
530	Louise Ford for Te Arai Links	Floor19, 48 Emily Place	1, 9	A	Yes
531	Nathalie Nasrallah	18/1 Holly Street	1	A	No
532	Pieter Tuinder for Manuhiri Kaitiaki Charitable Trust	PO Box 117	1, 2, 3, 8	A	Yes
533	Basil Denee	19 England St	1	A	No
534	Luca Denee	7 Grove Road	1, 2, 3	A	No

535	Daniel Barbour	945 East Coast Road	1, 4, 5	A	No
536	Rosemarie Hilke	9a Churchouse Road	1,2 ,3	A	No
537	Indigo	P.O. Box 99	1	A	No
538	Christine Hardie and Ian Taylor	8 Civil Rd	1	A	No
539	Blake Johns	304 Bawden Road	1	A	No
540	George Mirfin	5 Anglem Way	1	A	No
541	Rupert Denee	7 Grove Rd	1	A	No
542	Louise Ford for Ngati Manuhiri Settlement Trust	Floor19, 48 Emily Place	1, 9	A	Yes
543	Magdalena Shaw	7 Onslow Road	1	A	No
544	Dannielle Cripps	37 Sunkist Bay Road	1	A	No
545	Katie Ruscoe	15 Emmett Street	1, 2, 3, 10	A	No
546	Thomas Christie for DOC	253 Chadwick Road	1, 2, 3, 7	A	Yes
547	Greg Jenks MNZM	44 Matua Road	1, 2, 3, 10	A	Yes
548	Timothy Walters for Bridgeman Concrete Limited	55 Crooks Road	11	C	No
549	Gabriel Ransom	5 Pakiri Road	1	A	Yes
550	Nicholas Beveridge for Royal Forest and Bird Protection Society of New Zealand Inc.	PO Box 108 055	1, 2, 3, 7	A	Yes
551	Yasmin Leavins	18D Hogan Street	1	A	No
552	David Kent	PO BOX 401136	1	A	No
553	Linda Lockie	Devonport	1	A	No
554	Roseanne Hay	112 Grange Road	1, 2, 3, 10	A	No
555	Daniel	11 Pompallier Terrace	1	A	No
556	Sammy Allan	23B Clifton Road	1	A	No
557	Maximilien Wolf	128 Anzac Avenue	1, 2, 3	A	No
558	Leonie vingoe	24 Tiri Road	1, 2, 3, 10	A	No

559	Roxenne Saavedra Montesclaros	19 Tyrico Close	1	A	No
560	Marianne Laetitia Bridge nee Denee	13 Owen Street	1	A	No
561	Imogen Bunting	7 Samuel Place	1, 2, 3	A	No
562	Marion Warrington	11 Fairsea Place	1, 2, 3, 10	A	No
563	Marc Warrington	Auckland	1, 2, 3, 10	A	Yes
564	Fleur Heaton	P.O. Box 62	1, 3	A	No
565	Jess McCabe	351 Clifton Rroad	1	A	No
566	Vegas McCarroll	273 Motutara Road	1, 2, 3, 10	A	No
567	Briana Woolnough	301a Ocean View Road	1	A	No
568	James Michie	46 Paice Ave	1	A	No
569	Peter	St Anne	1	A	No
570	Julia Morris	236e Tim Rd	1	A	Yes
571	Francesca Hofland	1 Sackville Street	1	A	Yes
572	Andrea Macfarlane for New Zealand Underwater Association	Unit 1/40 Mt Eden Road	1, 2, 3, 4	A	Yes
573	Keith Warrington	11 Fairsea Place	1, 2, 3, 10	A	No
574	Luis Diaz Gutierrez	3F, 39 Mackelvie Street	1, 2, 3, 10	A	No
575	Emma Gilkison	115 Waiwhetu Road	1	A	No
576	Jordan Cormack	5 Wrights Road	1	A	No
577	Adrian Davie	1/20 Church Road	1, 4, 5	A	No
578	Melissa Greene	119 King Street	1, 2, 3	A	No
579	Alice Ward-Allen for BLAKE	71B Landscape Road	1, 2, 3, 10	A	No
580	Ohad Peleg	Leigh Marine Laboratory, 160 Goat Island Road	1	A	No
581	Raman Patel	PO Box 200	1	A	No
582	Jessica Griffin	11a Pierce Road	1	A	No
583	Alexandria Laurie	16 Cameron Street	1, 2, 3, 4, 10	A	No

584	Anton Matthew John Carter	PO Box 276	1	A	No
585	Hayden Swaving	957 Whangaparaoa Road	1, 4	A	No
586	Angela Crabb	P.O. Box 124	1	A	No
587	Dan Steel	1 Ferndale Avenue	1	A	No
588	Rachael Jackson	PO Box 223	1	A	No
589	Asher Beagley-Steel	1 Ferndale Avenue	1	A	No
590	Andrew James Mclaren	17 Peel Street	1	A	Yes
591	Azar Harley Atkins	119 Percy Street	1	A	No
592	S M Bayer	1 Dawson Road	1, 3	A	No
593	Jaeshana-Lee Kira	Leigh	1, 3	A	No
594	Bruce Everard	37 Royal Terrace	1, 2, 3	A	No
595	Storm Mckenzie	PO Box 68	1	A	No
596	Jayden Gatherer	Warkworth	1	A	No
597	Flynn Rangi Medland	27 Hauiti Drive	1, 2, 3, 4	A	No
598	Jessie Chapman	302 Pakiri River Road	1, 8	A	No
599	Alisha	Warkworth	1	A	No
600	Archie Molloy	22 Rita Way	1	A	No
601	Josh Lambert	16 Red Hill Road	1	A	No
602	Lucy van Oosterom	24 Bathgate Road	1, 2, 3, 4 10	A	Yes
603	Kruz	Wellsford	1	A	No
604	Saskia Wigman	14 Pioneer Crescent	1, 2, 3	A	No
605	Rebecca Evans for YogawaveNz	64 Tomarata Road	1	A	No
606	Dillon Patrick John Smith	521 Woodcocks Road	1	A	Yes
607	Ryan Stam	6b Clifton Lane	1	A	No
608	Treye Liu	24 Bathgate Road	1, 2, 3, 4, 10	A	No
609	Rebecca Leathem	45a Church Street	1	A	No

610	Toni Mekkelholt	65 Kakapo St	1, 2, 3, 8	A	No
611	Breila Mia Straka	Rodney	1	A	No
612	Rika Ozaki	222 Beach Road	1, 2, 3	A	No
613	Lauren Brittain	3/135 Shakespeare Road	1	A	No
614	Cushla Salt	413 Whangaripo Valley Road	1	A	Yes
615	Claire Hamilton	71 Grange Street	1, 2, 3	A	No
616	Pim Slagman	142 Constable Road	1, 2, 3, 10	A	No
617	Nathan Strong	PO Box 69	1	A	Yes
618	Julie Vice Glamuzina	PO Box 77	1, 2, 3, 10	A	Yes
619	Grace Ballinger	939 East Coast Road	1	A	No
620	Dharlia Lynch	14 Motutara Road	1, 2, 3, 4, 10	A	No
621	Nick Pitcher	309B Beach Road	1	A	No
622	-	-	-	-	-
623	Ingrid carter	562 ocean view rd te arai	1, 2, 3	A	No
624	Felicity Hopkinson	14 Elizabeth Rd	1	A	No
625	Bradley Thomas Walton	22 Marine Parade	1, 2, 3, 10	A	No
626	Alexander Jack Crook	110 Kennedy road	1, 2, 3, 10	A	No
627	Felice Karuna	PO Box 313	1, 2, 3, 10	A	No
628	Sarah Taylor	15 Tizard Road	1	A	No
629	Melissa Crockett-Joyoue	PO Box 103	1	A	No
630	Aaron John Muir Taylor	15 Tizard Road	1	A	No
631	Kiri Binnersley	PO BOX 166	1	A	Yes
632	Frances Dickinson	PO Box 20	1, 2, 3	A	No
633	Doria Joyoue	PO Box 103	1, 3	A	No
634	Arapeta Ashton	504 Leigh road	8	A	Yes
635	Matthew Fultz Ashton	504 Leigh road	8	A	No

636	Melanie Eade	1193 Pakiri Rd	1, 3	A	No
637	Edith Ashton	504 Leigh road	8	A	No
638	Carl	Pakari	1	A	No
639	Mervyn Ashton	504 Leigh road	8	A	No
640	Manda Giddens	3/39 St Peter's st	1	A	No
641	Sophie Randrup	33 Martins Bay Road	1	A	No
642	Donald Ashton	504 Leigh road	8	A	No
643	Frances Magness	1057A Dominion Rd	1, 2, 3	A	No
644	Albert Ashton	504 Leigh road	8	A	Yes
645	Richard Foster	12 Korama Lane	1, 3, 5	A	No
646	Sharleen Greer	553 Leigh Rd	1	A	No
647	Tureya Healey-Diaz	35 Goat Island rd	1	A	No
648	Caleb Ripley	8 darroch slope	1	A	No
649	Jacqueline Stevens	47 Grand View Road	1	A	No
650	Michael Tyler	44a Campbell Rd	1, 2, 3, 10	A	No
651	Daniel Evan May	32 Whenuapai Drive	1	A	No
652	Katrina Williams	1 Rahuikiri road	1	A	No
653	Sarah Waller	99 Ashton Rd	1, 2, 3	A	No
654	Sam Clark	698 Te Arai Point Road	1, 2, 3, 4	A	Yes
655	Jonathan Harvey Egdell	26 Te Wiata Place	1, 2, 3, 10	A	No
656	Brian Tozer Came	5 Te Arai Point Road	1, 2, 3, 4, 6 10	A	Yes
657	Olivia Tait	Student of Pakiri School	1, 2, 3	A	No
658	Indigo Eade	Student of Pakiri School	1, 2, 3	A	No
659	Tommy Ward	Student of Pakiri School	1, 2, 3	A	No
660	Stanley Briggis	Student of Pakiri School	1	A	No
661	Louis Ward	Student of Pakiri School	1, 2, 3	A	No
662	Christine Sheehy and Simon Ward	56 Point Wells Road, Warkworth	1, 2, 3	A	No

Key:

- For those wishing to be heard “-” means not stated
- Submissions in *italics* identify late submissions received

ATTACHMENT 6

SPECIALIST MEMOS

Technical Memo –Specialist Unit

To:	Colin Hopkins, Planning Consultant (MPlanPrac)
CC:	Alan Moore, Principal Specialist
From:	Ashishika Sharma, Coastal Specialist Kala Sivaguru, Senior Coastal Specialist
Date:	14 January 2021

1.0 APPLICATION DESCRIPTION

Application and property details

Applicant's Name:	Kaipara Limited
Activity type:	Sand Extraction
Purpose description:	Extraction of 2,000,000m^3 of sand from between the 25m and 40m isobath over an approximate area of 44km^2, with no more than 150,000m^3 per any 12-month period between the 25m and 30m isobath
Application number:	CST60343373
Site address:	Offshore Mangawhai - Pakiri

2.0 PROPOSAL, RULES AND SITE DESCRIPTION

2.1 Proposal and Rules

The applicant, Kaipara Limited, has applied for resource consent to extract up to 2,000,000m^3 of sand from between the 25m and 40m isobath over an approximate area of 44,126,536m^2 with no more than 150,000m^3 per any 12-month period between the 25m and 30m isobath. Consent is sought for a 20-year duration.

The applicant has also proposed two control areas, north and south of the extraction area, specifically for monitoring purposes. While most of the northern control area falls into the Northland Regional Council boundary, a small part falls within the Auckland Council boundaries.

The proposed sand extraction area has the following co-ordinates:

Point	NZTM	WGS84

	Easting (m)	Northing (m)	Latitude (D.D)	Longitude (D.D)
1	1758084.67	5990925.30	-36.21360013	174.75868134
2	1756328.79	5989464.69	-36.22704777	174.73944691
3	1751721.20	5994126.25	-36.18577335	174.68729716
4	1748945.94	5998824.36	-36.14386535	174.65555434
5	1747812.50	6000863.22	-36.12566455	174.64257762
6	1746958.06	6002956.33	-36.10688598	174.63269451
7	1748380.44	6004081.89	-36.09652603	174.64827925

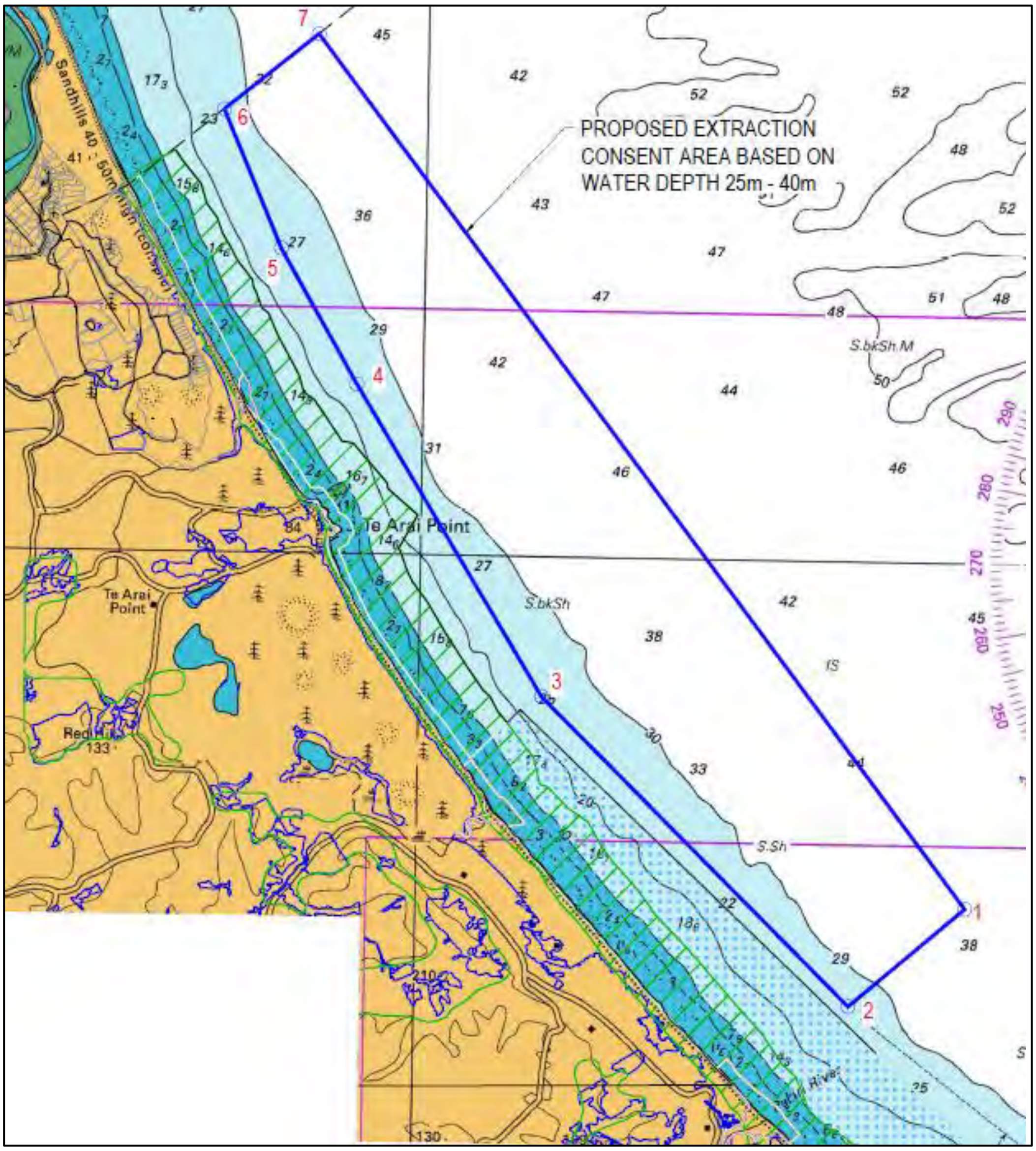


Figure 1. Proposed offshore extraction area marked in blue solid line.

The proposed activities are:

Activities:	AUP (OIP) Rules:
Sand extraction of up to 2,000,000m^3 .	Rule F2.19.4 (A28): Coastal marine area disturbance for mineral extraction (excluding petroleum) in a GCM Zone is Discretionary Activity.
Northern (in part only) and Southern control area monitoring.	Rule F2.19.4 (A37): Coastal marine area disturbance that is not otherwise provided for in a GCM Zone is Discretionary Activity.
Discharge of excess sea water, shell and sand associated with extraction.	Rule F2.19.7 (A62): Discharges which are not subject to another rule in the Plan, and not subject to the Resource Management (Marine Pollution) Regulations 1998, that comply with the permitted activity standards in a GCM Zone is Permitted Activity.

A description of the proposal is contained in the application report (and supporting documents) titled:

- Resource Consent Application and Assessment of Effects on the Environment for the Continuation of Sand Extraction, Auckland Offshore Sand Extraction Site. Prepared for Kaipara Limited by Osbornehay Resource management Practice, July 2019.

- Auckland Offshore Sand Extraction Site – Review of Coastal Processes Effects. Prepared for Kaipara Limited by Beca Limited, July 2019.

- Assessment of Ecological Effects: Following Sand Extraction from the Auckland Offshore Sand Extraction Site. Prepared for Kaipara Limited by Bioresearches, December 2017.

Plan:

- Auckland Offshore Sand Extraction Site, Kaipara Limited. Existing and Proposed New Operating Area. Prepared by Beca, July 2019.

Proposed Sand Extraction Methodology

The applicant proposes to use a trailer suction dredge from a motorised barge (the current vessel is the Coastal Carrier). The applicant proposes to replace this vessel with a new self-propelled barge, the William Fraser.

A trailer suction dredge involves pulling a dredge drag head along the seafloor behind the vessel The nature of the drag head is such that it disturbs the surface sand to a depth of around 30cm.

Suction is created via a sand pump that is halfway up the suction pipe between the seafloor and the surface. Water entering the drag head takes sand with it to create a slurry which is pumped through two flume pipes that have wire screens positioned on the bottom half of the flume pipe. The sand and water slurry passes over these screens with a portion passing through the screens into the hopper on board the vessel. Oversized material continues along the flume pipe and is ejected from the end of the flume pipe over the side of the vessel.

It takes approximately two hours to fill the barge before the barge travels back to Auckland to off-load the sand. The vessel is tracked during the dredging operation by DGPS.

The current vessel transverses approximately 10km to fill a hopper with each track approximately 0.7m wide, 0.3m deep and triangular in shape.

A new barge is to be shortly commissioned. It will likely have a transverse distance of 3km to fill a hopper with each track approximately an average of 1.8m wide, an average of 30cm depth of sand extraction, a more rectangular extraction track, and a speed of approximately 1.2kn, with a volume of 1600m^3 extracted, and a hopper capacity of 1400m^3. The exact depth which the new vessel can undertake sand extraction has not yet been confirmed but is expected to be in the order of down to 30-35m. An outer extraction area depth of ~40m is proposed in the event that changes in technology allow for efficient sand extraction in this depth in the near future.

<u>Environmental Monitoring Management Plan (EMMP)</u>

The applicant proposes to manage the extraction activity and associated monitoring through an Environmental Monitoring Management Plan (EMMP). It has submitted a draft EMMP with the application. It is noted that the existing extraction consent (20795) requires an EMMP. The proposed EMMP is more detailed than the EMMP under consent 20795.

The draft EMMP outlines the monitoring methodologies, sand extraction areas (within the sand extraction site) and is the depository for the required Pre-Sand Extraction Assessment Reports (PSEAR) and Sand Extraction Monitoring Reports (SEMR).

There are three components to the proposed monitoring programme. These are:

i) Pre-Sand Extraction Area Assessment.

ii) Sand Extraction Monitoring

iii) Sand Extraction and Vessel Tracking Monitoring.

Prior to sand extraction occurring within any area, a Pre-Sand Extraction Assessment is proposed to be undertaken. This will:

- identify those sub-areas within a Proposed Sand Extraction Area suitable for sand extraction.

- exclude areas from the sand extraction sub-area to avoid stony corals and significant shellfish beds; and

- provide baseline information for the subsequent sand extraction monitoring.

Those areas identified as being suitable for sand extraction are referred to as Approved Sand Extraction Sub-Areas (ASEA) and sand extraction is only to be permitted in those areas. The EMMP would include an updated plan showing those areas within the consented sand extraction area which are approved sand extraction sub-areas.

<u>Management Cells</u>

The proposed sand extraction area and the two control areas are to be divided into management cells. These management cells would be the basis for controlling maximum volumes of sand extracted in any one area within a twelve-month period (being 40,000m^3 per cell) and would also be used for monitoring (Figure 2). Management cells are approximately 20ha in area, being 1000m x 200m.

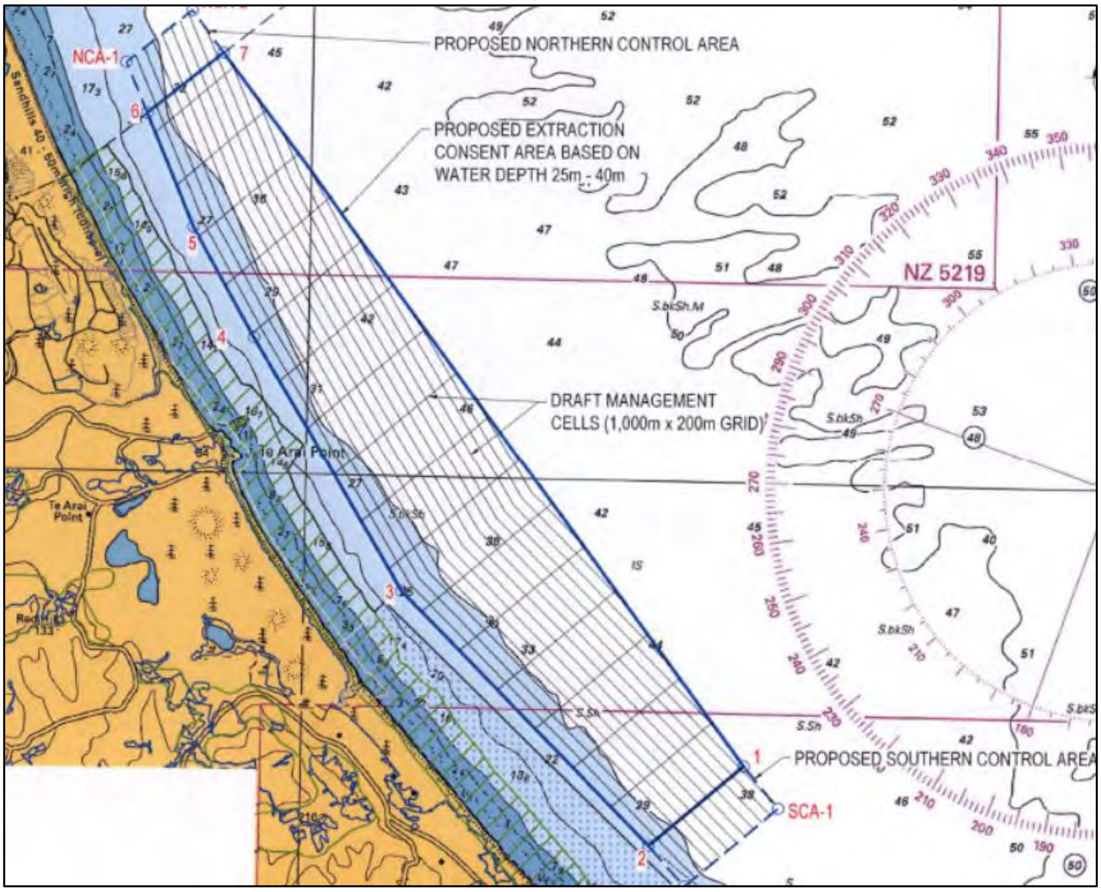


Figure 2. Proposed EMMP layout plan, showing the area of extraction, management cells and the two control areas.

Each of the management cells will have to undergo the pre-sand extraction assessment and be approved as an Approved Sand Extraction Sub-Area (ASEA) before extraction can commence.

2.2 Site Description

The Mangawhai-Pakiri embayment is a sandy, semi exposed beach system of the east coast, of the Auckland region. It is backed by an extensive dune complex 40 to 50m high, extending 350 to 1200m inshore of the active beach.

The landward side of the proposed sand extraction site (i.e. the western boundary) is limited to a minimum depth of 25m while the depth of the seaward limit is approximately 40m.

The southern extent of the sand extraction area is approximately 3.8km from the northern boundary of the Cape Rodney to Okakari Point (Leigh) Marine Reserve. The 25m isobath, or the landward extent of the proposed extraction area, is between 1.2 to 2km from MHWS.

Figure 3. Pakiri-Mangawhai embayment showing the approximate proposed offshore extraction area in red.

Under the Auckland Unitary Plan- Operative in Part (AUP: OiP) the site is:

- General Coastal Marine Zone

A Significant Ecological Area Marine 2 is located approximately 240m landward of the proposed sand extraction area.

An Outstanding Natural Landscapes Overlay – Area 22, Pakiri Beach and a High Natural Character overlay - Area 48 Te Arai and Pakiri Beach is located approximately 170m landward of the proposed sand extraction area.

A Significant Ecological Area – Marine 1 commences approximately 4.2km southeast off the eastern most extent of the proposed sand extraction area.

Two significant surf breaks; Te Arai Beach and Pakiri Beach, commence approximately 1km landward of the proposed sand extraction area. The surf breaks extend some 1.5km south of Te Arai Point and 4km to the north of Te Arai Pont. There are four other significant surf breaks in proximity to the extraction area.

<u>Existing Resource Consents</u>

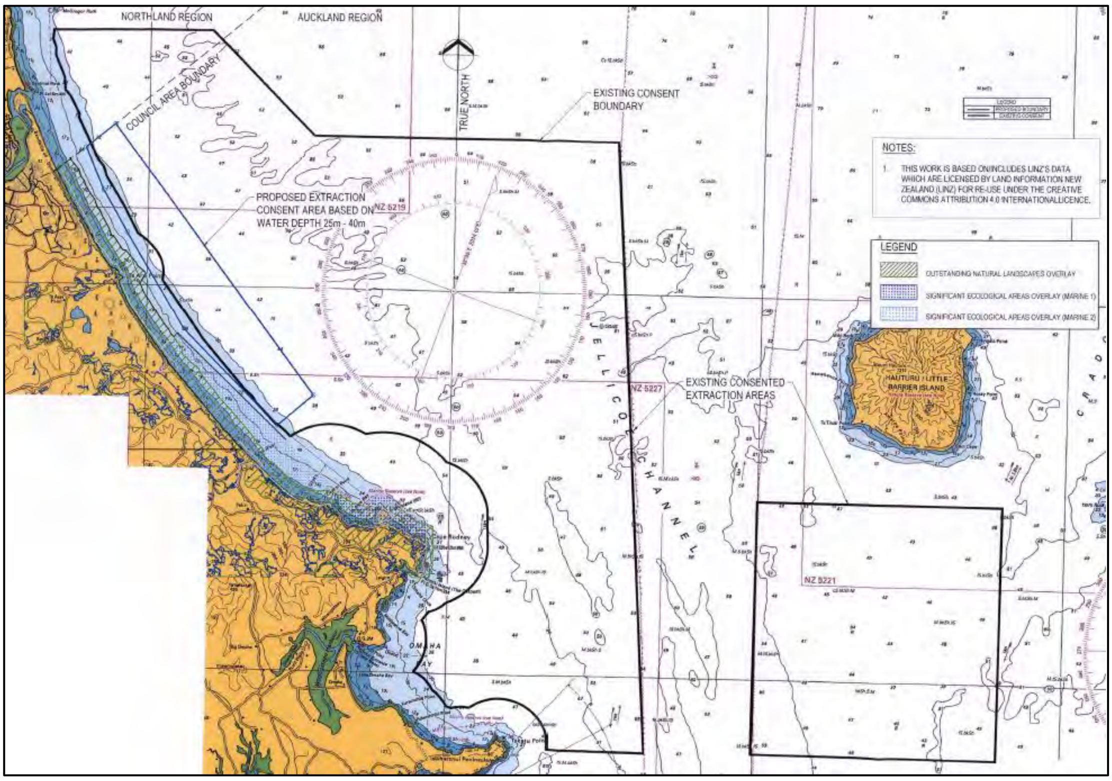


Figure 4. Chart showing the extraction area under the coastal permit 20795 (black line) and the proposed extraction area (blue line).

Kaipara Limited currently holds resource consent 20795 (granted February 2003, expiring February 2023) to extract up to 2,000,000m^3 of sand from the seabed with an extraction area (approximately 636 km^2) located offshore in the Outer Hauraki Gulf (Figure 4). This consent also limits the extraction from between the western boundary (being the 25m isobath) and the 30m isobath to 150,000m^3 per 12-month period. To date the area between the 25 and 30m isobath has been the main area of extraction under consent 20795. The total volume of extraction in any 12-month period has not exceeded 150,000m^3. Consent 20795 does not include a 12-month volume limit for the area between the 30m isobath and the eastern boundary of the sand extraction area.

Sand extraction carried out under consent 20795 has been confined to two designated deepwater areas, Area 1 and Area 2. These areas are approximately 1.1km wide and extending 19.5km from the Pakiri River in the south to just south of Mangawhai Heads in the north. Area 1 and Area 2 have a combined total area of 21km^2 and are located in the 25-40m depth range.

Sand extraction in the Mangawhai-Pakiri embayment has historically been concentrated on the seabed at depths of 4-8m, on the seaward side of the longshore bar (i.e., the surf break zone) and also from the Mangawhai spit and the Mangawhai Harbour mouth. This was due to the limitations of dredging equipment to use in deeper waters.

In the 1990s there were four companies (Kaipara Ltd, McCullum Bros Ltd, Sea Tow and Wilkinson) involved in extracting sand in the Mangawhai-Pakiri embayment.

2.2.1 General Geomorphology

The embayment's morphological components include inland dunes, foredunes, foreshore, surf zone, nearshore, inner shoreface, inner continental shelf and middle continental shelf (Figure 5).

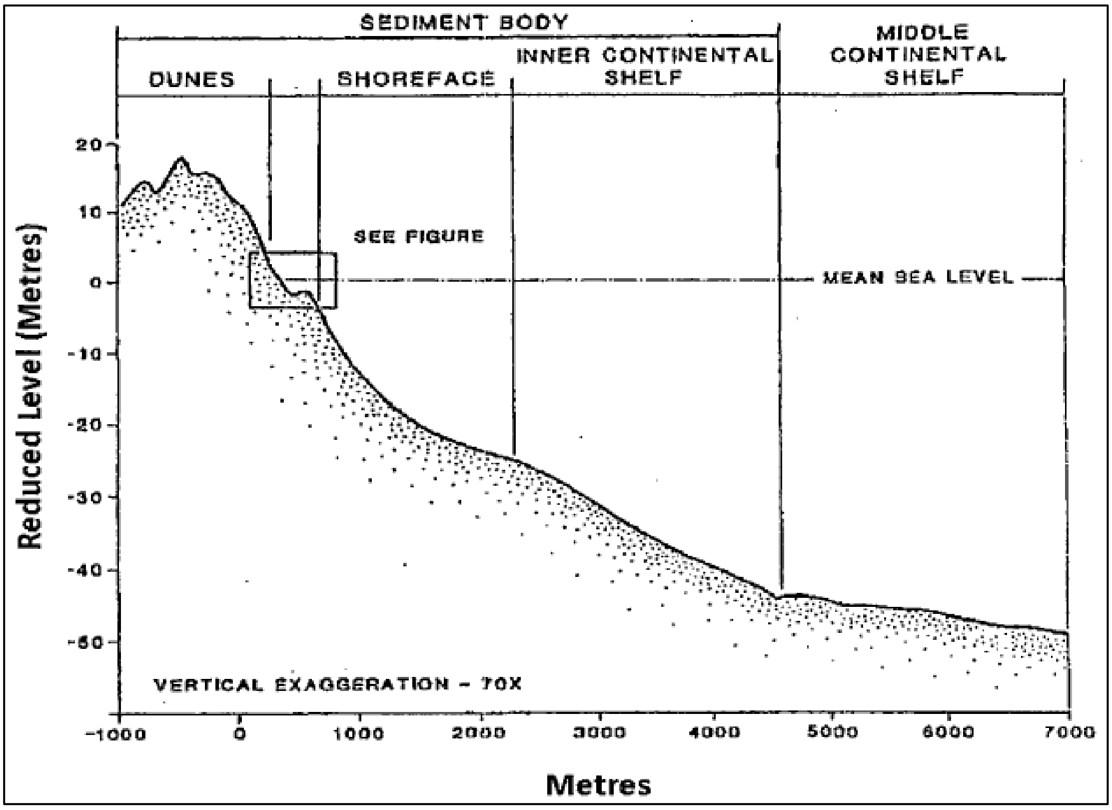


Figure 5. Morphological components of the Mangawhai-Pakiri Embayment.

The sand in the embayment is generally a wedge of sediment comprising the dunes, beach and seabed sands extending seaward. Recent or modern (Holocene) sands overlie older iron-stained consolidated Pleistocene sands, and the Holocene sands are the proposed extraction. The Mangawhai-Pakiri Sand Study (Modules 1, 2 and 3, and final report) (NIWA Sand Study 1999) indicated that the wedge of Holocene sand is in the order of 1m thick at the 25m depth contour, tapering out to 40m depth contour. The wedge is underlain by older sands of similar texture but red stained.

Coastal Dunes

An estimated 92 to 552 million cubic metres of Holocene sand is stored in the inland dune field as a cap over older Pleistocene sediments. Much of the surface of the dunes is covered in pine forest and farmland, effectively locking away the sand from the present-day sediment budget. The foredunes south of Te Arai Point have pro-graded (moved seaward) over the last 6000 years by between 150 to 200m. Sand losses from the beach into the foredunes is estimated to be in the region of 27,000m^3 per year.

Beach, Foreshore and Inshore

Beaches in the Mangawhai-Pakiri embayment have the following traits:
- have a flat to concave cross shore profile
- change in appearance under different wave conditions
- exhibit considerable exchange of sand between beach and any nearshore bar system for considerable distances along the length of the beach.
- store 40% of the sand in the beach/ foreshore (dunes to low-water), 40% in the surf zone and 20% in the nearshore bars.

Headlands

Investigations of the headlands to the north and south of the embayment by the NIWA sand study (Sand Study) identified coarse sediments and shell hash which would indicate little by-passing of sediment. It was proposed in the Sand Study that sand may be leaking from the southern end of the embayment where eddies transport small amounts of sediment into the deep waters of the Jellicoe Channel. There is also potential for a small amount of sand by-pass to the north, contributing to the Bream Bay sand system.

Sand Texture and Mineralogy

Sands in the embayment are generally quartzo-feldspathic with carbonate, as a fine shell material making up approximately 10% of the total sediment. The mineral component is identified to have been supplied by the Waikato River when it discharged into the Firth of Thames and supplied sediment to the east coast.

Sand from the embayment is of good quality for engineering purposes in terms of grading, mineral characteristics, and limited fines content; generally less than 1% of silt size or smaller.

The median grain size in the inshore bar and beach zones is in the order of 0.25mm and becomes coarser with depth, being 0.3 to 0.8mm in the proposed 25m to 40m depth of extraction. The grain size variations and gradings seem to be a result of sorting by the transportation processes that vary seasonally.

2.2.2 Coastal Processes

The driving forces for sediment transport processes comprise of two elements; wind, an important force in the construction of dunes, waves and associated turbulence, and currents. Waves and currents are the dominant forces causing erosion or accretion of the beach and foreshore.

Depth of Closure

The volumes and rates of exchange of sand between the beach, shoreface and inner shelf is difficult to quantify. Detailed investigations of bedforms, sub-tidal facies, historical morpho-dynamics and theoretical estimates indicate that the nearshore-inner shelf boundary approximates the 25m isobath. However, reports also note that the sediment disturbance of the inner shelf to water depths of at least 40m may occur during storm events.

The seaward boundary of the nearshore area in Pakiri embayment is at the 8-10m depth (Mangawahi Pakiri Sand Study (MPSS), NIWA, 1999). This boundary is known as the “closure depth”.

Beyond the closure depth no significant longshore or cross shore sediment transport take place due to littoral (longshore and cross shore sediment movement) transport processes. This closure depth of 8-10m at Pakiri was verified by Hicks et al (2002) through detailed monitoring of 16 beach/seabed profiles out to the 8m depth over a 6-week period of storm and swell waves. The monitoring showed that there were very large movements of sand in the beach/intertidal area out to closure depth, but little exchange with the seabed beyond the closure depth. Hicks et at (2002) concluded that the beach/intertidal area out to the closure depth is essentially a closed system, with no significant sand exchange with the seabed offshore.

Very large infrequent storms can transfer sand seaward of the 10m water depth to the inner shelf. Significant sediment transport does not occur beyond the 25m water depth. The 25m isobath is the nearshore-inner shelf boundary, known as the “Hallermeier limit”. Sediment exchange between the inner shelf and nearshore environments at Pakiri is unlikely and almost certainly insignificant.

The coarser band of sediments present in the inner shelf in the 25-40m depth is largely disconnected from the beach.

Wave Climate

As part of the Sand Study, wave climate was recorded by a wave buoy deployed for 17 months. The results showed significant wave heights ranged from 0.1 to 5.3m with a mean value of 0.71m. Significant wave periods ranged from 3 to 11 seconds.

As part of the 2011 monitoring review MetOcean generated hindcast records for the extraction area and showed mean significant wave heights of 1.08m.

Current Velocities

Currents in the embayment are generated by periodic tides and non-tidal forces such as a combination of winds, fetch, seiches, wave setup in the surf zone, vertical density variations and upwelling oceanic intrusions.

The Sand Study identified that the mean sea currents are relatively low, at less than 22cm/s for 90% of the time, rising above this only during storm events. This is particularly noticeable in the nearshore zone. The near bed current measurements at 15m depth show the current speeds close to the seabed are generally low and less than 10cm/s. This low current velocity means that there is insufficient energy to entrain sediment from the seabed in the absence of wave forces.

In contrast, the wave orbital velocities in 15m depth of water range from 5 – 40cm/s during non-stormy days. This increases to between 40 – 70 cm/s during storm events.

Wave-induced currents in deeper waters at seabed level are relatively low and during normal sea state conditions do not surpass the threshold velocities to mobilise the predominantly coarse-grained sands at these locations. The sediments at these locations are only moved by the largest storms.

Bathymetry

A comparison of bathymetry surveys of the offshore consent areas beyond the 25m depth of closure carried out as part of the Kaipara's 20795 consent monitoring requirements in 2003, 2011, 2015 and 2018 do not show significant variance in the seabed levels outside the immediate extraction area.

Surf Breaks

There are six (6) regionally significant surf breaks within the Mangawhai-Pakiri embayment which could potentially be impacted by the proposed offshore sand extraction. include Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island reef. Several of these breaks are ranked relatively high in the Auckland Council's regional surf break survey (2012), and the NZ surf break guides.

2.2.3 Ecology

Benthic Fauna

Whilst there is no comprehensive baseline benthic ecological information available, monitoring results from 2017 indicate that the proposed sand extraction area has benthic epifauna and infauna typical of an exposed north east coast ecosystem with a range of taxa including crustacea, gastropods, polychaetes, nematodes, echinoderms and a number of habitat forming/shellfish species such as horse mussels and scallops.

Details of the benthic ecology are provided in section below which outlines the results from the 2017 Bioresearches monitoring of the sand extraction activities authorised by consent 20795.

Finfish species

The Bioresearches report states that very few fish surveys have been undertaken in the region of the Auckland Offshore Sand Extraction site. Seabed assemblages recorded by drop camera in 2017 showed the presence of snapper and blue cod within the sand extraction site. Pelagic species such as Kahawai, kingfish, trevally as well as other bottom feeding species such as John Dory, red gurnard and tarakihi are either known from reported fish catch or expected to be present in the sand extraction site.

Marine mammals

The Bioresearches report states that cetaceans (whales and dolphins) and pinnipeds use the northeast region of New Zealand as migratory path and/or feeding and nursery grounds. A number of cetacean species have been recorded in the Hauraki Gulf (the report provides a list of 10 species) and notes that common and bottlenose dolphins were more likely encountered in deep waters in summer and shallower water in winter. Both dolphins are resident in the Hauraki Gulf year around. Dolphins and orca have been observed at Cape Rodney to Okakari Point Marine Reserve.

At least two species of pinnipeds are present within the Hauraki Gulf. The New Zealand fur seals *(Arctocephalus forsteri*) have been recorded at Cape Rodney to Okakari Point Marine Reserve and to the north in the Poor Knight Island Marine Reserve. The leopard seal (*Hydrurga leptonyx*) has also been recorded in the Waitemata Harbour and at Tutukaka Harbour.

<u>Marine mammals information from the Acoustic report prepared by Styles Group, dated March 2020</u>

The applicant's acoustic report states that to characterise the ambient soundscape within the area, four SoundTrap 300HF recorders (two arrays, providing sampling redundancy) off the northern end of Pakiri Beach were deployed from 19 March to 11 June 2019 (69 recording days). That area was chosen due to dredging operations occurring nearer Mangawhai.

The report mentions that nine marine mammal species were identified within the Extraction Area, five of which (the more common species) were focused on. Those five were common dolphins, bottlenose dolphins, Orca, Bryde's whales and NZ fur seals. Of those species, three functional hearing groups have been identified: low-frequency

(LF) cetaceans, mid-frequency (MF) cetaceans and Otariid pinnipeds (OW).

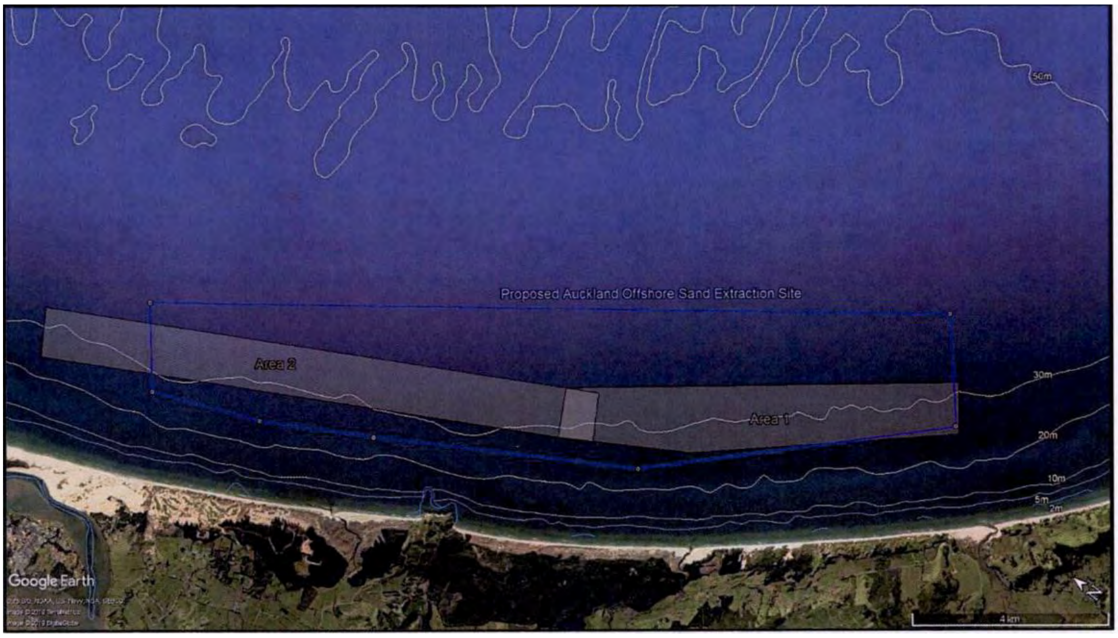


Figure 6. Location of the sand extraction areas (Area 1 and Area 2) approved by Resource Consent 20795, and the proposed Auckland offshore sand extraction site.

Monitoring Results from report titled" Assessment of Ecological Effects: Following sand extraction from the Auckland Offshore sand extraction site" prepared by Bioresearches, dated December 2017 for Coastal Permit 20797

The above report provides a summary of the effects of the existing sand extraction activities authorised by consent 20795.

This report provides the following information:

i) A comparative analysis of the sediment texture within and adjacent to Area 1. Data used includes that collected by ASR in 2003 in Area 1 and 2006 in Area 2, and the University of Waikato in 2003 before sand extraction, and data collected by bioresearches in 2011 and 2017 after sand extraction.

ii) A comparative analysis of the benthic biota data within and adjacent to Area 1. Data used includes that collected by ASR and the University of Waikato in 2003 before sand extraction and by bioresearches in 2017 after sand extraction.

Both comparisons are assessed against the changes observed at a control area located to the south of Area 1. Data for this comparison was collected in 2011 and 2017 by Bioresearches.

Whilst the above report has provided a comparative analysis, Bioresearches acknowledged in a memo dated 11 September 2019 that "*combined with poor reporting of baseline data, changes in methods, changes in sampling locations and intensity has resulted in data collected being able to be compared with earlier or later data making* *an assessment of effects very limited and broad*".

Sediment grain size

Bioresearches report states that the southern part of Area 1 was chosen for reassessment of sediment grain size and benthic biota in 2017 as this area has had the most sand extracted from it in recent years, making the detection of extraction effects more likely than for the northern Area 2. The report notes that all studies have shown there is a gradient of habitat types from inshore to offshore largely related to sediment type and depth.

Seabed Morphology

Bioresearches 2017 summarised the seabed morphology as below:

The seabed micro topography and condition shows a pattern that varies with increased depth and distance from shore of;

- fine sand with irregular small or no ripples inshore of the sand extraction areas,
- increasing sand size and ripple size with depth, across the sand extraction area,
- larger ripples with shell lag in the offshore section of the sand extraction area,
- back to longer period low ripples in deeper water beyond the sand extraction area.

The pre-side scan sonar studies (pre-sand extraction) identified that the seabed was divided into four different zones in bands parallel to shore. Along shore from the Control area to Area 1 the seabed is relatively similar being mostly sandy with even ripples with shell lag in between.

Seabed grain size

Bioresearches found that there are differences in sand grain size across the sand extraction area. In Area 1 North there are finer gained sands in shallower areas and coarser grain sand in deeper. These differences are statistically significant. These differences also vary between years. However, no specific conclusions can be drawn by the differences between the 2003 and 2011, or between the 2003 and 2017 data, as the 2003 data is based on weight and the 2001 and 2017 are based on volume.

The difference in grain size across the sand extraction area in Area 1 South and the Control areas were less pronounced and were not statistically significant.

Benthic biota from grab sampling

Results from 65 Smith-Macintyre grab samples collected in 2003 (50 within sand extraction area and 15 outside the area)

A total of 59 different species (725 individuals) were identified from the 65 grab samples. The report states raw data were not presented to enable further investigation into the geographic spread of species. Amphipods and other crustacea (e.g. cumacea, shrimp and hermit crab) dominated the samples, accounting for 62%, Polychaetes 19%, bivalves 13%, lancelets 3.1%, gastropods 1.9% and nematodes 1% of all individuals found.

The number of individuals per sample ranged from 0 to 29, with an average of 11 per sample. No protected or sensitive species were identified from the grab sample data.

Results from 25 Ponar grab samples collected in 2011 from the Control Area

A total of 62 different species (496 individuals) were identified from the 25 grab samples. Polychaetes 51 %, crustacea 31%, bivalves 14% and other taxa 4%, largely gastropods, lancelet and sponges.

Results from 74 Ponar grab samples collected in 2017 (42 within the sand extraction Area 1 and 13 outside, plus 19 in the Control Area)

A total of 184 different species (23,362 individuals) were identified from the 74 grab samples. Within the area of sand extraction, a total of 161 different species at a density of 6,705 individuals per m^2 were identified from the 42 grab samples. In the Control area 128 different species at a density of 4,253 individuals per m^2 were identified from the 19 grab samples.

The makeup was as follows: Amphipods and other crustacea 65%, polychaetes 29 %, bivalves 1.6%, gastropods 1.2%, lancelets 0.7% and salps 1.2%. Nematodes, echinoderms, anemones, bryozoans, sea squirts and sponges, while present, were rare. 48 species of polychaete, 47 species of mollusc and 43 species of crustaceans were recorded. A number of juvenile horse mussels were recorded.

Within the control area biota were dominated by polychaete 48%, amphipods and other crustacea 45%, bivalves 3.2%, gastropods 1.2% and chordates 1.7%.

Two samples recorded the presence of Scleractinia, or stony corals (>2mm). One sample in the sand extraction area contained 15 individuals and one sample in the control area contained 1 individual. Scleractinia are protected under the Wildlife Act 1953. The sample which had the corals were on the south eastern side, in a depth of ~ 35m. Scleractinia were not previously recorded in the sand extraction area or the control area in 2003, 2006 or 2011 surveys.

The percentage abundance of taxa was different between the Control and sand extraction areas while the percentage diversity was very similar. The percentage abundance of polychaetes was statistically significantly greater in the Control area when compared with the sand extraction area, while the percentage abundance of crustacea was statistically significantly greater in the sand extraction area compared to the Control area.

Benthic biota from dredge tows

No dredge tows were conducted in Area 1 in 2003 or 2006. In 2006, 12 dredge tows were conducted in Area 2. A total of 35 different species and 9595 individual specimens were identified. Crustaceans and bivalves were proportionally dominant in the samples followed by gastropods and polychaetes, lancets and brittle stars.

The proportion of different taxa from the dredge tows compared to grab samples were similar for crustaceans, however the proportion of bivalves (predominantly scallops) were considerably higher and polychaete worms much lower in the dredge tows than in the grab samples.

The report states that this highlights the necessity to use a range of techniques to quantify the species presence/absence and abundance when surveying soft sediment habitats.

In 2011, three dredge tows were conducted in the Control area. A total of 7 different species (38 individuals) were identified. Starfish and bivalves were proportionally dominant in the samples.

In 2017 a total of 15 dredge tows were conducted in Area 1 and three dredge tows in the Control area. A total of 24 different species (244 individual specimens) were identified in Area 1 and 15 different species (954 individual specimens) were identified in the Control area.

The report mentions that the lack of detailed methodology, lack of samples, possible differences in mesh sizes and differences in areas sampled during the baseline studies (2003 & 2006) prevent any sensible comparison between the later studies in the sand extraction areas. However, the report adds further that the dredge samples are useful in that they provide data on the larger less abundant species such as the scallop (*Pecten novaezelandiae*) and startfish (*Astropecten polycanthus*), that would not normally be recorded by the grab sampling technique.

The dredge tow data from the Control area in 2011 and 2017 are comparable and show slight increase in diversity and abundance over time.

Apart from the scallops, no sensitive species were identified in the sand extraction area 1 or Control area, nor were any benthic communities of particular conservation value identified.

3.0 ASSESSMENT OF EFFECTS

3.1 Effects on Coastal Processes

The applicant states that a minimum isobath of 25m has been selected for extraction as this equates to the Hallermeier limit (the applicant refers to this as the “depth of closure (DoC)”) as determined by the Environment Court (A066/2006 March 2006). The Hallermeier limit is an indicator of the outer extent of significant seabed movement where there is limited interchange between the inner bar system and the outer shelf. This means that extraction of sand from the application is effectively independent of the nearshore processes which relate to the maintenance of the beach system.

3.1.1 The Applicant's Assessment of Bathymetry

The applicant provides a review and comparison of monitoring work undertaken over the existing consent period. Compilation and comparison of bathymetric surveys carried out over the life of the existing offshore consent has been undertaken for Kaipara Ltd by Survey Worx. Survey Worx has undertaken the most recent two monitoring surveys (2015 and 2018). Earlier surveys were undertaken by different survey companies: pre-dredge baseline surveys in 2003 (Area 1) and 2006 (Area 2); and subsequent surveys of Area 1 in 2011 and Area 2 in 2015. These surveys, and the more recent coverage of Areas 1 and 2 in 2018 correspond with cumulative 500,000m^3 extraction milestones defined in the EMMP. The applicant states that bathymetry surveys have been undertaken by different hydrographic surveyors over the consent timeframe and hence comparison of the different datasets has been difficult.

The most recent surveyed seabed profiles, 2018 of Area 1 when compared with the 2011 survey suggested that removal of approximately 1,000,000m^3 of sand show a maximum change in the order of 0.5m in localised areas of recent extraction with the remainder of the Area showing reasonable evenly distributed cut and fill depths of less than 0.5m. The indicative contours of bed change between surveys show that effects of extraction are well-distributed.

The applicant states that extraction of sand to date has resulted in short-term localised depressions evident in the bathymetry surveys, which are gradually restored by natural wave induced effects. The longer-term effect is a small, distributed lowering of the bed over a large area approximately equal to the volume extracted.

The applicant proposes to establish a plan for extraction under the proposed EMMP to provide a more even distribution of extraction to minimise localised effects and to result in small but evenly spread level changes over the proposed extraction area.

Review (Auckland Council)

I concur with the applicant's assessment. The monitoring reports show localised deepening of up to 0.5m at the extracted locations. These are probably sorted and filled during periods of large storm waves by sand from outside of the extracted areas. A slight overall lowering of the seabed is possible in the long-term. The effect of sand extraction on bathymetry will be minor.

3.1.2 Applicant's Assessment of Seabed Characteristics and Sediment Texture Changes

Monitoring of bed types and characteristics (e.g. coarse sand with larger ripples and shell lag deposits) in the extraction area shows little change over time in the physical distribution of bed types. Bed types and characteristics are formed and maintained by a combination of wave action and water depth and are able to reform following the temporary disturbance caused by extraction.

The applicant states that the monitoring reports show that bedforms and grain size distributions vary over time but monitoring of undisturbed areas show that changes are consistent over both extraction and control areas, i.e., changes appear to be due to natural processes which are similar to sand extraction.

Review (Auckland Council)

I agree with the applicant's assessment that the bed types and characteristics are likely independent of the extraction process and maintained by the storm waves and current action. The extraction activities will cause changes to bed type and characteristics however these effects will be temporary. Post extraction activities caused by wave and current action will recreate natural bed types and characteristics over time.

Sediment grain sizes are likely variable during seasonal variations and independent of the extraction process. Effects of sand extraction on sediment texture changes is less than minor.

3.1.3 The Applicants Assessment of Coastal Erosion

The applicant has not provided an assessment relating to coastal erosion. They have stated that since the proposed sand extraction is below the Hallemeier limit it does not have the potential to cause or exacerbate coastal erosion along the Pakiri coastline.

The applicant refers to the Pakiri nearshore sand extraction permit areas, which is located landward of the 25m depth contour, where the operators of the inshore consent are required to undertake regular detailed survey of the beach and bar system. The applicant states that monitoring and analysis of the data collected does not indicate cumulative changes beyond natural beach process variations.

The applicant states that there is evidence of episodes of erosion and accretion of the regularly surveyed beach and bar profiles, but there is no reported cumulative observed change within the accuracy of the survey methods used that can be attributed to anything beyond natural variations arising from weather pattern variations.

Review (Auckland Council)

I concur with the applicant's assessment. The proposed extraction is beyond the 25m depth contour and there has been no evidence of coastal erosion along the Pakiri-Mangawhai embayment which can be attributed to the sand extraction beyond the 25m depth.

3.1.4 The Applicant's Assessment of Effects on Waves and Surf Break

For waves of a specific period the inshore extent of Deep Water, and thus the commencement of the Transition Zone, is defined as the water depth that is one half of the wavelength L in metres where L = 1.56 x T2 and T is the wave period in seconds. The inshore extent of the Transition Zone is where water depth is 0.05L. As water depths become shallower than this, waves begin to become unstable and breaking occurs. At Pakiri the range of wave periods dictates that the breaking zone is inshore of 8m depth.

The offshore extraction is proposed to take place in water depths greater than 25m. From the relationship above it can be shown that waves with periods less than 5.7 seconds would not be affected by interaction with the seabed. Based on 20 year hindcast data derived for Mangawhai (Gorman et al, 2003) approximately 74% of waves at this location have a period of less than 6 seconds, and thus this proportion of waves will remain nominally unaffected by changes in bathymetry resulting from extraction at and beyond 25m depth.

The remaining 26% of waves approaching the coast have longer periods (up to 10 seconds) and would be influenced by contact with the seabed in area greater than 25m deep. These longer period waves are of particular interest to surfers, providing more substantial and powerful waves that shoal more prior to breaking to create larger and cleaner surfing conditions.

The applicant provides a surf break assessment report on the impact of the deep-water sand extraction activity on 6 surf breaks in the area, namely Mangawhai Heads, Black Swamp (Canals), Te Arai Beach, Forestry, Pakiri Beach, and Goat Island reef.

Each of the 6 breaks was characterised in terms of the physical aspects that comprise the breaks. These include the wave type (beach break, bar/delta break, reef break, point break, etc.), optimal tide, swell and wind directions, surfing/skill level, wave rating, wave height range and peel angle. The surf assessment report stated that of the 6 regionally significant breaks, Goat Island reef will not be impacted by the proposed offshore sand extraction, since it is over 7 km south of the southern boundary of the proposed extraction area and is part of an extensive reef system that extends over 4 km south of Pakiri Beach to Goat Island. This means that there are no potential impacts from either change to the seabed in the swell corridor, or changes to sediment supply that could affect this reef break.

The surf assessment identified two potential impacts/threats on these surf breaks due to the proposed offshore sand extraction, a) changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction (e.g. shore-parallel channels and pits), and b) reduction of cross shore sediment transport delivering sediment to the breaks due to sediment trapping in shore-parallel channels and pits created by sand extraction.

The applicant states that the effects of the proposed offshore extraction are not expected to result in any observable changes to the surf corridor in relation to wave refraction or shoaling and will thus not influence the wave environment approaching the nearshore, and thus remain independent of beach processes.

The natural shoreward translation of waves is influenced by refraction which is the process of wave approach angle being modified by seabed contours. The shoaling coefficient, or the proportion of the offshore wave height at each depth contour, reduces initially as the wave loses energy through friction, then increases as the wave velocity reduces and wave height builds prior to breaking.

These parameters were calculated for a range of approach angles and wave periods over a regular bathymetry. The calculation was then repeated with a section of increased depth beyond 25m to simulate change to seabed level resulting from sand extraction and provide comparison of the modified wave behaviour. The calculation was done for regularly spaced shore-parallel depth contours, with waves approaching from offshore at 15 and 25 degrees from perpendicular to the shore. This range covers the dominant wave approach directions identified by Gorman et al (2003) and illustrates the amount of refraction that can be expected at the Mangawhai-Pakiri site. Waves have been translated inshore to 10m depth where localised and variable bed changes within the bar system will affect wave propagation further inshore and breaking, generally inshore of 5m depth.

The effect of sand extraction has been examined for an average increase in depth between the natural 30m and 25m depth contours which represents a 700m wide shore-parallel strip. The extraction is planned to recover sand from long narrow shore-parallel tracks of typically 30mm to 50mm depth. Natural redistribution of the seabed is estimated to result in a depth increase over the extraction area of less than 100mm, during the consent period. The calculations for up to 50mm depth increase over the proposed extraction area shows effectively no change to wave characteristics.

These show the progression of wave approach angle as depth reduces and waves fronts bend to better align with the bed contours, and shoaling coefficients which show initial relative loss of wave height in the transition zone and then increase as the waves slow and height builds towards breaking. These changes are negligible and are very unlikely to be measurable across the extraction area, with no change to the inshore wave characteristics.

The applicant concluded that the magnitude of potential impacts on wave quality at the 5 surf breaks in the Mangawhai-Pakiri embayment associated with changes to wave heights and directions due to reflection/refraction/diffraction as waves propagate over modified seabed bathymetry caused by extraction are considered less than minor to negligible with the current consent. The potential impacts on wave quality due to changes in seabed morphology at the 5 central surf breaks in the Mangawhai-Pakiri embayment are also considered less than minor to negligible for the proposed resource consent application. Potential impacts on wave quality at the 5 sand-dependent surf breaks due to reduced sediment supply are considered less than minor to negligible for the proposed resource consent application and associated management regime.

Review (Auckland Council)

The applicant’s assessment, models and calculations show that the waves and surf breaks along the Pakiri-Mangawhai embayment are unlikely to be impacted by the slight lowering of the seabed as shown in the bathymetry surveys. Based on the calculations, the proposed offshore extraction will have negligible effects on the swell corridor of the surf break and the surf zone. Wave period does not change with water depth and is unaffected by the proposed extraction.

I agree with the applicant's assessment that the impact of the sand extraction on surf breaks (heights and directions) due to modified bathymetry and reduced sand supply is less than minor.

The proposed conditions and EMMP implements an improved management regime where dredging is undertaken in thin 'skims' (e.g., <10 cm, rather than repeated dredging of the same area creating deep channels) and there will be progressive movement through the proposed extraction area cell by cell (management cells of 1,000m x 200m). In addition, a maximum of 40,000m3/yr is proposed to be extracted from any 1,000m x 200m cell, giving a maximum extraction depth of 200mm, averaged over the cell, and the cell must remain un-dredged for the following year if this extraction volume is reached. This prevents the formation of deep channels/pits/strips and allows for the seabed to recover, which also mitigates the potential effects of changes to wave height and direction; and reduced cross shore sediment transport.

The applicant has proposed to ensure that dredge run-lines within each cell are distributed evenly and/or randomly throughout the cell in order to reduce the potential for the creation of shore-parallel channels that have the potential to impact on cross-shore sediment transport.

3.1.5 Applicant's Assessment on Cumulative Effects on Coastal Processes

The applicant states that the cumulative effects of offshore sand extraction over the 20 years of the current consent period to date indicate that the extraction has resulted in a small and progressive distributed lowering of the seabed generally in the vicinity of the extraction process. This is expected to spread and reduce over time as sediments redistribute under natural conditions.

There have been no discernible effects on coastal erosion, surf breaks or seabed/sediment characteristics over the past extraction activities.

Review (Auckland Council)

While there has been a slight lowering of the seabed in localised areas of extraction area, and overall lowering is expected to be spread over a larger area of the seabed, it has been the only discernible effect of the sand extraction at the offshore location over the last consent duration.

While it is not easy to assess, I agree with the applicant's assessment that there have been no discernible effects on coastal erosion, surf breaks or sediment characteristics which can be attributed to sand extraction.

3.1.6 Review of the Coastal Processes Monitoring Programme

The applicant has proposed monitoring as part of its EMMP. The proposed EMMP focuses on sand extraction volumes and tracks but does not contribute towards monitoring of the effects of the proposed activity on coastal processes within the extraction area.

The EMMP suggests a bathymetric survey of the seafloor at pre-extraction stage of each cell. As the comparison of various bathymetry surveys for the existing consent show localised changes in bathymetry after extraction and potentially a gradual lowering of the adjacent seabed areas, it is recommended as a condition of consent that bathymetry surveys be triggered at certain volumes of extraction.

The applicant states that monitoring will be undertaken at the conclusion of the extraction of every 500,000m^3 (+/- 20,000m^3) of sand from each ASEA where sand extraction has occurred. This will form the basis for the Sand Extraction Monitoring Report which will be submitted to Auckland Council within six months of the requirement for the monitoring being triggered.

With a pre-sand extraction bathymetry and a bathymetry survey triggered at every 500,000m^3 of extraction, localised changes in bathymetry will be discernible. However, it will be difficult to discern any overall lowering of the adjacent seabed area if surveys are limited to extracted ASEA only. It is recommended that at the pre-extraction stage, the cell to be extracted is surveyed along with two immediately adjacent cells (on the west and east). The adjacent cells are to be surveyed each time a bathymetry survey is triggered. This will give a better understanding of the localised effects and the immediately adjacent effects.

3.1.6 Summary of Effects on Coastal Processes

Changes indicated by bathymetric survey to date under the existing consent are shown over discrete areas centred around the targeted extraction locations. Observed cumulative effects of extraction to date indicate a small, distributed lowering of the bed level within the extraction areas. The overall effects on coastal processes will be minor.

3.2 Effects on Marine Ecology

3.2.1 Applicant’s assessment of effects on benthic biota

The applicant’s assessment states that sample collection has been undertaken by a number of parties over time resulting in variations in sample type and sieve size used. This has resulted in data that differs across time that can only be compared non-parametrically through comparisons of taxa percentages. The assessment notes that the ability to identify biota to species level has changed over time, thus higher taxonomic grouping is required to make the data comparable. The assessment further states that lack of replicated data on benthic biota from the initial surveys of the sand extraction areas (Area 1 and Area 2) has limited the analysis of effects of sand extraction.

From the Control site data, it can be seen that there is natural variation over time over and above any effects of sand extraction. Comparison between the 2011 and 2017 control site samples showed the percentage abundance of crustacea and gastropods has increased between 2012 and 2017, while the percentage abundance of bivalves has decreased. At the same time the percentage diversity of gastropods has increased while the percentage diversity of polychaetes, crustacea and bivalves has decreased. Similar comparative data was not available for the sand extraction Area 1 for the same period.

The assessment states that in 2017 the comparison of percentage abundance and composition between the control site and Area 1 showed that sand extraction had little or no effect on the percent composition of the major taxa groupings. The effects of sand extraction in Area 1 resulted in relatively fewer polychaetes and bivalves but an increase in numbers of crustacea. This is in alignment with the expected effects of sand extraction. As the sand is extracted, bivalves are expected to suffer some shell damage and potential mortality as a result of passage through the dredge prior to return to the seabed via the oversize waste pipe, thus the numbers are expected to be reduced. The assessment considers that it is unknown if species are differentially affected by the passage through the dredge, however it could be expected that more fragile species will be more greatly affected than more robust species. The softer bodied polychaetes will also suffer mortality by passage through the dredge, this mortality is reflected by the decrease in abundance in Area 1 relative to the Control area.

The assessment notes that gastropods are generally more robust and compact than bivalves and by observation suffer less damage, hence their abundance has not been as greatly affected by the sand extraction activity. Generally small crustacea are for most part short lived and are either predatory or opportunistic feeders. Therefore, small crustacea such as amphipods are not expected to result in significant mortality, given their smaller size and robustness.

3.2.2 Applicant's effects of the continuation of sand extraction

The applicant's ecological assessment has provided the following in relation to the proposed activity:

Benthic biota will be destroyed in the path of the dredge head, through either removal, smothering or destruction caused by passage through the dredge head, pump, pipe and discharge. The significance of the impact depends on the value or uniqueness of the affected community, the susceptibility of the community, the composition of the surficial seabed sediments, the dimensions of the area and the recovery rate of the benthic community.

The benthic and near benthic communities of the proposed Auckland Offshore Sand Extraction Site have been described and are not unique, in that they are common along much of the north eastern coast of the north island. While they have value in that they provide the basis for significant fisheries, the effects to date do not indicate that the benthic communities will be degraded to the extent that these fisheries will be greatly affected. The loss of the local benthic fauna can have effects further down food chains. However, links and effects at higher trophic levels are not well understood. The extraction activity may also inadvertently create an abundance of food in the form of damaged animals like bivalves or crustaceans. This can temporarily enhance numbers of fish and marine mammals present in the area.

As part of the 2017 monitoring Stony corals were recorded from one location within the sand extraction area. Prior to this, Stony corals had not been recorded in the sand extraction area. Stony corals are protected under the 2010 amendment of the Wildlife Act 1953, and as such should not intentionally be removed from the seabed. However, given their size of approximately 5 mm diameter they should by-pass the dredge and be discharged back to the seabed. Since it is possible, they could be damaged by this activity it is recommended if they are, that this areas known to have stony corals be excluded from sand extraction until it has been shown they are no longer present.

The seabed sediment is mostly coarse sand with very little fine mud (< 3 %) as shown by the particle size analysis. Despite the differences in measurement methodologies, there is no evidence of ecologically significant changes in the particle size composition as a result of sand extraction activity, by comparison with control sites, or cumulatively over time. There are no sources of chemical contamination in or near the sand extraction area. Thus, the composition of the seabed sediments will not result in adverse effects if disturbed.

Estimates of the time taken for a benthic community to recover from a disturbance event of the scale of sand dredging is between 6 months to several years. This is based on smaller biota with general short life spans re-establishing first from adjacent habitats and those larger species following but taking longer to grow to adult sizes. Seasonal timing will also have an effect on the speed of recovery. Initial recovery will be by migration from adjacent habitats, and then by reproductive settlement which will be seasonal.

The area proposed for sand extraction is 44 km^2, based on the current sand barge's operational parameters, 0.7 m wide dredge, to 0.3 m depth, 0.5 m/s speed, barge load 460 m^3, and some assumptions of sand retention, it is expected that an area of approximately 0.006 km^2 would be dredged per day. Based on this rate of dredging per day and assuming the same area is not dredged again it would take more than 22 years to dredge the complete area, given no limits on volume extracted. However, the current consent limits the extraction to 150,000 m^3 per year which would result in it taking more than 25 years to dredge the entire proposed area once. Based on this frequency of dredging it is expected that the benthic communities will have more than recovered between dredging events assuming the dredging is spread out of the entire sand extraction area. Even if the dredging is concentrated to a smaller area such as the 9.6 km^2 of Area 1 dredging the return frequency given the limits is over 5 years, again long enough for benthic community recovery to have occurred.

<u>Auckland Council (Review) on applicant's assessment on benthic biota (covers section 3.1.1 and 3.1.2)</u>

Auckland Council
Te Kaunihera o Tāmaki Makaurau

The proposed sand extraction area is significantly smaller than the area consented under Coastal Permit 27095. However, the application area is largely that area that was subject to sand extraction for the last 17 years. The area proposed for sand extraction had been subject to disturbance over a relatively long period. Monitoring of the effects of sand extraction on the ecological values of the area shows that the extraction activity is likely to result in changes to the ecology of the site with fast growing and robust species, crustaceans and gastropods, increasing in numbers and more fragile species decreasing in abundance. Generally, the ecology of disturbed areas recovers over time. Overall, any adverse effects on benthic ecology from ongoing extraction in this area will likely to be minor. The following points are relevant to this conclusion:

The assessment of the effects on the benthic communities from sand extraction/seabed disturbance requires a good understanding of the communities present and the values (e.g. biodiversity, food for higher trophic levels) of those communities; the spatial and temporal scale of the severity and dispersion of any sediment plume/distribution; the tolerances of the communities to increased suspended sediment concentrations; and the potential for recovery from the effects.

The applicant has provided information on benthic biota (at taxonomic Order level) and percentage changes in some taxa over time within the proposed Area 1 which informs the ecological values and presence/absence of taxa within the subject area. Whilst there is no baseline to understand the community composition of the Area 1, ecological values indicate the subject area is likely to have benthic fauna typical of semi exposed soft sediment habitat and communities. The proposed sand extraction will suck up the substrate and benthic infauna and epifauna up to 0.3m and will be processed through the dredge prior to return to the seabed via the oversize waste pipe. The main direct physical impact on benthic communities will be the physical removal of sessile and sedentary taxa, as well as relatively immobile taxa, from the extraction area. It is likely that all larger, hard-bodied organisms will be screened out and returned to the seabed intact, but larger soft-bodied organisms will be destroyed if they are drawn up through the suction pump (as observed in the applicant's assessment).

While I agree that large gastropod molluscs could survive this process, the survival rate is not likely to be the same for all species of gastropod or any other taxa.

Soft sediment benthic invertebrates can recolonize within relatively short periods, the recovery from disturbance/extraction process would vary depending on the substrata, species inhabiting the area, settlement via recruitment processes and post-settlement survival of larval and pre-adult stages. There is no comparable data from the applicant's ecological surveys to understand the recolonization/recovery of benthic fauna following sand extraction.

While there is a possibility that habitat and benthic community in the Area 1 which contribute to the ecosystem service and function (including trophic interactions) could have been lost from the ongoing sand extraction in the Area 1, the loss is likely to be localised and will not have more than minor adverse effect on the wider Hauraki Gulf ecosystem.

Data collected from 2003, 2011 and 2017 cannot be used for comparable studies. Sampling was undertaken using a number of variations in sample type and sieve size used, and identification of benthic taxa to order level. The data was therefore cannot be used to provide any ecologically meaningful results to understand the changes in the community composition between surveys. In addition, whilst the 2011 and 2017 surveys were undertaken by the same party (8 years after the commencement of consent) within the consented and control area, any meaningful conclusions could not be drawn as the monitoring techniques were not appropriate to capture all sizes of benthic biota.

The applicant's assessment states that in general, grain size increases statistically significantly with depth in the north of Area 1 and is statistically similar at different depths in the south of Area 1 and in the Control area further south. It is well known that changes in the sediment grain size and stability of the seabed can influence the recolonsation of benthic fauna. For example, Desprez (2000) showed that the structure of the benthic community changed from one of coarse sands characterized by the lancelet *Branchiostoma lanceolatum* to one of fine sands composed of the infaunal polychaetes *Ophelia borealis.* Thus, the change in the assemblage structure reflected a change in sediment composition caused by dredging. Significant changes in particle size composition, resulting in a net fining of the sediment within extraction sites, have also been reported by Van Dalfsen et al. (2000) and Sarda´ et al. (2000) following sand extraction. In addition, a high variability in the composition of sediments and benthic assemblages at dredged locations has been reported by Kenny and Rees (1994) and Sarda´ et al. (2000). The higher variability observed in the benthic taxa by the applicant could be related to the change in the sediment grain size in addition to the variability with techniques and sample type. However, the propensity for the extraction site to exhibit variability in terms of sediment characteristics and species composition also has to be referenced against a high degree of natural variability.

Bioresearches' report indicate that there were horse mussel beds prior to sand extraction in parts of the consented area. This is an indication for the presence of biogenic habitat forming species such as horse mussels and absence of them in the recent surveys indicate this species has not recovered in the disturbed area. It is known from the literature that large bivalves such as horse mussels take a long time to recover from disturbance such as sand extraction, dredging and trawling.

Bioresearches's report estimates (as in the above section) that "based on the current sand barge's operational parameters and the rate of dredging, it is expected that an area of approximately 0.006 km^2 would be dredged per day and it would take more than 22 years to dredge the complete area, given no limits on volume extracted. However, the current consent limits the extraction to 150,000 m^3 per year which would result in it taking more than 25 years to dredge the entire proposed area once". This has not been taken into account in any of the surveys carried out in 2011 or 2017. It would be useful to use the spatial and temporal tracking information and volume of extraction in the future sampling locations.

The applicant's draft EMMP requires that:

Prior to sand extraction occurring within any area, a Pre-Sand Extraction Assessment is required to be undertaken. This will:

- *Identify those sub-areas within a Proposed Sand Extraction Area suitable for sand extraction. An area would be excluded from an approved sand extraction sub-area if it contains stony corals or significant shellfish beds; and*

- *provide the baseline information for the subsequent sand extraction monitoring.*

Those areas identified as being suitable for sand extraction are referred to as approved sand extraction sub-areas (ASEA) and sand extraction is only permitted in those areas. The EMMP will include an updated plan showing those areas within the consented sand extraction area which are approved sand extraction sub-areas.

Whilst it is not clear how frequent the pre-sand extraction survey will be carried out and the timing between the survey and sand extraction, the above approach to avoid the disturbance on unique or any protected species such as stony corals from the sand extraction is supported. However, a detailed timeframe for Pre-Sand Extraction Assessment over the consent duration is required should consent be granted.

The applicant has estimated that based on the currently available sand barge's operational parameters, 0.7 m wide dredge, to 0.3 m depth, 0.5 m/s speed, barge load 460 m^3, and some assumptions of sand retention (32%), an area of approximately 0.006 km^2 would be dredged per day (disturb 7,000m^2 for every 460m^3 hopper full of sand). Whilst this represents the dredge vessel Coastal Carrier, the applicant's s92 response dated 30 March 2020 provided the operational parameters for the recently commissioned dredge vessel the William Fraser (with1.6m width head, barge load 900m^3, up to 0.08m depth) which will disturb 24,000m^2 for every 900m^3 hopper full of sand, its retention efficiency is ~58% by volume, at an extraction rate of ~ 0.038m^3/m^2. The differences in the barge load, depth and retention rate between these two dredge vessels are likely to change the tracking frequency within the management cells proposed. Thus, sand extraction tracking records required under the consent needs to include the name of vessel used for tracking in addition to the volume of sand extraction.

With regards to the depth of the dredge of vessels, the William Fraser has a shallower dredge profile than the Coastal Carrier. Whilst the applicant's s92 states that the reduced dredge profile depth of William Fraser means that biota inhabit in deeper sediment will not be removed or damaged thus reducing impacts. The suction depth is a bit of a trade-off. If the dredge vessel takes deeper sand compared to surface sand to get the same volume, level of surface disturbance per m^3 would result in a lower level of surface disturbance per m^3 of sand taken. While there is a difference (80mm - 300mm) in the depth of the dredge footprint, adverse effects mainly depend on the infauna and epifauna recolonised or living in the area. Recovery of the substrate by the Coastal Carrier may take relatively longer than William Fraser as stability of substrate and sediment composition will also influence the rate of recolonization of benthic fauna.

3.2.3 Applicant's assessment on fish, marine mammals and birds

Fish

The applicant's assessment states that fish may be affected by noise, entrainment, sublethal effects from suspended sediment, and food source reduction from the sand extraction operation. The assessment notes that it is not expected that fish will be entrained into the dredge as the water flow will be targeted at sucking sediment up from the seabed. Mobile species will be able to avoid the sand dredging operation and thus avoid entrainment.

The assessment states that recent studies have identified that increased suspended solids in the water column is detrimental to juvenile snapper in the estuarine environment; while the research was aimed at the effects of increased terrestrial sediment inputs, the discharge of fine marine sediments from the sand barge could have similar effects. However, the assessment states that the percentage of fine sediments in the seabed of the sand extraction area has been low ranging from 0-3 percent, thus suspended solids in the water column will be small and unlikely to adversely affect fish present.

Whilst benthic biota forms the basis of many fish diets, the benthic biota collected in deep water sand Area 1 does not change in species composition, hence it will not affect fish diet/feeding. The assessment concludes that while the fish species present or likely to be present are ecologically and economically important, the effects of the sand extraction are expected to be no more than minor.

Marine mammals and birds

The applicant's assessment states that no direct adverse effects to marine mammals or birds have been reported by the barge operators. The operation of the sand extraction dredge results in the discharge of oversized material and fine material passing over the sand screen. The discharge of this material creates a plume behind the sand barge, which has increased turbidity and contains whole or fragments of benthic biota. It has been observed that red billed gulls frequent the area of the plume close to the barge for foraging for biota fragments.

Marine mammals are not resident within the sand extraction site, however they are likely to be transient, as part of a seasonal migration or foraging. Hence, the intermittent operation of the sand dredge is unlikely to have adverse effects on any cetaceans or pinnipeds present within the extraction area. The expected noise levels are at worst only likely to result in avoidance of the area while the dredge is in operation.

Auckland Council (Review on fish, and birds)

Any adverse effects on fish and birds will be less than minor.

The ambient TSS level provided by the applicant is relatively low (from 0.47 to 10.46 mg/l, averaging 1.04 mg/l), this level will slightly increase during sand extraction. But this increase will be negligible as the site is a semi exposed area.

The coastal birds and fish will not be directly affected by the extraction activities. They would avoid the area if the turbidity is not suitable for their feeding/foraging, but they would recommence feeding once the sand extraction in the area is complete.

Whilst the information on benthic species composition and trophic interactions are required to understand the effects on feeding, benthic ecological information provided for the site did not indicate any potential effects to fish diet/feeding. However, the TSS concentrations will reduce rapidly to ambient concentrations within a short time and the effects will be localised and temporary. Accordingly, TSS increase from sand extraction operation are not expected to have effects on fish eggs or larvae such they will have effects on local fish populations

3.2.4 Applicants assessment on water quality effects

The applicant's s92 states that water quality testing of the discharges from the William Fraser and the ambient conditions at the extraction site were conducted and reported by Jacobs 2020. To define ambient background natural water quality Jacobs used both water quality monitoring data collected for a short period adjacent to the extraction area and from regular repeated long-term council monitoring sites nearby.

The water quality monitoring at the site was generally lower in concentration than the Goat Island monitoring site for turbidity and suspended solids, while other physical parameters were similar, which was as expected. Background turbidity at the extraction site ranged from 0.14 to 3.11 NTU, averaging 0.31 NTU in May - July 2019. Similarly background suspended solids at the extraction site ranged from 0.47 to 10.46 mg/l, averaging 1.04 mg/l.

During sand extraction operation, the seabed sediment is sucked up through the dredge head (a 1.5 m wide vacuum head), extraction pipe and discharged into an 8m² screening tray. The water and sediment are passed over and through two screens; a coarse 35mm screen and a fine 2.5mm screen. The coarse shell and other material not passing through the fine screen is then discharged through a pipe which discharges into a moon pool and out under the vessel. The sand passing through the 2.5 mm screen is then discharged into the hopper. Water discharged into the hopper overflows weir boards which discharge into several moon pools and out under the vessel. The oversize discharge contains both shell and sand, and the weir board hopper overflows contain very small amounts of silt and clay sized sediments. The plume created behind the vessel is approximately as wide as the vessel with very little visually obvious lateral spread.

In December 2019 during routine sand extraction operation the turbidity and suspended solids were assessed in the discharge plume created behind the William Fraser. The results showed minor elevations in turbidity (1 – 2 NTU) values and suspended solids (3.5 – 8 mg/l) concentrations in the surface water at the point of discharge that rapidly decline back to ambient ranges of 0.13-0.14 NTU and 2.4-2.9 mg/l by a distance of 250m behind the dredge. The increases in turbidity and suspended solids concentrations are within the range of natural variation recorded as part of the background water quality studies. The suspended solids concentrations and turbidity values found within the plume beyond 250m from the William Fraser were within ranges recorded in the nearby unaffected coastal marine environment. At an operating speed of 2.5 knots this equates to the very weak plume being present at any one location for no more than 3 minutes 15 seconds.

Auckland Council Review (Water quality)

Given the physical sediment characteristics (with large proportion of sand) and coastal processes within the proposed semi exposed extraction area any adverse effects on water quality in terms of suspended sediment and turbidity will likely to be less than minor. The following points are relevant to this conclusion:

- The applicant's water quality (Total Suspended Solids levels and turbidity levels) information indicates low levels of ambient TSS compared to many other areas in the Hauraki Gulf. The TSS level measured in the discharge from the dredge vessel is also relatively low (3.5 – 8 mg/l). The subject area is not likely to have any contaminants in the sediment.

- Overall, water quality effects will be less than minor and localised. This is due to relatively higher proportion of coarser particles (sand & gravel) in the proposed extraction area and any material released during extraction and deposition will quickly settle with less than minor adverse effects.

3.2.5 Cumulative effects (Ecological effects)

The applicant's s92 provided the following in relation to cumulative ecological effects from continuation of sand extraction:

Sand extraction has the potential to create elevated suspended sediment concentrations, above those which are naturally occurring, immediately around the operational area. However, this effect will not present issues in respect of cumulative ecological effects with any other activities as there are no other activities within the sand extraction area will generate sediment plumes as a result of their ongoing operation.

The only other consented activity in the coastal environment nearby is that of the McCallum Brothers Limited (MBL) sand extraction (ARC28165, ARC28172, ARC28173 & ARC28174). This sand extraction operation is from the near shore area and at its closest, 1.2 km inshore from the currently approved Auckland offshore areas. The proposed new Auckland offshore sand extraction area will be at its closest 850 m offshore from the MBL areas. However, currently with only one vessel in operation, capable of sand extraction at this depth the effects will currently only occur from one site at any one time. There are no current plans to operate more than one vessel at a time, within either consented area or to operate vessels in both areas concurrently. Therefore, the effects in each area are separated by distance and by time and will not result in cumulative effects.

From the ecological components, it is very difficult to estimate or assess cumulative effects, as most of the effects of the sand extraction operations on the biota are transient in space and time. Operationally it is proposed not to repeatedly extract sand from the same specific area over short time periods of less than six months, thus limiting any cumulative effects of repeated disturbance.

The scallop fishery in the area has been very variable in catch between years, with the most recent plenary report (Hartill & Williams, 2014) showing a declining in catch. Thus, the disturbance impact from commercial scallop dredging is not expected to be significant nor contribute greatly to any cumulative effects.

Auckland Council (Review on cumulative ecological effects)

While it is generally agreed with the applicant's view, the following points are noted:

The proposed Area 1 has been extracted for at least 17 years under the existing consent as this area is more accessible and more efficient in relation to operation. This means the Area 1 is likely to have relatively more cumulative disturbance than Area 2. While it is agreed that cumulative effects assessment relies on other similar activities close to the subject area, if the surveys required under the EMMP had control sites prior, during and post (to date), there may be valuable data to understand the cumulative effects from the sand extraction activity by the applicant.

As the Area 1 is exposed to ongoing disturbance from the sand extraction, it is unlikely that the habitat and all benthic biota had enough time to recover from the disturbance. Presence of horse mussels prior to sand extraction and the absence of them after the extraction is an indicator for this recovery process. While some benthic species are transient in time and space, the recolonization will be rapid at least for some short-lived species. As literature suggests, heterogeneity is common where there is ongoing disturbance, this is reflected in the change of taxa percentage abundance observed in the applicant's survey results. There is a possibility some sensitive species in the area have been lost and replaced by some other opportunistic species in area 1. This could not be detected in the recent surveys as the data were not comparable and/or no baseline information.

As the applicant indicated there is at least another sand extraction operation is occurring near shore which would have added to the cumulative ecological effects in the wider context.

While the applicant has provided a draft EMMP, including appropriate sampling sites (impacted and control sites) for monitoring with comparable techniques/methodology will enable to understand the cumulative effects when there is a long-term data.

3.2.6 Applicant's assessment on Underwater noise effects

The applicant has provided an acoustic report titled" Assessment of underwater noise effects: Sand extraction -Auckland offshore extraction area Mangawhai-Pakiri Embayment" prepared by Styles Group, date 21 March 2020.

The acoustic report provides the following:

The main noise sources associated with the extraction activity using trailing-suction hopper dredging (TSHD), the William Fraser will be the drag head making contact with the seafloor, the water jetting and the movement of the sand slurry up the pipe to the hopper. The assessment notes that it has been assessed on the loudest operational stage (active dredging), using measured noise level data of the William Fraser.

This report states that previous research undertaken by Cawthron Institute has identified nine species of marine mammals within or near the current project area, five of which (the more common species) were focused on.

Those five were common dolphins, bottlenose dolphins, killer whales, Bryde's whales and NZ fur seals. Of those nine marine mammal species detected off the northern end of Pakiri Beach, three functional hearing groups have been identified: low-frequency (LF) cetaceans, mid-frequency (MF) cetaceans and Otariid pinnipeds (OW).

In order to assess potential noise effects on those species, two data needs were identified: (1) to understand the existing soundscape; and (2) to understand the source levels and true propagation coefficients of the William Fraser inside the proposed Extraction Area. These investigations were completed between March and June 2019, with two passive acoustic monitoring arrays being deployed inside the southern consent area off Pakiri, and a single measurement array (containing 6 SoundTrap recorders) used to investigate the noise levels of the William Fraser and propagation losses (used to adjust the acoustic models).

Those data revealed a typical soundscape for an open coastal area (with sounds from fish, marine mammals, snapping shrimp, vessels, dredging and weather (wind and waves), generating daily sound pressure levels between 96 and 111 dB re 1 μPa) and dredging noise levels below those from larger TSHDs previously assessed in New Zealand waters (average source level of the William Fraser approximately 168 dB re 1 μPa @ 1m).

Predicted noise emissions from the TSHD William Fraser were evaluated in terms of critical distances for which injury (PTS, where hearing sensitivities do not return to normal following noise exposure), temporary threshold shifts (TTS, whereby hearing sensitivities do return to pre-exposure thresholds after a period of time following noise exposure), risk of behavioural effects (as a percentage over range), and auditory masking (whereby noise interferes with a biologically-important signal that marine mammals rely on).

Injury (PTS) from the sand extraction activities using the TSHD William Fraser is not expected to occur at any stage of the dredging within the Extraction Area, for any species. Temporary threshold shifts are also not expected to occur for any species beyond 1m from the proposed TSHDs. These findings are based on the source levels and subsequent exposure levels being below the 2018 NMFS/NOAA (National Marine Fisheries Service/ National Oceanic & Atmospheric Administration (NOAA) thresholds for PTS and TTS beyond 1m.

Audibility of the dredging noise from the William Fraser is calculated to be within 5.6km, beyond which, acoustic disturbance is theoretically not possible. Based on the measured ambient sound levels and published hearing thresholds for the species listed above, there is a risk of auditory masking and behavioural effects occurring at a limited range from the William Fraser. There is also a risk of auditory masking for fish; however, they are substantially smaller than for the marine mammals. The risk for moderate behavioural responses (defined as those moderate or extensive changes in swimming speeds, direction and/or diving behaviours, cessation of vocalisations for a moderate or extended period, and/or avoidance of the area) was less extensive than low behavioural responses (defined as minor changes in respiration rates, swimming speeds and direction). For example, the 25% probability of a low behavioural response in the delphinids was within 168m compared to 79m for a moderate response. Those ranges drop to 28m and 0m, respectively, for a 50% probability of risk.

The degree of auditory masking (and spatial extent) was highest for fur seals (maximum of 76% reduction in the available listening space (i.e. the volume of ocean surrounding an animal within which a biologically-important sound can be detected) within 15m of the TSHD), followed by bottlenose/common dolphins (maximum 69% Listening Space Reduction (LSR)), orca (68% LSR), then Bryde's whales (66%). The spatial extent of any masking (i.e. greater than 1% LSR) was highest for fur seals, followed by killer whales, bottlenose/common dolphins and then Bryde's whales.

While the underwater noise produced by the William Fraser (new vessel) under normal operation in the southern end of the extraction area, may be faintly heard by marine mammals within the Cape Rodney-Okakari Point Marine Reserve the sound levels are not expected to result in any adverse or behavioural effects within the marine reserve.

<u>Auckland Council (Review)</u>

I concur with the applicant's acoustic assessment and consider the effects on marine mammals from the predicted noise level likely to be less than minor. I note the following reasons for my conclusion:

Table A10 of NFMS (2008) provides the following summary in relation to the onset of TTS and PTS levels (* Cumulative sound exposure level) for different functional hearing groups as below:

Functional group	Potential species	TTS Threshold (SEL *, weighted) dB SELcum	PTS Threshold (SEL *, weighted) dB SELcum
Low frequency	Brydes whale	179	199
Mid frequency	Common dolphin, bottle nose dolphin, killer whale	178	198
OW	Otarid pinnipeds	199	219

	(leopard seal)		
PW	Phocid pinniped (fur seal)	170	185

Since there is no New Zealand guidance on underwater noise effects on marine mammals, the technical guidance produced by the scientific agency of National Oceanic & Atmospheric Administration (NOAA) has been used in the recent projects to assess the underwater noise effects on marine mammals in relation to changes in hearing sensitivity (NFMS, 2018) which is the same guideline used in the applicant's acoustic assessment.

The applicant has predicted an underwater noise level of ~168 dB re 1 μPa @ 1m. This noise level is lower than the level predicted for any functional hearing group in the table above. I agree that there is unlikely to be any risk of TTS or PTS for any potential marine mammal species identified for the application area.

The applicant has recorded ecolocation clicks of dolphins (commons and bottlenose) and brydes whale vocalisations close to the application area. This is an indication that some marine mammal species may be encountered during the sand extraction operation. Whilst the predicted noise level is lower than the TTS and PTS levels, observing marine mammals during the sand extraction operation to ensure they are not within the TSHD operational area will also enable to minimise the effect on marine mammals.

I note that the underwater noise level predictions by the applicant considered only the new vessel, William Fraser while the proposal includes continuing the use of the current vessel, the Coastal Carrier. If the noise level is expected to be different for the Coastal Carrier, underwater noise level for this vessel need to be modelled prior to any works if the consent was granted for this proposal.

I note that as the applicant's acoustic assessment recorded vocalisation calls of brydes whales and whistle clicks of dolphins close to the subject area, there is a potential for vessel strike of threatened marine mammal (brydes) and dolphins if the species encounter the dredge barge. If these cetaceans are observed close to the barge operation area, travelling speed needs to be adjusted to avoid vessel strike on brydes and dolphins.

Monitoring (Auckland Council review)

While the existing consent requires that the Environmental Monitoring Management Plan (EMMP) to record the total volume of sand extracted and the track of the sand extraction vessels, this information has not been linked to the spatial or temporal assessment of ecological effects. The applicant's memo dated 11 September 2019 provided a summary of lessons learnt from the existing consent. This memo states that:

"Since 2003 the monitoring at the Auckland Offshore Sand Extraction site has been under the control of two EMMPs one for each area plus conditions in the Auckland Council Consent. Monitoring under both of these EMMP's has been triggered by the volume extracted which is reasonable. However, the triggers were two stage in that volume triggered bathymetric surveys, which then triggered additional sand composition and benthic biota monitoring. The initial bathymetric trigger has worked well, but the additional monitoring trigger while cutting costs for the operator has not provided adequate data with which to assess effects for a number of reasons. The current bathymetric erosion trigger of additional monitoring at volume triggers has not provided frequent sampling with which to assess changes over time. This combined with poor reporting of baseline data, changes in methods, changes in sampling locations and intensity has resulted in data collected not being able to compared with earlier or later data making an assessment of effects very limited and broad".

I agree with the applicant's statement above and the triggers did not help to monitor the changes in the benthic fauna as there were only two benthic surveys over 17 years (2011 & 2017). The draft EMMP states:

"To determine any potential changes in the seabed conditions or ecology as a potential result of longer-term accumulative causes, monitoring will be undertaken at the conclusion of the extraction of every 500,000m³ (+/- 20,000m3) of sand from the extraction area as a whole. This will form the basis for the Sand Extraction Monitoring Report which is to be submitted to Auckland Council within six months of the requirement for the monitoring being triggered".

While it is not clear how the trigger of 500,000m³ (+/- 20,000m^3) is achieved for the existing consent, the applicant is proposing to have the same trigger for this application. I consider the triggers should be appropriate and adequate to provide monitoring data on changes to benthic biota and sediment composition. In addition, the biota needs to be identified to species level to make the result ecologically meaningful.

3.2.7 Summary of effects on Marine Ecology

Overall, any adverse effects from sand extraction will be from minor in terms of benthic ecology to less than minor in terms fish, birds, marine mammals, water quality and underwater noise on marine mammals.

3.3 References

Desprez, M. (2000). Physical and biological impact of marine aggregate extraction along the French coast of the Eastern English Channel: short- and long-term post-dredging restoration. ICES Journal of Marine Sciences, 57: 1428-1438.

Gorman, R. M., Bryan, K. R., Laing, A. K., Wave Hindcast for the New Zealand region: nearshore validation and coastal wave climate – New Zealand Journal of Marine and Freshwater Research 2003, Vol 37: 567-588.

Hume, T., Nichol, S. Healy, T., Immenga, D. & Mathew, J. (1996). Technical report Marine Sands. Mangawhai-Pakiri Sand Study Module 2, NIWA Client Report ARC6021/2. Hamilton: National Institute of Water and Atmospheric Research Limited.

Hume, T., Smith, R. & Ovenden, R. (1996). Technical Report Marine Sands. Mangawhai-Pakiri Sand Study Module 1, NIWA Client Report ARC6021/1. Hamilton: National Institute of Water and Atmospheric Research Limited.

Hume, T., Smith, R. Oldman, J. & Ovenden, R. (1998). Technical Report Morphodynamics. Mangawhai-Pakiri Sand Study Module 3, NIWA Client Report ARC6021/7. Hamilton: National Institute of Water and Atmospheric Research Limited.

Hume, T., Bell, R., Black, K. & Healy, T. a. (1999) Sand movement and storage and nearshore sand extraction in the Mangawhai-Pakiri embayment. Mangawhai-Pakri Sand Study Final Report, NIWA Client Report ARC60201/10. Hamilton: National Institute of Water and Atmospheric Research Limited.

Kenny, A.J. & H. L. Rees (1996). The Effects of Marine Gravel Extraction on the Macrobenthos: Results 2 Years Post-Dredging. Marine Pollution Bulletin, Vol.32, Nos.8/9, pp. 615-622.

National Marine Fisheries Service (NMFS). 2018. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (Version 2.0): underwater thresholds for onset of permanent and temporary thresholds shifts. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-59.

Sarda´, R., Pinedo, S., Gremare, A., and Taboada, S. (2000). Changes in the dynamics of shallow sandy-bottom assemblages due to sand extraction in the Catalan Western Mediterranean Sea. ICES Journal of Marine Science, 57: 1446e1453.

Water Consult (2000). The Fixed Link. Sand Extraction in Kriegers Flak. Sediment Spill. Final report, March 2000 (Danish).

4.0 STATUTORY CONSIDERATIONS

4.1 Duration of Consent: Section 123

The applicant has sought consent duration for a period of 20 years for the sand extraction.

From the effects point of view, the consent duration sought is appropriate considering the adverse effects will be from minor in terms of benthic ecology & coastal processes to less than minor in terms of fish, birds, marine mammals, water quality and underwater noise on marine mammals from the proposed activities.

5.0 Review

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For: Plans and Places Department, Urban Design Unit, Design Review

Re: CST60343373

Technical review of an application by Kaipara Limited for resource consents, being a coastal permit (s12 RMA) and discharge permit (s15 RMA) under the Auckland Unitary Plan (Operative in part) (**AUP(OP)**), as a discretionary activity overall, to authorise, for a 20-year duration:

- the extraction of up to 2,000,000m^3 of sand, including a limitation of up to 150,000m^3 per annum within an area defined by the 25-30m isobath landform; and
- the discharge of seawater, sediment, sand and material associated with the extraction activity;

within the *'Auckland Offshore Sand Extraction Site'* as defined by the following coordinates:

Point ID	Easting (NZTM)	Northing (NZTM)
1	1758084.67	5990925.30
2	1756328.79	5989464.69
3	1751721.20	5994126.25
4	1748945.94	5998824.36
5	1747812.50	6000863.22
6	1746958.06	6002956.33
7	1748380.44	6004081.89

Being a site of 44,126,536m^2 within the Coastal Marine Area, offshore from Te Arai and Pakiri beaches.

Assessment of landscape, natural character and visual effects – technical specialist review

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Dear Colin

Introduction

1. Following my review of the above application and in response to the relevant submissions that have been made on the publicly notified application, this memo provides my technical review comments.

2. I am familiar with the coastal environment of Te Arai and Pakiri beaches, including from my involvement with a review of other applications in this area over the course of the last three-years; however, for the specific purpose of considering this application, I visited the headland track (which is part of Te Araroa) at Te Arai Regional Park on the morning of 25 June 2020, noting that no sand extraction vessel was operational during my visit. I have visited the area generally when such a vessel has been operational.

Background and terms of reference

3. I have reviewed the following relevant application material (as publicly notified):

- Completed application (Form A), cover letter (7 August 2019) and *'Resource Consent Application and Assessment of Effects on the Environment for the Continuation of Sand Extraction, Auckland Offshore Sand Extraction Site'*, prepared for Kaipara Limited by Osborne Hay (North) Limited, July 2019; with seven accompanying appendices, including:
  - Appendix One: Copy of current Coastal Permit 20795
  - Appendix Two: Sand Extraction Area Plans, titled *'Kaipara Limited, Auckland Offshore Sand Extraction Site'*, Civil Engineering Drawings, prepared by Beca Limited, 16/07/19, including:
    - *'Proposed Extraction Consent Area'*, No. 3233103-CA-010, Rev A;
    - *'Proposed EMMP Management Layout'*, No. 3233103-CA-011, Rev A.
    - *'Existing and Proposed New Operating Areas'*, No. 3233103-CA-012, Rev A; and
    - *'Existing and New Consented Extraction Area'*, No. 3233103-CA-013, Rev A - note an updated version of this drawing (08/06/20) has been provided by the applicant;
  - Appendix Three: *'Kaipara Limited, (TBC), Auckland Offshore Sand Extraction Site, Environmental Monitoring Management Plan'*, Draft V1, 24/07/2019;
  - Appendix Four: *'Auckland Offshore Sand Extraction Site - Review of Coastal Processes Effects'*, prepared by Beca Limited, 15 July 2019; and
  - Appendix Five: *'Assessment of Ecological Effects: Following Sand Extraction from the Auckland Offshore Sand Extraction Site'*, prepared by Bioresearches, December 2017;
- Letter from Osborne Hay (North) Limited (David Hay) to Auckland Council (Shenan Stanton), *'Re: CST60343373 – S92 Response and Public Notification Request'*, 14 April 2020, including attached information from: Beca (Coastal Processes); Bioresearches (Ecology); and Surveyworx Limited (Hydrographic Survey), plus additional / amended application information.

4. I understand that this application, should it be granted, will continue a current sand extraction activity that has been operating since February 2003 over a much larger extent of the coastal marine area, under resource consent (coastal permit) RCAN 0621 (ARC 20795), which has a 20-year duration (expiring in February 2023), with that consent proposed to be surrendered once a new consent has been given effect.

5. I am aware of the relevant statutory provisions which apply for the proposed activity, which is located within the General – Coastal Marine zone under the AUP(OP), as I have included at **Attachment 1**. The site is located offshore from (but not within) an area of identified Outstanding Natural Landscape and High Natural Character under the AUP(OP). The Hauraki Gulf Marine Park Act 2000; the New Zealand Coastal Policy Statement; as well as the Regional Policy Statement and the Regional Coastal Plan provisions of the AUP(OP) are also relevant, when considered under the Resource Management Act 1991.

6. In response to your request for specialist input brief (emailed 15 May 2020), I provided you with my initial *'landscape review'* comments on the application by return email on 26 May 2020. These initial comments noted that I have also been involved in providing specialist review input for the similar application for resource consents by McCallum Bros Limited (BUN6035291 – inshore site). As you are aware, in addition to that application, I am providing specialist technical review input for the council in relation to a second application which has been lodged McCallum Bros Limited (BUN60369079 – mid-shore site).

7. From a landscape, natural character and visual effects assessment perspective, my initial comments to you noted that the Kaipara application does not include a specialist *'landscape effects assessment'*, likely because the application site is not located within parts of the coastal marine area where relevant landscape and natural character overlays under the AUP(OP) apply; being further offshore.

8. I also noted that no photographs (from representative public viewpoints) of the existing sand extraction vessel and/or a comparative photomontage of a larger proposed sand extraction vessel had been provided with the application. I suggested to you that these images would be useful in gaining an appreciation of the likely visibility and visual effects that might arise from the proposal.

9. In response, the applicant provided a series of photographs (captured by Brown NZ Limited in September 2020) from three representative viewpoints, namely: from near the Pakiri River on south Pakiri Beach; from the walking track on Te Arai Point; and from near the Pakiri River on north Pakiri Beach. These photographs capture views towards the William Fraser vessel operating at the 25m and 28m contours. No viewpoint location plan (which I suggest should include the extent of the proposed sand extraction area and approximate vessel location) or expert commentary has been provided with the photos.

10. My initial review comments also noted a preliminary concern in relation to potential visual effects during night operations, particularly given the increased number of people that are likely to occupy dwellings along the coastline and the expectation of remoteness. This issue also has relevance to a cumulative effects consideration and whether or not specific mitigation measures may be required. For example, in response to potential impacts on the experience for recreational viewing audiences, limiting daytime operations and focussing on night operations for certain days of the week and times of the year.

Application review comments

11. It has been difficult to provide meaningful review comments on the application without being able to review a specialist landscape assessment of the proposal. I have also not been instructed to undertake my own detailed assessment of the proposal; however, when providing my review comments of the current application material, I have turned my mind to relevant assessment methodology, factors and my own scale of effects (refer **Attachment 2**) which would have informed such an assessment.

<u>Issues</u>

12. When reviewing this application, I have identified the following relevant issues:

- Do the activities authorised by the existing resource consents (coastal permits and discharge permits) held by Kaipara Limited and McCallum Limited (that will soon expire or be surrendered) form part of the *'existing environment'* for the purpose of an assessment baseline?
- How much greater visibility and effect would result through the use of a different (larger) extraction vessel compared to the vessel with a lesser visual bulk used in current operations?
- In order to avoid, remedy or mitigate adverse landscape, natural character and visual effects, should restrictions be imposed to limit the activity – including in relation to operation times, frequency / duration of operation and the number of vessels on site at any one time?
- What are the potential adverse landscape, natural character and visual effects that might result from the discharge of unwanted extracted material – i.e. will there be a noticeable plume?
- Will lighting during night operations result in adverse effects on people's amenity values?
- Will there be potential cumulative landscape, natural character and visual effects?

13. With the above issues in mind, I provide the following opinions based on my own judgement of the proposal's landscape, natural character and visual effects – based on the application information.

<u>Visibility</u>

14. No visibility analysis has been provided, nor has there been any identification of potential viewing locations or viewing audiences. The Te Arai and Pakiri coastal environment has been seen as a remote location, which forms part of the appeal of visiting the area, particularly when experienced during a variety of weather conditions. However, through recent development and consenting of residential property along this coastline (as enabled under the AUP(OP) through the Te Arai South and North Precinct provisions), my observation is that there has been an increase in viewing audiences and the area is becoming less remote. I have also observed that views from private dwellings out to the water and offshore islands is an important component of the amenity values enjoyed by people living in this area.

<u>Landscape effects</u>

15. The key adverse landscape effect from the proposed activity is in relation to the modification of the underwater *'seascape'* with the sand extraction method disturbing the natural form of the seabed. From my review of the application expert assessments, it is evident that the dynamic nature of the coastal processes that occur will remedy the temporary disturbance of the seabed, so that a natural form will return relatively quickly. Additionally, it is my understanding of the application that the activity will not repeatedly extract sand from one confined area without allowing these natural processes to occur. As such, it is my assessment that adverse landscape effects are likely to be negligible or very low.

16. I have contemplated however, whether natural processes left unaltered (i.e. if sand extraction ceased on site) would create a different *'seascape'* to that which is modified by continued sand extraction operation. Obviously, natural character would be less modified, but viewing audiences are extremely limited.

<u>Natural character effects</u>

17. In my opinion, noting that no expert assessment has been undertaken, there is potential for adverse natural character effects to occur from the proposal. For example, when the vessel is operating in relatively close proximity to viewing audiences, it might be possible for viewers to perceive details such as the on-board sand extraction activity and associated discharge plume. People may associate these aspects of the activity with an adverse effect on their experience of this natural coastal environment, including in relation to the very elements that contribute natural character, including:

    (a) natural elements, processes and patterns;

    (b) biophysical, ecological, geological and geomorphological aspects;

    (c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;

    (d) the natural movement of water and sediment;

    (e) the natural darkness of the night sky;

    (f) places or areas that are wild or scenic;

    (g) a range of natural character from pristine to modified; and

    (h) experiential attributes, including the sounds and smell of the sea; and their context or setting.

18. The repetitive nature of the operation, negative association with the activity and the potential for adverse lighting effects at night might contribute to a heightened sensitivity of viewing audiences. For example, given the relative remoteness of this coastal environment, *"the natural darkness of the night sky"* is an important factor which contributes positively to the experience of natural character.

19. Having said the above, I suspect that combination of viewing distance (being between 1.2km-10.0km offshore), limited frequency of operation and the fact that seeing a vessel of the type proposed in the water is not an unexpected occurrence, that the activity will not be a prominent element. As such, it is my opinion that the likely adverse natural character effects of the proposal will be very low, but controls should be placed over night operations in order to ensure successful mitigation of adverse lighting effects.

<u>Cumulative effects</u>

20. There is the potential for cumulative adverse landscape, natural character and visual effects to arise from the operation of sand extraction vessels under both the Kaipara and McCallum operations – primarily cumulative visual effects in relation to the potential for two or three vessels to be regularly viewed in the same visual catchment as an ongoing repetitive occurrence.

21. I suggest that these potential effects could be mitigated through a coordinated management approach whereby the sand extraction operation under each consent (if each application is granted resource consents) is undertaken with restrictions over the number of vessels that can operate in specified parts of the site at any one time. I note that the applicant has offered a similar type of condition as part of this application and that the approach could form part of the required Environmental Monitoring Management Plan which also forms part of this application.

22. In order to assist with an understanding of the consideration of cumulative effects, I suggest that it would be helpful for the applicant to produce a map which illustrates the spatial extent and relationship of the three application separate areas, within the context of the localised and wider landscape – noting that the McCallum application BUN60369079 (mid-shore site) contains maps which communicate these areas.

<u>Mitigation options</u>

23. It is my opinion that the currently proposed unrestricted operations (24-hours/day - 365-days/year) should be limited in order to avoid, remedy and mitigate adverse landscape, natural character and visual effects. These might include restrictions on weekend and public holiday use, for example.

<u>Consistency with relevant statutory provisions</u>

24. From my review of the relevant statutory provisions in Attachment 2, the key directives seek to:

- Maintain and enhance natural and physical resources
- Encourage restoration or rehabilitation of the coastal environment
- Preserve the natural characteristics and qualities that contribute to the natural character of the coastal environment, to meet the needs of future generations
- Avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character
- Protect visual and biological linkages with areas of outstanding natural landscape and avoid adverse cumulative effects on the values of areas of outstanding natural landscape

- Provide for deposition of appropriate material and enable use in the coastal marine area that results in a minor level of disturbance to the seabed, which can be remedied by coastal processes

- Provide for the extraction of sand from appropriate areas, adopting a precautionary and adaptive management approach, including in relation to environmental monitoring.

25. In my opinion, the application can be made consistent with the intent of the relevant statutory provisions.

Submission review comments

26. I have not reviewed any specific submissions and I rely on your review and recent advice that no specific submissions provide any technical or detailed matters that require specific comment in relation to landscape, natural character or visual effects.

27. You have advised that a handful of submissions mention the *'stealth'* nature of operating at night, alongside some that identify light pollution (including the impact on astrophotography) as relevant issues. You have also advised that other issues make general comments in relation to the landscape values of the surrounding coastline.

28. Acknowledging that further details regarding each submission may likely emerge during the submitters' evidence for the hearing, I note that these relevant issues relate to matters that I have addressed in my technical review and no specific further assessment is required in order to understand the issues.

Recommended conditions of consent

29. Should a decision be made to grant resource consents in response to this application, in order to ensure the avoidance and mitigation of adverse landscape, natural character and visual effects, I recommend that a condition be imposed that restricts lighting on vessels to ensure no objectionable glare when viewing from land viewpoints. I note that the following condition has been suggested by the applicant:

Lighting

(#) For all vessels associated with the sand extraction, to avoid adverse effects on sea birds, lighting is to be inward and downward facing and minimised as far as practicable while still complying with any relevant regulations and safety requirements.

30. In my opinion, the intent of such a condition should be expanded to address visual effects, as well as providing a measurable metric for compliance and monitoring purposes. I suggest the following additional wording for the condition (or similar wording that will achieve the intended outcomes):

Lighting

(#) For all vessels associated with the sand extraction, to avoid adverse effects on sea birds **and to avoid adverse visual effects on people viewing from land**, lighting is to be inward and downward facing and minimised as far as practicable while still complying with any relevant **standards (including those at F2.21.1.2 and E24.6 under the Auckland Unitary Plan – or any subsequent update),** regulations and safety requirements.

31. Conditions which provide controls on operational timeframes should also be imposed, in my opinion, alongside a requirement that the upcoming operational schedule be made available (on a publicly accessible website, for example), so that people wishing to experience a clear night sky (for photography purposes, for example) can check the schedule before making plans to undertake their activities. I suggest the following possible wording for such a condition:

Operating schedule

(#) No sand extraction shall take place during daylight hours on weekends or public holidays and, in order to inform members of the public, the consent holder shall make a copy of each upcoming weekly/monthly operating schedule available for public viewing.

Conclusion

32. Following my technical review of the proposal within the application and the relevant submissions, taking into account the recommended conditions of consent above, it is my assessment that the proposal will result in very low (less than minor and not significant) adverse landscape, natural character and visual effects and therefore be consistent with the relevant statutory provisions.

Please let me know if you require any further clarification.

Regards

Peter Kensington

Consultant Specialist – Landscape Architect[1]
Registered NZILA and MNZPI

On behalf of Auckland Council, Plans and Places Department, Urban Design Unit, Design Review

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Attachments:

1. *Relevant statutory provisions*
2. *Example methodology, factors and scale utilised to determine adverse effects*
3. *Peter Kensington – relevant qualifications and experience*

[1] Refer **Attachment 3** for my qualifications and relevant experience.

Attachment 1

Relevant statutory provisions (note: not all of these provisions, which have been set out in full, are specifically relevant to the topic of landscape issues/effects)

Hauraki Gulf Marine Park Act 2000

Section 8 – Management of Hauraki Gulf

To recognise the national significance of the Hauraki Gulf, its islands, and catchments, the objectives of the management of the Hauraki Gulf, its islands, and catchments are—

(a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:

(b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:

(c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:

(d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:

(e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:

(f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.

New Zealand Coastal Policy Statement 2010

Objective 2

To preserve the natural character of the coastal environment and protect natural features and landscape values through:

- recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;
- identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and
- encouraging restoration of the coastal environment.

Objective 4

To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

- recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;
- maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and
- recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.

Policy 3 – Precautionary approach

(1) Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown, or little understood, but potentially significantly adverse.

(2) In particular, adopt a precautionary approach to use and management of coastal resources potentially vulnerable to effects from climate change, so that:

(a) avoidable social and economic loss and harm to communities does not occur;

(b) natural adjustments for coastal processes, natural defences, ecosystems, habitat and species are allowed to occur; and

(c) the natural character, public access, amenity and other values of the coastal environment meet the needs of future generations.

Policy 4 – Integration

Provide for the integrated management of natural and physical resources in the coastal environment, and activities that affect the coastal environment. This requires:

(a) co-ordinated management or control of activities within the coastal environment, and which could cross administrative boundaries, particularly:

(i) the local authority boundary between the coastal marine area and land;

(ii) local authority boundaries within the coastal environment, both within the coastal marine area and on land; and

(iii) where hapū or iwi boundaries or rohe cross local authority boundaries;

(b) working collaboratively with other bodies and agencies with responsibilities and functions relevant to resource management, such as where land or waters are held or managed for conservation purposes; and

(c) particular consideration of situations where:

(i) subdivision, use, or development and its effects above or below the line of mean high water springs will require, or is likely to result in, associated use or development that crosses the line of mean high water springs; or

(ii) public use and enjoyment of public space in the coastal environment is affected, or is likely to be affected; or

(iii) development or land management practices may be affected by physical changes to the coastal environment or potential inundation from coastal hazards, including as a result of climate change; or

(iv) land use activities affect, or are likely to affect, water quality in the coastal environment and marine ecosystems through increasing sedimentation; or

(v) significant adverse cumulative effects are occurring, or can be anticipated.

Policy 13 – Preservation of natural character

(1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:

(a) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and

(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;

including by:

(c) assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and

(d) ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.

(2) Recognise that natural character is not the same as natural features and landscapes or amenity values and may include matters such as:

(a) natural elements, processes and patterns;

(b) biophysical, ecological, geological and geomorphological aspects;

(c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;

(d) the natural movement of water and sediment;

(e) the natural darkness of the night sky;

(f) places or areas that are wild or scenic;

(g) a range of natural character from pristine to modified; and

(h) experiential attributes, including the sounds and smell of the sea; and their context or setting.

Policy 14 - Restoration of natural character

Promote restoration or rehabilitation of the natural character of the coastal environment, including by :

(a) identifying areas and opportunities for restoration or rehabilitation;

(b) providing policies, rules and other methods directed at restoration or rehabilitation in regional policy statements, and plans;

(c) where practicable, imposing or reviewing restoration or rehabilitation conditions on resource consents and designations, including for the continuation of activities; and recognising that where degraded areas of the coastal environment require restoration or rehabilitation, possible approaches include:

(i) restoring indigenous habitats and ecosystems, using local genetic stock where practicable; or

(ii) encouraging natural regeneration of indigenous species, recognising the need for effective weed and animal pest management; or

(iii) creating or enhancing habitat for indigenous species; or

(iv) rehabilitating dunes and other natural coastal features or processes, including saline wetlands and intertidal saltmarsh; or

(v) restoring and protecting riparian and intertidal margins; or

(vi) reducing or eliminating discharges of contaminants; or

(vii) removing redundant structures and materials that have been assessed to have minimal heritage or amenity values and when the removal is authorised by required permits, including an archaeological authority under the Historic Places Act 1993; or

(viii) restoring cultural landscape features; or

(ix) redesign of structures that interfere with ecosystem processes; or

(x) decommissioning or restoring historic landfill and other contaminated sites which are, or have the potential to, leach material into the coastal marine area.

Policy 15 - Natural features and natural landscapes

To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:

(a) avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and

(b) avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment;

including by:

(c) identifying and assessing the natural features and natural landscapes of the coastal environment of the region or district, at minimum by land typing, soil characterisation and landscape characterisation and having regard to:

(i) natural science factors, including geological, topographical, ecological and dynamic components;

(ii) the presence of water including in seas, lakes, rivers and streams;

(iii) legibility or expressiveness—how obviously the feature or landscape demonstrates its formative processes;

(iv) aesthetic values including memorability and naturalness;

(v) vegetation (native and exotic);

(vi) transient values, including presence of wildlife or other values at certain times of the day or year;

(vii) whether the values are shared and recognised;

(viii) cultural and spiritual values for tangata whenua, identified by working, as far as practicable, in accordance with tikanga Māori; including their expression as cultural landscapes and features;

(ix) historical and heritage associations; and

(x) wild or scenic values;

(d) ensuring that regional policy statements, and plans, map or otherwise identify areas where the protection of natural features and natural landscapes requires objectives, policies and rules; and

(e) including the objectives, policies and rules required by (d) in plans.

Auckland Unitary Plan (Operative in part) 2016 – version updated 12 June 2020

Regional Policy Statement Chapter B8. Toitū te taiwhenua – Coastal environment

B8.2. Natural character

B8.2.1. Objectives

(1) Areas of the coastal environment with outstanding and high natural character are preserved and protected from inappropriate subdivision, use and development.

(2) Subdivision, use and development in the coastal environment are designed, located and managed to preserve the characteristics and qualities that contribute to the natural character of the coastal environment.

(3) Where practicable, in the coastal environment areas with degraded natural character are restored or rehabilitated and areas of high and outstanding natural character are enhanced.

B8.2.2. Policies

(1) Identify and evaluate areas of outstanding natural character or high natural character considering the following factors:

(a) natural elements, processes and patterns;

(b) biophysical, ecological, geological and geomorphological aspects;

(c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;

(d) the natural movement of water and sediment;

(e) the natural darkness of the night sky;

(f) places or areas that are wild or scenic; and

(g) experiential attributes, including the sounds and smell of the sea, and their context or setting.

(2) Include an area in the coastal environment with outstanding or high natural character in Schedule 8 Outstanding Natural Character and High Natural Character Overlay Schedule.

(3) Preserve and protect areas of outstanding natural character and high natural character from inappropriate subdivision, use and development by:

(a) avoiding adverse effects of activities on natural character in areas of the coastal environment scheduled as outstanding natural character; and

(b) avoiding significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment.

(4) Avoid significant adverse effects and avoid, remedy or mitigate other adverse effects on natural character of the coastal environment not identified as outstanding natural character and high natural character from inappropriate subdivision, use and development.

(5) Enable land use practices and restoration projects that will restore, rehabilitate or enhance natural character in outstanding natural character and high natural character areas in the coastal environment.

(6) Provide for the use of transferable development rights to avoid inappropriate subdivision, use and development in or on land adjoining to areas of outstanding natural character and high natural character.

Regional Coastal Plan Chapter E18. Natural character of the coastal environment

E18.2. Objectives

(1) The natural characteristics and qualities that contribute to the natural character of the coastal environment are maintained while providing for subdivision, use and development.

(2) Where practical the natural character values of the coastal environment are restored or rehabilitated.

E18.3. Policies

(1) Manage subdivision, use and development of land adjoining scheduled outstanding natural character or high natural character areas that have a biophysical or visual linkage with the scheduled area to:

(a) avoid adverse effects on the natural characteristics and qualities that contribute to the natural character values of outstanding natural character areas; and

(b) avoid significant adverse effects, and avoid, remedy or mitigate other adverse effects, on the characteristics and qualities that contribute to the natural character values of high natural character areas.

(2) Maintain significant landforms and indigenous vegetation and habitats that are connected to outstanding natural character and high natural character areas.

(3) Manage the effects of subdivision, use and development in the coastal environment to avoid significant adverse effects, and avoid, remedy or mitigate other adverse effects, on the characteristics and qualities that contribute to natural character values, taking into account:

(a) the location, scale and design of the proposed subdivision, use or development;

(b) the extent of anthropogenic changes to landform, vegetation, coastal processes and water movement;

(c) the presence or absence of structures, buildings or infrastructure;

(d) the temporary or permanent nature of any adverse effects;

(e) the physical and visual integrity of the area, and the natural processes of the location;

(f) the intactness of any areas of significant vegetation, and vegetative patterns;

(g) the physical, visual and experiential values that contribute significantly to the wilderness and scenic values of the area;

(h) the integrity of landforms, geological features and associated natural processes, including sensitive landforms such as ridgelines, headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs, streams, rivers and surf breaks;

(i) the natural characteristics and qualities that exist or operate across mean high water spring and land in the coastal environment, including processes of sediment transport, patterns of erosion and deposition, substrate composition and movement of biota, including between marine and freshwater environments; and

(j) the functional or operational need for infrastructure to be located in a particular area.

(4) Promote land use practices and restoration activities that will restore or rehabilitate natural character values.

Regional Coastal Plan Chapter E19. Natural features and natural landscapes in the coastal environment

E19.2. Objective

(1) The characteristics and qualities of natural landscapes and natural features which have particular values, provide a sense of place or identity, or have high amenity value, are maintained while providing for subdivision, use and development in the coastal environment.

E19.3. Policies

(1) Manage subdivision, use and development in the coastal environment adjoining scheduled outstanding natural landscapes or outstanding natural features to:

   (a) protect visual and biophysical linkages between the site and outstanding natural landscapes or outstanding natural features; and

   (b) avoid adverse cumulative effects on the values of outstanding natural landscapes or outstanding natural features.

(2) Manage the effects of subdivision, use and development in the coastal environment to avoid significant adverse effects, and avoid, remedy or mitigate other adverse effects on the characteristics and qualities of natural landscapes and natural features which have particular values, provide a sense of place or identity, or have high amenity values, taking into account:

   (a) the location, scale and design of the proposed subdivision, use or development;

   (b) the extent of anthropogenic changes to the natural characteristics and qualities;

   (c) the presence or absence of structures, buildings or infrastructure;

   (d) the temporary or permanent nature of any adverse effects;

   (e) the physical and visual integrity and the natural processes of the location;

   (f) the intactness of any areas of significant vegetation, and vegetative patterns;

   (g) the physical, visual and aesthetic values that contribute significantly to the natural landscape's values;

   (h) the integrity of landforms, geological features and associated natural processes, including sensitive landforms such as ridgelines, headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs, streams, rivers and surf breaks; and

   (i) the functional or operational need for infrastructure to be located in a particular area.

(3) Ensure appropriate processes are followed with accidentally discovered natural features of potential significance when trenching or excavating in:

   (a) basalt lava in the Auckland volcanic field;

   (b) organic deposits of pre-European age; or

   (c) greater rock strata known to contain fossils.

Regional Coastal Plan Chapter F2. Coastal – General Coastal Marine Zone

F2.3. Depositing and disposal of material

F2.3.2. Objectives

(1) Depositing of material in the coastal marine area is undertaken in appropriate locations to provide for public benefit including erosion management or habitat enhancement and the beneficial use of dredged material.

(2) Areas identified as having significant values are not adversely affected by material being deposited or disposed of in the coastal marine area.

(3) The adverse effects from the disposal of material, particularly any contaminated material, are minimised, where reasonably practicable, or otherwise avoided, remedied or mitigated.

(4) The depositing or disposal of material in the coastal marine area must not have significant adverse effects on the ecological, recreational, cultural, and amenity values of the Hauraki Gulf.

(5) The depositing and disposal of material in the coastal marine area must avoid, remedy or mitigate the spread of harmful aquatic organisms.

F2.3.3. Policies

(1) Provide for depositing of material in the coastal marine area on the foreshore and seabed for beach replenishment where all of the following apply:

  (a) it is free of waste;

  (b) it is free from contaminants and harmful aquatic organisms as far as practicable;

  (c) the material has similar physical characteristics to the sediment at the location it will be deposited;

  (d) it will have environmental, scientific, cultural, amenity or social benefits, or is for erosion management;

  (e) the adverse environmental effects of depositing the material can be avoided, remedied or mitigated; and

  (f) the methods used will include appropriate sediment retention methods to retain the material within the coastal cell in which it is placed. Such methods can include coarser sediment, combined with planting or repeated sand transfer.

(2) Provide for the disposal of contaminated material in an approved reclamation where any contaminants are contained in a way that avoids, remedies or mitigates adverse effects on water quality, aquatic ecosystems and indigenous biodiversity in the coastal marine area.

(3) Avoid the disposal of material in the Hauraki Gulf Marine Park other than where it is part of:

  (a) an approved reclamation;

  (b) a rehabilitation or restoration programme in degraded areas of the coastal marine area; or

  (c) provided for in accordance with section 15B of the Resource Management Act 1991 or Part 3 of the Resource Management (Marine Pollution) Regulations 1998.

(4) Avoid the disposal of material in the coastal marine area where it will have significant adverse effects on any of the following:

  (a) sites scheduled in the D17 Historic Heritage Overlay or scheduled in the D21 Sites and Places of Significance to Mana Whenua Overlay; or

  (b) significant surf breaks identified in Appendix 4 Surf breaks.

(5) Avoid the disposal of material where it will have adverse effects on significant navigation channels.

(6) Avoid the disposal of solid inorganic waste or other matter, such as vessels, or structures in the coastal marine area, unless any of the following applies:

  (a) it is for environmental, scientific, cultural, amenity or social benefits and the adverse effects associated with the disposal can be avoided as far as practicable, or remedied or mitigated;

  (b) there is no practicable alternative method for removal of the vessel, platform or structure from the coastal marine area and its subsequent disposal onto land;

  (c) there will be less environmental effect from disposing of the vessel, platform or structure in the coastal marine area than on land;

  (d) the proposed disposal area will not interfere with or adversely affect other users of the coastal marine area; or

  (e) the disposal is part of an approved reclamation.

(7) Avoid significant adverse effects from the disposal of material, other than the disposal of material in approved reclamations and determine the appropriateness of proposals by taking into account all of the following:

(a) the volume of material;

(b) the degree of contamination and resulting effects on water quality, sediment quality and ecology;

(c) the presence of harmful aquatic organisms in the material to be disposed of and the risk of introducing these into areas where they are not present;

(d) the sensitivity of the receiving environment, with particular reference to natural character and ecological values;

(e) the public use of the area;

(f) the characteristics of the disposal area, with particular reference to the potential for contaminants to be released from the area, and the potential for resuspension of the material;

(g) the disposal technique, and for dredged material, the water content or solidity of the material at the time of disposal;

(h) available alternative disposal techniques, including stabilisation, use as mudcrete, or disposing of the material on land; and

(i) the other matters contained in Schedule 3 of the Resource Management (Marine Pollution) Regulations 1998.

(8) Avoid the disposal of significantly contaminated material in the coastal marine area that is not undertaken as part of an approved reclamation, unless, after undertaking an assessment of waste management options described in Part 1, Schedule 3 of the Resource Management (Marine Pollution) Regulations 1998, it can demonstrate all of the following:

(a) there are no practicable alternative disposal methods or areas; and

(b) the contaminants can be satisfactorily contained within the disposal area, or if it is a dispersive environment, that the adverse effects associated with the release of contaminants will not be significant.

(9) Require the disposal of material to be undertaken in an area that will minimise the spread or loss of sediment and other contaminants to the surrounding seabed and coastal waters, or demonstrate that the site is the best practicable option given the type of material to be disposed of.

(10) Require proposals to dispose of material in a dispersive environment to ensure that the adverse effects associated with the release and spread of contaminants and sediment can be avoided, remedied or mitigated.

(11) Require any disposal of material to be undertaken at a location and time that will avoid, remedy or mitigate adverse effects on all of the following:

(a) the ecological function of the area, such as the growth and reproduction of marine and coastal fauna and flora, including feeding and spawning habitats and migratory pathways;

(b) other established activities, including recreational and commercial use; and

(c) water quality, including any contributing factors which may lead to or promote algal blooms.

F2.5. Disturbance of the foreshore and seabed

F2.5.2. Objectives

(1) Use and development in the coastal marine area that has only short-term and minor impacts on the foreshore and seabed is enabled.

(2) Activities that have long-term impacts or involve more than a minor level of disturbance avoid, remedy or mitigate adverse effects on natural character, ecological values, coastal processes, historic heritage and Mana Whenua values.

F2.5.3. Policies

(1) Enable use and development in the coastal marine area that results in a minor level of disturbance to the foreshore and seabed, or that can be remedied by wave and tidal processes.

(2) Provide for the disturbance of the foreshore and seabed outside areas identified as having significant values, for the purposes of the following:

(a) existing or new infrastructure or drainage systems or where the disturbance is in an appropriate location;

(b) the operation, maintenance, repair, reconstruction and use of existing lawful structures, or infrastructure;

(c) the safe and efficient functioning of drainage systems;

(d) public health and safety; or

(e) the normal operation of vessels.

(3) Provide for the disturbance of the foreshore or seabed that is necessary to protect, maintain or enhance historic heritage or Mana Whenua values, geological, ecological or habitat values, or for public access or research, where this is consistent with maintaining the values of the area.

(4) Limit the area of foreshore and seabed disturbance to the extent practicable and for the works to be done at a time of day or year, that will avoid, remedy or mitigate adverse effects on all of the following:

(a) the feeding, spawning and migratory patterns of marine and coastal fauna, including bird roosting, nesting and feeding;

(b) stability of coastal features such as dunes and coastal vegetation;

(c) public access, recreational and commercial use of the coastal marine area;

(d) other established activities;

(e) traditional gathering, collection or harvest of kaimoana by Mana Whenua; and

(f) historic heritage and Mana Whenua values.

(5) Require activities or works to be done by methods, at times and in conditions that will avoid, remedy or mitigate adverse effects arising from the release of sediment and contaminants into coastal water.

(6) Avoid disturbance of the foreshore and seabed that will result in the following:

(a) significant changes to natural coastal processes that will have adverse effects on surf breaks identified in Appendix 4 Surf breaks; and

(b) cause or exacerbate coastal erosion.

(7) Require where practicable visible disturbance of the foreshore or seabed to be remedied or restored upon completion of works to be in keeping with the natural character and visual amenity of the area that has been disturbed.

F2.6. Mineral extraction

F2.6.2. Objective

(1) The extraction of minerals, sand, shingle, shell, petroleum, and other natural material occurs in a manner that does not have significant adverse effects on the coastal marine area or nearshore environments.

F2.6.3. Policies

(1) Provide for the extraction of minerals, sand, shingle, shell, and other natural material from appropriate areas, having regard to the values of the area and the natural rate of sediment being deposited over sediment lost from the area where extraction is proposed.

(2) Adopt a precautionary approach to applications for petroleum exploration and for mineral extraction within the coastal marine area, which may include using an adaptive management approach in terms of the following:

(a) staging the operation;

(b) the location of the activity;

(c) the maximum volume of minerals, sand, shingle, shell and other natural material to be extracted;

(d) the term of consent; or

(e) environmental monitoring.

(3) Require applications for petroleum exploration or for mineral extraction to identify the significant adverse effects, and the extent to which they can be avoided, remedied or mitigated, for all of the following:

(a) marine and coastal vegetation;

(b) marine and coastal fauna, including feeding, spawning and migratory patterns, bird roosting and nesting, fish and shellfish;

(c) water quality, including effects arising from sediment, turbidity or contaminants;

(d) habitats of a rare or endangered species;

(e) dune stability and coastal erosion;

(f) changes to the bathymetry, foreshore contours, sediment particle size or physical coastal processes;

(g) the values of significant surf breaks identified in Appendix 4 Surf breaks;

(h) recreation and amenity values of the area;

(i) established lawful activities in the area; and

(j) Mana Whenua values.

(4) Require applications for petroleum exploration or mineral extraction in the coastal marine area to include measures to manage any adverse effects, including remediation and mitigation measures.

F2.11. Discharges

F2.11.2. Objectives

(1) Water and sediment quality in the coastal marine area is maintained where it is excellent or good and progressively improved over time in degraded areas.

(2) The life-supporting capacity and resources of the Hauraki Gulf are protected and, where appropriate, enhanced.

(3) Stormwater and wastewater networks protect public health and safety by preventing or minimising the adverse effects of contaminants on the coastal water quality.

F2.11.3. Policies

(1) Avoid the discharge of contaminants where it will result in significant modification of, or damage to any areas identified as having significant values.

(2) Require any proposal to discharge contaminants or water into the coastal marine area to adopt the best practicable option to prevent or minimise adverse effects on the environment, having regard to all of the following:

(a) whether it is practicable or appropriate to discharge to land above mean high water springs;

(b) whether there is a wastewater network in place that should be used;

(c) whether the receiving environment has the capacity to assimilate the discharged contaminants after reasonable mixing, particularly within areas identified as degraded or as having significant ecological value;

(d) the extent to which present or foreseeable future adverse effects have been avoided, remedied or mitigated on:

(i) areas of high recreational use;

(ii) relevant initiatives by Mana Whenua established under regulations relating to the conservation or management of fisheries;

(iii) the collection of fish and shellfish for consumption; and

(iv) areas associated with maintenance dredging;

(e) high ecological values;

(f) cleaner production methods are used where practicable to minimise the volume and level of contaminants being discharged; and

(g) the discharge after reasonable mixing, does not either by itself or in combination with other discharges results in any or all of the following effects:

(i) oil or grease films, scums or foams, or floatable or suspended materials;

(ii) conspicuous change in the colour or visual clarity;

(iii) any emission of objectionable odour;

(iv) any significant adverse effects on aquatic life; or

(v) any significant effects of aesthetic or amenity values.

(3) Provide for discharges that are unavoidable but intermittent, where:

(a) the discharge occurs infrequently;

(b) there are technical and practical difficulties which prevent measures being taken to avoid, remedy or mitigate adverse effects of the discharge; or

(c) there is an appropriate programme, consistent with the best practicable option approach, in place to prevent or minimise adverse effects within a reasonable timeframe.

(4) Minimise, to the extent practicable, the discharge of contaminants in areas that require maintenance dredging.

(5) Encourage source control of contaminants, through the management of land use and discharges, as a method to prevent or minimise contaminant generation and discharge to coastal receiving environments, where source contaminant control devices and methods can practicably be installed and maintained on an ongoing basis.

(6) Reduce the amount of litter entering coastal waters, and mitigate the effects of litter disposal, by encouraging design, maintenance and management initiatives, for discharge structures, road cleaning and other activities, that will help minimise the amount of litter discharged into the coastal marine area.

(7) Enable discharges associated with new or redevelopment of infrastructure to meet the economic and social needs of people and communities, taking into account all of the following:

(a) the practicability of upgrading the part of the infrastructure at issue, the state of the infrastructure and the costs of upgrading it;

(b) public health priorities;

(c) the nature of both the receiving environment and the discharge;

(d) priorities for flooding and inundation protection;

(e) the operational need for stormwater or wastewater infrastructure and associated discharges to be located in the coastal marine area; and

(f) Policies E1.3(8) – (14), (17) – (21) of E1 Water quality and integrated management;

(8) Avoid the discharge of wastewater to the coastal marine area, unless:

(a) alternative methods, sites and routes for the discharge have been considered and are not the best practicable option;

(b) Mana Whenua have been consulted in accordance with tikanga Māori and due weight has been given to section 6, 7 and 8 of the Resource Management Act 1991;

(c) the affected community has been consulted regarding the suitability of the treatment and disposal system to address any environmental effects;

(d) the extent to which adverse effects have been avoided, remedied or mitigated on areas of:

(i) high recreational use, or areas that are used for fishing or shellfish gathering;

(ii) maintenance dredging;

(iii) commercial or residential waterfront development;

(iv) high ecological value; and

(v) marine farms.

(9) Require operators of ports, marinas, ferry terminals and other marine facilities to take all practicable steps to prevent contamination of coastal waters, substrate, ecosystems and habitats that is more than minor.

(10) Require adequate and convenient facilities in ports, marinas, ferry terminals and other marine facilities for the containment, collection and appropriate disposal of:

(a) sewage, bilge water and litter from vessels;

(b) recyclable material including waste oils;

(c) residues from vessel servicing, construction, maintenance and repair;

(d) spills from refuelling operations and refuelling equipment;

(e) spills, residues and debris from cargo operations; and

(f) the discharge of stormwater generated from the port facilities, including facilities located above mean high water springs.

F2.21. Standards

F2.21.1.2. Lighting

(1) Lighting in the coastal marine area must not exceed the levels specified in E24 Lighting.

(2) Outdoor artificial lighting must not produce an illuminance exceeding 150 lux measured horizontally or vertically at the exterior of any building adjacent to the coastal marine area.

(3) Lighting sources must be sited, directed and screened to minimise, as far as practicable, annoyance or nuisance to adjacent properties or the bird life of any adjacent sites within the D9 Significant Ecological Areas Overlay – Marine 1 or 2.

(4) Lighting sources must be sited, directed and screened to avoid, as far as practicable, creating a navigation safety hazard.

Attachment 2

Example methodology, factors and scale utilised to determine adverse effects[2]

1. Baseline consideration

For each representative viewpoint, determine existing values and visibility based on the following factors[3]:

Existing values – the relative extent a landscape is valued in terms of:							
Biophysical Components - landform, vegetation, water bodies, cultural elements / features							
Perceptual Components - expressiveness, legibility aesthetic value, ephemeral / transient values							
Existing values ratings	*Very low*	*Low*	*Low to moderate*	*Moderate*	*Moderate to high*	*High*	*Very high*

Existing visibility – the relative extent a site/development/activity is visible in the landscape in terms of:					
Legibility / Prominence - how legible / prominent is the element from a viewpoint					
Existing visibility ratings	*Not visible*	*Low visibility*	*Moderately visible*	*Highly visible*	*Always visible*

2. Effects consideration

For each representative viewpoint, based on the above existing values / visibility, determine the following:

Landscape effects – the degree of impact from a proposal on:							
Elements and patterns - the extent of change to the structure of the landscape elements / patterns							
Coherence / unity - the extent of change to the perceived integrity of the landscape							
Character / identity - the extent of change to perceptions of sense of place and identity							
Key features / views - the extent of change or disturbance within views of the landscape							
Landscape effects ratings	***Negligible***	***Very low***	***Low***	***Moderate***	***High***	***Very high***	***Extreme***

[2] Noting the meaning of effect under section 3 of the RMA is broader than 'adverse' effects.

[3] With reference to the factors (a)-(g) under Policy B8.2.2.(1) of the AUP(OP).

Natural character effects – the degree of impact from a proposal on people's perception/appreciation of:							
Abiotic factors							
Vegetation type and cover							
Water areas							
Natural elements, patterns and processes							
The presence of human elements							
Landscape effects ratings	***Negligible***	***Very low***	***Low***	***Moderate***	***High***	***Very high***	***Extreme***

3. Overall assessment of effects

From the outputs of 1 and 2 above, in relation to each viewpoint analysis, conclude an overall rating based on:

Rating	Landscape effects	Natural character effects
Extreme	Very serious and obvious degradation of elements, character and values.	Very serious and obvious degradation of elements, character and values.
Very High	Obvious degradation of landscape elements, character and values.	Obvious degradation of coastal elements and patterns and overall naturalness.
High	Marked change to some landscape elements, character and values.	Marked change to coastal elements and patterns; evident reduction in overall naturalness.
Moderate	Appreciable change to some landscape elements and character; more obvious impact on some values.	Appreciable change to some coastal elements and patterns; more apparent change in overall naturalness.
Low	Increasingly evident change to some landscape elements and character; limited change to values (naturalness, expressiveness and aesthetic value).	Increasingly evident change to coastal elements and patterns; slight reduction in overall naturalness.
Very Low	Limited change to some landscape elements and character; no change to values.	Limited change to some coastal elements; no change to overall naturalness.
Negligible	No change or barely legible change to some landscape elements and character; no change to values.	No change or barely legible change to some coastal elements; no change to overall naturalness.

Explanation and use: under the Resource Management Act 1991, where the adverse effects rating of a proposal is a relevant consideration in relation to notification or non-complying activity determination on applications for resource consent; a *'low'* rating equates to a *'minor'* adverse effect. When considering *'significant'* adverse effects, for example in relation to relevant objectives/policies under plans/policies (including the New Zealand Coastal Policy Statement); *'high'*, *'very high'* and *'extreme'* ratings represent a *'significant'* adverse effect.

<u>Attachment 3</u>

<u>Peter Kensington – relevant qualifications and experience</u>

1. I have worked as a landscape architect and a planner for twenty-three years. I am currently a director of Kensington Planning and Landscape Consultants Limited (**KPLC**); formed in September 2017. As a KPLC consultant, I provide professional landscape architectural and planning services for applicants, regulatory authorities and submitters.

2. My relevant qualifications include a Bachelor of Landscape Architecture (Honours), 1995, from Lincoln University (Canterbury) and a Bachelor of Regional Planning (Honours), 1993, from Massey University (Palmerston North). I am a Registered member of the Tuia Pito Ora / New Zealand Institute of Landscape Architects (**NZILA**) and a Full member of the New Zealand Planning Institute. I have been an elected member of the national executive committee of the NZILA (during the 2011-2013 term), as Treasurer, then again appointed as a proxy member between 2016-2017. I have been a member of NZILA awards judging panels, including for the most recent 2019 awards.

3. I have worked for the Christchurch City Council (1995-1997), the Wellington City Council (1999), the Auckland office of Boffa Miskell Limited (1999-2012) and, prior to establishing KPLC, the Auckland Council (**Council**) (2012-2017). At the Council I was a Principal Planner in the Hearings and Resolutions team of the Resource Consents Department. In that role, I was responsible for the case management of appeals, direct referrals, judicial reviews, objections, hearings and independent duty and hearings commissioner processes – in relation to applications for resource consent associated with the geographic area generally defined by the legacy Auckland Council District Plan (Isthmus Section) and the Operative Auckland Council District Plan (Hauraki Gulf Islands Section). In addition to my core role, I also prepared expert landscape architecture evidence in relation to various matters. I also assisted the Resource Consents Department's Practice and Training team with interpretation and integration of the Auckland Unitary Plan (Operative in part) into the department's practices and procedures.

4. My landscape architectural work is focussed within the landscape planning speciality of landscape architecture, where an assessment of effects on natural character, landscape and/or visual amenity values is required primarily in relation to applications for resource consent or plan changes. Throughout my professional career, I have provided expert landscape architectural advice in relation to many matters where an assessment of the effects of proposed developments on the landscape character and visual amenity values of urban, rural or coastal environments is required. The majority of my recent KPLC consulting over the past three-years has been undertaken on behalf of the Council's Resource Consents Department, primarily through the former Auckland Design Office, design review team.

5. This includes providing professional expert advice in relation to pre-application meetings and with the formal review of applications for resource consent, such as the following recent projects:

   i. Coastal edge protection works, Marine Parade, Herne Bay
   ii. Wharf and base facilities for hosting of the 36th America's Cup
   iii. Expansion of existing Half Moon Bay Marina (North Pier Marina)
   iv. Replacement sea wall / landscaping at Brett Avenue, Takapuna
   v. Relocation of *'Sea Link'* vehicle ferry operations at Wynyard Point
   vi. Relocation of downtown ferry terminal facilities, Ferry Basin
   vii. Coastal residential subdivision (sixty vacant lots), Te Arai South
   viii. Establishment of golf courses / ancillary activities, Te Arai South
   ix. Construction of new dwellings at Tara Iti, Te Arai North
   x. Boat deck / public access ramp, Kohimarama, Tamaki Drive
   xi. Retrospective / ongoing quarry activity, Lake Road, Te Arai
   xii. Replacement bascule bridge, Wynyard / Viaduct Harbour.

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MEMO

TO: Colin Hopkins, Planning Consultant

FROM: Bin Qiu, Noise Specialist

DATE: 2/06/2020

SUBJECT: CST60343373

Resource Consent Application for Auckland Offshore Sand Extraction Site - Coastal Marine Area (Offshore from Pakiri), Auckland

Noise Considerations

* * * * * *

Dear Colin

I refer to your request for commenting on the potential noise effects of the proposed activity - sand Extraction in Coastal Marine Area (Offshore from Pakiri).

I have read the application information including the AEE report prepared by Osborne Hay and the Airborne Noise Effects Report prepared by Mr Jon Styles of Styles Group Acoustics & Vibration Consultants.

The proposal is to extract up to 2,000,000 m^3 of sand per year for 20 years from seabed of the Auckland Offshore Sand Extraction Area in the Mangawhai-Pakiri embayment, the extraction is carried out by a new purpose-built trailing suction dredging vessel. The details of sand exact location and methodology are described in Section 2 of AEE.

The sand extraction area is approximately 44 km^2, the landward side (the western boundary) of this area is between 1.2km and 2km from the shoreline.

Auckland Unitary Plan Operative in part (AUP)

The extraction area is zoned Coastal General Coastal Marine Zone (GCMZ), the zoning of lands along the extraction area varies including Coastal Transition Zone, Open Space Conservation Zone OSCZ, Open Space Informal Recreational Zone, and Rural Coastal Zone RCZ. The Style Group report advises that the closest existing and future residential dwellings are located in RCZ and typically separated further from the coastline by distances of 120-200m.

The relevant AUP noise rules are E25.6.14 Noise levels at the coastal interface and E25.6.22. All other zone interfaces.

Residential dwellings are located within the RCZ so will be protected by noise limits set out in E25.6.14.

The AUP does not prescribe noise limits for noise that is generated within the GCMZ and received within other zones mentioned above like CTZ or OSCZ, in these zones, the report quotes the requirement of Section 16 of RMA.

Discussions

The relevant AUP zoning and AUP noise rules have been discussed in the noise report, the sand extraction operational noise has been calculated by Mr Styles in his report for potential receivers at the various zoned locations, the results are as follows:

On Beach with on shore winds 25-30 dB LAeq,

On OSCZ (further inland from beach): 20-25 dB LAeq,

On Rural Coastal Zone at closest residential sites: less than 15 dB LAeq.

Nosie effect

The noise limits on the residential sites at Rural Coastal Zone are 50 dB L_{Aeq} (7am-10pm) and 40 dB L_{Aeq} and 75 dB L_{Amax} (10pm -7am), these levels are also the most stringent noise limits for all zones listed in E25 of AUP, the sand dredging noises are predicted to be less than 15 dB L_{Aeq} at this zoned land, which are well within these limits for the Rural Coastal Zone and other zones where applicable.

There is no limit for area on beach and on OSCZ/CTZ, but the ambient noise has been surveyed and presented in the report: on calm condition, the ambient noise on the beach (wind and swell) was recorded as 50 dB L_{Aeq} and 45 dB L_{A90}; in onshore wind condition, the noise reached 65 dB $L_{Aeq\ 15\ min}$ and 60 dB L_{A90}. It appears that the sand extraction activity noise will be significantly lower than the ambient noise levels and are unlikely to have adverse effect to the beach goers and people on the open space and CTZ zoned land.

The predicted sand extraction activity noise is well below the most stringent noise limit of 40 dB L_{Aeq} at any occupied site and is significantly below the ambient noise levels. It may not be auditable over the ambient noise; the sand dredging noise is fully compliant with applicable AUP noise limits and is not unreasonable for people on shoreline and lands adjacent to the proposed activity zone.

I concur with Mr Styles assessment and conclusions.

I have also reviewed the proposed noise condition recommended in the AEE report and suggest it be amended to be consistent with the relevant AUP E25.

Conclusions

The potential noise receivers and applicable noise limits/assessment criteria have been identified and discussed in the applicant's acoustic report, the ambient noise level and the noise of proposed sand extraction activity have been surveyed and assessed, the predicted noise levels from the proposed activity are significantly below the ambient noise levels and readily comply with the applicable AUP noise limits (day and night). I also agree with the noise report's conclusion, the noise from sand dredging is reasonable in terms of Section 16 of the Act. No noise mitigation measures are required.

Recommended Conditions of Consent

The proposed noise condition (#12) in AEE may be amended to read:

The noise (rating) level and maximum noise level from any pumping or mechanical equipment used in the sand extraction process shall not exceed the following at the adjacent coastline and within the notional boundary of a site in Rural Coastal zone:

50 dB L_{Aeq} 7am – 10pm and

40 dB L_{Aeq} and 75 L_{Amax} 10pm – 7am

The noise levels must be measure and assessed in accordance with the NZ Standards NZS 6801:2008 Measurement of environmental sound and the NZS 6802:2008 Acoustics – Environmental noise.

Please do not hesitate to contact me directly if you have any further queries.

Yours sincerely,

Bin Qiu

Noise Specialist