FTAA-2504-1048

22 September 2025

Fast-track Team

Environmental Protection Authority

Via Application feedback portal:

Tēnā koe

Response to request for section 51 report for Taranaki VTM Project

Request Overview

Project Name	Taranaki VTM Project
Project Applicant	Trans-Tasman Resources Ltd
Fast-track Request Number	FTAA-2504-1048
Relevant EEZ Approvals Sought	Marine and Marine Discharge Consents
Fast-track Request Summary	The Panel Convener directs the EPA to obtain advice and a report from the EEZ Act team within the EPA (the relevant administering agency in respect of marine consents) pursuant to section 51(1) of the Fast-track Approvals Act 2024 (the Act).
Response due date	Within 10 working days after the panel set up to determine the application invites comments under section 53.

Fast-track substantive application requested advice

1. In relation to the substantive application, Taranaki VTM Project (**the application**), the panel convener issued Minute 1 directing the Environmental Protection Authority (**EPA**) to obtain advice and a report from the EEZ Act team within the EPA, under section 51 of the Fast-track Approvals Act 2024 (FTAA).
2. The EPA is to file a report advising:
    a) how the weighting of matters set out in Schedule 10, Clause 6 of the Act is to be approached, having regard to relevant senior court decisions;
    b) whether they disagree with or wish to expand upon the expert technical reports or assessments lodged in support of the marine consents sought;
    c) their recommendation either to grant, subject to conditions, or decline the marine consents sought and the basis of such recommendation;
    d) any proposed amendments they consider necessary to conditions proposed in the application in the event of a recommendation to grant the marine consents sought.
3. Senior advisor of the EEZ Act team, Dr Ursula Rojas Nazar, has prepared the below report. Dr Rojas Nazar holds a PhD in Marine Biology from Te Herenga Waka – Victoria University of Wellington and has held the position of Senior Advisor, Technical Support – Land & Oceans Applications, at the EPA since August 2022.
4. Dr Rojas Nazar's background is in ecological and socio-ecological studies related to marine and coastal environments. Over the past decade, she has worked extensively with both government and non-government organisations, primarily in the marine field, with a focus on environmental protection and sustainable practices. Her technical and regulatory expertise is in the resource development sector, including environmental monitoring, applied research, and stakeholder engagement. Her professional experience spans roles as a scientist, practitioner, and academic.

Response to questions from the Panel Convener

a) how the weighting of matters set out in Schedule 10, Clause 6 of the Act is to be approached, having regard to relevant senior court decisions;

I consider this to be a legal issue, on which the Panel may want to seek their own independent legal advice.

b) whether they disagree with or wish to expand upon the expert technical reports or assessments lodged in support of the marine consents sought;

I do not consider it appropriate for me disagree (or not) with the technical reports or assessments lodged in support of the application as not only are some of these topics outside my area of expertise those are matters for the Expert Panel to determine. I have, instead, examined the application from a technical perspective and highlighted areas that may be of particular interest to the Expert Panel.

General Comments

For this report I have reviewed the documents supporting the Taranaki VTM Project application, listed in **Appendix 1** of this report. Based on my assessment of the documents listed, I am of the view that the activity is broadly described, and key components are identified. However, I consider that there are several areas where the Expert Panel may require further technical clarification and environmental

justification to ensure that all potential effects are fully understood, properly assessed and appropriately managed. I discuss these in the next section (*Detailed comments)*. Addressing the following points would strengthen the robustness of the environmental assessment and align the application with good industry practice and regulatory expectations.

Impact assessment

1. There are discrepancies within the application, such as inconsistent statements regarding the use of chemicals in reverse osmosis and a lack of clarity on their management. For instance, Section 5.10 of the application document describes the trace metals expected in discharges, and the executive summary states no chemicals will be discharged. Clearer articulation of operational methods and chemical handling would assist in clarifying this.
2. While a reasonable effort to identify the relevant matters appears to have been made, I consider there are several matters that require clarification (please refer to section *Detailed comments*). Much of the information referenced in the application dates back approximately ten years or more. It is therefore necessary to consider the historical issues identified in that material and to assess whether the applicant's 2016 responses adequately addressed those concerns. The reliance on dated information also raises questions about whether the application provides a sufficiently current understanding of potential environmental effects, therefore it would be useful for the Panel to consider whether the information provided is the best available information in line with s61 of the EEZ Act.
3. It is important to note that the file includes an "*19.21 Updated Environmental Impact Assessment 2025*". However, this document is a summary of monitoring reports previously submitted by the applicant in earlier applications. The summary does not contain any new assessment of the risks associated with the proposed activities, and no new data or updated analysis has been provided in support of this application.
   Furthermore, since the time the original environmental data was collected, additional activities have occurred in the area, such as the Kupe oil and gas development. These activities may have resulted in changes to the receiving environment that could affect the relevance or reliability of the older data relied on in the application.
4. ***EPA Key Issues Report- Trans-Tasman Resources Limited offshore iron sand extraction and processing project – application for marine consents and marine discharge consents - September 2016*** may be a useful resource, which is publicly available in the following link under "*EPA Key Issues Report*": Reports, advice and evidence | EPA . .

Detailed comments:

Technical Documents Submitted by the Applicant

The applicant has submitted a substantial volume of technical documents to support the application. While this material contains a considerable amount of information, several issues have been identified that could be addressed to improve clarity, transparency, and confidence in the application:

1. **Linkage to the Application:** I found it difficult and confusing to determine which parts of the technical documents support specific sections of the main application. It would have been helpful if the applicant clearly indicated within the main application which documents provide supporting evidence for particular statements or claims. Currently, it appears that all material has been provided without guidance, leaving the reader to determine relevance.

2. **Draft Status and Currentness:** Several documents are still in a *draft* state and contain unresolved elements, such as missing appendices or incomplete sentences. Many documents are also around 10 years old. In my opinion, the draft status and age of the documents contribute to uncertainty, as it is unclear whether the information has changed over time. Examples as follows:

    - Report breaching tests, New Zealand - GR 067 (Draft 2013)
    - Trans-Tasman Resources Ltd Iron Sands Offshore Ironsands Project C8381 High Level Optimization of Processing Plant Power Requirements (Document issued for comments – 2014)
    - Outline / Preliminary Tender Specification Mining Vessel TTRL (For approval in principle – 2014)

3. **Unaddressed Recommendations from technical reports:** Some technical reports presented in this application include clear recommendations for the applicant, particularly regarding operational methodology. For example, in the document *Process Plant Review* (Page 216), the following has been recommended :

    "dewatering process is new and pending patent". also dewatering magnetr [sic] new testing recomended.3.10 Desalinated Water Testwork. Although the desalination system was outside of DRA's scope of review, it is however important to quantify the mineral content in the desalinated water (chlorine, potassium and sodium, etc) as these could have an impact on the final product specification."

    It is not clear to me whether these recommendations have been implemented. The applicant could address this by explicitly stating which recommendations have been addressed and describe the consequences for the impact assessment.

4. **Outdated or Inconsistent References:** Some documents cite outdated references, while others refer to updated analyses or re-run assessments. This inconsistency is confusing, as the application refers to one set of reports while the evidence indicates more recent information exists. To reduce uncertainty, the applicant could ensure all reports are updated to reflect the latest and best available information, in line with the EEZ Act. In particular, the most up-to-date references should be used; for example, when applying ANZECC guidelines, all parameters should be compared against the latest version (2018).[1]

5. **Referenced Material not provided:** In both the application and the expert evidence, references are made to documents that appear to have been used in the assessment of effects. However, these documents were not included in the application package. While a comprehensive review of omitted referenced materials has not been undertaken in this response, several examples have been identified. To address this, the Expert Panel could request that the applicant review the list of referenced documents, confirm which have not been provided, and submit those necessary to ensure transparency and best available information. For example, in the application document

[1] For example, check *"Iron sand extraction in South Taranaki Bight: effects on trace metal contents of sediment and seawater" AUT Client report: TTRL 20138 - September 2013"*

the applicant cites reports and expert evidence from previous applications, such as joint conferences or reports. These are often included as footnotes, but the references are inconsistently provided: some are complete, others are not; some links do not work; and in certain cases, the source is listed only as an "*unpublished*" report. Ideally, the applicant would ensure all links are functional, provide copies of reports that are material to the statements made in this application, and include only references that can be reviewed. Examples of referenced documents not provided as follow:

- *Application document page vi, footnote 1: "ASX release 1 March 2023"*
- *Application document page 41, footnote 25: "Environmental Protection Agency, Joint statement of experts in the field of effects on bathymetry and oceanographic processes. Dated 20 March 2014"*
- *Application document page 67, footnote 45: "Torres, L.G., Compton, T., Fromant, A., 2013. "Habitat models of southern right whales, Hector's dolphin, and killer whales in New Zealand" NIWA Client Report No: WLG2012-28. October 2013. 61 pp. Updated November 2015."*
- *Application document page 131, footnote 104: "See memo from Dr Dearnaley on 22nd February 2017 for a summary of parameters varied: https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence-Applicants-evidence/b877c5d2fb/TTRWorst-case-parameterisation-for-source-term-for-use-in-sediment-plume-modelling.pdf"*
- *Application document page 186, footnote 141: "Statement of Evidence in Chief of Dr Kay Vopel on behalf of Trans-Tasman Resources, 15 February 2013, Paragraphs 66-67."*
- *Application document page 187, footnote 146: "Paras 587-599 and 614-616"*
- *Application document page 193, footnote 151: "TTR Marine Consent Decision. 15 June 2014. Para 400"*
- *Application document page 202, footnote 158: "Humpheson D (2017) Trans-Tasman Resources - Acoustic Modelling.* ***Unpublished*** *report to TTR."*
- *Application document page 205, footnote 162: "EPA (2024) A joint statement of experts in the field of effects on marine mammals. 19 February 2024."*
- *Hadfield, M.; Macdonald, H. (2015). Sediment plume modelling. NIWA Client Report No. WLG2015-22, 103 p*
- *Macdonald, H.S and Hadfield, M.G. (2017). South Taranaki Bight Sediment Plume Modelling Worst Case Scenario, 51 p.*
- *MacDiarmid, A.; Gall, G.; Stewart, R.; Robinson, K.; Fenwick, M. (2015). Zooplankton communities and surface water quality in the South Taranaki Bight February 2015. NIWA Client Report No. WLG2015-25, 22 p.*
- *Torres L.; Gill, P.; Hamner, R.; Glasgow, D. (2014). Documentation of a blue whale foraging ground in the South Taranaki Bight. NIWA Client Report No. WLG2014-17, Prepared for DOC, OSU, IFAW, Greenpeace NZ, Todd Energy, 34 p*

6. **Document Duplication:** Some files appear to be duplicated. For example, document *Attachment 3a: Siecap Taranaki VTM Project Pre-Feasibility Study Offshore Iron Sands Project 25 March 2025 - Part1*, Table 30 (at Page 207 of the document) lists all retained, removed, or new documents, yet

at least three documents (*19.21 Updated Environmental Impact Assessment*; *19.25 EPA Approved Marine Consent Conditions 2017*; *Metallurgical Review: Recovery of Vanadium from Taranaki VTM Project*) appear as appendices, but the applicant also includes files with the same name as separate files. It is unclear to me if these are the same or different files. Ideally, the applicant would ensure only one final version of each document exists, clearly indicating its purpose and relevance to the main application.

The Expert Panel may consider that it would be useful if the applicant reviewed all technical materials to ensure clarity, finalised draft documents, resolved inconsistencies, confirmed implementation of recommendations, updated analyses and removed duplicates and/or unnecessary files. This will improve the transparency and reliability of the application and facilitate a more effective review process.

Technical comments

Desalination process:

In Section 2.3.2.1 - Project description (page 13) of the application document, it briefly explains a process that requires desalinated water use and iron ore washing. Later in section 2.3.2.3, the application mentions that "*Extracted iron ore material will be slurried with desalinated water from the IMV and pumped via floating hoses to the FSO vessel*".

Section 2.3.6 (Transfer from IMV to FSO Vessel) again briefly explains the desalination water process as follows:

"*Ten proprietary reverse osmosis units will be used on the IMV to generate sufficient desalinated water for transferring the iron ore concentrate to the FSO vessel. A peak daily production of 30,000 m3 of desalinated seawater will be required, and a total annual requirement of approximately 5,000,000 tonnes.*

All chemicals used in the operation of the reverse osmosis plant will be collected and retained for onshore disposal by approved contractors. There will be no chemicals or contaminant by-products discharged to the sea as a result of any processing or water treatment activities related to the project.

As a final process, the iron ore concentrate having been rinsed with the desalinated water, will be de-watered to a final moisture content of less than 10% using hyperbaric disc filtration on-board the FSO vessel using similar equipment as shown in Figure 2.9 below.

The clean resalinated water from the filter system, will be discharged via an outfall pipe located 1m below the surface near the bow of the FSO vessel. Once the iron ore concentrate transfer operation is complete, the vessels will be disconnected and the floating slurry lines relocated back onto the IMV."

Despite the desalination process being referenced in the following documents: *Taranaki VTM Project Pre-Feasibility Study Offshore Iron Sands Project – March 2025*; *19.13 IHC Mooring Analysis*; and *19.23 - DRA Process Plant Review*), I consider that the Expert Panel may require further detail be provided to address the following matters.

I. Desalinated water and iron ore washing

The process of washing the iron ore concentrate to reach chloride levels below 350 ppm is briefly explained. However, greater clarity could be provided regarding:

- The expected chloride content of the discharge.
- Whether chlorides are released into the marine environment or managed onboard.
- Any pre-treatment or separation process prior to discharging used water.
- Potential environmental effects of residual chloride discharge.

II. Desalination Process and Discharge Impacts:

The proposal to produce up to **30,000 m³** of desalinated seawater daily (**approx. 5 million tonnes annually**) introduces several technical and environmental concerns:

- The discharged water's characteristics (temperature, salinity, pH, oxygen, and chemical composition) could be evaluated for compatibility with the surrounding marine environment.
- More detail with respect to the description of discharge via an outfall pipe located 1 metre below the surface would be useful regarding:
  - Discharge rate and frequency
  - Thermal or density-driven effects (e.g., stratification)
  - Impacts on planktonic organisms and surface water quality
  - The rationale for **surface-level discharge** could be provided, alongside an environmental effects assessment of this design choice.
  - A mixing zone assessment to understand how far the brine will disperse and at what dilution levels, could assist to assess potential ecological impacts.

III. Extraction Method:

The application explains that studies undertaken for this proposal demonstrated that:

"*The Metallurgical Review report findings specify that the recovery rate for extracting vanadium from iron sands under laboratory conditions peaked at 79% with a sustainable sodium salt roasting–water leaching process*." (application document, page 14)

On this basis, the application indicates an intention to use this method. However, the *Metallurgical Review report* (Siecap) identified significant challenges associated with the process, including (page 14):

- Formation of stable solid compounds during roasting, particularly with silicon (Si) and aluminium (Al), which reduces vanadium availability.
- Generation of high-salinity, ammonium-rich wastewater during vanadium precipitation, increasing treatment costs.
- Emission of harmful kiln gases, requiring advanced gas scrubbing systems to minimise environmental impacts.

In addition, because the productivity of the roasting method depends on the type of additives used, the Siecap report assessed two roasting salt methods: Sodium Carbonate (Na_2CO_3) and Sodium Chloride (NaCl). Both methods were found to generate by-products with varying levels of environmental impact (pages 22–23).

Within this context:

- The application does not specify which roasting salt method (Na_2CO_3 or NaCl) will be used.
- The impact assessment does not evaluate the potential effects associated with either roasting salt method.

Furthermore, as the roasting salt methods have only been tested at laboratory scale, the Metallurgical Review report recommended a series of pre-industrial trials, including pilot-scale testing using a 20 kg sample of titanomagnetite concentrate (page 18). Siecap described these recommendations as "*critical to establishing a commercially viable and technically sound vanadium recovery process*."

- The application provides no clarity on whether the applicant has undertaken the recommended pilot-scale testing or what the outcomes were, particularly with respect to environmental effects observed at a larger scale.
- If the applicant has not completed the recommended pre-industrial testing (as advised by Siecap in February 2025), I consider there remains substantial uncertainty about whether this process, one of the core processes of the proposed activity, will perform as intended at commercial scale, and about the potential environmental consequences of its application.

IV. Use and Management of Chemicals:

The application states that no chemicals will be used (refer to *Environmental Leadership* in the *executive summary* and section 5.10.2.1 -page 207). However, this is inconsistent with the stated use of chemicals in the reverse osmosis desalination process. To avoid confusion or underestimation of risk, the Expert Panel may wish to have the following clarified:

- A list of chemicals used for reverse osmosis membrane cleaning and operation (e.g., antiscalants, biocides, chlorine).
- Handling, containment, and spill response protocols.
- Amendments to the application to reflect that chemicals are used but managed with no marine discharge.
- Explanation of how the applicant will ensure that no chemicals will be released into the water.
- Mitigation plan in case that the chemicals ended being released into the water.

V. Pre-Treatment Chemicals:

It would be beneficial for the applicant to clearly state and describe in detail which chemicals are used in pre-treatment, their concentrations, and to either confirm that no residual chemicals will enter the marine environment or to evaluate potential effects of those chemicals on marine organisms, including plankton, filter feeders, and benthic communities.

VI. Brine-Plume Interaction with Marine Habitat:

The application does not consider brine modelling. Please note that brine plumes can lead to hypersaline layers affecting benthic and pelagic communities. The Expert Panel therefore may want to:

- Consider requiring modelling the interaction of the brine plume with local currents, tides, and seasonal conditions to predict dispersion and potential impacts on benthic and pelagic habitats.

- Consider requiring assessment of whether the brine could settle on the seabed and affect sensitive habitats such as sand or rocky reefs.

VII. Operational and Maintenance Risks

The Expert Panel may consider requesting that the applicant provide clear measures for periodic membrane cleaning and maintenance to prevent accidental brine or chemical releases.
I consider it would be beneficial for the Expert Panel to understand contingency measures in case of plant or membrane failures and how these will prevent impacts to the marine environment.

Maintenance and Waste management

Maintenance requirements for vessels and machinery are very briefly acknowledged in section 2.3.2.1 *Integrated Mining Vessel* (page 18), and later in table 4.1 (page 112). Additionally, the application refers in 5.2.3.4 *Other Quantitative Impacts* (page 126, 128, and 129) that the project will contract external services including "maintenance" without specifications or details.

I. Onboard Substances:

For vessels and machinery maintenance there are different types of maintenance, and each of them could cause different impacts on the environment, because it includes the handling of several chemicals and lubricants, within this context, further clarification could be provided regarding:

- Whether routine or non-routine maintenance (including the handling of lubricants, and solvents) will occur in situ.
- The storage, handling, and containment measures for maintenance substances onboard.

II. Hull Cleaning and Antifouling Measures:

While it is noted that long-life antifouling coatings and cathodic protection will be used (please refer to section 2.3.2.1 *Integrated Mining Vessel* – page 18 of the application document), I consider that further detail would be useful for the following:

- The type of antifouling substances and their active ingredients.
- The storage and handling protocols for such substances onboard.
- Specifics of the in-water hull inspection and cleaning process (e.g., frequency, methods, and containment of debris or residues).

III. Waste Management from the AHV:

The nature and origin of the waste referred to on page 21 (section 2.3.2.5 *Anchor Handling Vessel* of the application document) are not specified. The Expert Panel may wish to clarify:

- Whether this waste includes organic, oily, sanitary, or chemical waste.
- From which activities the waste arises.
- The onboard management and storage procedures prior to onshore disposal.

Sub-activities effects and Cumulative effects

The application assesses the potential environmental effects on existing interests arising from the proposed iron sand extraction project, including cumulative effects and proposed mitigation measures, however I consider there remain other matters that may be relevant for the panel to consider on the effect assessment, for example:

I. Cumulative effects

Despite the application document mentioning that the potential of cumulative effects has been assessed in this application (section 3.1 *Introduction* - page 35 & section 5.1 *Introduction* - page 117), in my opinion the cumulative effects assessment is limited in scope, focusing mainly on suspended sediment and visibility (section 5.5.5 Cumulative Ecological Effects of Suspended Sediments – page 182 & 5.11.3 Summary of Potential Effects – page 212-113).

There is a section (5.13.2.9 Commercial Fishing Exclusion - Cumulative Effects - page 241) where the applicant considers that the exclusion of fishers, as a result of this activity, in conjunction with other regulatory closures to protect dolphins, constitutes cumulative effects that could "*potentially"* cause some set net fishers to have limited flexibility to respond to even small additional exclusions in the future. However, there is no assessment of the cumulative effects on the environment for these two activities (the application and the fishers together) on the environment.

More broadly, many assumptions regarding effects, consequences, and recovery have been considered in isolation, rather than evaluating the combined and cumulative impacts across ecological receptors. For instance, the application predicts that effects of reduction of light on primary production would be localised and temporary. Yet, primary production will not be influenced by light reduction alone: other environmental pressures resulting from the activity, such as nutrient availability, increased suspended organic material, potential discharge of hazardous substances, and changes to physical water characteristics also directly affect primary production.

Furthermore, the project is proposed to operate continuously (24 hours a day, 7 days a week) for 35 years. This means pressures will be ongoing and long-term. Although the application suggests that once sand removal ceases in one mining block the stress will stop, this assumption overlooks the uncertainty surrounding recovery timelines.

This application does not assess cumulative impacts across ecological receptors, including multiple stressors, against long-term timelines and the uncertainty around recovery. In my opinion, this is needed to provide a realistic understanding of the potential regional and ecosystem-wide impacts.

II. Sub-activities

The main activities associated with the project, such as seabed extraction, de-ored sediment redeposition, and iron ore concentrate transfer, have been adequately identified and considered within the environmental effects assessment. However, I consider that several supporting sub-activities that are expected to occur routinely and on a daily or periodic basis, such as vessel maintenance, hull cleaning, and the use of chemicals in the reverse osmosis desalination system, are not fully described (section project overview – pages 15 – 19). While these may be considered ancillary, their repetitive nature means they have the potential to generate both short- and long-term environmental effects, particularly if substances are stored or handled onboard, or if discharges, thermal, chemical, or saline, occur without clear mitigation measures. The limited detail provided on these sub-activities introduces, in my opinion, a degree of uncertainty into the overall assessment of environmental effects. A more detailed description would assist the panel to fully evaluate cumulative effects and the adequacy of proposed mitigation measures.

Rare and vulnerable ecosystems and habitats of threatened species

The assessment submitted includes some consideration of sensitive environments drawing largely on NIWA surveys conducted in 2013 and predictive modelling of reef-associated taxa (e.g., corals, sponges, bryozoans). While this provides a useful baseline, the analysis appears limited in scope and does not incorporate more recent scientific findings, such as the identification of sponge gardens and other sensitive environments in New Zealand waters.

Although the applicant concludes that no rare or vulnerable ecosystems are present, this finding is based on dated surveys and generalised habitat descriptions (*3.3.1.2 Offshore Benthic Ecology – Page 51* of the application document). It is also unclear to what extent predictive models have been applied to evaluate the potential presence of sensitive environments that may not have been detected in earlier surveys.

Given the sensitivity of these species and habitats, the effects of the proposed activity, including indirect and cumulative impacts, could be more explicitly assessed, even where the risk of impact is considered negligible by the applicant. This is particularly important because section 59(2)(e) of the EEZ Act requires decision-makers to take into account the importance of protecting rare and vulnerable ecosystems

In this context, the panel may find it useful to request a more thorough description or evaluation of potential effects, including updated survey data, clarification of how predictive modelling has been applied, and consideration of cumulative and indirect impacts on sensitive environments. Expanding the level of assessment, such as through increased survey effort, would help reduce uncertainty and ensure that all rare and vulnerable ecosystems that may be present are adequately identified and considered in the decision-making process.

Environmental Recovery and Ecological Uncertainty

The assumptions presented in the application documents and supporting expert evidence suggest that recovery in the proposed mining area will be relatively rapid. For example, it is stated that:

- Communities associated with sand in high-energy environments are frequently disturbed and likely remain in early transitional stages.
- Natural events like storms are causing similar disturbance and effect on the environment as activities in this application.
- Early successional dominance in the excavation and sand redeposition zones suggests that recovery could occur relatively quickly, potentially within months to a year.
- Smaller taxa, such as polychaete worms, may begin to recover within weeks after operations move to another part of the consent area.
- Larger, long-lived biota could take months to several years to fully recover.
- Based on these assessments, some experts conclude that sediment discharge impacts on biota—including primary producers, invertebrates, fish, and marine mammals, are unlikely to result in material harm.

However, I consider that considerable uncertainty remains for the following:

- The application assumes that populations will recover quickly once rehabilitation begins, but there is limited clarity about how long recovery may actually take or about the overall environmental footprint of seabed mining operations.
- Key species highlighted in the application, such as salps and copepods, are abundant, ecologically important, and highly sensitive to environmental change. If recovery is prolonged, these populations may struggle to rebound, increasing the risk of ecological change or tipping points.

- While literature shows that marine species and ecosystems may withstand short-term or pulsatile pressures, these findings also highlight the importance of recovery periods between disturbances. Continuous or overlapping pressures, such as those anticipated under this proposal, raise doubt about whether adaptive capacity will be sufficient to prevent long-term or irreversible change.

Comparison with natural disturbances:

- Natural events, such as storms, can stress marine environments, for example, by displacing fish (as it is noted in this application and as addressed in Dr MacDiarmid's evidence), increasing turbidity, or scouring the seabed. These events are typically episodic and short-lived, allowing ecosystems to recover. Many marine species and ecosystems have evolved adaptive mechanisms to cope with such pulsatile, intermittent pressures.
- In contrast, seabed mining would be a prolonged, chronic disturbance. Operations would occur daily over decades (35 years in the case of this application), generating continuous pressures such as sediment plumes, noise, light, vibration, and potential release of harmful substances. Unlike storms, this activity layers multiple stressors simultaneously, without recovery periods, potentially overwhelming natural adaptive capacities.
- The key difference lies in the duration, frequency, and cumulative nature of the stress. While ecosystems can rebound from short, natural shocks, persistent anthropogenic disturbances of the kind proposed here significantly increase the risk that populations, habitats, and ecosystem functions may fail to recover, leading to long-term or potentially irreversible ecological change.

Given these uncertainties, the reliability of assumptions about rapid recovery is unclear.

Alternative methods

Regarding methods, the applicant indicates in several sections of the application that the project will adopt "*best practices*" and operate in accordance with high environmental standards consistent with international norms (e.g. section 2.3.10 *Fuel Storage, Use and Handling* – page 32; section 5.9 *Noise Effects* – page 202 & 203; section 5.13.4.3 *Management of Potential Biosecurity Effects* – page 244; 5.14.3.3 *Considerations of Effects and Mitigation* – page 260; to name a few).
I consider the application would benefit if it provided specific alternative methods that were considered to avoid or remedy environmental effects before arriving at mitigation measures.
For instance, the applicant notes that various options for de-ored sediment disposal were considered (please refer to section 2.4.4 *De-ored Sediment Disposal* – page 33). However, the application moves immediately to a justification for redepositing sediments near the extraction site, without providing a comparative evaluation of those alternatives. No clear description is offered of the potential environmental benefits or limitations of alternative disposal methods or spatial configurations.

Potential effects of the activity and marine discharges on human health

The human health risks associated with such discharges are primarily linked to the consumption of seafood (e.g., fish and shellfish) that may bioaccumulate these contaminants. The assessment notes that the concentrations of copper and nickel expected from these activities are below levels typically associated with adverse health outcomes in humans (refer to section 5.5.6 and 5.10 of the application).

However, it also acknowledges that these metals are known to affect the growth of marine organisms, including fish, invertebrates, and shellfish, at concentrations below human health thresholds.
Mercury, a trace metal of significant concern for human health, as noted in Section 5.5.6.2 (*Potential Trace Metal Effects* – page 183) has not been considered with regard to human health effects. This could represent a gap in the evaluation of potential contaminants and associated health risks.
In Section 5.10.2 (*Human Health Effects of the Discharge Activities* – page 207), the applicant notes:

- The only expected contaminants in discharges from seabed disturbance (such as grade control drilling and SBC operation) are naturally occurring trace metals.
- No chemicals are added or used in the sediment processing; the de-ored sediment returned to the seabed is expected to be chemically unaltered.
- The discharge is not expected to introduce new contaminants into the environment, only redistribute existing ones.

The application contains inconsistencies and would benefit from more clarity regarding the use and management of chemicals:

- In several parts of the application, including the executive summary and Section 5.10.2.1 (*Contaminants Present within the Discharges* - page 207), the applicant states that no chemicals will be used.
- However, elsewhere in the application (refer to section 2.3.4 *Processing Methodology* – page 27) under the project description section), there is reference to the use of chemicals in the reverse osmosis desalination process, specifically for membrane cleaning and system maintenance.
- This inconsistency could be potentially affecting the assessment of human health effects.

To avoid misrepresentation or underestimation of human health risks, the following further information could be provided by the applicant:

- A complete list of chemicals to be used in reverse osmosis, even if they are considered ‘safe’ or ‘biodegradable’ and an explanation or analysis how these may pose risk or effects on human health.
- Handling, containment, and spill response protocols for those chemicals, particularly where vessel-based operations may present a risk of accidental discharge.
- A clear statement that, although chemicals may be used, they will be fully managed on board and not discharged to the marine environment, if that is indeed the case.

Erosion Risk

i. The shoreline analysis (*Shoreline Stability along the South Taranaki Bight* – Page 55 South Taranaki Bight Factual Baseline Environmental Report – – NIWA updated 2015; *Coastal stability in the South Taranaki Bight - Phase 1 Historical and present day shoreline change* – NIWA updated 2015; *Coastal stability in the South Taranaki Bight - Phase 2 Potential effects of offshore sand extraction on physical drivers and coastal stability* – NIWA updated 2015) provides a valuable baseline of how different coastal sections have behaved historically and are likely to behave in the future under natural drivers such as geology, climate cycles, storms, and sediment supply. However, the assessment does not directly evaluate how the proposed offshore extraction activity may contribute to, or exacerbate, shoreline erosion and accretion processes. While the report notes that historical information can provide a basis against which to scale likely impacts, this scaling has not yet been undertaken.

In particular, in high-energy beach environments already subject to chronic erosion, the potential for offshore extraction to accelerate sediment loss and further destabilise the coast is a significant concern. The degree to which mining alters sediment budgets, wave dynamics, and nearshore transport processes remains uncertain, but even relatively small changes in these systems could amplify existing erosion pressures.

Given the high degree of temporal variability in shoreline change, and the uncertainty regarding the role of offshore processes in influencing sediment supply and coastal stability, further investigation to establish the potential linkages between offshore extraction and shoreline erosion would fill this gap.

ii. The project area is near the edge of the Holocene sand prism (section 3.2.1 *Geological Setting* – page 35), where seabed sediments are thinner and more erosion-prone (page 48). Although the applicant concludes that the risk is low and intends to mitigate this through the redeposition of de-ored sediments, the effectiveness of this measure depends on the ability to replicate the original seabed structure accurately.

Shoreline processes and coastal stability – mitigation measures

The evidence in the application is that due to the regional nature of oceanographic processes, mitigation beyond project location and methodology is "*impractical"* (please refer to section 5.4.1.4 *Management of Potential Effects on Shoreline Processes and Coastal Stability* – Page 157*)*. This position is based on earlier assessments (Decision-Making Committees (DMCs) for TTR's 2014 and 2016 applications), which found the area unlikely to contribute significantly to shoreline stability or coastal erosion.

The current approach focuses on monitoring to confirm predicted effects, with unspecified operational responses if unexpected impacts occur. However, I consider the lack of defined mitigation actions creates uncertainty around feasibility and responsiveness.

The application could benefit from a more comprehensive consideration of alternatives. Currently, it assumes the proposed approach is necessary, with little exploration of other extraction techniques, sediment disposal methods, or lower-impact locations.

Avoidance and Remedy

The application largely focuses on mitigation (e.g., from the application document: *section 5.4.1.4; section 5.6.2; section 7; section 5.13.1.3; section 6*; to name a few), with limited discussion of avoidance or remedy. For instance, although alternative disposal methods for de-ored sediment were said to be considered, no comparative analysis or explanation is provided. In my view, if alternative disposal methods "will be considered", it would be beneficial to consider these during the application process itself rather than deferred until later. A more transparent discussion of alternatives would improve confidence in the proposed approach and the robustness of the effects management.

c) their recommendation either to grant, subject to conditions, or decline the marine consents sought and the basis of such recommendation;

Even if I was an expert on all matters raised in this application, I do not consider it appropriate to make a recommendation to grant or decline until all information is available (particularly comments are received and the impacts on existing interests can be fully understood), conditions are set, and the test set down by the Supreme Court can be worked through.

d) any proposed amendments they consider necessary to conditions proposed in the application in the event of a recommendation to grant the marine consents sought.

As I have not made a recommendation above, I make no comment on the proposed conditions, noting there is an opportunity to comment on the draft conditions later in the process.

Dr Ursula A. Rojas Nazar

Senior Technical Support Advisor - EEZ Applications Team

If you have any questions, please don't hesitate to contact Ben Bond on 027 206 5110 or at ben.bond@epa.govt.nz

Nāku noa, nā

Ben Bond

Team Leader
Land and Oceans Applications
Environmental Protection Authority

Appendix 1:

List of the document reviewed in this application (based on the FastTrack website)

1. Taranaki VTM cover letter to the EPA (PDF, 271KB)
2. Taranaki VTM application form (PDF, 1.4MB)
3. Taranaki VTM application (PDF, 8.9MB)
4. Attachment 1 - Proposed marine consent conditions (PDF, 895KB)
5. Attachment 3a: Siecap - pre-feasibility study part 1 (PDF, 39MB)
6. Attachment 3b: Siecap - pre-feasibility study part 2 (PDF, 21MB)
7. Attachment 4: Siecap - recovery of vanadium (PDF, 1.2MB)

Appendix

Taranaki VTM application appendix sections:

8. Appendices index (PDF, 62KB)
9. Appendix section 1 (PDF, 3MB)
10. Appendix section 3 (PDF, 8.4MB)
11. Appendix section 4 (PDF, 149KB)
12. Appendix section 5 (PDF, 12.7MB)
13. Appendix section 7 (PDF, 17.2MB)
14. Appendix section 8 (PDF, 325KB)

Technical reports

15. Supplementary technical index (PDF, 94KB)

NIWA South Taranaki Bight Factual Baseline Environmental Report – November 2015:

16. Phytoplankton (main report) (PDF, 11.7MB)
17. Phytoplankton – Appendix 1 (PDF, 713KB)
18. Phytoplankton – Appendix 2 (PDF, 5.5MB)
19. Phytoplankton – Appendix 3 (PDF, 5.7MB)
20. Phytoplankton – Appendix 4 (PDF, 5.5MB)
21. NIWA Benthic habitats, macrobenthos and surficial sediments of the nearshore report (PDF, 3.4MB)
22. NIWA Benthic Flora and fauna of the Patea Shoals region report (PDF, 11.8MB)
23. NIWA Habitat models of Southern Right Whales, Hector's Dolphin, and Killer Whales report (PDF, 5.2MB)
24. NIWA Coastal stability – Phase 1 – historical and present-day shoreline change (PDF, 5.6MB)
25. NIWA Coastal stability – Phase 2 – Potential effects of offshore sand extraction (PDF, 12.7MB)
26. NIWA Effects of ships lights on fish, squid and seabirds (PDF, 358KB)
27. NIWA Seabirds of the South Taranaki Bight (PDF, 465KB)

28. NIWA Zooplankton communities and water quality report (PDF, 3.6MB)

29. NIWA South Taranaki Bight fish and fisheries report (PDF, 4.4MB)

30. Appendix A (PDF, 5.5MB)

31. Appendix B (PDF, 5.7MB)

32. Appendix C (PDF, 5.5MB)

33. NIWA Geological desktop summary report (PDF, 2.9MB)

34. Appendix A (PDF, 89KB)

35. Appendix B (PDF, 3.5MB)

36. Appendix C (PDF, 3.2MB)

37. Appendix D (PDF, 10.1MB)

38. Appendix E (PDF, 11.6MB)

39. Appendix F (PDF, 4.5MB)

40. NIWA Oceanographic measurements data report (PDF, 3.5MB)

41. NIWA Nearshore optical water quality (PDF, 4.1MB)

42. NIWA Shoreline monitoring data report (PDF, 10.5MB)

43. NIWA Nearshore wave modelling (PDF, 9MB)

44. NIWA Effects on primary production (PDF, 1.1MB)

45. NIWA Assessment of the scale of marine ecological effects (PDF, 7.1MB)

46. NIWA South Taranaki Bight commercial fisheries (PDF, 2.6MB)

47. NIWA Zooplankton and the processes supporting them (PDF, 1.4MB)

48. Aquatic Environmental Sciences ecological assessment report (PDF, 2.2MB)

49. Tonkin & Taylor Air dispersion modelling studies on gas turbine discharges (PDF, 3.2MB)

50. Tonkin & Taylor Ltd Air dispersion modelling studies on reciprocating engine s (PDF, 3.7MB)

51. Clough and Associates Archaeological assessment report (PDF, 919KB)

52. Martin Cawthorn Associates Cetacean monitoring report (PDF, 1.2MB)

53. Fathom Consulting Assessment of potential Impacts on commercial fishing (PDF, 3.4MB)

54. R.N. Barlow and Associates Maritime and navigational impacts (PDF, 4.7MB)

55. Marico Marine traffic study (PDF, 3.1MB)

56. Hegley Acoustic Consultants Assessment of noise effects (PDF, 1.8MB)

57. Rob Greenaway & Associates Recreation and tourism assessment of effects (PDF, 2.4MB)

58. Corydon Consultants Social impact assessment (PDF, 1.3MB)

59. Boffa Miskell Visual effects report (PDF, 13.3MB)

60. Boffa Miskell Graphic supplement part 1 (PDF, 39.9MB)

61. Boffa Miskell Graphic supplement part 2 (PDF, 39.5MB)

62. Boffa Miskell Graphic supplement part 3 (PDF, 35.9MB)

63. OCEL Consultants Implications of loose tailings seabed material PDF, 638KB)

64. MetOcean Solutions oil spill trajectory modelling (PDF, 2.8MB)

65. eCoast Potential effects of mining operations on surfing breaks (PDF, 13.6MB)

66. Auckland University of Technology trace metal assessment report (PDF, 3.2MB)

Expert evidence presented in 2023 and 2024 hearings

Evidence on seabirds

67. Evidence of Dr David Thompson 19 May 2023 (PDF, 183KB)

68. Appendix 1 to evidence (PDF,152KB)

69. Rebuttal evidence Dr David Thompson 23 January 2023 (PDF, 160KB)

Evidence on marine mammals

70. Evidence Dr Simon Childerhouse 19 May 2023 (PDF, 25.4MB)

71. Darran Humpheson evidence responding to Dr Simon Childerhouse 16 February 2024 (PDF, 1.3MB)

72. Rebuttal evidence Dr Simon Childerhouse 23 February 2024 (PDF, 602KB)

Evidence presented on sedimentation and sediment plume modelling

73. Evidence Dr Alison MacDiarmid 19 May 2023 (PDF, 243KB)

74. Evidence Dr Helen Macdonald 19 May 2023 (PDF, 175KB)

75. Rebuttal evidence Dr Alison Mac Diarmid 23 January 2024 (PDF, 234KB)

76. Rebuttal evidence Dr Helen Macdonald 23 January 2024 (PDF, 188KB)

77. Rebuttal evidence Dr Michael Dearnaley 23 January 2024 (PDF, 221KB)

List of the document not reviewed in this application (based on the FastTrack website)

1. Attachment 2 - NZIER economic impact assessment (PDF, 609KB)

NIWA South Taranaki Bight Factual Baseline Environmental Report – November 2015:

2. Te Taihauauru Iwi forum fisheries plan 2012 – 2017 (PDF, 852KB)
3. Kevin Richardson journal article: A perspective of marine mining within De Beers (PDF, 2.6MB)
4. Findlay paper on the impact of diamond mining noise on marine mammal fauna off Southern Namibia (PDF, 3.2MB)
5. Institute for Maritime Technology environmental impact study on underwater radiated noise 1994 1(PDF, 5.1MB)
6. Institute for Maritime Technology environmental impact study on underwater radiated noise 1995 (PDF, 5.7MB)
7. Tahu Potiki cultural values assessment and analysis (PDF, 340KB)
8. Briefing for the incoming Minister for Resources (PDF, 1.9MB)