

SOUTH TARANAKI UNDERWATER CLUB

Your Comment on the Taranaki VTM Project

Please include all the contact details listed below with your comments.

1. Contact Details	
Please ensure that you have authority to comment on the application on behalf of those named on this form.	
Organisation name (if relevant)	South Taranaki Underwater Club
First name	
Last name	
Postal address	
Phone number	
Email (a valid email address enables us to communicate efficiently with you)	

2. We will email you draft conditions of consent for your comment	
☒ I can receive emails and my email address is correct	☐ I cannot receive emails and my postal address is correct

+

3. Please select the effects (positive or negative) that your comments address:	
☒ Economic Effects	☒ Sedimentation and Optical Water Quality Effects
☐ Effects on Coastal Processes	☒ Benthic Ecology and Primary Productivity Effects
☒ Fished Species	☐ Seabirds
☐ Marine Mammals	☒ Noise Effects
☐ Human Health Effects of the Marine Discharge Activities	☐ Visual, Seascape and Natural Character Effects
☒ Air Quality Effects	☒ Effects on Existing Interests
Other Considerations (please specify): ☒ "Rebuttal" points (given throughout categories in point 3 above), Various Legal comments, International best practise comments, Agreed Issues per 2023 EPA Reconsideration, Conditions (some suggestions)	

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OTHER CONSIDERATIONS: SOUTH TARANAKI UNDERWATER CLUB SUBMISSION

1. We appreciate the invite to comment extended to the STUC 8th September 2025.¹
2. K Pratt is a member of our Club, and has been the co-Project lead for our nationally awarded project “Project Reef South Taranaki”,² which began in 2015. She initiated the application for funding from MBIE’s “Curious Minds” for our Club and from the start of this project contacted scientific experts from around NZ and overseas in order to assist us with this project.
3. She has attended Sustainable Seas conferences and webinars, in person and online. She has presented at the NZ Geological Society in 2024³, NZ Coastal Society Conference in 2023⁴, the NZ Marine Sciences Conference in 2022⁵, and was a keynote speaker at the 2021 NZ Ecological Society Conference⁶ and in 2018 was invited by the Office of the Prime Minister’s Chief Science Advisor – National Coordinator for the Curious Minds Participatory Science Program –to be a ‘Curious Minds’ STEM Ambassador.
4. In 2018 when LINZ established a National NZ Marine Geospatial Working Group (NZMG-WG). (made up of representatives from across the public and private sector) K Pratt ensured we were represented in the group. Her queries with the NZ Hydrographic Society in 2018 confirmed “Unfortunately, we do not have detailed bathymetry in South Taranaki (see [here](#)) as our survey areas are prioritized around areas of high marine vehicle traffic – such as shipping lanes and ports.”

¹ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0014/11561/FTAA-2504-1048-Minute-3-Expert-Panel-invitation-to-comment.pdf

² <https://www.projectreefsouthtaranaki.org>

³ <https://airdrive.eventsair.com/eventsairseasiaproduct/production-conference-public/c14c1304f3c746a29f6cfe6ca43ea2b3>

⁴ <https://www.coastalsociety.org.nz/assets/Uploads/NZCS-2023-Conference-Programme-131123.pdf>

⁵ <https://nzms.org/app/uploads/2024/02/2022-NZMSS-Conference-Programme.pdf>

⁶ <https://confer.eventsair.com/nzes-2021-conference/speakers>

5. In 2019 K Pratt accepted on behalf of the STUC the Terry Healy Award at a NZ Coastal Society Conference for “Project Reef” ⁷
6. She has submitted on the Taranaki Regional Council Coastal Plan⁸ review, making a number of suggestions for wording of the Policies & inclusion of ONC-6 'Project Reef' on page 129, Schedule 2 of the Draft Coastal Plan.
7. She has worked voluntarily, with no payment from the STUC, or any other organisation, for all the submissions and communications she has prepared and (submitted in her personal name) to the EPA since 2013.
8. She has endeavoured to share our local marine environment not only with Decision Makers but with our community – with again no remuneration – for TED-x⁹ and Puke Ariki’s “Reef Alive” permanent exhibition, Creative Community installations (a Mural and Corten steel sculptures in Pātea) and a Marine Frame Installation at our local beach at Ōhawe. ['Reef Alive' Venture Taranaki FB post](#) [Te Papa fish expert marvels at Reef Diorama](#)
9. She obtained in confidence GPS coordinates from a number of our club members, and other locals – and placed them into a GIS spatial mapping format, so she could help the Decision Making Panel in the 2017 Hearing appreciate how extensive South Taranaki’s fishing and diving grounds are. The 2017 Decision Document produced their own map and showed as red dots the sites.
10. K Pratt also recommended in her submission that due to the huge range of environmental factors & activities in the Pātea shoals area, that the Decision Making Committee would benefit from using GIS spatial mapping, where lenses could be ‘turned in or off’. (see K Pratt’s Index with her submission¹⁰). The subsequent result produced by TTRL and on the

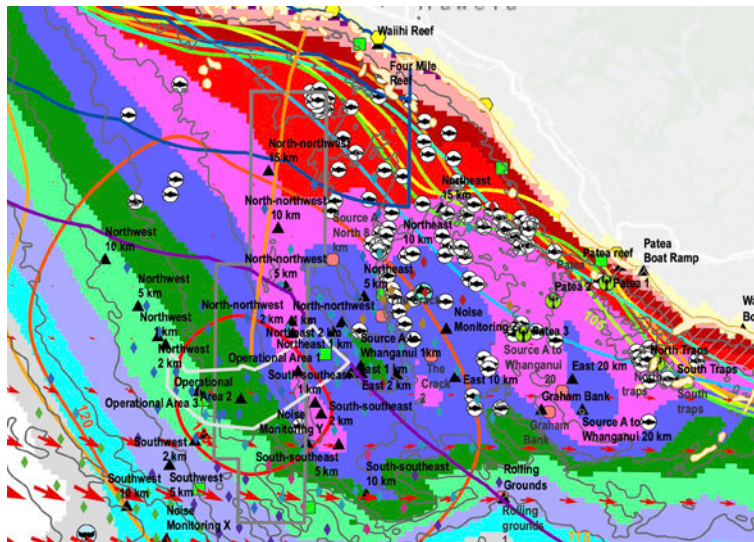
⁷ <https://www.coastalsociety.org.nz/news-and-events/news/nzcs-scholarship-and-award-winners-for-2019/>

⁸ <https://www.trc.govt.nz/assets/Documents/Plans-policies/CoastalPlanReview/CoastalPlanSubmissionsMay2018-web.pdf> pages 51-58

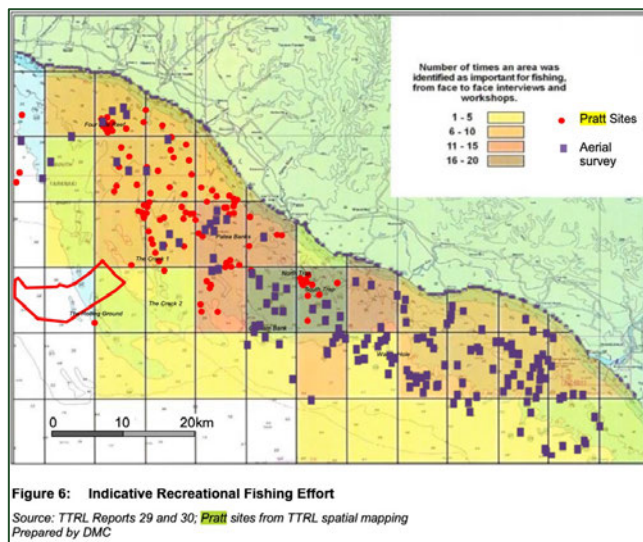
⁹ <https://www.youtube.com/watch?v=I-u8bFhvg80>

¹⁰ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Submissions-and-or-comments/dbab83ac37/Pratt-K-Section1-123055.pdf>

EPA website was too cluttered¹¹ & missing important factors - as noted in the Fisheries Memorandum 12th May 2017¹².



TTR's “cluttered” GIS spatial map



¹¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents/4429670cf7/TTR-Maps-new-002.pdf>

¹² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/34eaf6923e/Memorandum-of-Counsel-for-Fisheries-Submitters-12May.pdf>

11. Page 168 of the 2017 EPA decision stated “783. We would like to **pay tribute to the valuable material that was provided** by clubs, societies and individuals. Ms Pratt, the Ngā Motu Marine Reserve Society, and sport fishers and divers **filled gaps in our understanding of the marine environment of the STB.** & 784. **We would not have known of the existence of rocky reefs such as The Crack and The “Project Reef” of those locations had not been brought to our attention by submitters. We thank these people for their assistance.**

12. We also note that her efforts have also been recognised by the applicant, TTRL as well as the EPA

13. A listing of some of her work previous with earlier Hearings can be found (pg. 128 & 129) as part of her Reconvened Hearing submission 6th October 2023¹³, her submission on relevant parts of the Supreme Court Hearing to be considered by the DMC¹⁴ & also her 4th March 2024 Opening Submission¹⁵.

14. Statement of Evidence in Chief of Andy Sommerville (TTRL Executive Team member) 17 February 2014. 59. TTR acknowledges that there are many considered submissions, important issues have been raised and discussed, and practical contributions have been made by many to this consent process. We are grateful for this. There were a number of other excellent submissions. We have addressed these in our expert evidence. I am reluctant to single any out any individual submissions, but I wish to acknowledge those from Ms Pratt, who our advisors report has put an enormous effort into understanding the

¹³ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/Submitter-responses/Karen-Pratt-SUBMISSION-TTRL-2.pdf> pages 128 & 129

¹⁴ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/Karen-Pratt-response-to-Minute-8.pdf>

¹⁵ https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/opening-legal-submissions/Karen-Pratt-submission_final_4_3_24.pdf

detail of TTR's reports, including, as may be expected with a project of this scale, unearthing some errors. Many of the points that Ms Pratt has raised were valid contributions and these have been responded to in TTR's evidence.¹⁶

15. 2014 EPA Decision Document, pg.18¹⁷ 37. We also need to note the effort that has been put in by some submitters who have spent hours and hours reading and discussing the material produced by the applicant and others so that they were in a position to talk knowledgeably to us about their concerns. In that regard, we wish to single out Mrs Karen Pratt whose extraordinary eye for detail has been of considerable assistance to us in a number of areas.

16. Pg 2658 New Plymouth Hearing transcript¹⁸ CHAIRPERSON: Thank you very much. Thank you for your submission. Mrs Pratt? Now, Mrs Pratt, are you – I am not sure whether it is by design, but you may be the last submitter that we hear from today, but on behalf of the panel, and I am hoping Mr Beatson is not going to think this is inappropriate, but I just want to acknowledge how much work you have clearly put into your submission, you have clearly gone through it in a huge amount of detail and in fact a number of the TTR experts have clearly referred to your statements and have made certain corrections and things based on your submission, so the amount of the work you have done is clearly acknowledged by all of the panel.

17. Historical Knowledge of Documents: As the DMC in the second Hearing (and likely in this Fast-track also) *proposed not to consider documents relating to TTRL's previous application, K Pratt's historical knowledge of documents, provides the ability to put before the panel items of importance* that would not otherwise be before the panel. While we appreciate that this

¹⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/e4853a6a46/EEZ000004-03-Andy-Sommerville-Background-to-Project.PDF> 2014 Hearing

¹⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Boards-Decision/ff4e630f5d/EEZ000004-Trans-Tasman-Resources-decision-17June2014.pdf>

¹⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/9a3ac0bc9f/EEZ000004-23-TTR-Transcript-02.05.14.pdf>

approach taken by past Decision Making Committees, and likely this Fast-track panel, requires the lodgement of a new application for marine consents, “to be considered afresh” - we think ‘best available information at little cost’ is best served if submitters, using careful judgment, put before the panel pertinent past EPA Hearing reports/extracts. This has been done in our comments.

One example to illustrate how K Pratt used her past historical knowledge of documentation can be shown in her feedback¹⁹ to the DMC/Decision Making Committee about DOC.

As DOC did not submit in the second EPA Hearing – K Pratt included a significant amount of information in her submission (due by Dec 2016) that included information DOC had obtained/been involved with, in the first Hearing (K Pratt’s focus was primarily on sedimentation and conditions.)

On Jan 2017 and Feb 2017, the DMC sought advice (s44 requests) from DOC.

Deputy Director-General Operations, Mike Slater, in his January response²⁰ confirmed there was no one report from their sedimentation expert Longdill, and that Dr Longdill has not considered the application beyond the information available at the pre-application stage & that Longdill could be available for expert conferencing.

(The decision not to submit on the second Hearing by DOC was an internal report²¹, not available on the EPA website or available online.)

DOC in their response to the February 2017 request stated in arriving at their opinions there was *consideration of material from the first application, and to ‘assist you in this respect’* they added links to previous application documents. K Pratt alerted the DMC to the fact that *excluded from the links* was useful information on **sedimentation and conditions** contained in Joint Witness Statements, that

¹⁹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/4bcc5a8b6a/Karen-Pratt-attachment-Re-s44-request-to-DOC-redacted.pdf>

²⁰ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/bb0c19c9df/DOC-response-s44-8Feb2017-230kb.pdf>

²¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/External-advice-and-reports/cf394cdad3/EPA-Letter-TTR-s44-request-Feb-2017.pdf>

DOC/DOC's expert had been signatory to (the only links provided by DOC in their response was in regards to Marine Mammals and Noise).

The JWS on sedimentation, to which DOC's expert was a signatory included three supporting reports attached to the JWS

1. Mark Hadfield - South Taranaki Bight Sediment Plume Modelling: the Effect of Revised Source Particle-Size Distributions - 19 March 2014 report
2. Mark Hadfield - South Taranaki Bight Sediment Plume Modelling: Sediment in the Hyperbaric Filter Discharge - 25 March 2014 report attached to JWS
3. Mark Hadfield - South Taranaki Bight Sediment Plume Modelling: Seasonal Variability of Natural Sediment Suspension - 26 March 2014

The JWS on Conditions, to which DOC's expert was a signatory, which included Proposed Conditions. These Conditions were subsequently changed by TTRL.

Draft conditions put forward by DOC on 13 April 2014 :Appendix C – Director-General of Conservation draft conditions.

Recently correspondence has been received by the EPA from TTRL on **19 September 2025**. What is not made clear in this 19/09/25 correspondence is that the DoC support discussed was *only in relation to noise limits and marine mammal controls* – not sedimentation. If the Fast-track panel read Longdill's response²² of 15th March 2017 about his pre-application advise to DOC, it will provide the insights needed in regards to sedimentation.

“It has been brought to Trans-Tasman Resources Limited's (TTR) attention that the statement at [2065] of the transcript from the overview conference may be taken to mean that the current Fast- track Application has the Department of Conservation's (DoC) support. That is not the position, and not what TTR intended to convey. The DoC support TTR was describing related solely to TTR's 2016 EPA application and

²² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings/1f13e098c2/Peter-Longdill-Summary-report-on-pre-application-advise-to-DOC.pdf>

2017 DMC approval. Please can this clarification be published alongside, or as a note on, the transcript to avoid any confusion.”²³

Extract above from 19th September 2025 correspondence

[2064] I just want to add that *the noise limits and marine mammal controls* in the condition documents were developed closely with DOC during the 2016 process.

[2065] As Alan mentioned, DOC supported the application in that form – and as we understand, they continue to support it in its current form.

[2066] DOC played a key role in identifying the appropriate controls for *marine mammals* in this area.

– see [Transcription \(PDF, 1.4MB\)](#)

Conditions: We as a Club support K. Pratt’s focus on conditions through the EPA and now via our club’s comments for the Fast-Track process. The EPA commissioned report²⁴, which analysed submissions received for the second EPA Hearing, described K Pratt’s submission as “*There was an extensive analysis and critique of the conditions offered by the applicant, with detailed comments.*” In terms of minimising the length of our comments, a full evaluation of Conditions is not included here and we look forward to engagement at a future time on these. (Taranaki Regional Council and EPA have not provided in their recent comments any analysis on conditions in their responses to the Fast-track panel)

Finally, as per [13]²⁵ of the Overview Conference Transcription – for the Taranaki VTM Project it is noted that the panel intends to convene a meeting of the statutory participants — that is, those identified in the Act who must be invited to comment on the application — and the applicant, **and possibly some of the discretionary commenters**, in Taranaki, in the **week beginning 20 October**. We kindly ask, that the South Taranaki Underwater Club can be part of this process.

²³²³ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0018/12348/TTR-clarification-regarding-DoC-correspondence-about-TTR-presentation.pdf

²⁴ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/e5d8e2b2e9/TTRL-AOS.pdf> Prepared by MWH Feb 2017

²⁵

[https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/11600/Transcription with Paragraph Numbers.pdf](https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/11600/Transcription_with_Paragraph_Numbers.pdf) 2nd September 2025

OTHER CONSIDERATIONS: TARANAKI VTM DOCUMENTATION NOT OF THE STANDARD A PROJECT OF THIS MAGNITUDE REQUIRES

Application documents not thorough and extreme care has not been taken to ensure no documents are missing

The STUC believe the Taranaki VTM project application documents' does not evidence the 'extreme care' that a project of this magnitude requires. A recent Fast-track case *draft decision* ²⁶ stated:

"591. Overall, the Panel is not satisfied that the matters set out in section 81 of the FTAA have been addressed appropriately and that purpose of the FTAA is achieved by this Decision. In accordance with section 85 the RMA approvals (both for new resource consents and amendments to existing consent conditions *are declined*. 29th August 2025."

We understand that the "completeness check" by the EPA is essentially an administrative exercise to check the application contains information on relevant topics. It is not an assessment or review of *the actual merits* of that information. That is the role, in the past of the Decision Making Committee - and currently yourselves - the Fast-track Panel.

The comments of the Fast-track Panel in the Delmore *draft* decision, are relevant we believe, for consideration of this Fast-track panel in assessment of the Taranaki VTM application:

"The Delmore application was deemed *of such magnitude* that no documents should be missing, and the application documents should have been thorough and extreme care should have been taken. Not meeting this criteria was one of the reasons given by the panel for declining the application: *"The time constraints set out in the FTAA do not provide an expert panel with time to ensure all the documents are in order and up to date throughout the process. It is imperative that for projects of this magnitude the application documents are thorough and that extreme care is taken to ensure no documents are missing. . ."*

(On 11 September 2025, the applicant withdrew the Delmore substantive application.)

²⁶ <https://www.fasttrack.govt.nz/projects/delmore/draft-decision-and-conditions> 29th August 2025

**Evidenced by: Siecap 3a27 Appendix 19.9 HR Wallingford Tailings Plume Review
“Independent review of Plume Modelling August 2014”**

1. This document is not in the Footnote document provided on 9th September 2025.
2. This document has not been included in previous application documents submitted to the EPA.
3. This document is important and has not been reviewed by the EPA’s independent experts (although, the DOC sedimentation expert, Peter Longdill, lists it as one reviewed, in only one of his 2014 reports, that he submitted during the Hearing.)

Evidenced by: the updated Taranaki Regional Council Coastal Plan (2013) is missing from Taranaki VTM documentation

Missing is any information or reference to the current Taranaki Regional Council Coastal Plan – which came into effect **September 2023**. The Taranaki Regional Council (TRC) comments²⁸ do not make mention of this omission.

TTRL in their Fast-Track application²⁹ **15th April 2025** stated

“The research and assessment work is of varying age from 2012 to 2025. The less recent work was reviewed and updated where necessary to support TTR’s 2016 application and the 2024 application. *A further review of this information has been undertaken as part of the preparation of this application, to ensure the information is sufficiently up-to-date to be reliable and commensurate with the relevant effects, and to satisfy the statutory requirements in Section 8 to make decisions using the best available information.*”

²⁷ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0015/4263/Attachment-3a-Siecap-Taranaki-VTM-Project-Pre-Feasibility-Study-Offshore-Iron-Sands-Project-25-March-2025_Part1-FINAL.pdf

²⁸ <https://www.trc.govt.nz/assets/Documents/Meetings/PolicyPlanning/2025/Policy-and-Planning-Committee-Agenda-Sept-2025-web.pdf>

²⁹ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0017/4337/Taranaki-VTM-FTA-Application.pdf

The only mention of the Taranaki Regional Council's Coastal Plan is in section 3, 3.2.7.1. pg. 47, in reference to the applicant's expert Boffa Miskell's assessment of 2015, which refers to *the now outdated* TRC Coastal Plan. What was missing in this section was a comment that the Coastal has since been updated – with (amongst other matters) inclusion of 'Project Reef', an ESA.

The South Taranaki Underwater Club invested considerable effort (working with Iwi, DOC and the TRC) to get the informally named "Project Reef" included in the updated Coastal Plan (2013) as well as recommending a number of wording changes to some of the policies. The "Project Reef" is now reflected in the TRC Coastal Plan (2023) in *Schedule 1 as an area of outstanding value and Schedule 2 Outstanding Natural Character*.

The applicant, TTRL, unsuccessfully submitted (unsuccessfully) in opposition³⁰ to the inclusion of the Project Reef in the updating of the Coastal Plan (2023) process.

TTRL also opposed the inclusion of the Sensitive Marine Habitats Schedule 4B.

6 – Trans-Tasman Resources Ltd	Schedule 2 – Coastal areas of outstanding value	Amend Schedule 2 to delete inclusion of the Project Reef (ONC6) as an area of outstanding value, including: ☒ the reference to ONC6 and Map-link Map 42 on page 121; ☒ the entire ONC6 Project Reef material on page 129; and	Oppose	The amendment sought won't enable the Plan to give effect to the NZCPS or RPS	Reject the amendment sought
3 August 2018					
6 – Trans-Tasman Resources Ltd	Schedule 4A – Significant species and ecosystems	☒ Map Link Map 42. Seek that Schedule 4A is deleted in its entirety or amended to remove any non-threatened species and any at risk species other than those which are listed as at risk (declining) under the <i>New Zealand Threat Classification System</i> .	oppose	The amendment sought is inconsistent with the NZCPS	Reject the amendment sought
6 – Trans-Tasman Resources Ltd	Schedule 4B – Sensitive marine benthic habitats	Amend Plan by deleting Schedule 4B in its entirety.	oppose	The amendment sought is inconsistent with the NZCPS	Reject the amendment sought

³⁰ <https://www.trc.govt.nz/assets/Documents/Plans-policies/CoastalPlan/Further-submissions-on-the-Proposed-Coastal-Plan-for-Taranaki.PDF>

EVIDENCED BY FN101: This report is the redacted one.

The report in FN101, is a *redacted* copy. This is the same report that an Environment Court decision ordered to be released in November 2016.

https://www.fasttrack.govt.nz/_data/assets/pdf_file/0016/11905/FN101-Laboratory-Testing-of-Sediments.pdf October 2014, the un-redacted copy of the HR Wallingford report ‘Laboratory Testing of Sediments’ is on the EPA website,³¹ under the description *s158 report*.

Commercial sensitivity: s158(1)(b) and public interest in s158(2) s158(2), EEZ Act s158(1)(b)

s158 reflects s 9 of the Official Information Act 1982 - the “public interest test”.

History of the Environment Court direction to release redacted information

- 14 September 2016: The Decision-Making Committee (DMC) issued Minute 3 confirming the continued restriction/redaction of certain information³² on the application by TTRL (with the exception of those who entered a confidentiality agreement with TTRL³³.)
- 23 September 2016: KASM challenged the directions by way of Memorandum.
- 7 & 8th November 2016: A hearing was held in the Environment Court

³¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/420bd311f2/TTIS062-s158-Report-3a-HRW-Lab-Testing-Sediments.pdf> Oct 2014

³² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/a5d90100ce/TTIS061-Memorandum-of-Counsel-Regarding-Protection-of-Sensitive-Information.pdf> 22 August 2016

³³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/810aa463af/TTIS067-Letter-to-EPA-in-support-of-s158-request.pdf>

- 8 November, 2016 the Court ordered³⁴ that all the information ordered to be restricted in Minute 3 be made publicly available. TTR's sensitive information was predominantly about how the new projected plume was achieved. The Court found the sensitive information crucial for the assessment, with the new model including flocculation which dramatically altered plume results.

TTRL maintained the release of the redacted information could save TTRL's competitors \$10 million.

The Sensitive Information is:

- (a) Redacted sections of a report being HR Wallingford (2014b), Support to Trans-Tasman Resources: Laboratory Testing of Sediments, DDM7316-RT002-R01-00;
- (b) Redacted sections of a report by HR Wallingford (2015), Support to Trans-Tasman Resources: Source Terms and Sediment Properties for Plume Dispersion Modelling, DDM7316-RT004-R01-00;
- (c) Redacted sections of a memorandum entitled "Contribution to source terms report for TTR" from Matt Pinkerton, NIWA, to Mike Dearnaley, HR Wallingford, dated 4 September 2015;
- (d) Tables 2-3, 2-4 and 2-5 in a report by Hadfield, M and McDonald, H (2015), Sediment plume modelling, NIWA Client Report No WLG 2015 – 22;
- (e) Table 5-1 in a report by Pinkerton, M, and Gall, M (2015), optical effects of proposed iron-sand mining in the south Taranaki Bight region. NIWA Client Report No. WLG2015 - 26 and;
- (f) Table 1, "1. The industry (employment) multipliers generated/applied by Butcher & Partners" and Point 5 – Direct Expenditure forecasts, in a document entitled "Confidential Response to EPA Information Request", dated 28 January 2016.

List per Environment Court Decision [12]

³⁴ https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/1a27b714ec/Court-decision.pdf?utm_source=chatgpt.com

EVIDENCED BY: Application fails to include three of the most important reports

Missing is the “OPTICAL EFFECTS REPORT 2015” AND “OPTICAL EFFECTS OF PROPOSED IRON-SAND MINING IN THE STB REGION – WORST CASE UPDATE” AND “SEDIMENT PLUME MODELLING REPORT 2015”

The Fast-track application *does not contain three of the most important reports in terms of the effects of sedimentation and optical effects.*

The Optical report was redacted³⁵ (page 39) and then released

The Sediment Plume Modelling report was also redacted³⁶(page 27, 29,) and then released.

(For a full list of the redacted reports see: [EPA website s158 redacted documents](#))

(For a full list of the un-redacted reports see: [EPA website un-redacted documents](#))

Links to the un-redacted reports, for the Fast-track panel:

- 1) The un-redacted report: Optical Effects Report (2015) ³⁷
- 2) The un-redacted report: Sediment Plume Modelling (2015). ³⁸

³⁵ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/e5b619c60a/5-NIWA-Optical-effects-TTR15301-WLG2015-26-rev2-Redacted.pdf>

³⁶ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/bbd197c6cc/4-NIWA-Sediment-Plume-Modelling-TTR16301-WLG2015-22-Redacted.pdf>

³⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents/10972f4afb/NIWA-Optical-Effects-Report-Full-version.pdf>

³⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/8e6049938f/TTIS064-s158-Report-3c-NIWA-Sediment-Plume-Modelling-Report.pdf>

3) The Optical effects worst case update (2017)³⁹

The worst case Optical Report states **“Averaged across the sediment model domain, optical effects that are relevant to estimating effects on primary productivity were 44% greater in the new simulations than estimated using the models summarised in Pinkerton & Gall (2015). The total amount of light received by the seabed in the domain of the sediment model is predicted to reduce by 30% (site A, was 23%) and 21% (site B, was 15%), and this reduction will primarily affect the area east of the proposed mining area.**

On average, optical effects of mining at the selected eight stations are 41% greater in the new simulations than estimated using the models summarised in Pinkerton & Gall (2015).

This considers four optical effects: horizontal visibility (midwater, seabed), number of high visibility days per year (in midwater and at seabed), euphotic zone depth, and number of days per year with >1% light at the seabed. The predicted effects are 2.2 times greater due to mining at site A than mining at site B.

These are relevant to estimating “worst-case” effects on primary production following the approach of Cahoon et al. (2015) but this analysis is not included here – this is strictly an “optical effects” analysis. Pg 43 The significance of these simulated optical effects of mining for primary production by phytoplankton and microphytobenthos in the STB (cf. Cahoon et al., 2015) are not considered explicitly in the present report.

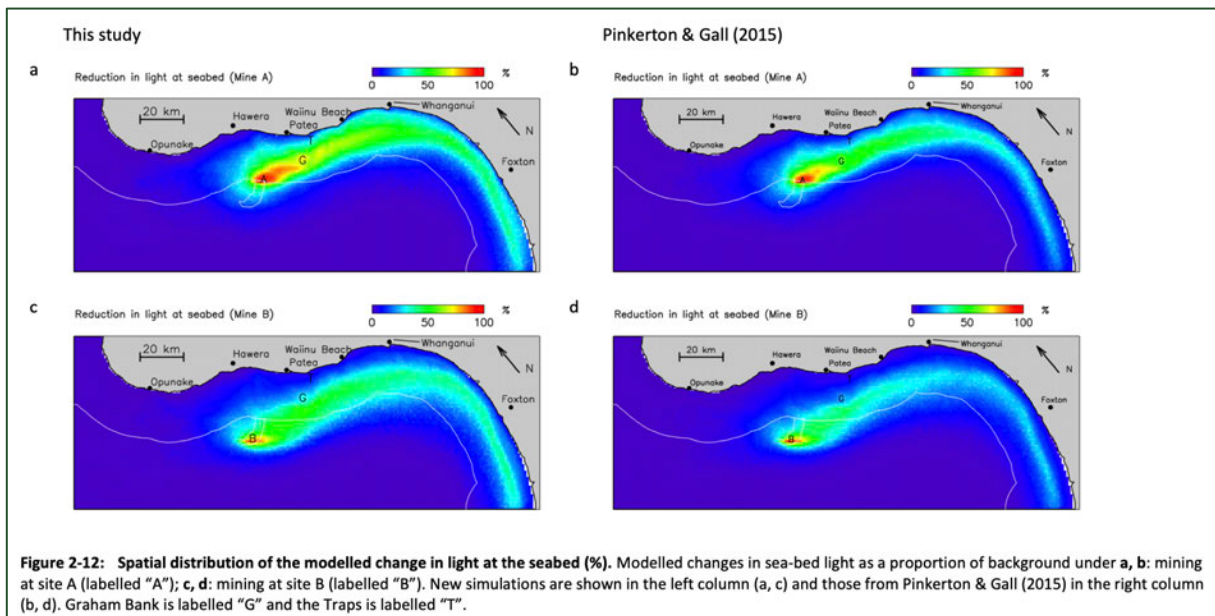
The Taranaki VTM application document, 5.3.3 ‘Optical Effects’ **page 142 has no commentary on the reduction in light at two important ecologically sensitive areas: The Project Reef and The Crack.** (On page 150 of the Application Document, The Traps & Graham Bank are discussed

... “The optical modelling predicts that the median underwater visibility at Graham Bank will be reduced by 37 to 38% as a result of iron sand extraction activities at Location A and by 16 –

³⁹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents/847ab7ccee/Optical-modelling-TTR-Apr2017-v2-002.pdf>

17% as a result of activities at Location B.” “The median euphotic zone depth at Graham Bank is predicted to reduce by 24% due to iron sand extraction activities at Location A, and by 12% as a result of activities at Location B.”

The DMC in their Decision Document noted in point 39. “The evidence before us indicates that ecologically significant sites such as The Crack and The “Project Reef” will be severely impacted by sediment deposition and light reductions. Benthic primary production will be significantly reduced over large areas of the Pātea Shoals.” **The Fast-track omission is significant.**



Modelled % change in light at the seabed pg.25⁴⁰

⁴⁰ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents/847ab7ccee/Optical-modelling-TTR-Apr2017-v2-002.pdf>

Table 3-2: Simulated optical effects of mining at selected stations. Comparison of effects in the present "worst-case" simulations [x] and in Pinkerton & Gall (2015) [y], where the column marked: "Difference" = $100 \cdot (x-y)/y$. "Station average" is the average change between this study and Pinkerton & Gall (2015) at a given station for mining at both site A and site B, considering all six optical properties.

Station	Change in optical property	Present study		Pinkerton & Gall (2015)		Difference (%)		Station average
		Site A	Site B	Site A	Site B	Site A	Site B	
Source A to Whang-anui 20	Horizontal visibility (midwater) (%)	-47.1	-24.6	-38.9	-16.5	21.1	49.5	43.0
	Horizontal visibility (seabed)	-45.3	-22.6	-39.9	-15.4	13.5	46.2	
	High visibility days (midwater) (d/y)	-91.6	-31.8	-70.4	-19.3	30.2	64.5	
	High visibility days (seabed) (d/y)	-94.2	-34.8	-71.5	-18.9	31.8	84.4	
	Euphotic zone depth (%)	-33.1	-15.4	-25.6	-10.5	29.1	47.6	
	Days with >1% light at seabed (d/y)	-115.9	-52.9	-85.8	-32.4	35.1	63.7	
Graham Bank	Horizontal visibility (midwater) (%)	-45.2	-23.3	-36.5	-17.0	23.9	37.1	40.4
	Horizontal visibility (seabed)	-46.1	-24.5	-37.1	-15.7	24.3	55.7	
	High visibility days (midwater) (d/y)	-93.7	-37.0	-66.9	-21.9	40.2	68.5	
	High visibility days (seabed) (d/y)	-95.0	-36.8	-70.8	-24.0	34.2	53.5	
	Euphotic zone depth (%)	-33.0	-17.0	-24.1	-11.9	36.9	43.4	
	Days with >1% light at seabed (d/y)	-124.8	-64.0	-95.4	-46.8	30.8	36.6	
The Crack 1	Horizontal visibility (midwater) (%)	-54.5	-23.6	-46.5	-17.2	17.3	37.3	31.6
	Horizontal visibility (seabed)	-54.4	-24.6	-47.1	-17.1	15.4	43.8	
	High visibility days (midwater) (d/y)	-121.0	-37.0	-97.6	-24.6	23.9	50.3	
	High visibility days (seabed) (d/y)	-124.5	-40.0	-101.8	-24.6	22.3	62.8	
	Euphotic zone depth (%)	-36.9	-14.9	-29.9	-10.4	23.5	42.9	
	Days with >1% light at seabed (d/y)	-95.1	-43.9	-86.9	-33.7	9.5	30.4	
The Crack 2	Horizontal visibility (midwater) (%)	-57.3	-27.1	-47.3	-20.7	21.1	31.0	29.6
	Horizontal visibility (seabed)	-57.9	-27.0	-48.3	-20.2	19.8	33.4	
	High visibility days (midwater) (d/y)	-132.7	-40.7	-107.4	-27.1	23.6	50.5	
	High visibility days (seabed) (d/y)	-137.9	-45.0	-112.2	-30.2	22.9	49.2	
	Euphotic zone depth (%)	-42.9	-18.9	-34.2	-13.5	25.5	40.3	
	Days with >1% light at seabed (d/y)	-116.8	-53.8	-102.4	-43.4	14.0	24.2	

Table 3-2. Continued

Station	Change in optical property	Present study		Pinkerton & Gall (2015)		Difference (%)		Station average
		Site A	Site B	Site A	Site B	Site A	Site B	
North Traps	Horizontal visibility (midwater) (%)	-24.8	-7.9	-17.1	-6.2	45.4	27.7	49.9
	Horizontal visibility (seabed)	-23.7	-9.7	-17.1	-6.6	38.5	46.3	
	High visibility days (midwater) (d/y)	-34.2	-11.9	-25.8	-6.7	32.8	78.6	
	High visibility days (seabed) (d/y)	-35.4	-14.1	-29.9	-6.6	18.5	113.6	
	Euphotic zone depth (%)	-19.2	-6.9	-12.1	-4.4	58.8	56.4	
	Days with >1% light at seabed (d/y)	-44.8	-17.2	-33.9	-11.5	32.4	50.0	
Rolling Grounds	Horizontal visibility (midwater) (%)	-7.3	-22.7	-4.7	-15.6	56.6	45.8	57.9
	Horizontal visibility (seabed)	-7.3	-24.0	-4.5	-17.2	63.2	39.7	
	High visibility days (midwater) (d/y)	-7.8	-22.9	-4.8	-13.9	62.2	64.8	
	High visibility days (seabed) (d/y)	-7.9	-31.7	-4.4	-18.3	77.1	73.9	
	Euphotic zone depth (%)	-4.3	-11.1	-2.8	-7.8	53.3	42.9	
	Days with >1% light at seabed (d/y)	-3.6	-1.3	-0.1	-0.3	NA	NA	
Project Reef	Horizontal visibility (midwater) (%)	-34.1	-14.9	-24.9	-10.5	36.5	42.4	37.1
	Horizontal visibility (seabed)	-34.2	-15.7	-28.1	-11.6	21.9	35.3	
	High visibility days (midwater) (d/y)	-70.2	-22.5	-51.8	-13.9	35.5	61.9	
	High visibility days (seabed) (d/y)	-69.8	-21.3	-56.5	-18.6	23.5	15.0	
	Euphotic zone depth (%)	-27.3	-10.3	-20.4	-6.7	33.9	54.9	
	Days with >1% light at seabed (d/y)	-64.3	-29.3	-49.7	-18.9	29.4	55.2	
Source A North 20	Horizontal visibility (midwater) (%)	-6.7	-4.3	-4.8	-2.2	38.6	94.4	41.4
	Horizontal visibility (seabed)	-5.9	-3.2	-6.3	-4.7	-6.8	-31.2	
	High visibility days (midwater) (d/y)	-12.7	-7.4	-9.2	-5.3	38.6	38.7	
	High visibility days (seabed) (d/y)	-13.9	-9.1	-9.9	-9.4	41.0	-3.5	
	Euphotic zone depth (%)	-5.1	-1.9	-2.8	-1.3	82.5	48.0	
	Days with >1% light at seabed (d/y)	-17.9	-7.5	-10.5	-4.1	71.1	85.0	
Mean change due to mine A/mean change due to mine B			2.19		2.45			
Average (by site of mining)						33.5	48.6	
Average (across both sites)							41.0	

From Worst Case Optical Report⁴¹

⁴¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents/847ab7ccee/Optical-modelling-TTR-Apr2017-v2-002.pdf>

Table 2-10: Project Reef: Predicted optical properties. Predicted optical properties and their changes from background conditions if iron-sand recovery operations took place at the inner (Site A) or outer (Site B) end of the proposed mining area. For comparison, results based on the optical modelling of Pinkerton & Gall (2015) are shown and shaded grey.

Project Reef	Metric	Present study			Pinkerton & Gall (2015)		
		Back-ground	Site A	Site B	Back-ground	Site A	Site B
Horizontal visibility	Median (midwater) (m)	5.2	3.4	4.4	5.2	3.9	4.7
	Median (seabed) (m)	4.7	3.1	4.0	5.1	3.7	4.5
	Change (midwater) (%)		-34.1	-14.9		-24.9	-10.5
	Change (seabed) (%)		-34.2	-15.7		-28.1	-11.6
High visibility days (days per year)	Median (midwater)	189	119	166	189	137	175
	Median (seabed)	176	106	155	186	129	167
	Change (midwater)		-70	-22		-52	-14
	Change (seabed)		-70	-21		-57	-19
Euphotic zone depth	Median (m)	20.2	14.7	18.1	20.3	16.2	19.0
	Change (%)		-27.3	-10.3		-20.4	-6.7
>1% light at seabed	Median (days per year)	140	76	111	142	92	123
	Change (days per year)		-64	-29		-50	-19

Table 2-7: The Crack 2: Predicted optical properties. Predicted optical properties and their changes from background conditions if iron-sand recovery operations took place at the inner (Site A) or outer (Site B) end of the proposed mining area. For comparison, results based on the optical modelling of Pinkerton & Gall (2015) are shown and shaded grey.

The Crack 2	Metric	Present study			Pinkerton & Gall (2015)		
		Back-ground	Site A	Site B	Back-ground	Site A	Site B
Horizontal visibility	Median (midwater) (m)	6.7	2.9	4.9	6.7	3.5	5.3
	Median (seabed) (m)	6.2	2.6	4.5	6.4	3.3	5.1
	Change (midwater) (%)		-57.3	-27.1		-47.3	-20.7
	Change (seabed) (%)		-57.9	-27.0		-48.3	-20.2
High visibility days (days per year)	Median (midwater)	220	87	179	221	114	194
	Median (seabed)	211	73	166	215	103	185
	Change (midwater)		-133	-41		-107	-27
	Change (seabed)		-138	-45		-112	-30
Euphotic zone depth	Median (m)	24.9	14.2	20.2	25.0	16.5	21.6
	Change (%)		-42.9	-18.9		-34.2	-13.5
>1% light at seabed	Median (days per year)	140	24	87	141	38	97
	Change (days per year)		-117	-54		-102	-43

Below is a listing of the reports filed with the Fast-track Application, as per Appendix 3 of the application document: 42 reports: no Optical Effects report and no Sediment Plume Modelling report and no Worst Case Optical report.

An additional 11 documents (not reports) from the EPA 2023 Reconsideration Hearing were also included in the application.⁴² This makes a total of 53 documents.

⁴² <https://www.fasttrack.govt.nz/projects/taranaki-vtm/substantive-application>

Appendix 3. Application Reports

The following reports are those lodged with the application. The report numbers are those assigned by the EPA and used on the EPA website.

- [Report 1](#) South Taranaki Bight (STB) Baseline Environmental
 - *STB Baseline Environmental Appendix 1*
 - *NIWA STB Baseline Environmental Appendix 2*
 - *NIWA STB Baseline Environmental Appendix 3*
 - *NIWA STB Baseline Environmental Appendix 4*
- [Report 2](#) Benthic Habitats, Macrobenthos and Surficial Sediments of the Nearshore South Taranaki Bight
- [Report 3](#) Benthic Flora and Fauna of the Patea Shoals Region, South Taranaki Bight
- [Report 4](#) Habitat Models of Southern Right Whales, Hector's Dolphin, and Killer Whales in New Zealand
- [Report 5](#) Coastal Stability in the South Taranaki Bight – Phase 1
- [Report 6](#) Coastal Stability in the South Taranaki Bight – Phase 2
- [Report 7](#) Effects of Ships Light on Fish, Squid and Seabirds
- [Report 8](#) Seabirds of the South Taranaki Bight
- [Report 9](#) Zooplankton Communities and Surface Water Quality in the South Taranaki Bight
- [Report 10](#) NIWA South Taranaki Bight Fish and Fisheries
 - *NIWA Fish and Fisheries Appendix A*
 - *NIWA Fish and Fisheries Appendix B*
 - *NIWA Fish and Fisheries Appendix C*
- [Report 11](#) Geological Desktop Summary
 - *NIWA Geological Desktop Summary Appendix A*
 - *NIWA Geological Desktop Summary Appendix B*
 - *NIWA Geological Desktop Summary Appendix C*
 - *NIWA Geological Desktop Summary Appendix D*
 - *NIWA Geological Desktop Summary Appendix E*
 - *NIWA Geological Desktop Summary Appendix F*
- [Report 12](#) South Taranaki Bight Iron Sand Mining: Oceanographic Measurements
- [Report 13](#) Nearshore Optical Water Quality in the South Taranaki Bight
- [Report 14](#) South Taranaki Bight Iron Sand Mining: Shoreline Monitoring Data Report
- [Report 15](#) South Taranaki Bight Iron Sand Mining Nearshore Wave Modelling
- [Report 16](#) Effects on Primary Production of proposed Iron Sand Mining in the South Taranaki Bight
- [Report 17](#) Assessment of the Scale of Marine Ecological Effects
- [Report 18](#) South Taranaki Bight Commercial Fisheries
- [Report 19](#) Zooplankton and the Processes supporting them in Greater Western Cook Strait
- [Report 20](#) Aquatic Environmental Sciences - Trans-Tasman Resources Ltd Consent Application: Ecological Assessments

Appendices

- [Report 21](#) Tonkin & Taylor Ltd – Air Dispersion Modelling Studies on Gas turbine discharges
- [Report 22](#) Tonkin & Taylor Ltd – Air Dispersion Modelling Studies on Reciprocating engine discharges
- [Report 23](#) Clough and Associates Ltd – Trans-Tasman Resources South Taranaki Bight Offshore Iron Sand Project: Archaeological Assessment
- [Report 24](#) Martin Cawthorn Associates Ltd – Cetacean Monitoring Report
- [Report 25](#) Fathom – Assessment of Potential Impacts on Commercial Fishing
- [Report 26](#) R N Barlow and Associates Limited – Maritime and Navigational Impacts of the Project
- [Report 27](#) Marico Marine – South Taranaki Bight Marine Traffic Study
- [Report 28](#) Hegley Acoustic Consultants – Assessment of Noise Effects
- [Report 29](#) Rob Greenaway & Associates – Recreation and Tourism Assessment of Effects
- [Report 30](#) Corydon Consultants Ltd – Social Impact Assessment
- [Report 31](#) Boffa Seascape Natural Character Assessment
 - *Boffa Miskell – Visual Effects Report and Graphic Supplement*
- [Report 32](#) OCEL Consultants – Implications of Loose Tailings Seabed Material on Future Jack-Up Deployment
- [Report 33](#) MetOcean Solutions Ltd – Oil Spill Trajectory Modelling
- [Report 34](#) Te Taihauauru Iwi Forum Fisheries Plan 2012 – 2017
- [Report 35](#) Richardson, K, 'A perspective of marine mining within De Beers', The Journal of The South African Institute of Mining and Metallurgy, Volume 107
- [Report 36](#) Findlay, K, P. The Impact of Diamond Mining Noise on Marine Mammal Fauna off Southern Namibia, June 1996
- [Report 37](#) Institute for Maritime Technology – Environmental Impact Study: Underwater Radiated Noise, 1994
- [Report 38](#) Institute for Maritime Technology – Environmental Impact Study: Underwater Radiated Noise II, 1995
- [Report 39](#) eCoast Potential Effects of Trans-Tasman Resources Mining Operations on Surfing Breaks in Southern Taranaki Bight
- [Report 40](#) Martin Jenkins Ltd - Economic Impact Analysis of the Offshore Iron Sands Project
- [Report 41](#) Tahu Pōtiki - Cultural Values Assessment and Analysis
- [Report 42](#) Auckland University of Technology – Iron Sand extraction in the South Taranaki Bight: effects on trace metal contents of sediment and seawater

Table 5-1: Classes of sediment in the hydrodynamic model. NSC = Natural Sediment Cores; "PGT" = Post-Grind Tailings (after processing on board the mining vessel). See Hadfield & Macdonald (2015) for details of the hydrodynamic model.

Label	Source	NSC proportion	PGT proportion	Nominal sinking speed (mm/s)	Nominal diameter (µm)
sand_01	Riverine	1	0	0.62	27.5
sand_02	Riverine	1	0	0.01	3.5
sand_03	Seabed	1	0	103	313.8
sand_04	Seabed	1	0	39	193.1
sand_05	Seabed	1	0	6.6	79.4
sand_06	Seabed	1	0	0.8	27.7
sand_07	Seabed	1	0	0.01	3.1
sand_08	Overflow	0.617	0.383	1	33.2
sand_09	Overflow	0.783	0.217	0.1	10.5
sand_10	Overflow	0.751	0.249	0.01	3.3
sand_11	Underflow	0.675	0.325	1	33.2
sand_12	Underflow	0.727	0.273	0.1	10.5
sand_13	Underflow	0.632	0.368	0.01	3.3

Optical effects of an iron-sand mining sediment plume in the South Taranaki Bight region

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Optical Effects, Table 5-1 was redacted

2.9.1 Suspended source

The suspended-source sediment parameters in the current simulations are based on laboratory and model results outlined in the HRW report (HRW 2015). The resulting classification is presented in Table 2-3.

Table 2-3: Suspended source sediment parameters. The discharge rate is for a plant throughput of 50 Mt/a. Values that differ from the March 2014 configuration are shown in a **bold** font.

Class	Source	Settling velocity (mm/s)	Critical stress (Pa)	Discharge rate (kg/s)
sand_08	Overflow	1.0	0.200	1.45
sand_09	Overflow	0.10	0.200	12.55
sand_10	Overflow	0.01	0.200	6.00
sand_11	Underflow	1.0	0.200	0.25
sand_12	Underflow	0.10	0.200	1.80
sand_13	Underflow	0.01	0.200	0.85

The movement from a grain-size-based classification (March 2014) to a settling-velocity-based classification has not changed the settling velocity of the finest sediment classes, which remain at 0.1 mm/s and 0.01 mm/s. These are the sediment types that are most readily mixed to the surface and they are the most optically active, so they are the sediment types that are most important in determining the near-surface SSC and optical effects. The changes in the discharge rates for these sediment classes are summarised in Table 2-4.

Table 2-4: Summary of changes in discharge rates for the finer mining-derived sediments. .

Settling velocity (mm/s)	Discharge rate (kg/s)		Ratio (Mar 2015/ Mar 2014)
	Mar 2014	Mar 2015	
0.1	14.5	14.35	0.99
0.01	14.7	6.85	0.47
all < 0.1	29.2	22.8	0.73

Another difference from the March 2014 simulations is the depth at which the tailings discharge is introduced into the model. For the March 2014 simulations this release height was assumed to be

Sediment Plume Modelling Tables 2-3 and 2-4 were redacted

EVIDENCED BY FN 25: The link is to a Joint Witness Statement (JWS) which is not a full report.

This is not putting the ‘best information’ before the Fast-track panel, when a more detailed report is available.

https://www.fasttrack.govt.nz/_data/assets/pdf_file/0021/11883/FN25-EEZ000004-Effects-on-Bathymetry-and-Oceanographic-Processes-joint-witness-statement.pdf 20th March 2014

EVIDENCED BY FN105. This link is to a 2008 abstract, not the full paper

https://www.fasttrack.govt.nz/_data/assets/pdf_file/0017/11906/FN105-Ocean-forecasting.pdf

Nine of the footnote reports in relation to sediment tolerances studies – did not relate to sub-tidal ocean environments: FN118, FN121, FN126, FN129, FN130, FN131, FN125, FN135

These footnotes: FN118, FN121, FN126, FN129, FN130, FN131 – were estuarine studies, FN125 was a port study, FN128 a Greenland Fjord study, FN132 a Singapore, seagrass & corals study, FN135 an inter-tidal study.

EVIDENCED BY THE NEED FOR A FOOTNOTE INDEX “to assist in navigating the application”

9th September 2025: A ‘Footnote Index’ with #268 footnotes⁴³ with links to documents was sent through by the applicant.

[2] On 9 September 2025, the applicant submitted additional information to the Panel comprising 53 documents.

[3] The submission includes a Footnote Index, which identifies the location of documents referenced in the footnotes of the Taranaki VTM application. The index contains hyperlinks to relevant documents and references to Supplementary Technical Reports and Footnote documents.

⁴³ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0017/11942/Footnote-Index.pdf

[5] The Panel considers that additional information *will assist in navigating the application* and has therefore determined that it is appropriate to accept the information⁴⁴

EVIDENCED BY: FAST-TRACK PANEL REQUESTING DOCUMENT

FN 158: **19th September 2025**: The expert panel (minute 4) requests *Humpheson D (2017) Trans-Tasman Resources – Acoustic Modelling. Unpublished report to TTR*, referred to in footnote 158 of the application document.

Minute 4 request:

[7] While the new information provides updated results, the consultant’s advice note (Humpheson 2024) is not a full update of the original Humpheson D (2017) report. Accordingly, the Panel requests that the applicant provide the following document:

Humpheson D (2017) Trans-Tasman Resources – Acoustic Modelling.

Unpublished report to TTR, referred to in footnote 158 of the application document.

The report was provided to the EPA on 22 September 2025.⁴⁵ This report still contains fundamental weaknesses. The comments we have under ‘Noise’ are still relevant to this supplied report.

EVIDENCED BY THE EPA RESPONSE (s51 request) WITH DISCREPANCIES, MATTERS NEEDING CLARIFICATION & INFORMATION TEN YEARS

⁴⁴ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0019/12178/Minute-4-of-the-Taranaki-VTM-expert-panel.pdf

⁴⁵ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/12311/TTR-response-to-Minute-4-request-for-Humpheson-2017-Report_Redacted.pdf

22nd September 2025: EPA response⁴⁶ – their section 51 report in relation to the Taranaki VTM Project, outlined discrepancies within the application, several matters that require clarification, much of the information referenced in the application dates back approximately ten years or more, raises questions about whether the application provides a sufficiently current understanding of potential environmental effects, the Updated Environmental Impact Assessment²⁰²⁵” is a summary of monitoring reports previously submitted by the applicant in earlier applications and does not contain any new assessment of the risks and no new data or updated analysis has been provided. The EPA response suggests EPA Key Issues Report September 2016⁴⁷ may be a useful resource, which is not in the application documents provided.

Of note for the Fast-track panel: our club member K Pratt pointed out in her submission⁴⁸ that the Key Issues report (Sept 2016) did not include important finer details on the modelled reductions in light, on limitations in regards to testing work performed by HR Wallingford, and finer details on the reduction in benthic primary production.

EVIDENCED BY FN 24: WRONG DESCRIPTION AND INCORRECT LINK

The footnote link is to a summary of work conducted, by SKM, which notes the various reports, rather than outlining their findings. We are unable to find the document “Assessment Of Effects On The Physical Environment From The Trans-Tasman Resources Marine Consent Application: Oceanographic And Coastal Processes” SKM review for EPA. February 2014.

We are also unable to find those reports listed on the EPA website.

[FN24 Michael Huber Environment, Marine Mammals, Fish and Benthic Ecology \(PDF, 182 KB\)](#)

https://www.fasttrack.govt.nz/_data/assets/pdf_file/0020/11882/FN24-EEZ000004-Michael-Huber-Physical-Environment-Marine-Mammals-and-Fish-and-Benthic-Ecology.pdf 26th March 2014

⁴⁶ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/10025/Memorandum-of-Counsel-from-TTRL-in-Response-to-Panel-Convener-Directions.pdf

⁴⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/External-advice-and-reports/ddd3ed1402/EPA-Key-Issues-Report-Final-29-September-2016.pdf>

⁴⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Submissions-and-or-comments/dbab83ac37/Pratt-K-Section1-123055.pdf> pg. 42

[1373] Dr Hilke Giles:

[1374] there's a bit of mixed referencing across the documents.⁴⁹

Actions arising from, or agreed to by parties at Reconvened Hearing Hāwera 13-15 March 2024

1. Issues raised by submitters Ms Karen Pratt and Climate Justice Taranaki concerning **the draft agreed statement of issues required by Minute 15 were resolved and, where appropriate, were included in the draft document.**
2. [TTRL agreed to confirm whether the overall **description of the project**, as recorded in the 2017 Decision by the Majority, **remains the same**. TTRL will also advise whether there are any updates and, if so, how they can accurately be described.
3. **Insurance and bond**, TTRL agreed to: (i) provide a summary of its position on insurance (with relevant references to the evidence discussion during the 2017 hearing on those topics) and;(ii) update the DMC as to whether there have been any recent discussions with underwriters as to any modifications. If the insurance and underwriting position were to change, that could be relevant to, and may have an impact on, whether there needs to be a bond.
4. **Storm modelling data files** - Dr Macdonald (one of TTRL's experts on sediment plume modelling) agreed to provide more recent storm modelling data files from the last two years. Such information should be compared with the 2011 and 2012 data files. This work has become necessary because the impacts of climate change have seen an increase in the number of storms and their intensity.
5. **Pre-commencement monitoring** The DMC has requested TTRL to provide a submission on issues discussed at the hearing on pre-commencement monitoring (**including references to relevant parts in the Supreme Court judgments** that deal with pre-commencement monitoring.
6. On the assumption that the use of pre-commencement monitoring is lawful, the DMC invites TTRL **to consider for inclusion in the conditions, provisions whereby :if any surveys are to be are carried out** (for example for obtaining biological, ecological, sediment, acoustics and other data), such data should be **sourced and managed by independent suitably qualified experts**;(ii) any results and reports are **independently peer reviewed**; and (iii) any results and reports are **made publicly available in real time** (or as close as practical)in the interests of transparency.

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https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/11600/Transcription_with_Paragraph_Numbers.pdf

7. Enhancement of conditions - Dr Dearnaley was invited to **consider possible options for enhancing conditions 48 (and schedule 2), 52 and 53, and whether they are currently fit for purpose.** The DMC agrees that Dr Dearnaley may confer with TTRL legal counsel as well as other experts on this, as well as referring back to earlier transcripts or evidence. What the DMC is interested in is making an assessment of **whether these and other conditions proffered by TTRL are of the same standard as international best practice.** As discussed during questioning, the DMC **would also be interested to see the examples of conditions from similar projects Dr Dearnaley has advised on** during those referred to in the UK.
8. During questioning, Dr Dearnaley noted that from his experience where there have been **adverse effects arising from sediment the cause was often the type and use of equipment onsite.** Both Dr Dearnaley and TTRL planner Dr Mitchell **were invited to consider the relevant conditions relating to equipment use to determine whether such a risk has been considered.**
9. **Underwater noise conditions (specifically condition 11),** Dr Humpheson was asked to provide further clarity on, and information about, who will be undertaking the monitoring, what peer review will take place and how the information will be stored (and who it will be made available to). These and any related conditions should be designed to meet international best practice.
10. Experts for TTRL may wish to **reconsider the conditions relating to marine mammals to ensure they meet or exceed international best practice.**
11. **Seabird conditions (specifically condition 9), Dr Thompson was asked to provide further clarity on pre-commencement monitoring.** The DMC requests further information about who could undertake the monitoring, what peer review could take place, how such information could be stored and who it would be made available to. These and any related conditions should be designed to meet international best practice.
12. **Economic update** TTRL agreed to provide by Friday 5 April 2024 an updated assessment of the following: a) the overall revenue per annum from the produce from the mining; b) export revenue; c) royalties to NZ; d) tax implications; e) projected job creation in the region and nationally; and f) Any other relevant economic updating information.
13. **Evidence of Dr Alison MacDiarmid – pre-commencement monitoring Dr MacDiarmid is invited to provide a higher degree of specificity around any proposed testing (in regard to benthic ecology and recovery), and consider the inclusion of details about when to test and where to test in accordance with international best practice and transparency (for example, in relation to conditions 7, 8 and 57).**
14. Evidence of Mr Greer (for KASM/Greenpeace) **Mr Greer agreed to review and provide further comment on the GHD Report (by Bethot and Petch) that was commissioned by the EPA in 2016 in relation to the effects of the proposed mining activity on sediment mobilisation and transport.**

OTHER CONSIDERATIONS: 17th SEPTEMBER 2025, DELMORE FAST TRACK DRAFT DECISION – DECLINED-⁵⁰ - POINTS FOR PANEL’S CONSIDERATION

We think it *helpful for the Fast-track panel to have before them* a number of points from the draft decision:

99. In terms of what the term “*adverse impact*” means it is defined in section 85(5) as meaning “any matter considered by the panel in complying with section 81(2) that weighs against granting the approval”. The Council submits that the *term is “therefore broad, and could encompass (for example) adverse effects on the environment, matters arising from planning instruments, and section 104(1)(c) matters.”*⁴⁵

102. The Council submits further that “*where inconsistency with planning provisions is coupled with actual adverse impacts both factors “may legitimately contribute to a decision to decline.”*⁴⁸

103. The Council refers to *several material adverse impacts that it considers are sufficiently significant to be out of proportion to the project’s regional benefits*. The adverse effects/impacts assessment is set out in Part F and the benefits assessment is set out in Part G of this Decision.

106. The Council’s Legal Memorandum then considered a number of discrete legal topics that are relevant to the Panel’s deliberations as follows:

i. Case law and higher order planning instrument provisions confirming that *infrastructure issues, including funding impacts, are valid considerations for the Panel;*

117. The Council submitted that under clause 17(1) while the fast-track approvals process prescribed in the FTAA applies to the Application instead of the usual RMA consenting process, the *FTAA expressly incorporates (or imports) most RMA provisions* relevant to the assessment of resource consent applications, with all necessary modifications.

118. In terms of the *two statutory purpose provisions* to resource consent decision-making the Council spelt these out as being: the FTAA purpose which is “to facilitate the delivery of infrastructure and development projects with significant regional or national benefits” and the *familiar sustainable management purpose of RMA*, which also applies in light of clause 17(1)(b), albeit with the ‘greatest weight’ given to the FTAA’s purpose.

136. The Panel’s findings on these principal issues in contention are that the wastewater, water supply, transport *and ecological effects are sufficiently significant that they are out of proportion to*

⁵⁰ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0015/11148/Delmore-Decision-Draft-Decision-29-August-2025-Final-version.pdf

the Application's benefits. These effects are not capable of being addressed by way of conditions. The detail of the Panel's assessment is contained elsewhere in this Decision.

137. The Panel notes that these *principal issues were not substantially refined or resolved through the expert witness conferencing session.* This is further discussed in Part J of this Decision.

144. The Panel notes that these matters are *addressed by using the term in section 85 of the FTAA which is 'impact'.* The Panel considers that *the term 'impact' is equivalent to the term 'effect' used in the context of clause 5(4) of Schedule 5 and use them interchangeably in this Decision.*

145. For the purposes of the assessment under section 85 which is covered in Part C of this Decision, the term is *impact*. For the purposes of the assessment under clause 5(4) of Schedule 5 of the FTAA the term is *effects*.

g. Potential ecological effects - *there are a number of key information gaps in the Application with respect to ecological effects. These information gaps mean adverse terrestrial and freshwater ecology effects are not able to be fully assessed.* Consequently, it is not possible to determine whether the measures proposed by the Applicant are appropriate to mitigate or avoid these effects.

h. Sedimentation effects - An Adaptive Management Plan is considered necessary, given the *extent and duration* of the earthworks activity within the receiving environment that contains wetlands and streams, to ensure that *adverse sedimentation effects are appropriately mitigated and managed.* The Applicant is opposed to this mechanism.

168 e. Freshwater and terrestrial ecology – The development represents *a potentially significant adverse impact on indigenous biodiversity that has not been properly assessed, avoided, or mitigated.*

Panel findings

217. The Panel agrees with the Council's terrestrial ecologist, Mr Statham, that *for a development of this magnitude a greater degree of upfront site specific and details surveys would typically be expected. If this had been undertaken there could have been a more thorough investigation and understanding of the impacts on terrestrial wildlife, including from urbanisation of the site, which the Panel acknowledges to be an anticipated outcome within the FUZ*

221. Notwithstanding these concerns, the Panel accepts that with further information as outlined and greater consideration of the wording of the conditions, effects on terrestrial ecology associated with the Application could be appropriately managed by conditions. However, while the mitigation measures for construction and operational effects have been considered and are reasonably reflected in the conditions, *the conditions requiring management and maintenance of vegetation by the Residents' Society have not been developed to a point where the Panel can have confidence the adverse effects on terrestrial ecology will be appropriately managed in perpetuity.*

367. It is the Panel's view that to grant a consent with significant pre-conditions is not genuinely granting a consent at all. The Panel *does not have adequate information available to provide it with certainty that it can impose appropriate conditions to mitigate potential adverse effects noted by the Council.*

National Policy Statement for Indigenous Biodiversity 2023

519. The Applicant considers the proposed development has been designed to avoid adverse effects on native vegetation to the maximum extent practicable. The Council, however, considers *the Applicant has not demonstrated how the proposal will protect areas of significant indigenous vegetation and significant habitats of indigenous fauna.*

520. The Panel is *not convinced that the conditions currently proposed will avoid outcomes for indigenous biodiversity on the Site that would otherwise be contrary to the objective of the NPSIB.*

OTHER CONSIDERATIONS: 17th SEPTEMBER 2025, DELMORE FAST TRACK DRAFT DECISION – DECLINED-⁵¹ - ECONOMIC POINTS FOR PANEL’S CONSIDERATION

We have found the points outlined in the recent Fast-track decision useful in our economic comments. They are provided here for easy reference for the Fast-track panel.

485. Where the claimed benefits are economic, the Council submits that the *Panel must also... consider whether the alleged benefits represent a net economic contribution or benefit*.

This requires scrutiny not only of the gross outputs, but also of associated economic costs –which, in a given case, might include for example opportunity costs and displacement effects.

Without such a net assessment, *benefits risk being overstated, in turn distorting the proportionality exercise required under section 85(3)*.

The FTAA is silent on whether regional or national economic benefits are to be assessed on a gross or net basis. *The Council submits that the only reasonable approach is that economic benefits should be considered on a net basis*. A gross-benefit approach risks perverse outcomes, where projects that may deliver significant gross economic outputs but impose economic costs that outweigh those outputs could nonetheless be elevated under the FTAA’s purpose. Parliament cannot have intended that result, absent express language (such as a specific reference to “gross economic benefits”). *Mr Stewart is correct when he expresses the view that it is necessary to consider the net position, as “[t]o interpret it otherwise would depart from basic principles of sound economic analysis”*.

While he holds different views from Council’s economics expert (James Stewart), the Applicant’s economics expert, Adam Thompson, agrees that “*external costs can occur and need to be considered*”. Both Mr Stewart and Council’s economics peer reviewer, Dr Richard Meade, consider it essential to assess both the *economic costs and benefits*.

494. Mr Stewart expresses some reservations about the other benefits cited within Mr Thompson’s report, considering that the figures given are meaningless without the context of costs involved. In his view Mr Thompson has not adequately considered costs nor quantified benefits. Furthermore, the infrastructure required to support the proposal would likely be redirecting planned investment from other growth areas, and those opportunity costs have also not been assessed.

496. Given the divergent views of the Applicant’s and the Council’s economic experts, *the Panel commissioned Dr Tim Denne to review the economic analysis* by Urban Economics and the Council

⁵¹ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0015/11148/Delmore-Decision-Draft-Decision-29-August-2025-Final-version.pdf

commentary. He also finds Mr Thompson's analysis to be inadequate relative to the key economic benefit criteria of the FTAA and *considers the decision criteria of the FTAA seem to require a regional and/or national cost benefit analysis*, as suggested by Auckland Council. However, he suggests the analysis could be undertaken more simply than suggested by Messrs Stewart and Meade.

498. Dr Denne also notes that Mr Thompson has conducted a form of Economic Impact Analysis to estimate *GDP effects rather than a cost benefit analysis*. He references Treasury's comparison of Economic Impact Analysis and cost benefit analysis, that concludes while *Economic Impact Analysis can provide useful contextual information for decision-makers, it is not suitable as a tool for measuring the balance of costs and benefits of a decision to society*. By contrast a cost benefit analysis would also identify the opportunity costs of land and labour, as well as infrastructure costs and environmental effects.

499. Through both evaluating the various analyses and his own interpretation of the FTAA, Dr Denne also concludes that consistency *with the net benefit criterion of the FTAA would be best achieved using a cost-benefit analysis*. He concludes that the analysis provided by the applicant does not suggest significant net economic benefits.

503. The Panel concludes that it agrees with the Council and Dr Denne that *the benefits (largely economic), claimed to occur from the Project have been overstated*.

OTHER CONSIDERATIONS: TTRL'S COMMENTS THAT 'RECONVENED 2023 EPA PANEL'S REQUESTS FOR INFORMATION, THE FINDINGS OF SUPREME COURT AND ISSUES IN CONTENTION - "WON'T PROVIDE AS MUCH GUIDANCE AS OTHERS THINK"

We strongly disagree with TTRL's response to the FastTrack Convenor on the 4th August 2025

As club members, we were encouraged by the Convenor's efforts to follow up on what we consider very valuable requests for information and updates made by the Reconvened Panel in March 2024, and agreed to by the parties. We believe these requests are of such significance that we strongly hope the Fast-Track Panel will also seek the same information.

As TTRL has stated in their 4th August 2025 correspondence (point 22) they have not sought to address in a specific way any of the DMC's lines of inquiry in their Fast-track application. They maintain that all relevant considerations for the FTA Panel have been *comprehensively* addressed in its new application, incorporating such updates as remain relevant given the Supreme Court's findings.

We strongly disagree with TTRL's response to the FastTrack Convenor on the **4th August 2025**, that:

they “do not consider⁵²

(a) the findings of the Supreme Court,

(b) the issues in contention during the reconsideration,

or (c) the matters on which the reconsideration DMC requested further information,

will provide as much guidance for the Panel on the present application as others may think”.

SEDIMENTATION: FAST-TRACK PANEL QUERY RECEIVES AN ‘OBSCURE’ AND NOT DIRECT RESPONSE

In the presentation by TTRL to the Fast-track panel on 2nd September, 2025 they were asked by Dr Giles if *technical reports had been prepared*. The responses by MacDiarmid and Eggers were less than transparent, in light of what was filed on the 4th August 2025 which confirms standalone technical reports were not prepared. Furthermore, the ‘substantive, new evidence’ for Plume Modelling does not exist -as the evidence of Helen MacDonald⁵³ states there is no new relevant information since the 2017 evidence and Dearnaley⁵⁴ states there haven’t been updates or new information.

[359] Dr Hilke Giles:

[360] Sure. Information having been updated — and you listed marine mammals and seabirds and sediment plume modelling — **have any technical reports been prepared for these updates?**

[361] Dr Alison MacDiarmid:

⁵² https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/10025/Memorandum-of-Counsel-from-TTRL-in-Response-to-Panel-Convener-Directions.pdf

⁵³ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/4310/Report-20e-Evidence-statement-Macdonald-May-2023.pdf

⁵⁴ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0013/4306/Report-20a-Rebuttal-evidence-DEARNALEY-Jan-2024.pdf

[362] **We can dig those out for you**, they are listed at various points in the document and we can point to them

[363] Alan Eggers:

[364] **Yes** — they are listed in the evidence points in this document, and we can point to them.

In point 11 of the 4th August 2025 TTRL response it states “The present application incorporates all of these substantive updates. **Rather than prepare further standalone technical reports** on each of the above topics, **the updates have been made directly to the application document.**”

TTR’s “new evidence” which they describe as ‘substantive’ is that which was filed with the EPA in 2023. There is no new substantive evidence for sedimentation.

(a) Primary and rebuttal *statements of evidence* of Dr Simon Childerhouse, marine mammals and recommended conditions (b) A primary *statement of evidence* of Darran Humpheson, addressing underwater noise on marine mammals; (c) Primary and rebuttal *statements of evidence* of Dr David Thompson, addressing potential effects on seabirds, and recommended conditions **(d) Primary and rebuttal statements of evidence of Dr Helen Macdonald on sediment plume modelling (e) A rebuttal statement of evidence of Dr Michael Dearnaley addressing near-field sediment dispersion and the plume modelling fitness-for-purpose; (f) Primary and rebuttal statements of evidence of Dr Alison MacDiarmid addressing all effects of sediment discharge on marine biota (excluding mammals and seabirds) (g) Primary and rebuttal statements of evidence of Dr Philip Mitchell providing a planning assessment of all effects in accordance with the legal principles identified by the Supreme Court, including recommended conditions.**

Evidence presented on sedimentation and sediment plume modelling ⁵⁵

- [Report 20c - Evidence Dr Alison MacDiarmid 19 May 2023 \(PDF, 243KB\)](#)
- [Report 20e - Evidence Dr Helen Macdonald 19 May 2023 \(PDF, 175KB\)](#)
- [Report 20b - Rebuttal evidence Dr Alison Mac Diarmid 23 January 2024 \(PDF, 234KB\)](#)
- [Report 20d - Rebuttal evidence Dr Helen Macdonald 23 January 2024 \(PDF, 188KB\)](#)
- [Report 20a - Rebuttal evidence Dr Michael Dearnaley 23 January 2024 \(PDF, 221KB\)](#)

Report 20e Helen MacDonald. “**There is no new relevant information since the 2017 evidence**” MacDonald states: “When given the behaviour of a material (e.g., sinking velocity) I can use numerical modelling to infer where it will go but I am not an expert in sediment behaviour. I

⁵⁵ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/substantive-application>

consider Dr Mike Dearnaley to be the expert in sediment behaviour. In particular he understands the sediment plume behaviour in the nearfield (within 3 km of the mining operations) and I consulted with him about the parameters used in the worst-case scenario. He was also consulted on and reviewed the original model set up by Mark Hadfield.” “I have reviewed all of the plume modelling work in light of the Supreme Court’s concerns regarding the effects of sediment, and in my view the sediment plume model used in the initial assessment is of good quality and fit for the purpose it was used for”

Report 20a Dearnaley⁵⁶ “I am **not aware of new information** relating to the character and properties of the material to be mined and returned to the seabed. The **near-field numerical modelling** undertaken by my team at HR Wallingford **has not been updated**. Dr Macdonald reports in her evidence that there has **been no update to the far-field sediment plume modelling** undertaken by NIWA.

⁵⁶ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0013/4306/Report-20a-Rebuttal-evidence-DEARNALEY-Jan-2024.pdf

Convenor took a conservative approach to timeframe due to TTRL not providing information requested by the EPA reconvened Decision Making Panel

We recognise the Convenor took this into account in her **12th August 2025** minute⁵⁷

“Of critical importance is that, once set by me, the timeframe cannot be amended for any reason (other than applicant-initiated suspension). While I had hoped to gain a clearer picture of the technical and evidential matters likely to be in dispute for the purpose of setting an appropriate timeframe, the Applicant's responses to some of my directions have provided little, if any assistance, and have in fact *led to my taking a more conservative approach to timeframe.*”.

THE COMPLEX SUITE OF CONDITIONS REQUIRES SIGNIFICANT ATTENTION – WE AGREE

We are also very aware of the Convenors other comments and our Club has a particular interest in the Conditions and our South Taranaki Underwater Club agree strongly that they require significant attention.

We are conscious that neither the EPA or the TRC⁵⁸ in their comments have provided any feedback on the Conditions – which have not changed since the 2017 Hearing and Reconsideration Hearing.

We have made a few suggestions to some of the Conditions in our comments, but have more feedback to provide, which I understand is an opportunity available to us later on in the Fast-track process.

“The complex suite of conditions required for the approvals sought will require significant attention from the Expert Panel and that effort should not be underestimated. I am also

⁵⁷ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/10043/FTAA-2504-1048-Convener-Minute-regarding-expert-panel-appointment-and-timeframes.pdf

⁵⁸ <https://www.trc.govt.nz/assets/Documents/Meetings/PolicyPlanning/2025/Policy-and-Planning-Committee-Agenda-Sept-2025-web.pdf>

conscious that the end of year holiday period may limit the Panel's ability to finalise a draft decision and draft conditions for circulation

Dr Mitchell's response – unclear – as shown by Convenor's interpretation – this is not the transparency standard required for the smooth facilitation of this Fast-track process

We feel that in light of the Delmore Fast-Track case, the Panel Convenors directions of **16th July 2025** (coming after the 7th July Conferencing) with its requirements for TTRL to provide further evidence is a clear example of where the application documents are not at the requisite standard required. This is especially so when one considers the significant scale of this project.

We note that on the **7th July 2025** Convenor's meeting with the applicant and invited parties, the Convenor discussed Minute 20, issued by the EPA reconsideration panel **in March 2024** (before TTRL withdrew), which asked for these pieces of information and updates to information. The Convenor said she would be grateful for TTRL's planning expert, Dr Mitchell, to comment on the extent to which some of those matters had been undertaken . . .because in her mind once the new panel looks at the application they may have similar requests.

She asked Dr Mitchell to what extent has the application material been modified to anticipate some of those queries? Phil Mitchell responded that *'the short answer to your question is **that when preparing the substantive application we were well aware of and cognisant of the matters that were canvassed in the Hearing in March, and I don't have a schedule in front of me where I can go through that list and go 'tick, tick, tick one by one and give you categorical assurance in that regard – but what I can say is that all those matters were considered and in my opinion and my judgement they've all been addressed to the extent it is appropriate to address them, to enable a decision making panel to be comfortable that all the relevant technical information is before the panel**''*

The Convenor then asked **'does that include the further sediment plume that was going to be undertaken'?** In the video of the meeting Eggers points Mitchell to a note he had passed him earlier, both Eggers and Lawyer nod their heads, whilst looking at Mitchell and Mitchell then responded **'yes'**.

Mitchell's response to the Convenor was carefully crafted to say the matters had been **addressed to the extent it is appropriate to address them** . . . which we now know from TTRL's Memo of Council response 4th August 2025 – means the requests were considered, but they were deemed by TTRL to be inappropriate to address. **In effect a “no”, but the wording meant the listener might have interpreted this as a “yes”**. . .as can be seen from the Convenors comments on **17th July**

2025 where she stated⁵⁹ “When I posed that question to the Applicant team at the conference, I was told that in preparing the current application, the Applicant's team was cognisant of the matters canvassed at the March 2024 hearing and that **they have all been addressed.**”

16th July 2025 Convenor request to TTRL for memo on updated evidence

For ease of the Fast-Track panel we have listed some of the actions arising from, or were agreed to by parties at the first stage of the hearing held in Hāwera between 13-15 March 2024 (the request for this evidence and information was to have been provided by **Friday 5 April 2024**, as per Hon Lyn Stevens CNZM KC DMC Chair 21 March 2024, but TTRL withdrew on the **28th March 2024**).

The Minute 20 2024 and issues raised, *are not* on the Fast-Track website materials and we think it *helpful to include* them in our comments.

We also stress the importance of the line of enquiry the Chair of the Reconsideration panel was pursuing in relation to the potential re-running of the Plume Modelling following Dougal Greer’s presentation, especially on wave periods. The transcript for the Reconsideration Hearing evidences this.⁶⁰ We support the Fast-track panel also pursuing this line of enquiry – importantly the ocean conditions used in the near-field modelling. This is currently a ‘**matter in contest**’.

The Convenors’ request to TTRL was for **matters ‘in contest’** to be addressed (see (a)ii.

(a) a memorandum that identifies *clearly which sections of the application documentation, including technical reports and conditions, have been substantively updated:* **i** in response to the findings of the Supreme Court in 2021; **ii**. in response to any of the issues that were in contention during the reconsideration or were identified by the DMC as requiring further information prior to withdrawal of the application; **iii**. since the 2016 application was withdrawn in March 2024

(b) a table indicating by report and section reference where those updates or amendments have principally been made;

⁵⁹ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0020/8354/FTAA-2504-1048-Panel-Convener-Minute-3-post-conference-directions.pdf

⁶⁰ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

SEDIMENTATION AND OPTICAL QUALITY: BEST INTERNATIONAL PRACTISE GUIDANCE

CSIRO dredge plume modelling guidelines

There has been a lot of debate about how dredging impacts on the environment should be modelled, and different projects have often used inconsistent methods. Because of this, regulators usually take a very cautious approach when assessing dredging proposals. To improve confidence and consistency, CSIRO has developed a new guideline on dredge plume modelling. The guideline brings together the latest science and lessons from major research programs, and it sets out clear recommendations on how to estimate sediment sources, plan modelling strategies, and account for uncertainty. A key principle is that **modellers and ecologists should work together from the start, so that sensitive marine habitats and species are properly considered**. The guideline also calls for a public database of environmental data, so future assessments are more robust, transparent, and trusted by both regulators and the community.

EXTRACTS:

CSIRO “There has been much debate on how modelling should be undertaken, with inconsistencies in how they are applied for EIA purposes. In light of this, environmental regulators have generally taken **a precautionary approach** when using these outputs to evaluate environmental impacts and any monitoring that may be required as part of the dredge activities regulatory approval.

To address this challenge, CSIRO has **prepared a dredge plume modelling guideline** to assist in establishing consistent modelling approaches, providing improved robustness and assurance in modelling outcomes. It is hoped that the availability of this guideline and its use will **lead to improved public confidence** in the EIA process and will **reduce the monitoring and management burden** associated with large-scale dredge activities.”⁶¹

The Guideline **draws heavily on learnings from the WAMSI Dredging Science Node** and provides recommendations on a number of concepts including source estimation, modelling strategy, uncertainty evaluation, and the need for a public database to capture EIA data to improve future modelling exercises.

Guideline on dredge plume modelling for environmental impact assessment

A practical guideline to support best practice in dredge plume modelling PDF (717 KB)

⁶¹ <https://www.csiro.au/en/research/natural-environment/oceans/dredge-plume-modelling>

The Guideline represents a ***synthesis of extensive literature review, new research, and key learnings*** from the Western Australian Marine Science Institution (WAMSI) Dredge Science Node (Themes 2 and 3).

An overarching guiding principle from the Guideline is that ***dredge plume modellers need to engage ecologists from the very beginning of the EIA process to understand the spatial distribution and ecological thresholds of the sensitive marine habitats and identify relevant cause- effect timescales and pathways.***

The Guideline strongly recommends ***that a public database to support dredge plume modelling be established and all relevant data be made available.*** The database will greatly improve the availability of reference information at the EIA stage, assisting both those responsible for the EIA preparation, and for interpreting and approving the dredge activity.

Government of Western Australia Technical guidance 2021⁶² - Environmental Impact Assessment of Marine Dredging Proposals

⁶² <https://www.epa.wa.gov.au/policies-guidance/technical-guidance-environmental-impact-assessment-marine-dredging-proposals>

Version	Change	Date
1.0	Initial version	December 2016
2.0	Technical guidance includes the findings of the WAMSI Dredging Science Node relating to tolerance thresholds of key benthic marine organisms to dredging pressures and on critical life cycle windows where important marine taxa are likely to be particularly sensitive to these pressures. The structure and content of the main document is largely retained, with the detailed scientific information included in three technical appendices.	September 2021

“This Technical guidance describes the impact prediction and assessment framework that the EPA expects proponents and consultants to use so that **predictions of the extent, severity and duration of impacts to benthic habitats associated with significant dredging activities are presented in a clear and consistent manner.**”

This version of the Technical guidance was published in **October 2021**. The framework remains largely unchanged, however the Guidance now incorporates the relevant scientific findings from the Western Australian Marine Science Institution’s Dredging Science Node. The information generated by the research has been collated and reviewed to identify and further refine the key findings, with input from relevant stakeholders. The bulk of the additional information is detailed technical advice most relevant to tropical north-west Western Australia and provided in three appendices. These appendices include **suggested guideline values based on the tolerance of key biota to dredging pressures, the scientific rationale behind the values, advice relating to the pre-development baseline surveys required to support impact prediction and advice to assist proponents with post-approval monitoring and management programs.**

SEDIMENTATION & OPTICAL QUALITY: The Woodside report⁶³ (over 900 pages) FOR 20.4 million tonnes dredging

⁶³ https://www.woodside.com/docs/default-source/our-business---documents-and-files/burrup-hub---documents-and-files/scarborough---documents-and-files/scarborough-dsdmp.pdf?sfvrsn=35cb82fe_8 2023

The Woodside report⁶⁴ (over 900 pages) was peer reviewed by Greg Britton (see Appendix F) who is the Technical Director of Royal Haskoning DHV in Australia based in Sydney. This **report was in support of 20.4 million tonnes of extraction, and 1.4 million tonnes maintenance dredging** (to give this some context TTRL will be extracting 50 million tonnes per year, under a 35year sought FastTrack permit).

The document lists sets of **thresholds expressed as suspended sediment concentrations and daily light integrals** to define three zones of potential impact within three ecological zones. Calculations are set out in detail and notes provided on the use of these calculations to interrogate sediment dispersion modelling outcomes in predicting the marine environmental impacts of the Scarborough trunkline.

Importantly the Woodside report notes: WAMSI recommendations and the WAEPA guidance specify that **thresholds** should be adapted to reflect the **background water quality environment in which the communities under assessment have developed and to which they are adapted.**

There has been nil work by TTRL, for taxa thresholds in the Pātea shoals – the area with the localised impact.

Greg has 43 years professional experience in the investigation, design and documentation, planning, environmental assessment, and project management of coastal, estuary and maritime projects.

Greg has provided expert advice on coastal, maritime and environmental engineering to the NSW Land and Environment Court, NSW Supreme Court, Queensland Supreme Court, Federal Court of Australia and several Commissions of Inquiry.

He has fulfilled the role of a Court Appointed Expert (CAE) in the NSW Land and Environment Court. He has recently been appointed by the NSW Minister for Planning to the Sydney District and Regional Planning Panels as a Coastal Expert.

Greg is a long term member of an expert panel retained by the Commonwealth Department of Agriculture, Water and Environment (DAWE) to advise the Commonwealth on dredging, dredged material management and coastal engineering matters under the Commonwealth

⁶⁴ https://www.woodside.com/docs/default-source/our-business---documents-and-files/burrup-hub---documents-and-files/scarborough---documents-and-files/scarborough-dsdmp.pdf?sfvrsn=35cb82fe_8 2023

Environment Protection (Sea Dumping) Act 1981 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Greg was a member of the Independent **Ichthys Project Dredging Expert Panel** (IDPEP) with a particular focus on hydrodynamics and sediment plume modelling.

*Note for Fasttrack panel: **Ichthys dredging campaign likely shifted in the order of 26–32 million tonnes of material over three years** (depends on the bulk density).*

SEDIMENTATION & OPTICAL QUALITIES: TTRL DREDGING v WORLD-WIDE DREDGING COMPARATIVES

No comparative figures or contextual details of dredging operations around the world and their tonnages have been presented in the FastTrack materials (or in past Hearings) by the applicant. As a club we feel this is a critical and material matter that need to be before the FastTrack panel.

It is hard to find examples of any dredging project that comes close to the tonnages, timescale and operational manner of this extraction, as proposed by TTRL. At 50 million tonnes extraction, for a the time scale TTRL has stated, is 1 billion tonnes over 20 years – (although the EPA permit applied for is 35 years.).

A conservative way for the Fast-track panel to consider the term of the extraction from this mining project, is to consider the statement in the Appendix 19.16 - Trans-Tasman Resources 2023 Mineral Resource Statement where it states “further work: *potential for further infill drilling to extend the available recoverable resources* in the Cook and Kupe Deposits resource areas. Pending budget approval, a detailed vessel based geophysical survey over the mine area is planned.”

The Supreme Court [252] stated ‘material harm can be temporary’.

SEDIMENTATION & OPTICAL QUALITIES: SIZE, DURATION & SCALE OF RISK MUST BE ASSESSED AS/NZS ISO 31000

Within New Zealand, the Australia Standard/ **New Zealand Standard for Risk Management (AS/NZS ISO 31000 [21])** involves identifying, analysing, evaluating, and treating risks as an approach to guide risk management. here are many definitions of risk and methods to assess risk, and there can also be a difference in the underlying concept of risk. A “likelihood-consequence”

approach expresses risk as the product of the expected likelihood and consequence of an event, and is often regarded as suitable for rare and unpredictable events (such as a major oil spill). **The risks arising from activities that are predictable (where the likelihood is known), ongoing, and cumulative** (such as fishing and some **seabed mining activities**) **may be better suited to an “exposure-effects” approach where the size, duration and scale of the impact is used** to assess the ecological consequence of the impact

It is important for the Fast-track panel to consider that although the applicant TTRL have stated their mining schedule is for 20 years, of the 35 year permit sought During oral evidence in the second EPA Hearing, representatives for MBIE explained it was preferable for the marine and discharge consents to be for a longer term as there was an ability to extend the length and duration of the mining permits.

In terms of the renewal process for mining permits, section 36 of the Crown Minerals Act makes it clear that extensions are dealt with as a straight-forward renewal rather than a more involved reconsenting process. In particular, an extension can be granted at the request of the

permit holder or on the Minister's own motion where the Minister is satisfied an extension is required to enable the economic depletion of the resource. There is no public consenting process to be stepped through.

SEDIMENTATION & OPTICAL QUALITIES: COMPARATIVE EXAMPLES: LARGE SCALE DREDGING & PORT TARANAKI DREDGING

1. DOC's sedimentation expert Dr Peter Longdill who appeared in the first application, and was requested to appear for the DMC in the second application, stated⁶⁵ "For the past ten years, a significant period of my time has been spent on mega-dredging/reclamation projects (i.e., **the largest of these included dredge volumes of ~60 million m³ [i.e. ~150 million tonnes]**, with land reclamation works utilising all of that dredged fill".
2. HR Wallingford's sedimentation expert, Dearnaley, engaged by TTRL stated "The scale of the extraction and return of de-ored sediment *makes the proposed project **similar to other large scale dredging projects around the world***. Most dredging projects involving this mass of material being removed from the seabed would be more complex, involving several large pieces of dredging plant working simultaneously and typically with the dredgers participating in a cycle of loading, transporting and discharging the material. Such projects **might typically last for one to three years** and be associated with a construction project."⁶⁶
3. In response to questioning (see questions and answers in appendix attached to JWS Sedimentation 13/2/17)⁶⁷ Dr Dearnaley responded "*By large dredging projects Dr Dearnaley is considering major reclamation projects involving of the order of 200 million m³ or more of dredged material. Such projects include new port development at Rotterdam in the Netherlands and land creation in Dubai, Hong Kong and Singapore. The projects had typical **construction times of 3-10 years** and involved fleets of dredging plant.*" 200 million m³ converts to **320-400 million tonnes**, based on bulk density bulk density is typically in the 1.6-2.0 t/m³.
4. Port Taranaki's maintenance dredging program 2004-2021⁶⁸, cumulative volume over three campaigns = 1.3 million cubic meters – converts to 461,297 tonnes over 18 years.

⁶⁵ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings/1f13e098c2/Peter-Longdill-Summary-report-on-pre-application-advice-to-DOC.pdf> 15th March 2017

⁶⁶ Point 12, pg.8

<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/ab6decb7c6/15.-Michael-Dearnaley-Sediment-plume-model.pdf>

⁶⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings-Week-02/c8f6a03a27/03-Expert-conferencing-Sediment-Plume-Modelling-JEWS-including-appendix.pdf>

⁶⁸ <https://www.trc.govt.nz/assets/Documents/Environment/Monitoring-Industry/2022/22-75-Port-Taranaki-Ltd-Maintenance-Dredging-Monitoring-Programme-Biennial-Report-2020-2022-3089361.PDF>

This is an average p.a. of **25,000 tonnes p.a.** or 0.9% of TTRL's tonnage p.a.

The EPA's Decision Making Committee asked for details of the Port's dredging, under a s44 request to the Taranaki Regional Council.

5. Dumping of **11-14 million tonnes over 35 years** ⁶⁹

Coastal Resources Limited (CRL) is the holder of a deemed marine dumping consent, EEZ900012. Under this consent 50,000m³ of dredged material, from marinas and proposed marinas, can be dumped per annum at the northern disposal area (NDA). The NDA is an existing dump site in the exclusive economic zone (EEZ) of New Zealand, approximately 25km east of Great Barrier Island. On 5 June 2018 CRL applied for a replacement consent, EEZ100015, to dump up to 250,000m³ of dredged material per annum at the NDA. The reason a higher volume is sought is to take account of future marine dredging work which CRL considers will be required in the Auckland and Waikato region over the next number of years.

(details contained in Coastal Resources Limited marine dumping consent application EEZ100015 Key Issues Report 2018)

Included within the Key Issues report is Appendix 1 containing a number of reports, including a PhD thesis on dispersion of sediment, review of post-disposal monitoring, Conference paper, on the use of dynamic penetrometers to profile small vertical changes in seafloor sediment properties, Trajectory modelling, of invasive species in the Hauraki Gulf.)

⁶⁹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ100015/External-advice-and-reports-EPA-reports/4f37fc6133/EPA-Key-issues-report-September-2018.pdf>

SEDIMENTATION & OPTICAL QUALITIES: TTRL FINES v BACKGROUND RIVER FINES

1. When we compare our background local marine environmental impacts from *fine* sediment to the *fine* sediment of the TTRL operation, it is materially contributing to the cumulative impacts for the Pātea shoals.
2. Our local marine environment, the Pātea shoals has *finer* input from local rivers of around **1 million tonnes**. (1,161,400 tonnes.).⁷⁰

These fines impact the nearshore predominantly. There is a strong gradient difference in how sediment impacts near shore (within 10km) than further offshore (10-40km).

3. MacDiarmid et al. (2012)⁷¹ ranked increased sediment loading through river inputs as third equal with bottom trawling in terms of its effects, and marine sedimentation as the most important marine pressure that could be mitigated under the RMA.
4. Based on data, TTRL provided, as *finer* for use in plume modelling. In the first Hearing: 143kg/s of *finer* (**4.51 million tonnes**) which (due in part) to grinding efficiencies dropped to 97kg/s (**3.06 million tonnes**).
5. In the second Hearing and reconsideration Hearing – which is what the FastTrack application is based on – the *finer* reduced to 22.7kg/s (**0.72 million tonnes**).

These *finer* are impacting offshore (10-40km).

SEDIMENTATION & OPTICAL QUALITIES: TTRL FINES v BACKGROUND RIVER FINES – REDUCTIONS OVER THE HEARING & FAST-TRACK PROCESS

⁷⁰ Point 8, River inputs, EIA Pre-feasibility study February 2025 (excluding Whanganui river tonnage as longshore currents take the sediment south towards Kāpiti, so impacts on Pātea shoals not applicable) https://www.fasttrack.govt.nz/_data/assets/pdf_file/0016/4264/Attachment-3b-Siecap-Taranaki-VTM-Project-Pre-Feasibility-Study-Offshore-Iron-Sands-Project-25-March-2025_Part2-FINAL.pdf

⁷¹ <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/sediment/research-priorities-for-sediments-in-the-coastal-marine-area-of-aotearoa-new-zealand.pdf>

1. There are no visuals included in either the applicants' or EPA's documents to show the historical changes in fines, produced by TTRL – which are highly dependent on the engineering processes on the Integrated Mining Vessel and mining schedules, as well as assumptions about the interactions/behaviours of those fines in the local marine environment.
2. If **assumptions e.g. about flocculation, can be challenged**, then the tonnages revert to being more like those seen in the first EPA application.

We note that DOC's expert, Longdill had concerns with HR Wallingford's testing:

Suspension mass test results (HR Wallingford, 2014 – Table 3.3) are strangely *not supportive of flocculation* processes (though other tests are).

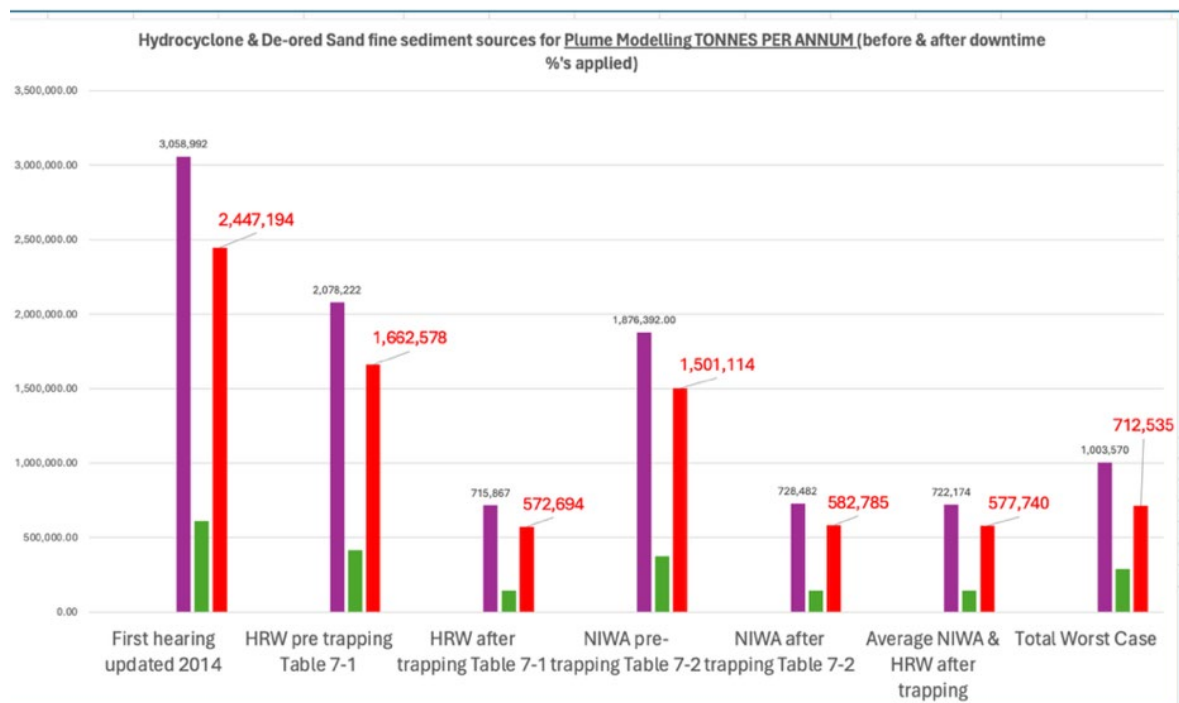
<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings/1f13e098c2/Peter-Longdill-Summary-report-on-pre-application-advice-to-DOC.pdf>

3. We have provided a number of pieces of expert evidence (DOC, Dearnaley, Dougal Greer) which **throw doubt about the ability of the fines to flocculate**.

A review and test program by HR Wallingford Ltd (HRW) for the Second Hearing, and the basis of this Fast-track application also, made some changes – in comparison to the First Hearing

- a) **Flocculation:** The original plume model neglected flocculation, a process in which *fine sediment particles combine into fast-sinking aggregates*, called flocs;
- b) **Sediment settling rates:** The extent to which the fine suspended sediment would settle on the bottom and be trapped in the matrix of discharged sand has been reviewed by HR Wallingford and is *predicted to occur to a greater extent* than assumed previously.

- c) **Sediment resuspension:** The HR Wallingford tests found that the shear stress required for resuspension of freshly deposited material was *in the range 0.2–0.3 Pa rather than the 0.1 Pa* (minimum value) assumed by NIWA.
4. You can see the impact this has had on the fines for Plume Modelling & the impact assumptions on ‘floculation’ has had on ‘trapping in the mining pit’, and therefore reductions in the modelled sediment plume.



Source: pg. 3 STUC member K Pratt's submission⁷² 4th March 2024

⁷² https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/opening-legal-submissions/Karen-Pratt-submission_final_4_3_24.pdf

(Source of Graph: The “worst case” of 1 million tonnes (before downtime was applied) is shown in further detail as to the breakdown of fines/SSC on page 19 of our club member K Pratt’s 4th March 2024 Opening Submission⁷³)

TTRL in their closing remarks⁷⁴ at the EPA Hearing May 2017 are not transparent as to the actual process incurred before actions are triggered. The reality is that the limits are worked out over weeks, months, or even a full year. The statement that *the “worst-case” could not occur for more than 48 hours* sounds instantaneous, but Conditions 4 and 5 need to be read to fully appreciate the reality of what actions will occur and when.

The reality is that Condition 4(b) for Discharge Limits, shows a time-line before exceedances are calculated: 7,190 *averaged over any month*, the <38 micron limits per hour - *averaged over 48 hours, 7 days and three months* based on 12 samples taken every 24 hours, and the <8 micron *averaged over one week* based on a minimum of 20 samples.

For Condition 5, the 25th, 50th and 80th percentile SSC limits at the ten monitoring sites (in Schedule 2) are *as determined over a 12 month period*.

“While we consider the DMC further information requests were lawful, even if that were not the case, in our submission, the further information was not essential for or material to the DMC’s decision. In particular, *the worst-case modelling was not required to assess the effects of the proposed operation as the original modelling had already significant conservatism built in, and the proposed conditions impose limits which would ensure the worst-case could not occur for more than 48 hours.*”⁷⁵ MR HOLM, page 3348 Transcript

⁷³ https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/opening-legal-submissions/Karen-Pratt-submission_final_4_3_24.pdf

⁷⁴ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings-Week-07/b9d8d0b23c/22-EEZ-Transcript-TTRL-25-05-17.pdf>

⁷⁵ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Hearings-Week-07/b9d8d0b23c/22-EEZ-Transcript-TTRL-25-05-17.pdf> pg. 3348

SEDIMENTATION & OPTICAL EFFECTS: HADFIELD DISCUSSES SIGNIFICANT REDUCTION IN FINES 2014

For the benefit of the Fast-Track panel we have included the sediment modeller, Hadfield's comments about the significance of the reduction in fines.

Explanation by Hadfield for 19th March 2014 reductions:⁷⁶

"The revision achieves an overall reduction in fine sediment output by 30–40%"

"In the deposition belt deposition offshore, the revised source parameters reduce the deposition rates by 50% overall. As I noted in my Evidence in Chief, the material deposited in this area is the 38–90 micron sediment, the output of which has been reduced by 50%."

"The suspended source simulations have been repeated with revised source parameters, which involve a substantial reduction (35–55%) in all size classes, with the exception of the 16–38 micron class (coarse silt), which is increased by 27%"

SEDIMENTATION & OPTICAL QUALITIES: DOC REPORT ON SEDIMENTATION (2021) IMPORTANCE OF SEDIMENT SIZE

As the Fast-Track panel require 'the best available information' – we bring to your attention a recent 2021 report on fine sediments and rocky reefs. It is a DOC report, looking at research priorities for sediments in the coastal areas.

⁷⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/8f78b1f153/EEZ000004-Mark-Hadfield-Updated-evidence-Sediment-plume-model-19-March.PDF>

Steering our waka through turbid waters. Research priorities over the next 5 years for sediments in the coastal marine area of Aotearoa New Zealand⁷⁷

Importance of sediment size. Fine sediments (approximately fine silt and smaller) cause more damage than coarse sediments for a number of reasons.

- Firstly, fine sediments are more effective per unit mass of sediment than coarse sediments in attenuating light in the water column, which adversely affects primary producers.
- Fine sediments also cause a greater reduction in seabed permeability than coarse sediments, which affects gas and solute transport across the sediment–water interface and within the seabed affecting a range of biogeochemical seabed processes and the suitability of the seabed as habitat for a variety of animals.
- Finally, fine sediments are more readily ingested than coarse sediments, which can harm animals.

However, it is clear that hard substrates are at least equally adversely affected by sediments. For instance, fine sediments influence the composition, structure and dynamics of rocky coast assemblages, and can affect the attachment and survival of algal species on intertidal reefs. The effects of fine sediments on rocky reefs can be spatially dependent and related to gradients in suspended sediments and light availability (Blain et al. 2019; Tait 2019).

⁷⁷ <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/sediment/research-priorities-for-sediments-in-the-coastal-marine-area-of-aotearoa-new-zealand.pdf> 2021

SEDIMENTATION & OPTICAL QUALITIES: EPA REVIEWERS BERTHOT & PETCH (GHD)⁷⁸
CAUTIONARY NOTE ON DISCHARGES FINES/SSC PROVIDED BY TTRL

The discharge rates (kg/s) are provided by TTRL which cannot be independently verified

They are dependent on the design dredging and grinding circuit and technology process design. The EPA appointed reviewers (Dr Alexis Berthot and Dr David Petch GHD) clearly outlined that “*the accuracy or otherwise of these estimates cannot be verified*”.. They also pointed out “*information on the durations of the potential suspended sediment concentrations events at selected receptors was not presented which are commonly required by an those undertaking an ecological review of the impact assessment*

⁷⁸ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/6361b8e695/GHD-Lodgement-review-of-sediment-mobilisation-transport.pdf> 2016

SEDIMENTATION & OPTICAL QUALITIES: THE 'AUDIT TRAIL' CAN BE CHALLENGING, WHEN RECONCILING MOVEMENTS IN FINES/SSC

The material nature of the Sediment Plume, makes it essential a Decision Making Panel and experts can easily see the changes (both in kg/s & tonnages) that are the basis for the Plume Modelling.

(F) shows a starting value of 65.9 kg/s, which HR Wallingford used in their modelling. This number is 30% lower than the 97 kg/s figure presented at the first Hearing **(E)**.

To reach the 65.9 kg/s figure (see Column **D**), one size range of particles (38–90 microns) was left out. In Column F, however, part of the 65.9 kg/s was put back into that size range — just over half (about 29.4 kg/s from one source, plus 4.1 kg/s from another).

For the plume modelling, it was then assumed that all particles of this size would be trapped, so the final amount for the 38–90 micron range was recorded as zero.

A	B	C	D	E	F	G	H	I	J	K	L
		Source Rate original 2013/14 kg/s	Oct-15 Dearnaley used	updated 19th March 14 kg/s	Table 7-1 updated Oct 15 HRW kg/s	Table 7-2 updated Oct 15 NIWA kg/s		After trapping kg/s SOURCE RATE FOR MODELLING NIWA	Total HRW & NIWA pre-trapping	Average HRW & NIWA pre-trapping	Table 7-3 updated Oct 15 Av. NIWA & HRW kg/s AFTER trapping
Source	size range						TRAPPED				
Hydro-Cyclone	38-90	24.6		16.1	29.4	26.50	100%	0.00	55.90	27.95	0.00
Hydro-Cyclone	16-38	25.7	31.4	31.4	3.5	3.50	90%	2.50	7.00	3.50	1.45
Hydro-Cyclone	8-16	20.3	13.1	13.1	21.4	12.10	25%	9.00	33.50	16.75	12.55
Hydro-Cyclone	<8	28.5	13.3	13.3	3.5	9.30	5%	8.70	12.80	6.40	6.00
de-ored sand	38-90	35		15	4.1	1.40	100%	0.00	5.50	2.75	0.00
de-ored sand	16-38	3.2	5.3	5.3	0.5	3.70	90%	0.40	4.20	2.10	0.25
de-ored sand	8-16	2.4	1.4	1.4	3.0	1.70	25%	1.30	4.70	2.35	1.80
de-ored sand	<8	3.3	1.4	1.4	0.5	1.30	5%	1.20	1.80	0.90	0.85
GRAND TOTALS:		143	65.9	97	65.9	59.50		23.10	125.40	62.70	22.90

SEDIMENTATION & OPTICAL QUALITY: FIRST HEARING REVIEW PROCESS DOES NOT RAISE THE ISSUE OF FLOCCULATION

For context, the first 2014 EPA Hearing application tonnages went through the following review process. TTRL in the first 2014 Hearing⁷⁹ stated “TTR had identified sediment plumes as an important matters for attention in investigations. For this we commissioned assistance and advice from a range of international plume modelling experts including the Scottish Office of Royal Haskoning DHV”. The nearfield sediment behaviour modelling was done by Svasek Hydraulics and reviewed by Deltares. The far-field sediment behaviour was done by Hadfield (NIWA) and reviewed by Deltares and Royal Haskoning DHV.

⁷⁹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/e4853a6a46/EEZ000004-03-Andy-Sommerville-Background-to-Project.PDF>

SEDIMENTATION & OPTICAL QUALITIES: PLUME MODELLING VIDEOS & STORM MODELLING/CLIMATE CHANGE IMPACTS TO BE MODELLED

We downloaded some of Dr Hadfield's videos during the first Hearing, which are no longer on the EPA website. We then asked a GIS specialist to place them on a few layers and scale in, so as to better see the effects on the Pātea shoals. Three links are provided below for the panel to see the Plume impacts based on the first Hearing. *Cautionary note:* These videos are based on outputs from the model every 12 hours, so the extremes due to tidal currents are not reflected.

SEDIMENTATION & OPTICAL QUALITIES: Recommendation to Fast-Track panel: The Plume Modelling outputs be output on an hourly rather than 12 hours bases.

It would also be helpful if the videos were run at a slower speed so the tidal effects can be seen. Computational power is far greater than when these were run back in 2014, so this would be 'best available information' at a reasonable cost.

SEDIMENTATION & OPTICAL QUALITIES: Recommendation to Fast-Track panel: Storm Modelling Data Files compared to 2011 & 2012 be obtained

At the Reconvened EPA Hearing, Dr Macdonald agreed to provide more recent storm modelling data files from the last two years. Such information to be compared with the 2011 and 2012 data files. This work had become necessary because the impacts of climate change have seen an increase in the number of storms and their intensity.

One of the information requirements in the Fasttrack legislation⁸⁰

(4)The information to be included in the referral application is as follows: a description of whether and *how the project would be affected by climate change* and natural hazards.

While the stage of proceedings is not a referral – the intention of the Act would seem to require an awareness of how climate change impacts on the Taranaki VTM project.

⁸⁰

https://www.legislation.govt.nz/act/public/2024/0056/63.0/whole.html?search=sw_096be8ed81f0e715_climate+change_25_se&p=1

SEDIMENTATION & OPTICAL QUALITIES Recommendation to Fast-Track panel: Inter-annual variations be modelled, as the HR Wallingford ‘Independent Review of Plume Modelling (not in Footnote document) & not previously in EPA submitted documents recommends

The findings in the report, listed in Appendix 19.9 are important for the Fast-track panel to be aware of. As has been mentioned earlier in our comments – this report was not in any of the previous Hearings’ submitted documents. The report is not listed in the Footnote Document.

Below are important findings from the Siecap document, **Siecap 3a Appendix 19.9 HR Wallingford Tailings Plume Review “Independent review of Plume Modelling August 2014”**

4.4. Oceanographic inter-annual variation

It can often be the case with environments strongly influenced by oceanic currents that currents may vary from year to year or even over longer periods such as those caused by El Nino events. It is a useful exercise to examine existing data or existing oceanographic models for conditions from other years to see if the ocean currents influencing Taranaki Bight change significantly particularly if they (from time to time) fall outside of the range of behaviours modelled in the plume study. If there are potentially conditions which would result in a significant change in the movement of the plume nearer to sensitive areas (see Figure 4.1) then these conditions should be included in the sediment plume assessment along with the reasoning why these particular conditions are important and how they were selected.

4.5 This model performance is considered to be satisfactory for the proposed studies but there needs to be some additional thought as to whether the small amount of uncertainty in the residual current direction at the mining site or inter-annual variation in oceanic currents could result in the plume moving to ecologically sensitive sites which are not predicted to be affected at present.

SEDIMENTATION & OPTICAL QUALITIES – VIDEOS TO SEE INFLUENCES ON SEDIMENT PLUME

Hadfield explains what the videos mean in his March 2014 Statement of Evidence in Chief⁸¹: “Before I describe the statistical analyses of the Model output, I would like to refer to the DVD accompanying this evidence. This DVD contains an HTML document (index.html) with links to several informative animations.

1. Here is the Plume Modelling Dr Hadfield did of the fines near bottom for the 0-38 micron
<https://maps.main.net.nz/static/TTRL/Plume%20videos%202017/TTR-near-bottom-0-38micron.mp4>
2. Here is the Plume Modelling Dr Hadfield did of the fines near bottom for the 38-90 micron
<https://maps.main.net.nz/static/TTRL/Plume%20videos%202017/TTR-near-bottom38-90micron.mp4>
3. Here is the Plume Modelling Dr Hadfield of the fines at the surface
https://maps.main.net.nz/static/TTRL/Plume%20videos%202017/TTR-surface_SSC_pointA_korora.mp4

DISCLAIMER: When TTR published the videos they have manipulated them to fit a layout - and it is impossible to accurately geo-reference them to fit the Charts. So when the 12 nm line is close - the actual shoreline is not.

SEDIMENTATION & OPTICAL QUALITIES: DIRECTOR GENERAL OF CONSERVATION COMMENTS 15/4/2014 & 4/5/2014 & ATTACHMENTS 1,2,3

Many concerns outlined in this information are still relevant and of use to consider in the Condition setting process for this Fast-track process. This information is not before the Fast-track panel and so has added to our comments.

It would be excellent if the Fast-track panel could request the attendance of Longdill in the Condition setting exercise.

Director-General's Position on Conditions (May 2014)

⁸¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/359e8511a9/EEZ000004-20-Mark-Hadfield-Sediment-plume-modelling.PDF> See pages 12-15

Timing concerns:

- The Director-General had his first opportunity to comment on conditions on 6 May 2014, but noted he was given *very limited time* to provide technical input.
- As a result, his advice on sediment plume conditions and benthic ecology was *preliminary* and could not be fully endorsed without further technical consideration.

Sediment plume and monitoring conditions:

- He disagreed with the EPA staff recommendation of three-monthly fines measurement, instead seeking daily or 7-day averaging periods.
- Rationale: sediment transport processes mean that if processing were ramped up for more than a few hours or days, three-monthly averaging would mask significant impacts. Daily or weekly averaging would be more effective in ensuring compliance and environmental protection.

Condition 4 concerns:

- On 7 May 2014, the Director-General stated that TTRL's proposed Condition 4 (allowing operational variation with EPA certification) was not acceptable.
- He emphasised the need for stronger controls on amendments to ensure environmental objectives were met.

Benthic ecology and objectives:

- The Director-General was not confident the proposed benthic objectives were clear, enforceable, or scientifically robust.
- He highlighted the link between benthic effects, light/optical conditions, and primary production, noting these must be considered together before finalising objectives.

Case law context (Crest and others):

- In previous cases, qualitative conditions were only acceptable when paired with a robust, approved Environmental Monitoring and Management Plan (EMMP).
- Where EMMPs were not sufficiently robust, conditions were rejected.
- This suggests any consent here would require both robust quantitative limits and enforceable qualitative measures, underpinned by a credible EMMP.

1. **6TH MAY 2014.** This is the first opportunity the Director General had to comment on the Conditions.⁸² His memorandum covers 4th May 2014 EPA Staff report, and TTRL proposed conditions 15th April 2014.
2. **7th May 2014 Closing Submission**⁸³ The Director-General stated Condition 4 is not acceptable. On the last day of the Hearing TTRL offered a condition 4 which stated “The consent holder may vary operational methods from those set out in Condition 3, subject to certification from the EPA that such varied methodology will not result in potential adverse environmental effects which are inconsistent with the attainment of the environmental objectives set out in Condition 9.
3. Points 13 & 14 were important Condition recommendations, for daily or maximum 7 day averaging periods. *“If a consent holder significantly ramped up processing for a period of time exceeding a few hours or days, to compensate for downtime experienced at a different time it would quickly become non-compliant. Daily to maximum 7 days are appropriate in light of the physical transport process . . . could be an appropriate way to permit an activity in accordance with the max fluxes proposed during the Hearing whilst at the same time avoiding the need to hardwire in any operational down time requirements into any conditions of consent”*
4. In terms of benthic objectives the Director-General cannot be confident they are clear, reasonably certain and enforceable. The benthic issues appear related to the optical and primary production issues and consideration of these matters in the round is likely to be required before more precise objectives could be confirmed.
5. The case law for *Crest* was outlined. Qualitative conditions were informed by a full EMMP, which was approved at the time of consent and the qualitative ones sat alongside quantitative ones. In other cases the EMMP was not found to be

⁸² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/8b6e78ecd2/EEZ000004-EPA-Staff-Report-Comments-DoC.pdf>

⁸³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/dc7b2c4c96/EEZ000004-24-Director-General-of-Conservation-closing-submissions.pdf>

sufficiently robust to overcome the problem – and so conditions were not accepted.

6. DOC's expert DIRECTOR-GENERAL OF CONSERVATION COMMENTS ON TTR CONDITIONS (ATTACHED AS APPENDIX A "PROPOSED CONDITIONS" TO GARRY VENUS' SUMMARY STATEMENT **15 APRIL 2014** – NON TRACK CHANGE VERSION)⁸⁴ and his **4 MAY 2014** comments⁸⁵
7. SUGGESTED REVISED ENVIRONMENTAL PERFORMANCE OBJECTIVES IN RELATION TO MARINE MAMMALS AND SEABIRDS AND COMMENTS IN RELATION TO BENTHIC⁸⁶ COMMENTS RELATE TO TTR CONDITIONS ATTACHED AS APPENDIX A "PROPOSED CONDITIONS" TO GARRY VENUS' SUMMARY STATEMENT DATED **15 APRIL 2014** – NON TRACK CHANGE VERSION
8. K Pratt: 2014 Hearing – provided edited suggestions - ⁸⁷ and has continued throughout the various Hearings to make Condition amendment requests – particularly the omission of the Project Reef and Crack in the Benthic Monitoring schedule.

⁸⁴ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/73c1798499/EEZ000004-EPA-Staff-Report-Comments-DoC-Attachment-1.pdf>

⁸⁵ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/505c8e1b57/EEZ000004-EPA-Staff-Report-Comments-DoC-Attachment-2.pdf>

⁸⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/a32a031063/EEZ000004-EPA-Staff-Report-Comments-DoC-Attachment-3.pdf>

⁸⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/3c53178f3c/EEZ000004-EPA-Staff-Report-Comments-Karen-Pratt.pdf>

Panel Recommendation: Condition setting: It is really important that the Panel ensure that the fines/SSC used in the Plume Modelling, are reflective and in step with allowable discharges in the Conditions. TTRL should provide a reconciliation for the panel to assure them this is the case.

Implications for the Panel

The Director-General's advice highlights serious concerns about timing, enforceability, and adequacy of the proposed conditions.

Stronger and clearer conditions (e.g. daily/weekly monitoring, enforceable benthic objectives, limits on operational flexibility) are needed to ensure environmental protection.

Precedent shows that conditions cannot rely solely on qualitative EMMPs unless these are robust and tightly integrated with quantitative limits.

SEDIMENTATION & OPTICAL QUALITIES: CAUTIONARY NOTES + NEED FOR CONSISTENCY IN MODELLING PIPE DISCHARGES FOR SEDIMENT & METALS

1. As the Woodside report [Woodside Dredged Sediment Dispersion Modelling | Rev 3 | 22 March 2022](#) outlines - the spatial area affected is typically greater in the near-seabed layer than in the near-surface layer.

We point this out for the Fast-track panel, as it is important to consider this when looking at videos.

2. An important point when looking at comparative videos from the first Hearing, to any second Hearing/Fast Track presented videos, is to understand the different approaches taken to the discharge pipe. For the first Hearing The Plume modelling had the discharge pipe at 15 metres from the surface, extrapolating that out, at the 20 metre depth, it is 5 metres above the floor. At a 30 metre depth, it will be 15 metres above the floor and at 40 metres it is going to be 25 metres above the floor. For the second EPA Hearing and for this Fast-track application the Plume Modelling was done at 4m above the seafloor.
3. For both Hearings and the FastTrack, Hadfield's metal dilution modelling was done at 20 metres above the floor due to that an undesirable attachment effect . . .the modelling of which has not been done in any Hearing, or for the FastTrack.

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: PĀTEA SHOALS V AOTEAROA NZ – MORRISON AT EL. REPORT (2022)

1. On a national scale, the Pātea shoals are of importance.

There are no papers or reports that we have sighted, nor conversations we have had with GNS, DOC or NIWA, to indicate another place in in Aotearoa, NZ showing a similar extent of acreage of subtidal reefs so far offshore. The area is unique, and the ‘duty of care’ in assessing this ecosystem needs to be pitched at a level that recognises this.

2. 2022 the report by Morrison at el. was released.

The [report by Morrison at el.](#)⁸⁸ documenting findings from NIWA’s extensive rocky reef research

3. The Supreme Court’s Hearing of matters 17th -19th November 2020, could not benefit from the material insights the report by Morrison at el. provided

The report’s Executive Summary ‘that they are worthy of careful management’. The Supreme Court’s judgement was issued 30th September 2021.⁸⁹

4. NIWA’s Benthic Terrain Modelling in the Pātea shoals June 2020

was used to determine likely rocky reef habitat in the Pātea shoals based on the characteristics of bathymetry data that was collected in **June 2020**. Our club members provided spatial knowledge of reefs to help drive the spatial design of the multi-beam survey route. NIWA stated our assistance “was invaluable”.

⁸⁸ <https://www.trc.govt.nz/assets/2238-TRC002-FINAL-Offshore-subtidal-rocky-reef-habitats-on-Patea-Bank-South-Taranaki-2.pdf>

⁸⁹ <https://www.courtsofnz.govt.nz/assets/cases/2021/2021-NZSC-127.pdf>

5. **2,000 and 1,400 acres was considered likely to be rocky reef just based on a 250km transect – with ‘more to be discovered’**

Analysis of the data identified numerous features throughout the survey area likely to be rocky reefs. **Of the 61.5 km² multi-beam surveyed in 2020 – between 2,000 and 1,400 acres was considered likely to be rocky reef.** Reef topography varied from scattered, low relief patch reefs and knolls, to extensive linear ridges extending for kilometres in length. Also noted were a range of unusual seafloor bedforms that were only partially mapped, as well as fault-lines evident for several of the reefs.

6. **Our underwater club divers have seen how each reef is unique.**

We describe them as pinnacles, caves, slabs, cracks. The marine life on each reef often drives the informal names they are given e.g. “Snot rock”, “The Bricks”, “The snails”. The variability, richness and unique nature of life on the reefs that we observe was confirmed, when NIWA in 2021 surveyed by drop-camera 14 reefs of an initially planned 20 reefs.

7. **The Taranaki Regional Council did not submit in the 2023 EPA Reconsideration process,** K Pratt covered the Morrison report in great detail in her engagement with the EPA Hearing process.

Taranaki Regional Council⁹⁰ in their comments to the Fast-track panel have included their view on the Application’s treatment of the new information revealed in the Offshore subtidal rocky reef habitats on Pātea Bank, South Taranaki (2022) by Morrison et al. . .

*30. . . . However, **the Application’s treatment** of the new information revealed in the *Offshore subtidal rocky reef habitats on Pātea Bank, South Taranaki (2022)*¹¹ by Morrison et al. **is poor**. . . The Application’s main consideration of these matters appears **confined to passing reference in two paragraphs**. ([17] and [18] of Dr. Alison Macdiarmid’s evidence of 19 May 2023.*

8. **Our South Taranaki Underwater Club member, K Pratt (in her individual capacity) submitted EPA Reconsideration process but unable to be heard due to withdrawal of TTRL.**

⁹⁰ <https://www.trc.govt.nz/assets/Documents/Meetings/PolicyPlanning/2025/Policy-and-Planning-Committee-Agenda-Sept-2025-web.pdf> pg.22

- a) K Pratt submission **6th October 2023** addressed (amongst other matters) the [Morrison et al. report](#) findings.
 - b) K Pratt also gave a response⁹¹ by **30 November 2023** to Minute 8⁹² issued by the DMC which sought submissions of the parties on the nature and scope of the reconsideration process directed by the Supreme Court, in light of the observations in the judgments of the Supreme Court, and in the judgment of the High Court on the application for directions.
 - c) K Pratt provided a written opening⁹³ submission **4th March 2024** – following the DMC’s instructed limit of 20 pages
 - d) Stage 1 of the EPA Reconsideration Hearing took place on 13-15 March 2024 in Hāwera, focusing on environmental matters, with the Stage 2 on environmental matters to be held in **April 2025** - our club member K Pratt was unable to be heard at the EPA Hearing, due to TTRL withdrawing on 28th March 2024.⁹⁴
9. During the three day EPA Reconsideration Hearing March 2024, day 3, the [Morrison et al. report](#) was **referred to in exceptionally brief terms** by TTRL’s expert Dr MacDiarmid, with no findings from the report shared.
10. There were **no questions from the DMC panel on the [Morrison et al. report](#)** during the three days of the EPA Reconsideration Hearing.

It will be for the Fast-track panel to explore matters covered in this report – they will be the first Decision making panel to do so. The findings from Morrison et al. have not been put through the Courts.

⁹¹ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/Karen - response-to-Minute-8.pdf>

⁹² <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/TTRL-DMC-Minute-8.pdf>

⁹³ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/opening-legal-submissions/Karen-Pratt-submission final 4 3 24.pdf>

⁹⁴ <https://www.epa.govt.nz/public-consultations/completed/trans-tasman-resources-limited-2023-reconsideration/>

BENTHIC ECOLOGY AND PRIMARY PRODUCTIVITY: SOUTH TARANAKI UNDERWATER CLUB WAS INVOLVED IN PĀTEA SHOALS SURVEY & CONTRIBUTED TO THE MORRISON AT EL. REPORT

Since inception of the MBIE ‘Curious Minds’ funding in 2015, that initiated our more focussed studies of the offshore reefs, we have reached out to scientific experts in NZ and overseas. Dr Mark Morrison was first contacted in 2017, where we shared footage of the ‘Project Reef’ – his response was “**very impressive reef communities and very colourful – I don’t think I’ve seen that sort of species mix anywhere else in NZ before**” (23rd October 2017). We had discussed multibeam mapping the Project Reef for a while, but the cost would have been around \$30k, The TRC when asked, was unable to fund this, nor did we have that budget. An outreach opportunity arose in 2020 that would enable the Project Reef to be mapped, and when more boat time became unexpectedly and last minute available – we reached out to Club members, and other local community members – so that their “closely held” coordinates could be shared with Dr Morrison. As Dr Morrison acknowledged “**having that spatial knowledge to help direct the survey route was invaluable in avoiding the issue of searching for needles in a haystack**”.

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: CONDITION TO IDENTIFY ROCKY REEFS NEAR THE MINING SITE – NOT ACTIONED BY TTRL

Conditions proffered by TTRL during the 2024 reconsideration Hearing: Dr MacDiarmid after referring to the [Morrison at el. report](#) noted that additional conditions would be added to identify rocky reefs near to the mining area. The FastTrack application does not contain such additional conditions, nor has any reef survey work been done in the intervening eighteen months.

“I note that these rocky habitats are islands of biological diversity among otherwise low diversity communities on the surrounding sandy flats, and I understand that TTR, as has been commented earlier, is volunteering some additional conditions to undertake further survey work to identify rocky reefs surrounding the proposed mining area”⁹⁵

⁹⁵ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/Hearing/EPA-TTRL-Reconsideration-Hearing-15-03-24.pdf> pg.252

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: LOCAL ENVIRONMENTAL KNOWLEDGE (“LEK”)

The STUC members/Project Reef team have been recognised for their efforts via a NZ Ecological Society ‘Ecology in Action’ Award, Dive NZ Wyland Award, NZ Coastal Society Terry Healy Award, Ministry for the Environment Green Ribbon Award and Taranaki Regional Council Environmental Award.

1) Minimal/ almost none visual representation by TTRL of our unique offshore biodiversity

Various members attended the TTRL expo back in 2013. We could see no visual representation of the richness of the marine environment and biodiversity to be found on the reefs that we fish and dive on. We recognised that this might also be an issue for those on the Decision Making Panel – without our sharing of footage and stories – how would they know? [Video of species annotated and Diver](#)

2) 2 reefs/36 sample points in TTRL survey accounts for 61% of species

We have decades of diving and fishing experience on, and surrounding, our offshore reefs and have first-hand knowledge of the rich biodiversity these reefs support. It was no surprise to us that NIWA’s nearshore survey in 2013 had two sites (out of 36 sites) that were hard rock outcrops and these two reefs accounted for 61% of all species collected! Reefs are biodiversity hotspots.

3) Acreage of Pātea shoals

Our local diving occurs predominantly on the shallow shelf extending off South Taranaki, mostly exiting from the Pātea bar. The inner ‘Pātea shoals’ cover around 1,700 km². The outer ‘Pātea shoals’ are a further 1,100 km² and where TTRL have part of their proposed operation. The ‘Pātea shoals’ are all within scuba depth being a maximum of 30m. The extent of shallow shelf is relatively unique in NZ. We note that TTRL have reported many

environmental effects at the scale of the ‘Sediment Modelling Domain’ which is 13,300km² and in character vastly different to the ‘Pātea shoals’.

4) Goldilocks Zone

Our concern is for the modelled localised scale of impacts, in an area that would appear to be unique in NZ in terms of the thousands of acres of rocky reefs lying so far offshore in relatively shallow waters (a ‘goldilocks zone’) experiencing a vastly reduced sediment profile than experienced by nearshore reefs, and shallow enough to receive light values which support primary productivity/algae - the start of the food chain.

5) Zooplankton densities in Pātea shoals some of the highest in NZ

Some of the highest densities of zooplankton in NZ, due in part to the upwelling from Cape Farewell (4 x that of other NZ continental shelf regions, 6.5x North Taranaki Bight) are found in the Pātea shoals. As divers we experience going through meters of planktonic gelatinous life on our descents.

6) STUC have a sense of the relative uniqueness of the Pātea shoals

Our divers have also a good sense of the *relative uniqueness* of the Pātea shoals area, having dived around NZ and overseas.

7) Exceptionally few, and poor photographs of Pātea shoals REEFS provided by TTRL

The *only* photographs of reefs that TTRL have provided in their application materials in past EPA Hearing, and this Fast-Track application have been collated and shown in Morrison at el.⁹⁶ .They are drop-camera images, which suffer from the inherent weaknesses in terms of colour and resolution. For the seven offshore reefs – four were described as ‘low relief’ and three as ‘buried bedrock’. The five nearshore reefs – two were mudstone, one low relief and two moderate relief.

⁹⁶ <https://www.trc.govt.nz/assets/2238-TRC002-FINAL-Offshore-subtidal-rocky-reef-habitats-on-Patea-Bank-South-Taranaki-2.pdf>

These are the only visual representations of our local rocky reefs in the FastTrack application documents.

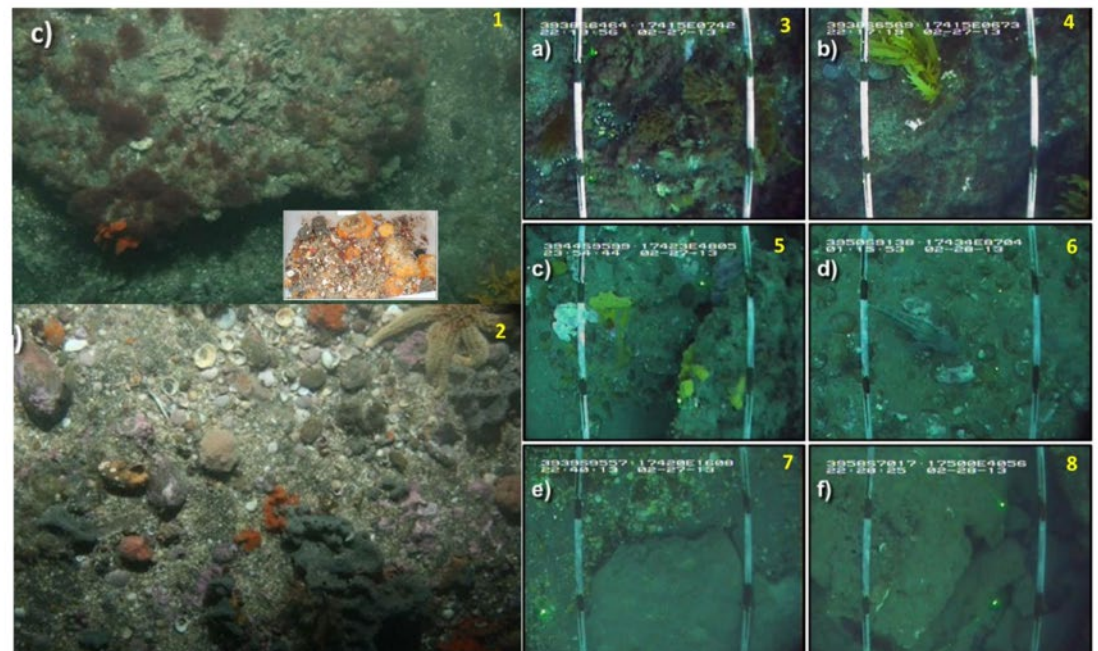


Figure 5-6: Seafloor images of other South Taranaki rock/reef sites Beaumont et al. (2015) 1) site #7 (26 m), low-lying rock outcrop (7.35% transect cover) (insert; dredge sample at site). Species visible are grey sponge Family Chondropsidae species 2, orange and yellow sponges (and either filamentous red algae or bryozoans); 2) site #42 (26 m), low-lying rock outcrop (<1% transect cover). Anderson et al. (2015). 3–4) site +7 (13 m), rock with bryozoans, *E. radiata* kelp and grey sponge *E. alata*; 5) site +6 (20 m), yellow *Halichondria* sp. sponges; 6) site +5 (22 m), encrusting sponges and blue cod; 7) pale grey mudstone with no visible biota (top half of image is soft sediment); 8) site +CS1 (13 m) offshore of Whanganui, mudstone outcrop with patches of benthic diatoms and red filamentous algae.

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Offshore subtidal rocky reef habitats on Pātea Bank, South Taranaki

8) Benthic Ecology & Primary Productivity: Location of Reefs

- The Green triangles show the location of the TTRL Anderson (2015) study and the Blue triangles shown the TTRL Beaumont (2015) study (benthic studies).
- Red squares = interesting sites, with no drop-camera video work numbered Z1-Z9
- North & South traps – red triangles
- Yellow blobs = DOC *desktop study* determined reefs, based in changes in bathymetry
- Black boxes = Drop-camera sites, “ground-truthing” reef sites – which included those given in confidence by local divers. Small box, is the drop-camera area, and larger black box around is the multibeam mapped area, showing it in the wider reef system.
- K = [Project Reef](#) (see photo of reef in page 58 of the Morrison at el report)

- Many reef features not marked up
- The seafloor is characterised into 14 features – **8 of them characterise reefs.**

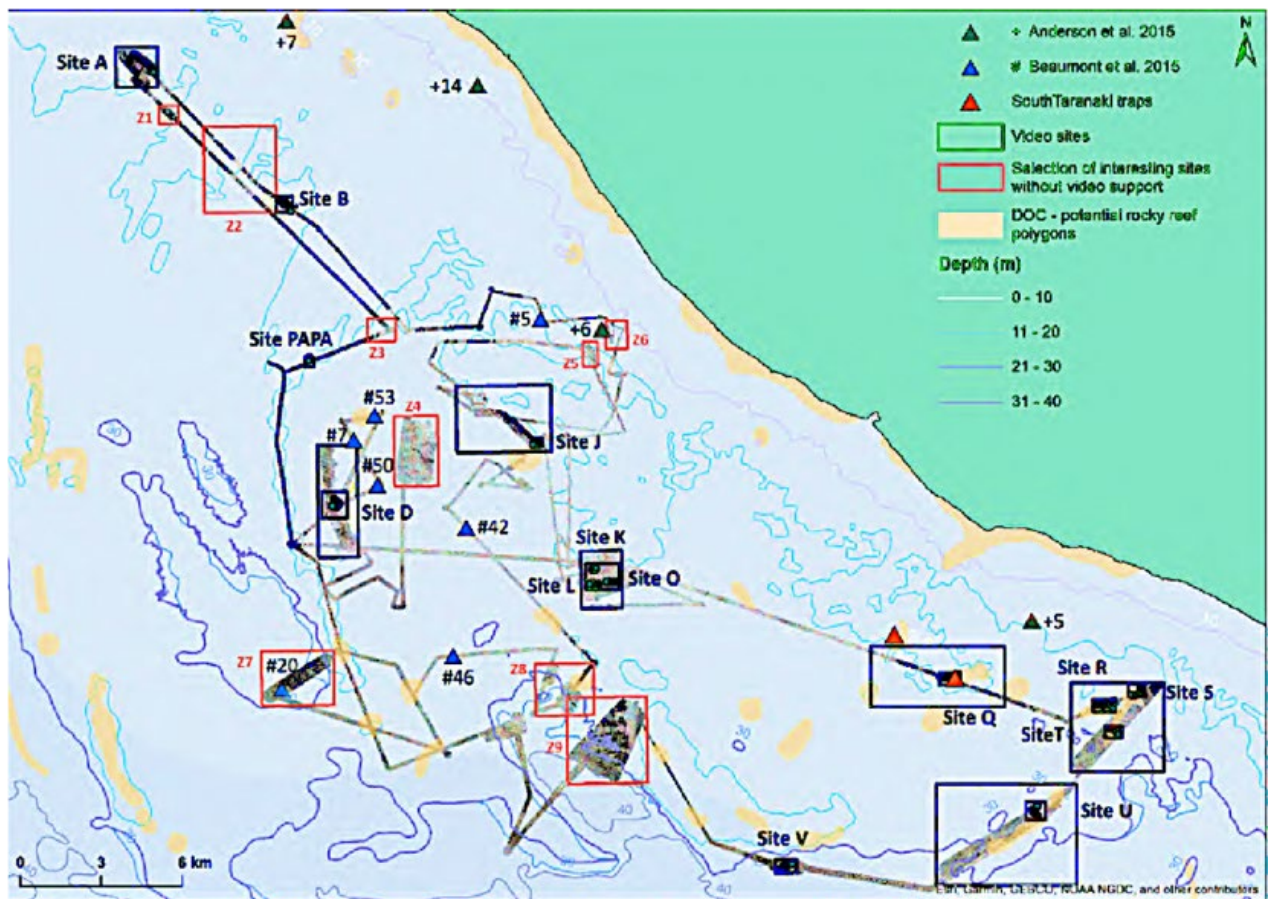


Figure 3-1 from Morrison et al. “Offshore Subtidal rocky reef habitats on Pātea Bank, South Taranaki”⁹⁷

⁹⁷ <https://www.trc.govt.nz/assets/2238-TRC002-FINAL-Offshore-subtidal-rocky-reef-habitats-on-Patea-Bank-South-Taranaki-2.pdf>

10) STUC provide full colour, high resolution photos & video of our offshore reefs

In direct contrast, our diver photographs are full of colour and resolution – as is our video footage which also has “major advantages with respect to detection of infrequent taxa, behaviours and delineation of habitat transitions”⁹⁸.

We know of pinnacles, caves and much higher profile reefs. (see Morrison’s Appendix C, pg.211 for all the different descriptions of what a “reef” is).

11) We want to assist the Fast-track panel & showcase our beautiful biodiversity

To assist the panel, we have included some footage of two ESA’s for you to review:

Videos of a selection of sponge species at ‘The Crack’ [Link to Dropbox of sponge species](#)

YouTube videos of species at ‘The Project Reef’, including sponges & blue cod (cut from numerous videos taken over the years) <https://www.youtube.com/@MarineFrames/videos>

Inaturalist photos (public database of species) of [Project Reef](#) sponges (421 observations)⁹⁹ brown algae (73 observations)¹⁰⁰

12) TTRL have taken videos of reefs – but they haven’t shared them

On pages 29-30, Dr McClary states in his Evidence in Chief that in February 2014 visual surveys were conducted by diver and drop camera at the Traps and elsewhere. He only gave a qualitative description of the findings, provided none of the videos and provided no coordinates.

⁹⁸ <https://www.mpi.govt.nz/dmsdocument/40379-aebr-239-best-practice-in-seabed-image-analysis-for-determining-taxa-habitat-or-substrata-distributions/> 2.2 2020

⁹⁹

https://www.inaturalist.org/observations?project_id=7234&taxon_id=48824&verifiable=any&view=species

¹⁰⁰

https://www.inaturalist.org/observations?project_id=7234&taxon_id=48220&verifiable=any&view=species

In the Non-Expert Evidence of our club member K Pratt, in 2014 (prior to ‘Project Reef’ work) she provided photographs taken at the North Trap, from photographs provided by our Club member S Hornby.¹⁰¹ A few extra photos were also included of the Four Mile Reef.

13) “The sands are toxic to sea life because of the presence of Vanadium”

It was early on in the process we recognised that our local marine environment was described in a different way as to what we knew. In 2007, TTRL’s Executive Chairman wrote¹⁰² to our local government authorities and Iwi, stating “in areas of high concentration of iron sands **our underwater photographic work also shows the sands are toxic to sea life because of the presence of vanadium. Thus the seabed in those areas contains no shellfish or vegetation** – it is a vast swathe of black sand dunes which are constantly moved around by the tides, waves and swell.”

14) Multi-beam survey of Pātea shoals and reefs & role of STUC/Project Reef

A really important milestone for the STUC was the multibeam survey work in 2020 and ‘ground-truthing’ of reefs in 2021. As the Taranaki Regional Council stated in their report to TRC Councillors “The Council would like to thank NIWA for this valuable report, and also acknowledges the important role that the [Project Reef](#) team played in initiating this research. This report, and the information it contains, is another accomplishment for [Project Reef](#).”

The Fast-track panel might like to read a summary of the extensive 200+ page report Morrison et al. report written for the NZ Coastal Society on this survey work¹⁰³ - it amounts to only a few pages.

Another short summary that might be helpful for the Fast-track panel can be found on Pages 105-113 prepared in **2023** for the TRC Policy & Planning Councillors, on the 200 plus

¹⁰¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/a81a54ae4f/EEZ000004-Karen-Pratt-Non-expert-evidence-summary.pdf> pages 43-50.

¹⁰² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/fa578d80eb/EEZ000004-02A-Bill-Bisset-TTR.PDF>

¹⁰³ <https://www.coastalsociety.org.nz/assets/Publications/Coastal-News/CN-Offprints/CN80-Patea-Bank-reefs.pdf>

page report that TRC commissioned NIWA to do, based on this survey work¹⁰⁴. The full report is to be found there as well.

15) Erroneous representation by Eggers (TTRL) on involvement of TTRL in Morrison survey work & subsequent report of findings

The involvement of the STUC/Project Reef on this somewhat ground-breaking and significant rocky reef research (which provided independent scientific evidence substantiating ‘local knowledge’ on reefs shared previously to the DMC by the community) & subsequent report makes us feel it important to correct erroneous representations of the work. For example:

A presentation by Eggers to the NPDC, Elected Members Workshop - Trans Tasman Resources presentation on seabed project 18 Jun 2025 9:00am Council Chambers, Civic Centre stated where he stated “We contributed and encouraged the latest Pātea shoals survey and a third of the information has been supplied by TTR and our research” [Dropbox link](#). Dr Morrison and STUC/Project Reef have no evidence in support of this claim by Eggers.

We accept that as the Morrison at el. report also covered other reef survey work done in Taranaki and Aotearoa NZ, including Project Reef’s work – that about seven pages, of the over 200 page report, covered the work done by NIWA for TTRL (Beaumont and Anderson) which included their identification of reefs. Seven pages does not account for a third of the Morrison at el. Report. The words ‘encouraged’ also indicates some kind of relationship and collaboration – this was not the case.

16) TTRL’s “reef” work – not comprehensive & presentation potentially misleading

The Powerpoint presentation, slide 29, by Eggers to the Fast-track panel, lists environmental data gathered (headed up as “*TTR delivered NZ’s most comprehensive mining project environmental application ever*”)

All of the listed descriptions*, have a Report that can be read by the Fast Track panel. The exception to this are ‘reefs’ (highlighted in red below). There has been no commissioned report by TTRL on reefs.

¹⁰⁴ <https://www.trc.govt.nz/assets/Documents/Meetings/PolicyPlanning/2023/Policy-and-Planning-February-2023-web-version-v2.pdf>

- a. *Slide 29 lists: Bathymetry, Benthic Studies, Cetacean Surveys and HabitatModelling,Coastal Stability,Effects of Ships Lights,Fish Stocks,Commercial Fishing,Geology,Navigational, Noise Impacts,Oceanographic Information,STB Climate Records,Recreation Activities,Cultural Use,Biosecurity,Oil & Gas,Other Marine Management, **Reefs**, SedimentToxicology,Shoreline Profiles,Social Effects,Visual Effects Wave & Surf Effects,Seabirds

17) “REEF FISH” INFORMATION ‘MISLEADING’

Figure 3.7 says it is based on Lundquist 2020. The diagram says 'updated 17 August 2022'. For those who haven't investigated further, this has the potential to be misleading - in terms of the fact the dates are fairly current - yet the data is old - based on a 2013 paper by Smith, which in turn was based on data gathered 1986-2004 - NONE of which was from South Taranaki.

Project Reef has recorded **36** species of fish. See I-naturalist record [Fish recorded](#)

In contrast, the study used in the Fast-track application states “reefs further offshore support more diverse reef fish assemblage (typically **20+** species)”.

Extracts from FastTrack Application:

"Reef Fish

In 2020, NIWA used ensemble predictions from boosted regression tree and random forest species distribution models to describe the predicted probability of occurrence of 51 species of reef fish throughout New Zealand on a 250 m2 grid, updating the work of NIWA

The relative abundance of reef fishes were obtained from 467 SCUBA dives made around the coast of New Zealand over an 18-year period from November 1986 to December 2004 (for detailed methodology see Smith et al. (2013))." (From Lundquist et al 2020)

The reef fish data set used for those models **comes from 2013**, there is **no data from the 2022 Pātea Bank survey used in it**.

Our club member K Pratt submitted at previous Hearings, that **Smith (2013)** used SCUBA dives - **none of which came from South Taranaki**. She contacted Smith and chatted to him - he had no knowledge, of the extent of reefs offshore of South Taranaki.

The reef fish model does not get updated as new data is created, it's static and from a DOC one-off project that created the models. So **nothing new added to it since 2013. Lundquist et al (2020¹⁰⁵) just summaries that.**

The 2020 report is quoted in the Fast Track application rather than the paper where the original modelling report was.

The **map provided in the Fast Track application for Reef Fish**, has the potential to mislead people to the incorrect assumption that the findings are more current that they are in reality.

The date of the map 17 August 2022 refers to **the time the GIS has accessed the modelled data** to create the map, held within/linked to a GIS. So someone creates a GIS project that links to the various data-bases, so that you can run it and it will populate your map/tables with all the relevant data from the database = the data you got from your previous run + any new data added in the interim. This works well for situations where new data is being added over time - **which is NOT the case for REEF FISH data.**

18) LINZ mapping off South Taranaki 1959/60 – puts the Morrison mapping in context

To put the importance of the multibeam mapping by NIWA that we were involved with - the last LINZ mapping off Pātea occurring in 1959/1960.

¹⁰⁵ <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/marine-protected-areas/mpa-publications/evaluating-kea-datasets-2020.pdf>

19) STUC/Project Reef work noted in various reports

We started our marine survey work and established an excellent relationship with to Dr Michelle Kelly a sponge taxonomist.

One (of a number of reports) our efforts have been recognised, is the 2016 “Sensitive Habitats report” commissioned by the Taranaki Regional Council
*“recent work from the National Institute of Water and Atmospheric Research (Michelle Kelly NIWA) has tentatively identified **a dozen different sponge species** on a small patch reef approximately 11km offshore from Pātea”.*

20) We soon realised the importance of the biodiversity of our reefs in terms of Ministry for the Environment criteria

Our work soon determined that offshore reefs contain ‘sensitive habitats’¹⁰⁶ such as macroalgal beds, sponges, and beds of large bivalves (using the diagnostic criteria listed in the 2013 report, prepared by NIWA & The Ministry for the Environment) Leader author Alison MacDiarmid NIWA.

We urge the Fast-track panel to hear from NZ specialists in sponges and algae – so their importance in the ecosystem can be fully appreciated.

In the High Court Decision¹⁰⁷ **CIV-2017-485-704**

[2018] NZHC 2217 16-20 April 2018, there **was a description of a sponge being a plant. This greatly undermines and underestimates the importance of this filter feeding animal.**

[2] Despite the appearance of vast emptiness, many taonga lie beneath the surface of the waters off the South Taranaki Coast. Those taonga include hydrocarbon deposits which have provided the basis for Taranaki’s oil and gas industry;1 substantial iron sand deposits formed by the erosion of volcanic material from Mt Taranaki and concentrated by sea currents and tides; a habitat for fish exploited by large commercial fishing companies;2 a seafood resource used by tangata whenua and by

¹⁰⁶ <https://environment.govt.nz/assets/publications/Files/niwa-sensitive-marine-benthic-habitats-defined-2013.pdf> Report prepared for Ministry for the Environment, April 2013

¹⁰⁷

https://www.justice.govt.nz/jdo_documents/workspace_SpacesStore_a07d46c8_ded0_46e9_aa05_56a6e35accba.pdf

*recreational fishers; and a habitat for marine flora and fauna, ranging from simple bottom dwelling organisms (benthic biota) and phytoplankton, **through plants like sponges** and seaweed, up to 13 different cetacean species, including internationally endangered blue whale and nationally critical or endangered Southern right whale, killer whale and Maui's dolphin.*

The Fast-track panel might like to read a few of James Bell's papers which discuss the importance of sponges for an ecosystem. "The importance of sponges on substrate, sponge benthic-pelagic coupling, and sponge interactions and associations" "From the information available, many anthropogenic stressors have the potential to negatively impact sponge pumping, and therefore have the potential to cause ecosystem level impacts." "Sponges are a major component of benthic ecosystems across the world and fulfil a number of important functional roles".

We posted a 30 sec. video, showing the various **sponge species** at the Project Reef [Link](#)



Project Reef Facebook post 17th July 2025: with notated sponges etc.

21) STUC/Project Reef prepare extensive analysis for feeding into Morrison at el. report

The very *first reef survey* for South Taranaki was in **2020** when the STUC/Project Reef collaborated with NIWA as part of their MBIE juvenile fish habitat work, to get a number of hard rocky reefs multibeam mapped, including a more extensive mapping of 'The Project

Reef'. There was also some drop-camera 'ground-truthing' of 14 reefs in **2021**. After the data had been collected, the TRC engaged NIWA to write up the results in a report – a report which also provided contextual information on other reef surveys and published findings in NZ. The STUC/Project Reef team prepared over 200 pages for Dr Mark Morrison to assist with the writing of this report, including provision of 'Project Reef' data collected since 2016.

22) TTRL's experts stated 'no sponge gardens' and 'ecologically absent' macro-algae in Pātea shoals

The scientific evidence provided in the Morrison at el. report, which shows sponge gardens, macroalgal beds and blue cod nurseries, **shows a material shift & improvement in scientific knowledge** when compared to the two, and only, benthic surveys* conducted by NIWA for TTRL, where their expert Dr Anderson stated in 2014 '3.5 **no sponge gardens** or brachiopod beds per se were recorded within the Patea Shoals or Nearshore regions (*Beaumont et al., 2013 and Anderson et al., 2013) & '38. **Macroalgae was also ecologically absent** from this 20-40 m depth zone, within both mining and non-mining sites across the midshelf. Executive Summary of Evidence of Dr Tara Anderson¹⁰⁸ on behalf of Trans-Tasman Resources Ltd 29 March 2014

23) One occurrence of Ecklonia (macro-algae species) in TTRL's benthic survey v Morrison at el. Findings of Ecklonia forests,

Only one occurrence of Ecklonia radiata (Appendix N Algae species list, pg 184) recorded from the Benthic flora and fauna of the Patea Shoals region, South Taranaki Bight survey. In direct contrast, during a focussed reef study LinkMorrison at el observed: "It seems likely that this narrow Ecklonia forest ran right along the top of the 1.17 km ridge line", "Ecklonia forest and green lawn algae in association with finger-and-gutter reef" "Ecklonia forest re-appeared in association with a roughly 45 degree reef slope, forming a second narrow forest band, that also may extend along the reef side to form a second narrow western side kelp forest up to 580 metres long" "This suggests that a long narrow Ecklonia forest could be associated with the 4.5 kilometre long Reef U#2 (Figure 3-54); and with the 3.5 kilometre long reef feature east of it". **Of the 14 reefs drop-camera surveyed in 2021 there was Ecklonia forest (6 sites, one or more per site), Caulerpa meadow (3 sites) & Macroalgae garden (4 sites).**

¹⁰⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/1592da55c4/EEZ000004-TTR-Dr-Tara-Anderson-Executive-Summary.pdf>

24) TTRL's Baseline study: one sponge record for Pātea shoals

To give the Fast-Track panel context as to *the information gaps* our work addresses:

NIWA conducted a '**STB Factual Baseline Environmental Report**' in **2011** (updated 2015) and reviewed national datasets . . Data for taxonomic groups with good national coverage were exported from OBIS (Ocean Biogeographic Information System) as well as Mollusc and Algal data from the Museum of New Zealand Te Papa Tongarewa's database system.

- i. In total there were 1129 mollusc records, 269 algal records, 246 polychaete records, 97 bryozoan records, 47 echinoderm records, 34 arthropod records and **1 sponge record** within the study area.¹⁰⁹
- ii. Local club members, through collaboration with NIWA's Dr Michelle Kelly (an internationally renowned sponge taxonomist) have through photographs and samples, identified **40 sponge species** on the subtidal reefs of South Taranaki, with our photographs used in the NIWA Sponge Guide, and contributing a number of species range extensions for Dr Kelly. A club member has also had a holotype recorded for a new sponge species found in South Taranaki, which is registered and acquisitioned at NIWA.

25) No sub-tidal monitoring of Pātea shoals by DOC

26) **DOC** does not conduct sub-tidal reef monitoring in South Taranaki, as there are no marine reserves. One exception to this is a 2005 drop-camera survey of the North and South Traps – two large reefs in the southern part of the Pātea banks that were recorded in the TRC's Coastal Plan as outstanding natural features.

27) The main contribution towards an understanding of South Taranaki's marine life was a gathering of knowledge through conducted interviews and the publication of a 200 page report¹¹⁰, which included the survey comment: "sizeable reefs out from Pātea have been described as being responsible for some of the best fishing in Taranaki" Report: "Netting Coastal Knowledge South Taranaki-Whanganui Marine Area, 2006

¹⁰⁹ (<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/7bdcd2e2f7/Report-1-NIWA-STB-Baseline-Environmental-Report-November-2015.pdf>)

¹¹⁰ https://ref.coastalrestorationtrust.org.nz/site/assets/files/9674/netting_coastal_knowledge_-_south_taranaki-whanganui_marine_area_-_doc-5545381_1.pdf

28) No inclusion of South Taranaki in DOC's subtidal reef survey & report finds *Ecklonia* 'ecologically absent' on the West Coast

DOC South Taranaki is *not included* in the 2007 DOC report 'Quantitative description of mainland New Zealand's shallow subtidal reef communities' - an extensive study of shallow subtidal reef communities at 43 locations (247 sites) throughout mainland New Zealand. All the reefs in the study were at depths < 12 m.

- a. Had DOC known of the Project Reef, and other reefs ground-truthed in the NIWA 2020 & 2021 study by Dr Morrison the following statement in their 2007 report would no longer hold true: Pg. 83 of the DOC 2007 study* stated *E. radiata* was 'probably absent from most other west coast coastal sites because of extreme wave actions, sandscour and turbidity.' This kind of 'assumption' made by DOC in 2007, shows how important contributions from local divers can make in adding to knowledge.

29) No sub-tidal monitoring by the TRC

TRC: No offshore (sub-tidal) reef monitoring occurs by the Taranaki Regional Council (TRC). Their focus is inter-tidal reef monitoring.

30) STUC/Project Reef – our data in two academic papers (2021)

Academia: The *only* academic published on South Taranaki's reefs (prior to our focussed reef studies which began in 2015) was by Bombosch **2008** – which was focused on analysing DOC's 2005 drop-camera data taken on the North and South Traps.

The North & South Trap survey data gathered for DOC was by drop-camera and the quality of the photography was poor. In comparison our Benthic diver led surveys show incredible detail.

Due to our collaborative efforts in **2021** a further two academic papers, including data on 'Project Reef', have been published and this was shared with the DMC in the 2023 reconsideration by our club member K Pratt.

We were successful in encouraging Professor James Bell of Victoria University – a specialist in sponges (*Porifera*) and his PhD student (Ben Harris) to extend his survey to conduct a ROV study of “Project Reef”. Some extracts¹¹¹:

“The mesophotic-like reefs in Taranaki also exhibited high sponge cover relative to those reported on other temperate reefs within the same depth range (15– 25 m), particularly Pātea, which had 30% total sponge cover; higher than reported for any other shallow temperate reefs outside of the Mediterranean (see Bell et al. 2020).”

“Patea showed the highest sponge assemblage complexity score of all locations at 25 m (Fig. 2.5) with an overall cover of 17.2% (± 3.5 SE) of medium complexity forms (Fig. 2.6) representing 59.3% of the sponge assemblage (Fig. 2.7) and the only location to exceed the proportion of low complexity forms (9.8%) at this depth.” Pg.66

Data from ‘Project Reef’ in relation to sponges (dated data) was included in the academic paper by (2021) Mc Cormack The Biogeography and Trophic Roles of Coastal Marine Sponges (*Porifera*) from the west coast of the North Island, New Zealand: Influences of Catchments¹¹²

31) Waikato University Sponge Specialist reviews our footage of ‘The Crack’ (ESA)

We were also engaged with another NZ sponge specialist, Professor Battershill [Link](#) (Waikato University) having earlier shared with him some outstanding footage of an extensive reef of many km’s in length, covered with sponges and his response was they “show a spectacular, diverse and robust collection, that needs protection”. This reef is informally known as ‘The Crack’

‘The Crack’/also known as ‘The Himalayas’ appears as an ‘ecologically sensitive area’ (ESA) throughout the EPA’s 2017 Decision

¹¹¹

[https://openaccess.wgtn.ac.nz/articles/thesis/The distribution and feeding ecology of temperate marine sponges through shallow and mesophotic habitats/19669398?file=34929840](https://openaccess.wgtn.ac.nz/articles/thesis/The%20distribution%20and%20feeding%20ecology%20of%20temperate%20marine%20sponges%20through%20shallow%20and%20mesophotic%20habitats/19669398?file=34929840)

¹¹² <https://researchcommons.waikato.ac.nz/handle/10289/14690>

e.g. point 350, pg.78“Overall, we find that the effect on the primary production of the Patea Shoals is likely to be moderate, but will be significant at ESA such as [The Crack](#) and The “Project Reef” .

The panel may like to view the YouTube video of ‘The Crack’ [here](#).

32) \$71 million Sustainable Seas fund – no South Taranaki offshore research other than collection of some molluscs approx.60m depth

NIWA – Sustainable Seas (\$71 million funded from 2014-2024¹¹³) Our club member attended one of the first Conferences in 2018 – and spoke to members of the Team to encourage them to bring research to South Taranaki. No research was ever conducted in South Taranaki, other than obtaining some samples of molluscs in the EEZ for the research ‘Sediment tolerance and mortality thresholds of benthic habitats on the Taranaki Shelf ‘.

¹¹⁴The focus region was described as Pātea Shoals, South Taranaki Bight (60-80 m) and the Wellington south coast (<20 m).

As locals we find it interesting that the ‘Pātea shoals’ is described in this research document as the area to depths of 60-80m. In the EPA documentation the ‘Patea Shoals’ is regarded as the inner area of 1,700km² and the outer area of 1,100km² (where part of TTRL’s mining operation is located) – and less than 30m.

Although the research aim initially was to have comparisons of the same species from shallow and deep water to explore relative sensitivities across a range of shelf depths, this did not happen.

The study stated that “In New Zealand there has been just one study of sponge response to SSC in the shallow water *Tethya* sp. (Murray 2009). Similarly, there has been only a single study on New Zealand bryozoan responses to SSC, which found lowered feeding activity of an intertidal species”.

¹¹³ <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/national-science-challenges/the-11-challenges/sustainable-seas>

¹¹⁴ <https://www.sciencedirect.com/science/article/pii/S0141113619305434>

The sponge species '*Crella*' which the Project's aim was to collect in South Taranaki – did not eventuate. Instead samples close to shore in 4m-9m depths were obtained from Breaker Bay in Wellington.

(Power-point with photos of *Crella* in their experiment)¹¹⁵

33) Depth of TTRL's operation mis-stated in a Sustainable Seas paper – STUC/Project Reef notified the authors

A **2017** Marine Science paper 'Environmental management frameworks for offshore mining: the New Zealand'¹¹⁶ incorrectly states at 1.3.4 –that TTRL's operation occurs at depths 50m to 100m. We did contact the author about the error.

The paper does provide two important paper references – which are relevant for the FastTrack panel.

2005 Boyd¹¹⁷

In contrast to other studies that have demonstrated the rapid degradation of dredge tracks after cessation of dredging (Millner et al., 1977; Kenny et al., 1998), it **appears that substantially longer periods, i.e. at least 9 years, are required for the complete erosion of dredge tracks in the disturbed area** to the northeast of Area 222. Furthermore, the **maintenance of a biological assemblage composed of juvenile animals at the site of high dredging intensity up to 6 years after cessation suggests that these species are unable to reach maturity owing to the unstable nature of sediments in the area.** Thus, it appears that at the site of high dredging intensity the effects of dredging are still discernible on the composition of sediments and fauna even 6 years after cessation. This is in direct contrast to a body of case studies which together suggest that substantial progress towards restoration of the fauna could be expected within 2e4 years following cessation of marine sand and gravel extraction (Millner et al., 1977; Kenny et al., 1998; Desprez, 2000; Sarda ´et al., 2000; Van Dalssen et al., 2000; ICES, 2001). This discrepancy between the Area 222 data and other studies may reflect differences in the magnitude of dredging disturbance, since **many of the studies reported in the literature have been concerned**

¹¹⁵ https://niwa.co.nz/sites/default/files/Clark-Cummings-Webinar_27August_ROBES-and-Sustainable-Seas.pdf

¹¹⁶ <http://www.sciencedirect.com/science/article/pii/S0308597X16306972>

¹¹⁷

<https://www.researchgate.net/publication/255644725> The effects of marine sand and gravel extraction on the macrobenthos at a commercial dredging site results 6 years post-dredging

with the effects of relatively short-lived dredging campaigns (Kenny et al., 1998; Sarda et al., 2000; Van Dalfsen et al., 2000), **whereas Area 222 was dredged repeatedly over a 25-year period**. This work was also supported in 2004 with funding from the MEPF Aggregate Levy sustainability Fund

2011 Cooper¹¹⁸

Implications of dredging induced changes in sediment particle size composition for the structure and function of marine benthic macrofaunal communities. Changes in sediment composition can have implications for resident and recolonising fauna, resulting in the establishment of a faunal community that differs from the assemblage present before the dredging

34) First of its kind in NZ & World – unique insights into offshore reef life day & night – 23m depth, 11km offshore

Our Insitu camera at a rocky reef 11km offshore, 23m depth. It has been amazing to watch schools of fish (kingfish schools, trevally schools, snapper schools etc) in an undisturbed state, as there are no divers around. Snapper are diver shy, so to see large snapper mooching around the Project Reef has been hugely insightful. We have seen a seal pass by the camera, obviously the reef is a rich source of food.

- a. **We are the only ones to have done this kind of study in NZ.** Nowhere in Aotearoa NZ, or indeed around the world, have we found any other organisation with a camera set up, located 11km offshore – at 23m depth – recording night and day footage. This deployment is into one of the most challenging marine environments.
- b. When we supplied our data for the Morrison et al. report in 2022 we had reviewed and analysed **#3,145 videos**.
- c. Looking cumulatively at all videos we sighted these fish species the following times: 63% Boarfish, 88% on leather jackets, 88% on the Blue Moki and 100% of insitu camera deployments sighted snapper. #42 species (fish & others) have been sighted on our insitu footage . . .and densities of plankton not identified to species.

¹¹⁸ <https://www.sciencedirect.com/science/article/abs/pii/S0025326X11004048>

- d. The STUC applied to the Toi Foundation (TSB Community Trust previously) for *capital funding* so we could develop an innovative ‘first of its kind’ camera set up that could remain at the ‘Project reef’ day and night.
- e. The *night footage* provides clear insights as to the *energy and variability of the ocean currents*, as the particles (plankton and sediment) are highlighted against the blackness due to the lights of the camera. This footage shows the incredible density of zooplankton (krill) [Link](#) our insitu camera took.
- f. The **density of sound** captured by our footage also attests to the healthy status of the reef, with numerous papers published on the importance of reef sounds for fostering larval settlement.
- g. The sounds captured show clearly that dawn and dusk are associated with increased activity. Play some of the sounds at <https://www.projectreefsouthtaranaki.org/reef-sounds>
- h. We have data on **fish behaviours** – such as the reef being used as a cleaning station by Eagle Rays, Blue Moki and Scarlet Wrasse.
- i. We observe fish, such as large schools of snapper – that a diver survey would miss.
- j. 3.5.2, Pages 59 and 60 of the Morrison¹¹⁹ at el. report provides analysis of data – recognising that substantial more data has been gathered since the 2022 report.
- k. Our club has spent hundreds of hours maintaining this equipment and making modifications to ‘Rolls Royce’ it.
- l. The Project now uses two ‘Mark II’ versions of the insitu-camera with the original Mark I insitu-camera on display at Puke Ariki (New Plymouth) in the reef diorama. The reef diorama, which is of an incredible quality and realism - is - part of the permanent “Reef Alive” exhibition. The STUC/‘Project Reef’ donated vast hours and resources to “Reef Alive”. The Fast-Track panel may like to visit the diorama

and have the Project Team introduce the species and discuss their importance to our local marine ecosystem. [Mark I 2016](#)

- m. Springload worked with us to see if A.I. analysis of the footage obtained was possible – but after they had spent well over 100 hours work, it was decided the accuracy issues made this unfeasible to pursue. We reached out to the Australian Marine Institute ¹²⁰about A.I. analysis of footage – but they were no further ahead with solving this.

35) STUC/Project Reef: only ones to deploy BUV in South Taranaki

Baited Underwater Videos (BUV)

We are the only ones to have deployed baited underwater videos in the Pātea shoals. Our results for Blue Cod far exceed national figures that The Department of Conservation have obtained from around Aotearoa NZ.

Our largest count (Max(N) was 71. The Max(N) DOC obtained for Goat Island (as of 2021) was 5. BUV drops for Max(N) inside and outside the Cape Rodney to Okakari Point Marine Reserve from 1997 to 2005, shows the highest recorded Max(n) for blue cod at less than two.

You can see a video for Max(N) taken 13th March 2021 at the Project Reef

<https://www.dropbox.com/s/nppqdw68niur2m2/BUV%2013.02.2021%20%28Combined%29.mov?dl=0>

When we showed the footage to a member of the local DOC Marine Team In April 2021 he stated that the BUV results were ‘impressive’ and ‘the most blue cod I’ve seen in one place at one time’.

We would like to see a similar BUV analysis done for the Pātea shoals, as conducted by DOC for their Marine Reserves – as we are aware that our results is from one deployment each time, whereas they do multiple drops.

We ask the FastTrack Panel to consider carefully the understudied nature of the Pātea shoals in terms of fish. MPI surveys do not come into the Pātea shoals due to the ‘foul ground’/reefs. **In fact a recent MPI survey in the EEZ, close to the TTRL mining site, now records a ‘foul ground’ to be avoided in future surveys as huge quantities of sponges were retrieved in their survey nets.**

¹²⁰ <https://www.aims.gov.au/research-topics/technology>

The Morrison at el. survey found a blue cod nursery at Reef V, and many commercial fishermen describe areas of the Pātea shoals as nurseries for fish.

We have diver video of a reef ('Papa Reef' in the Morrison at el. report) where there were huge numbers of juvenile blue cod.

Morrison at el. in 3.5.1 discusses our BUV deployments.

36) STUC/Project Reef: only ones to take e-DNA samples on sub-tidal reefs in South Taranaki

Our Environmental DNA work. We are the only ones to have taken e-DNA samples in the Pātea shoals. This method is increasingly seen as a cost effective way to gather data. We would like to see this method used as a monitoring tool should consent be granted.

45% of our eDNA samples were unable to be identified, as the particular sequences are not in public databases and available to match against.

Examples of some of the very small creatures that came back to us from this survey method: The small crustacean, the copepod *Temora* as well as picoplankton, *Micromonas* & *Bathycoccus prasinos*, as well as *Polyplacophora* a Chiton and *Tellinoidea* a Clam, and worms: the *Serpulidae* – tube building bristle worms, *Sabellariidae* (a family which include Euchone worms) and *Spionidae*.

37) STUC/Project Reef: only ones to gather sound profiles with hydrophone at a reef in South Taranaki – extensive data gathered

Our hydrophone work – we have sixteen months of data collected, spanning a number of years and seasons. Each deployment captures around 28.5 hours of data.

DOC also, in 2016, deployed a hydrophone at our Project Reef mooring.

38) STUC/Project Reef: only ones to have conducted diver-led benthic surveys on South Taranaki's subtidal reefs

Our Benthic Survey work. We are the only ones to have conducted benthic surveys on reefs offshore of South Taranaki. The quality of the photographs are outstanding, and far

surpass drop-camera ones. To give the FastTrack panel an idea – this is one of the benthic survey photos taken:

<https://www.dropbox.com/scl/fi/90pga9dpub438c6ylit1a/DSC00829.JPG?rlkey=up5z2vlovuj6ta882nno4urie&st=uw8t05k7&dl=0>

39) STUC/Project Reef: Plankton Trawls

Our plankton studies – which use a net mesh 0.33 mm (335 um) -a bit coarse for standard scientific zooplankton studies (typically 200um) but very suitable for capturing macro-zooplankton, as well as fish eggs. We have captured krill through this method: *Calyptopsis* *Euphasiid* small shrimp-like crustaceans and copepods of the family *corycaidae*.

It is a fascinating world, that we have shared via our Project Reef Facebook page, [Ctenophore Comb](#), [Salps](#), [Microscope footage showing plankton feeding etc](#), [Fish egg](#), [Beautiful microscope footage of a species](#)

41) DMC Chair 2017 – challenges our reef descriptions in light of what experts have said.

As the EPA transcript 7th March 2017 shows, a number of STUC members (Malthus, Boyd, Purser, Pratt) attended the Hearing and spoke to the DMC and shared knowledge & footage of South Taranaki's offshore reefs. The Chair, Mr Shaw, challenged our reef descriptions in light of what experts had said.

- a. MR SHAW:
- b. *"They've talked about what have been described by submitters as unmapped reefs.¹²¹ The experts for the most part have said, no, they're not unmapped reefs, there are areas of hardness and so forth that have and some reefs that come and go because sand washes off and washes on to them, but to describe them as reefs would be an overstatement, I think that's really what they've been saying. So, this question of locating these things is particularly -- because it's a theme that's come through so many submissions, but it's not going to be good enough, I'm afraid, to just say, "Well, they're there and you have to take our word for it because we don't want to share these secrets".*
- c. MR MALTHUS: Oh, happy to.
- d. MR SHAW: *Because it will not cut the mustard.*

42) DMC Chair 2017 24th May 2017 states 'opportunity for science to be done and paid by someone else' – this is not the STUC's/Project Reef's motivation

- a. Transcript of Mr Shaw 24th May 2017
- b. MR SHAW
- c. *"There's always the worry, I think, with extensive monitoring plans, whether or not the monitoring is intended to further the purpose of the conditions and to understand the consequences of the grant of consent, or the exercise of the consent, or whether*

¹²¹ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/Applicant-evidence/7-March-2017-hearing-transcript.pdf> page 1282

they are about an opportunity for some science to be done, paid for by somebody else, which is of interest to particular scientific groups.”

d. Our responses:

The Club wants to emphasise that our desire to see the Project Reef included in the Benthic Monitoring Conditions is *in recognition of its unique nature* – we worked successfully to get the reef included in the Taranaki Regional Council’s Coastal Plan , and the Morrison at el. report further justifies its inclusion. On pg 85 of the report it is geologically described “It sits within a much larger reef complex of long narrow ridges up to 1.9 km long but does not appear well aligned with those either in aspect or morphology (Figure 30). The Project Reef stands out quite clearly as a discrete bathymetric feature.”

There are biogenic habitats such as sponges and macroalgae that are regarded as “sensitive”* on the Project Reef. Furthermore we now have long term datasets, as well as Benthic Survey lines already installed.

**“In this context “sensitivity” is defined as: the tolerance of a species or habitat to damage from an external factor, and the time taken for its subsequent recovery from damage sustained as a result of an external factor.*

The descriptions of tolerance are using take rarity into account, as the more rare a habitat is, the more an external factor is likely to damage a significant proportion of the habitat, and therefore it has a lower tolerance rating.” (taken from MfE Sensitive Habitats 2013)

None of our club members get any financial remuneration for their diving time, their boat time and fuel used. Many times they have forgone coming home with fish – instead perhaps coming home with a sponge sample for NIWA, or knowing they have carefully secured our insitu camera or hydrophone at the reef.

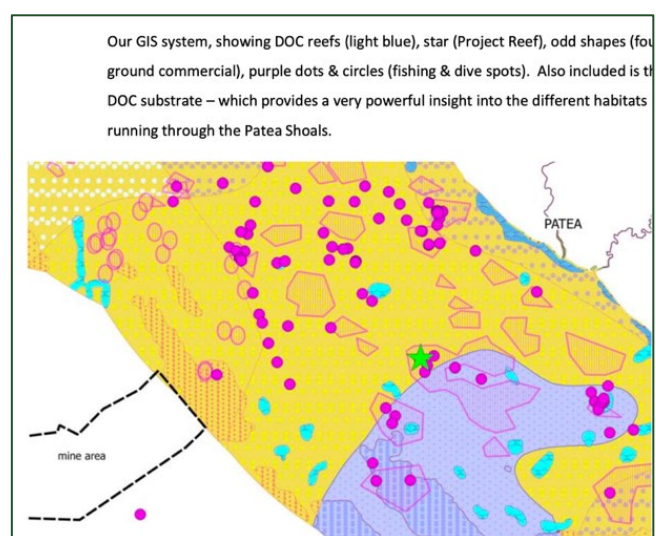
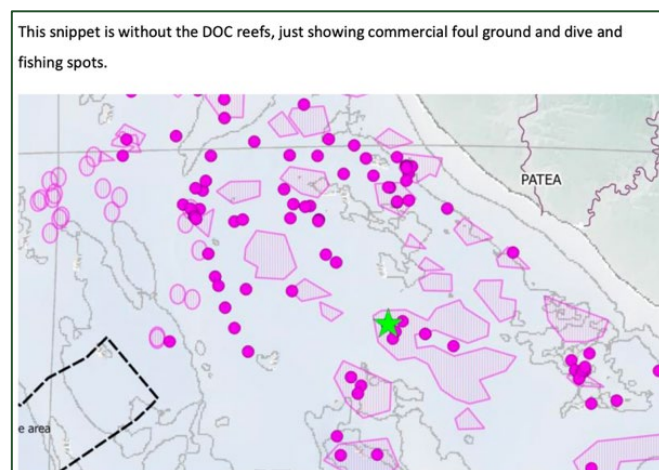
Our club member K Pratt in her submissions and other communications in the Hearing process has repeatedly requested the ‘Project Reef’s’ inclusion (as well as ‘The Crack’). The EPA’s expert, Lieffering, suggested the Decision Making Committee (DMC) look to include it in the Conditions. The DMC offered no explanation as to why they did not include these two reefs in the Benthic Monitoring Condition’s Schedule.

It is worth emphasising to the Fast-Track panel that not only is the work offshore conducted for no remuneration but our divers need to:

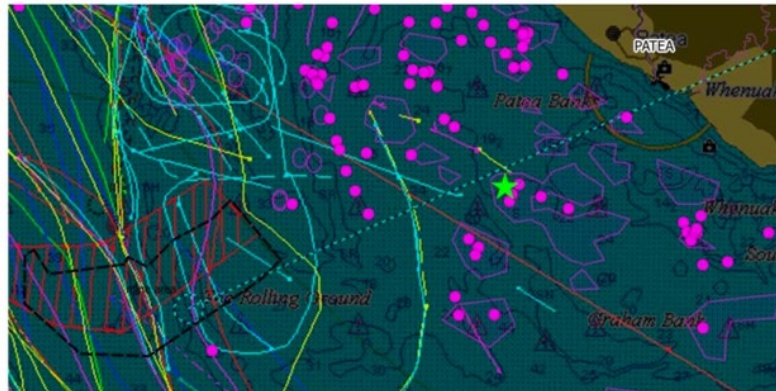
- Navigate a river to access the ocean (Pātea Bar) which can only be crossed at the right tidal times
- Strong currents, which makes diving only attainable during 'slack tide'
- Requires diving with extra equipment – such as the insitu camera, hydrophone, sample bags, benthic frame
- Depth at 23m means limited diving time.

43) STUC/Project Reef have worked hard to provide DMC's with insights on reefs

Examples shared March 2017 with DMC by STUC members K Pratt



This map combines trawl marks and known dive and fishing spots, as well as the Project Reef. **Again the GIS system proves its worth when you look at the combination of data – the dive spots appear either in untrawled areas, or in the polygons showing foul ground.**



44) Reef Condition offered by TTRL: not in Fast-track Conditions

On day 3 of the EPA Reconsideration Hearing, MacDiarmid stated “I understand TTR is volunteering additional conditions to undertake further survey work to identify reef habitat surrounding the PPA.”¹²² The FastTrack conditions have not included these additional conditions.

45) Importance of sharing local knowledge of great assistance to DMC/EPA & acknowledged in the DMC Decision Document

We have put a huge effort into sharing our knowledge with the EPA’s Decision Making Committee.

To illustrate – here are some extracts from the 2014 EPA Decision Document:¹²³

681. After hearing from recreational fishers and divers as well as the site visit, we have gained a picture of local Taranaki recreational fishing and diving that is more significant than put

¹²² <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/Hearing/Day-3-TTRL-MacDiarmid-Powerpoint-presentation.pdf>

¹²³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Boards-Decision/ff4e630f5d/EEZ000004-Trans-Tasman-Resources-decision-17June2014.pdf>

forward by the applicant. This raises issues about the impact of the proposal on recreational fishers and divers.

682. We conclude that the area to be mined has more value to recreational fishers than the applicant has assumed. While usage of this area is modest, it is growing. The wider area of the STB where fishing may be affected by the plume also appeared to be more important for recreational fishing than the applicant assumed. There is considerable uncertainty as to how the recreational fishing may be affected. The same conclusion applies to customary fishing in the wider area.

673. Mr Purser, Commodore of the Patea and District Boating Club, which operates out of the Patea River mouth, questioned the accuracy of TTR's information about recreational fishing on the STB. He set out from his research (over a 12-month period) there were up to 2,000 radio calls made to the South Taranaki Coast Guard. He stated:

- i. "Now on one specific day alone, there was ... 33 boats on an average day were heading out in the summertime. This is quite common, okay.*

Recreational diving

683. We now turn to diving at the traps and banks. Mr Cummerfield told us: "Being distant from the shore, the reefs are substantially free from sediment damage" "The clear water and shallow reefs provide enjoyable diving. The water visibility has always been adequate for diving on my visits.

685. We heard evidence as to the strong tidal currents and the risk this presents to the diver. Mr Boyd, a local diver from Patea, stated in his evidence: "I limit my diving to the turn of the tide because you can run into all sorts of difficulties because there is a huge current flow out there.

686. We have heard how diving on these reefs may be impacted by any increased sediment loading that may result from the proposed activities of the applicant, and submitters are understandably concerned.

- b. Mr Cummerfield explained: "The remote location of the reefs and banks on this exposed coast has provided some protection from over-fishing. The reefs and banks have been marvellous for recreational fishers and divers who have a passion for that unspoilt sea and a hunger for fresh seafood, such as myself.*

46) Local ecological knowledge in some cases exceeds scientific data: MPI report

We are aware that the MPI values the important insights that Local Knowledge brings. For MPI they know how critical biogenic habitats are to a healthy fisheries. Below are extracts from: A Ministry for Primary Industries (MPI) 2016 report¹²⁴ Biogenic habitats on the continental shelf: Part I' - which shows the rich biogenic habitats existing in the Pātea shoals - **page 34 of the report has a map of Taranaki.**

*Fishers develop detailed knowledge of their fishing grounds, often built up over many years. Known as Local Ecological Knowledge (LEK), this information about the environment and the fish they catch is often different but **highly complementary to scientific data about localized marine eco-systems, and in some cases, exceeds it.** Fifty trawl fishers around New Zealand were interviewed to record their knowledge of biogenic habitat, with charts being marked by the fishers themselves before being digitised and collated to provide a national map of fisher-drawn areas of possible biogenic habitat.*

47) MPI report documents Local Ecological Knowledge

In 4.9 of the report, it has a map and discussion about the South Taranaki Bight and Kapiti Island: Thirty-nine LEK areas were marked on charts, along with nine unmarked observations (mentioned verbally only) by 14 fishers in the South Taranaki Bight (Table 10, Figure 12).

Fishers described a wide range of habitats dominated by descriptions of “coral” (likely to include bryozoans), large sponges, and live and dead dog cockles found across large areas of the inner shelf. The report states that Worm fields were characterized by patches of high density sabellid tubeworms (*Euchone* sp.) were found in the northern mid-shelf and deeper areas, with the authors noting the association of a characteristic orange Catenicellid bryozoan with these worm fields (possibly known to fishers as “sponge weed”).

The report also discusses:

a study of the sediment facies of the Wanganui Shelf, Gillespie & Nelson (1996) which defined three groups of skeletal components found in the shelf sediments.

¹²⁴ <https://webstatic.niwa.co.nz/library/NZAEBR-174.pdf> (2016) 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. Part 1, Local Ecological Knowledge New Zealand Aquatic Environment and Biodiversity Report No. 130. 156 p.

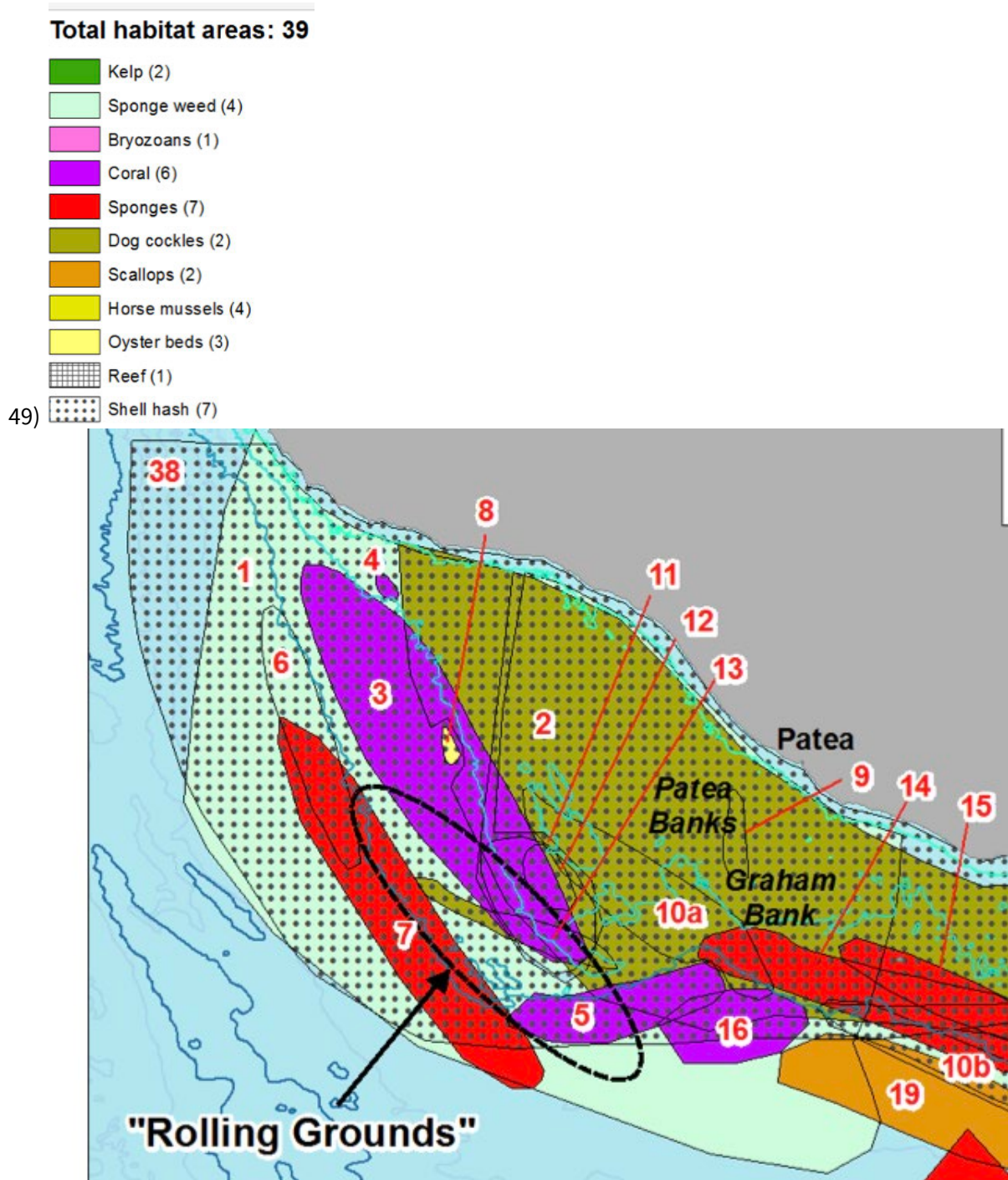
The areas described by fishers as **shell hash**, dog cockle beds and scallop beds roughly coincided with their “Assemblage C” (*Glycymeris*, *calpomactra*, *Tucetona*), whereas the **sponge** and coral areas tend to overlay “Assemblage A” (*bryozoan*, *Talochlamys*, *Tucetona*).

Gillespie & Nelson further described five surficial sediment facies, of which Facies 2 was high-carbonate dominated by skeletal-carbonate material, the bulk of which was described as being fresh and originating from bryozoans and bivalves.

In their assessment of bryozoan biodiversity in New Zealand, Rowden et al. (2004) highlighted this region as an area with samples displaying a wide range of biodiversity values from high to low

- a. *One retired fisher marked a very large area encompassing a wide depth range of what he described as “sponge weed”(1); brown spongy weed growing on shells, with little tubes about the thickness of a pencil, like a coral, but spongy and smelling strongly of iodine. Trawl gear brought up so much of the weed it needed to be cut from the sweeps with a machete and “gave your hands hell”. Heavy fishing had removed this weed. A current fisher marked a small area (6) where large volumes of orange “sponge weed” could damage the net.*
- b. *In shallower water, a large area was described as untrawlable, with dog cockles, scallops, patches of bare rock, rock lobster, kina (2). A small area of rock / gravel in about 30 m was located where “coral” was found (4), and patch where shell hash (dog cockle and scallop shells) accumulated in undulations (9).*
- c. *This area was marked by multiple fishers, many noting it as a large area of shell hash (10, 12), including dog cockles(13), also some patches of hard ground (11), and coral described as hard, white / cream coloured and “lumpy” (3,5), another recognizing pictures of bryozoans (16). In deeper water, the trawl net could pick up very large (1–2 ft across) grey / brown sponges, called “plumb duffs”, which had a lot of “growth” on them.*

MPI REPORT LOCAL ECOLOGICAL KNOWLEDGE – PATEA BANKS, GRAHAM BANK, ROLLING GROUNDS



50) MPI report & Biogenic habitats: supports our efforts to document and study them

We know the interconnectedness of the marine environment. The siloed approach noted in the MPI report, has also been the approach taken by TTRL in their FastTrack application – with discussions on fisheries by MacDiarmid, largely devoid of alongside commentary on the biogenic habitats.

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.

“Fisheries research and management has traditionally been focussed on the fish populations, while the habitats and environments which underpin their production have been largely ignored. This situation is changing, with an increasing awareness that habitats are important and can be degraded through human activities, both marine and land-based. One type of habitat that appears to be especially important for many demersal species are those referred to as ‘biogenic’ habitats.”

51) TTR’s OPEX budget seems lower than Eggers states is best practise

On 2 September 2025, the expert panel attended an overview conference where the applicant of the Taranaki VTM project provided a summary of the application.

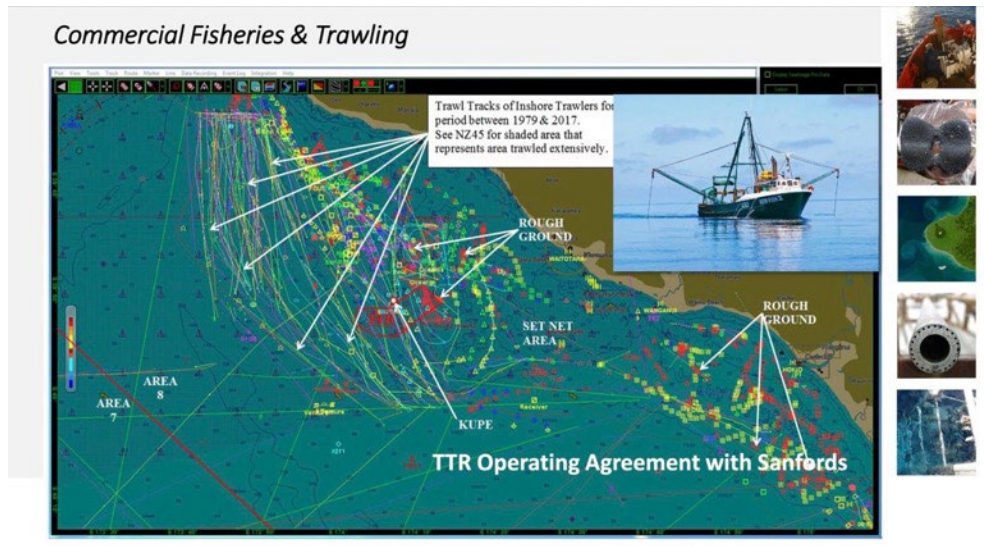
On point [47] of the transcription Eggers stated ten percent for environmental work was the lesson he’d been taught.

We are curious why in light of this, the OPEX he presented to the panel has 4% as the budget.

- a. [Transcription \(PDF, 1.4MB\)](#)
- b. [The applicant's presentation \(PDF, 17MB\)](#)
- c. [47] But importantly, they told me right from the start: “**Ten** percent of your budget, Alan, in mineral exploration and mining, will be for environmental work.” This was back in the early 1980s, and it taught me a great lesson, and I’ve never forgotten that.

52) “Foul Ground/Reefs: shown by Eggers –not a Sandfords map

This map was shown in Eggers presentation to the FastTrack panel. It was produced by Captain Smith.¹²⁵ who is not with Sandfords (the source should have been acknowledged) It shows “foul ground”/reefs – which clearly points to an area close by the Mining site, if not actually inside the mining site



On 14th March 2017, Counsel for Fisheries Inshore New Zealand Limited, The New Zealand Federation of Commercial Fishermen Inc, Talley’s Group Limited, Southern Inshore Fisheries Management Company Limited and Cloudy Bay Clams Limited (Fisheries Submitters) refers to the charts provided by Captain Smith, and asks leave to allow Captain Smith to attend the caucus on the Effects on Fishing.

MAY IT PLEASE THE DECISION-MAKING COMMITTEE¹²⁶: 14th March 2017

This memorandum addresses:(a) **The provision of updated charts by Captain Smith**; and(b) The evidence of Alison Undorf-Lay; and (c) The DMC’s position on a further caucus on the Effects on Fishing.

Captain Smith, Explanation of Chance3. **Captain Smith provided evidence at the hearing on 2 March 2017 which was summarised in a PowerPoint Presentation.**

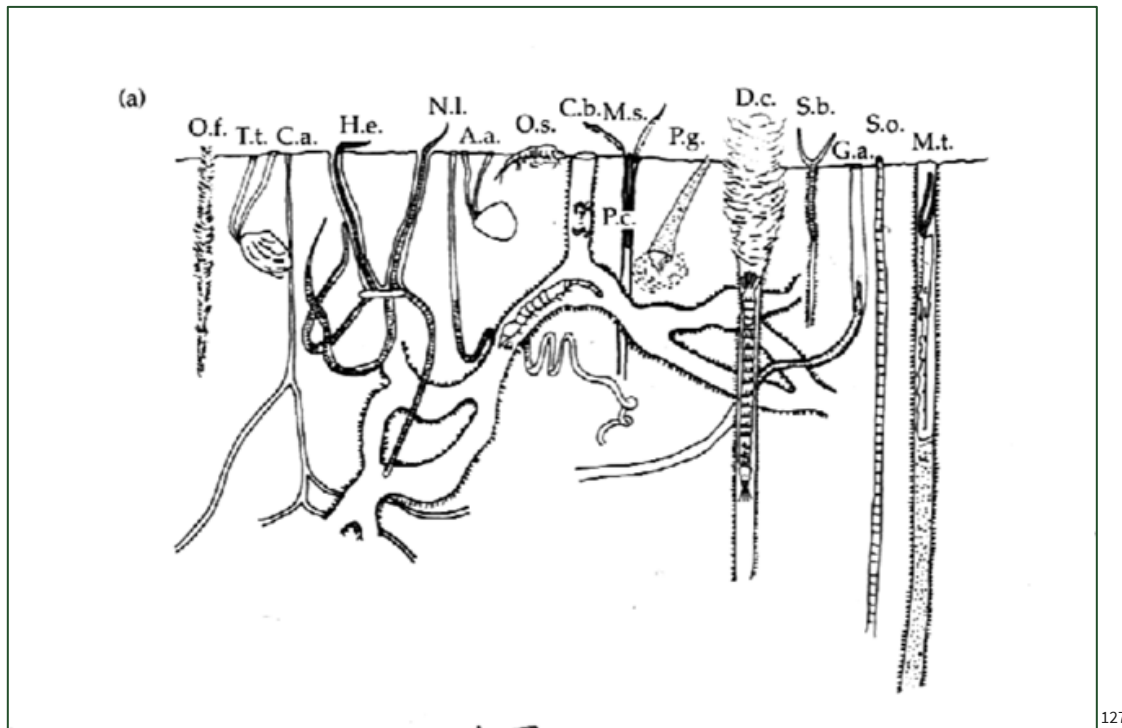
Captain Smith had several interactions with the DMC in regards to slides of charts included in his PowerPoint presentation.4. The DMC invited him to amend and to simplify the charts . . .

¹²⁵ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/0a5676beb8/Fisheries-Captain-Smith-Additional-evidence-on-charts.pdf>

¹²⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/96d720c92b/Fisheries-7794-Memorandum-in-regards-to-charts-of-Captain-Smith-evidence-of-Alison-Undorf.pdf>

ECOLOGY – SANDY SEAFLOOR AND SHELL HASH

As divers and fisherfolk we understand the importance of ‘a food chain’. We understand that the healthy fisheries are sustained by the prey upon which the fish eat. The sandy seafloor we know to be full of life. We know that seafloor sediments have different horizons of animal, fungal, microbiological, chemical and nutrient compositions – rather like a typical garden. Understanding these is an important part of understanding how the benthic ecology of the area functions. We know that Infauna drastically alters the productive surface area and seafloor habitat structure.



We have included the above diagram as it illustrates just how ‘busy’ and multi-dimensional the sandy seafloor is. (source, Dr Brian Paavo Evidence Summary)

The members of our Club know of many sandy seafloor areas, where there is excellent fishing to be had. We believe it likely that it is the rich food sources which encourages the presence of fish to this particular habitat.

¹²⁷ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0016/4264/Attachment-3b-Siecap-Taranaki-VTM-Project-Pre-Feasibility-Study-Offshore-Iron-Sands-Project-25-March-2025_Part2-FINAL.pdf
Appendix 19.23

Many fish species are well suited to eat from the seabed – with fleshy lips and snouts (like the Magpie perch, Boarfish and Copper and Blue Moki). Blue cod also.

SHELL HASH: What is a somewhat unique aspect of large parts of the seafloor in the Pātea shoals is the *shell-hash*. This buffers against re-suspension of the seafloor, as well as providing a really important habitat for marine life. As divers we also notice how much reflected light occurs due to the shells at the seafloor. [Bruce, our diver, collecting shell hash](#)

Shell-hash is clearly shown in the FastTrack material. The report by DRA shows clearly that a large portion of the oversize material is shell-hash.

It is important to point out to the Fast-Track panel, that the re-deposition of seabed material will not be replacing this shell-hash as the top layer.

We recommend the FastTrack panel request the upload of the [#20 videos taken](#) at the mining site, so that the various seafloor substrates can be seen.

NIWA recorded the *presence of an infaunal community by bioturbation such as burrows, pits, and trails in CoastCam images* and also by direct capture of some of its shallower burrowing species.

NIWA's dredge data also provided *evidence of an undocumented infaunal community* in the predicted impact zone.

3.1 Screening Testwork

ROM sizing / grading has been conducted on the -2 mm material. The oversize material comprises mainly of shell and debris as can be seen in Figure 2. The top-size was limited to the opening of the sample pipe.



Figure 2: Photograph of Oversize Material

53)

BENTHIC ECOLOGY AND PRIMARY PRODUCTIVITY: CONDITION SEDIMENT PROFILE IMAGERY – RECOLONISATION ANNUAL TESTING

“Sediment Profile Imagery (SPI) is used throughout the world and in New Zealand.

Mining and deposition will destroy this sedimentary structure in the impact zones and are likely to alter it in nearfield areas. No SPI measurements have been made by TTRL.

We recommend a condition for annual recolonisation testing, and for SPI measurements to be included in the pre-commencement monitoring.

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: GAPS IN TARANAKI REGIONAL COUNCIL’S (TRC) COMMENTS TO FAST-TRACK PANEL

We have the following observations:

Sensitive Habitats Report

The “Sensitive Habitats Report 2016 ” that the TRC commissioned¹²⁸, and later had to provide under a s44 request¹²⁹ in Jan 2017 to the EPA (now on the EPA website¹³⁰) includes a map as shown on the right.

Another representation of Sensitive Marine Habitats is included in TRC’s coastal marine work on ‘buffer’ distances¹³¹ (map on left).

Neither of these reports were provided in the Taranaki Regional Council’s response on the Taranaki VTM project. No recognition in the TRC comments, (5.1)¹³² that the reefs identified by Morrison et al. include sensitive habitats. E.g. *Ecklonia radiata* is only referred to as an ‘associated species’ without mention that the scale sighted on the reefs meet the criteria of a ‘sensitive habitat’.

¹²⁸ <https://www.trc.govt.nz/assets/Documents/Plans-policies/CoastalPlanReview/SensitiveHabitats.PDF>

¹²⁹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/External-advice-and-reports/89259ba34d/Taranaki-Regional-Council-Response-Section-44.pdf>

¹³⁰ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/External-advice-and-reports/991755deb8/Cawthron-Report.pdf> page 13

¹³¹ <https://www.trc.govt.nz/assets/Documents/Plans-policies/CoastalPlanReview/BufferDistances.PDF>

¹³² <https://www.trc.govt.nz/assets/Documents/TTR-Seabed-Mining-Documents/Taranaki-Regional-Council-Taranaki-VTM-Project-Written-Comment.pdf>

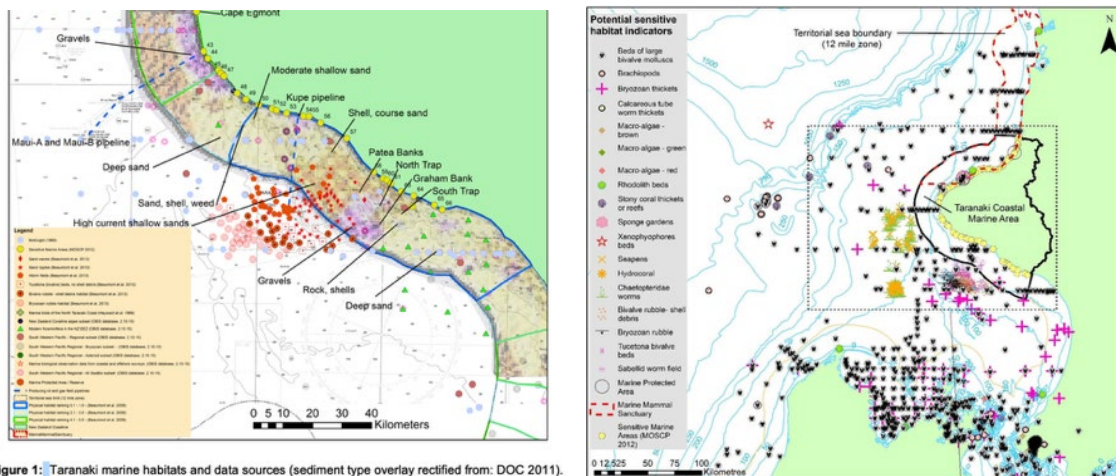


Figure 1: Taranaki marine habitats and data sources (sediment type overlay rectified from: DOC 2011).

Extracts from the ‘Sensitive Habitats report:

- “The South Taranaki area was noted in Beaumont et al. (2009) as being ‘important’ habitat in terms of polychaete diversity, and was noted as having three to four species (per ‘cell’2) of threatened invertebrate species (species undefined in report)”
- “results from Beaumont et al. (2013) suggest the South Taranaki area may be more diverse than some of the previous references and charts suggested.”
- “For additional sea pen and worm species records, the Cawthron database (Caddis™ Database 2016) was interrogated. However as these are client-owned data, only limited detail (presence/absence only) could be used without client approval”
- “Patea Shoals / Rolling Ground area (LINZ charts and Beaumont et al. 2013) are worth considering as outstanding habitats in terms of ecological sensitivity (EEZ 2012), particularly the following sensitive habitats: bryozoan rubble (possible thickets)bivalve rubble, bivalve beds, other possible sensitive habitat identifiers (brachiopods, algae and sponges) described in the report by Beaumont et al. (2013) Graham Bank has not been investigated (as far as is known), and may be a potentially outstanding area.”
- Results have been presented in Excel™ spreadsheets (lists) for internal purposes**
- “However, the shelly sand types occurring predominantly in the Southern Taranaki Bight region (LINZ marine chartNZ45), and Tucetona bivalve beds (live and dead/rubble) found at Patea Shoals (South Taranaki; Beaumont et al. 2013) could potentially fit the EEZ (2012: Appendix 1) description of a sensitive offshore habitat”

TRC’s 5.1 ‘Environmental Setting & Sediment Plume’: too narrow focus on reefs within 3km

We think the comment that future consideration for reefs to be within 3km of the mine site – is an unnecessary narrowing of focus.

“The Application’s main consideration of these matters appears confined to passing reference in two paragraphs. Further consideration of these matters is needed, especially the potential for rocky reefs to be within 3km of the mine site.”

TRC’s 6.1 Discussion of Wider Ecological Effects: not enough investigative work and use of specialists e.g. *Euchone* worm

The caveat in TRC’s submission “Within the mining site, *it is likely* that that recolonisation of seabed biota would occur, and flow on effects on food webs *may be* minimal. This is *subject to the caveats* that the presence of *novel species in the area is unknown* and recolonisation *relies on nearby source populations.*, does not make up for the fact that little research has been done – since 2013 when the TRC first raised their concerns with the implications for the food web, as well as the rate of recolonisation.

The *Euchone* sp. a worm, of which the density is the highest in the mining site is undescribed, and has not been studied. It’s life cycle is unknown. The TRC has not sought independent expert advice e.g. Dr Brian Paavo, on *Euchone* worms.

The TRC submitted to the EPA 19th December 2013¹³³ more fully on this matter.

Their recommendation point 65 was that an assessment be taken how a reduction in *Euchone* sp. A could impact on predators and the food web.

¹³³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/4f58448836/EEZ000004-09-Sarah-Gardner-Affidavit.pdf> See appendix ‘E’

61. The assessment of recolonisation times, anticipated to be months to years, does not appear to factor in the following considerations:
- The de-ored sediment will be devoid of all fauna and chemical cues which assist re-colonisation.
 - The study examples drawn from Table 36, p 262-263 of the IA show re-colonisation occurring over several months to 2-4 years. However, these studies are mainly concerned with the effects of dredging operations undertaken over a relatively short time scale e.g. up to periods of 1 year.
 - There is a lack of consideration of the long-term (up to 20 years) smothering effect of the plume on recolonisation. While few studies have addressed the consequences of long-term dredging operations, the Council reviewed a study (Boyde *et al.*, 2005) that assessed the status of an extraction site off the south coast of England which had been dredged for a period of 25 years. The study found that the effects of dredging were still discernible on the faunal composition even 6 years after the cessation of dredging. It was considered that the reduced biomass present may have been caused by the abrasive effects of the increased sediment (mainly sand) inhibiting the growth and survivorship of benthic organisms.
 - There will be a 1 m overlap on both sides of each mining cut (12 m wide) to ensure that there are no losses in iron ore.
62. The Council is concerned that TTR have underestimated the time required for recolonisation within the mined area given the points made above.

influence of the sediment plume are likely to be negatively impacted by the high suspended sediment loads. In a study by Lohrer *et al.* (2006) investigating the deposition of land-derived sediment on benthic communities, *Euchone* abundance

was found to significantly decrease when sediment treatments of 3 mm or greater were applied. This indicates that the soft sediment benthic communities (including *Euchone* sp A) within the influence of the sediment plume may be at risk of smothering by sediments.

The Council recommends, given that mining activities are likely to severely impact on *Euchone* sp A and other abundant polychaete populations, an assessment should be made of their relevance/role within the marine food web of the South Taranaki Bight. The Council questions whether these polychaetes are key prey species for marine predators within the area?

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: THE RELATIVE HEALTH OF PĀTEA SHOALS v IN MANY OF AOTEAROA'S COASTAL REGIONS

We have a healthy local marine environment.

As local fisherfolk and divers we have direct knowledge of this, and know how privileged we are in comparison to many other areas in Aotearoa, NZ where it is not so easy to readily obtain your fishing and crayfish quota. While there are no marine reserves in South Taranaki, our small population combined with the challenges of accessing the ocean through the river mouth (the Pātea bar) has largely protected our local marine environment, including reefs, from over-exploitation.

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY Numerous compromised marine environments elsewhere in Aotearoa NZ – the Pātea shoals is in a healthy condition

We approached DOC to see if there was a 'summary map' of all these, to put before the FastTrack panel, but unfortunately this is not the case. However we feel it important to outline some of these for the panel, in order to highlight and provide context and a sense of relativity for the currently healthy state of our local marine environment. It also adds weight to the need for a precautionary approach to this application.

- Exotic seaweeds *Caulerpa brachypus* and *Caulerpa parvifolia* affecting 1,600 acres¹³⁴
- unprecedented marine heatwaves in New Zealand impacted millions of sponges at a spatial scale greater than reported anywhere in the world¹³⁵

¹³⁴ <https://www.rnz.co.nz/news/national/560306/nz-faces-9-point-4b-hit-from-invasive-caulerpa-analysis-shows> 2025

¹³⁵ <https://www.sustainableseaschallenge.co.nz/tools-and-resources/marine-heat-waves-drive-bleaching-and-necrosis-of-temperate-sponges/> 2023

- The subtropical long-spined sea urchin (*Centrostephanus rodgersii*) abundant¹³⁶ and forming barrens¹³⁷
- extended seasonal closure for blue cod Marlborough Sounds¹³⁸
- “functionally extinct” crayfish in Hauraki Gulf [Link additional link](#)
- and kina barrens [Link MPI 24/25](#))
- milky white flesh syndrome affecting snapper in the Hauraki Gulf and East Northland areas¹³⁹

¹³⁶ <https://www.doc.govt.nz/news/media-releases/2025-media-releases/doc-and-partners-tackle-damaging-sea-urchins-at-poor-knights-marine-reserve/> 2025

¹³⁷ <https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2023.1224067/full> 2023

¹³⁸ <https://www.mpi.govt.nz/consultations/marlborough-sounds-blue-cod-review-measures-to-reduce-fishing-pressure-and-improve-fishery-health/> 2025

¹³⁹ <https://www.mpi.govt.nz/dmsdocument/62775-FAR-202425-Distribution-and-potential-causes-of-milky-fleshed-snapper-in-SNA-1/> 2024

SEDIMENTATION & OPTICAL QUALITY Rebuttal [151-156 & 393-394] Grinding/beneficiation process – a material omission by Eggers in his presentation to the Fast-track panel

[Transcription \(PDF, 1.4MB\)](#)¹⁴⁰ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

Eggers missed outlining [156-157] to the FastTrack panel a critical component - the grinding, or beneficiation, process.

For ease of the FastTrack panel we have highlighted the word **grinding/beneficiation** in light blue our responses to Eggers comments.

[151] And there are no chemicals, no toxins, nothing.

[152] The black sand coming up goes past some large drum magnets. We've got an 80-megawatt power station on board. It primarily does three things:

[153] Electrically drives the crawler

[154] Produces fresh water — reverse osmosis plant

[155] And... I've forgotten the third... oh yeah, that's right — produces electricity for the magnetic separator

[156] It's a drum magnetic separator, and the material going past — about 10% of it clings to that drum. It's circulating, and it scrapes it off as it goes, and that goes into the concentrate.

[157] The rest just keeps going straight through and down. It's in the same seawater that it came up in — and it's going back down

[393] We do have light grinding on board — but it's basically to segregate clumps of sediment that come out — clumps of iron sands — that come out and burst them apart so that they go through the circuit and we can extract the best of it.

¹⁴⁰ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

[394] But we're not actually grinding. And somebody said the other day, "Ah, they're grinding — they'll be putting more fines into the discharge — that causes the problems."

1) GHD: Grinding's importance to the plume modelling

The EPA's independent reviewers GHD, in their report¹⁴¹ 'Review of sediment mobilisation and transport' 06/09/2016 Dr Alexis Berthot and Dr David Petch, noted that variations in the proposed plant and sediment discharge rate have the potential to modify modelling input and therefore results of the modelling.

- a. *"However, it is noted that the accuracy and reliability of the predicted suspended sediment source is dependent on predicted discharge amounts at the overflow and underflow. These predictions have been provided by TTRL (Hadfield, 2015) and are dependent on the design dredging and grinding circuit and technology process design. "The accuracy or otherwise of these estimates cannot be verified."*

- 2) This GHD report was mentioned by the reconsideration panel in 2024 – they tasked Dougal Greer the oceanographer to review it and get back to them. Mr Greer had outlined to the panel his concerns about the modelling understating wave periods and shear stress (see the visual on the second to last PowerPoint slide by Greer)¹⁴²The Chair was starting to pursue a line of enquiry about redoing the modelling¹⁴³

3) Hadfield comments on TTR's reduced fines due to grinding efficiencies

¹⁴¹ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/6361b8e695/GHD-Lodgement-review-of-sediment-mobilisation-transport.pdf>

¹⁴² <https://www.epa.govt.nz/public-consultations/completed/trans-tasman-resources-limited-2023-reconsideration/hearings/> Day 3 PowerPoint Dougal Greer

¹⁴³ <https://www.epa.govt.nz/public-consultations/completed/trans-tasman-resources-limited-2023-reconsideration/hearings/> Day 3 Transcript, pg.337

In Dr Hadfield's Statement of Summary Evidence 28 March 2014¹⁴⁴ – he outlines a reduction in the inputs to the Plume Modelling, due to revised discharge data advised to him in a memorandum from Andy Sommerville of TTR dated 4 March 2014.

Hadfield states that “as I understand it the changes are: a reduction in the amount of fine sediment generated by grinding, as a result of a process redesign involving optimisation of the grinding circuit and technology.

The revised PSDs were materially reduced by 35–55% in the output of the suspended source for three of the four size classes represented in the model, but an increase in the 16–38 µm class by 27%. When modelled the effects on SSC and deposition rates were reductions varying between 20% and 50% with the revised PSDs.

4) Test work shows grinding is necessary from an economic point of view

Test work showed the iron sands are immature in respect of its liberation from gangue silicates and so it is necessary to grind the ore to obtain liberation and increase product grade and maximise Fe recovery. Siecap 3a 7.5.9 Tailings Handling:

- a. *“The only physical alteration of the ore is the size reduction during the grinding process. In order to minimise the environmental impact of the tailings in terms of plume formation, it will be dewatered before disposal via a set of hydro-cyclones.*
- b. *Water from the fine tailings dewatering will contain too high level of suspended solids to be used as process water and will be discharged.*

5) Test work shows grinding necessary to reduce phosphorus levels

The Callaghan report shows phosphorus (P) is also present in the sand, and can detrimental to the mechanical properties of steel. The total phosphorus level in the coarser particles may be reduced through grinding to smaller particle sizes

¹⁴⁴ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/ee0ecf14b8/EEZ000004-05-Dr-Mark-Hadfield-Statement-of-Evidence.PDF>

*“We assume the criterion for selecting a sieve cut to be excused **grinding** is for FeXRF to be 55% or greater. This must have the prerequisite condition that the level of phosphorus be lower than 0.18 wt. % There are few holes that meet this criterion”*

Siecap 3a shows a product specification of 0.17% P maximum corresponds to a **grind** size of 90 micron.

6) Grinding is a huge power consumer

Siecap 3a, pg. 226 Based on the current assumptions, Vertimill **grinding is the largest single power consumer**. Other significant power consumers include the ship positioning system, the coarse tails cyclone pumping system, the reverse osmosis plant, the trommel screens and the crawler system.

7) The grinding process and resultant fines are still uncertain TTRL’s expert states

There is uncertainty about the grinding process and hence the fines that will be released in the pipe discharges – see DRA (pg.232 Siecap 3b) DRA recommends that grind variability test work be conducted to verify these findings as only a single sample of 20kg was tested. Additional test work is also required to determine mill charge and **optimal grinding** media sizing.

Siecap 3a 3.15.2 Minerals Processing Test work also raises the point that there is needed to be confirmation of optimum **grind** size for each **grinding** stage and **grinding** circuit optimization

Siecap 3b¹⁴⁵ contains a number of reports on the grinding process:

There was the “Test Plant Report January 31, 2014” with METSO-DRA providing a full analysis – on one sample of Iron Sands received at the Metso York Test Plant - with the purpose of doing a ‘Special Jar Mill Grindability Test ‘to determine the specific energy required to grind the as-received material to eighty percent passing 125µm using a Vertimill.

There is also the 7.1 Metso Milling Recommendation & the 7.12 DRA Milling Simulation Reports.

SEDIMENTATION AND OPTICAL QUALITY: Rebuttal [157] Discharges

[Transcription \(PDF, 1.4MB\)](#)¹⁴⁶ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

[157] The rest just keeps going straight through and down. It’s in the same seawater that it came up in – and it’s going back down.

[158] There’s nothing being added to it whatsoever. And there’s no way for us to infuse anything into that process.

The waste water discharge and the wastewater discharge plume need monitoring for trace metals – an AUT expert’s recommendation. It is not, as Eggers asserts, the same seawater that has come up - for a number of reasons, including the inclusion of trace metals.

SEDIMENTATION & OPTICAL QUALITY: Grinding releases trace metals

The mining operation involves two activities that *release contaminants* into the water column

¹⁴⁵ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0016/4264/Attachment-3b-Siecap-Taranaki-VTM-Project-Pre-Feasibility-Study-Offshore-Iron-Sands-Project-25-March-2025_Part2-FINAL.pdf

¹⁴⁶ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

TTR displaces sediment from depths up to 11 m below the seafloor, and suspension of this sediment mobilises trace metals.

TTR will **grind sediment** increasing its specific surface area - the sediment is suspended in seawater to feed it through grinding mills. This seawater, and any dissolved trace metals released from the sediment particles during grinding, is returned to the sea. For example, copper concentrations after a medium and fine grind meant the seawater before discharge would exceed the guideline for the protection of 80% of species. A 160-fold dilution would decrease the concentration to below the concentration limit for the protection of 99% of species. SKM (2014) also noted that overflow water from the coarse tailing stream will be recycled in the process stream. Mixing of this water, which will have already been mixed with raw sand and therefore potentially accumulated

Precautionary principle: conditions should assume elevated bioavailability of trace metals

Footnote 27 in the Technical Package has the report of testing by AUT.

Not included in the Fast Track documents is the Executive Summary by AUT's Vopel¹⁴⁷, with the cautionary note "Because of possible variations in the mass and water balances of TTR's proposed mining operation and remaining uncertainty over spatial variations in the quality of the target iron sand, *I recommend implementation of effective monitoring of trace metal concentrations in both the wastewater discharge and the wastewater discharge plume*" and "Uncertainties remain regarding the effects of the elevated dilute-acid soluble concentrations of nickel and chromium in subseafloor iron sand and the observed trends with depth below the seafloor. A *precautionary approach to monitoring conditions should assume elevated bioavailability of these trace metals* should this iron sand be exposed by removal of the overlying iron sand or otherwise displaced to the surface of the seafloor."

NIWA's/Hadfield's dilution report not in Fast-track documents

¹⁴⁷ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/8b4ec53722/EEZ000004-42-Kay-Vopel-Sediment-toxicology-pore-chemistry.PDF>

NIWA's sediment modelling expert, Hadfield prepared a report, 20th March 2014¹⁴⁸ on the dilution required to meet environmental standards

Not included in the FastTrack documents

Sample areas and depths are not representative of depths that will be mined

Important note: The sampling areas and depths for providing samples for the AUT testing were not representative of the mining – the likely depths for mining due to the mineral resources are shown in the [Callaghan Innovation report](#)

The Callaghan report shows maximum depths of 11m throughout the mine area.

In contrast the 3 samples provided for sampling to AUT/Vopel were taken from the outer mining location 'Christina' at depths 4m, 5m & 2m and in the mid-area for mining in location 'Diane' from depths 2m & 3m.

No statistical analysis was performed to indicate this was suitable in light of the mining schedule.

Metal testing and metal grinding - Tables provided to assist the Fast-track panel

To assist the FastTrack panel, we have included two tables presented in our club member K Pratt's 'Summary for the EPA Hearing' in 2014. As noted in the material above, there is still uncertainty about the grinding size that will be used, so consequently uncertainty about levels of metal discharges.

In red numbers are the metal readings *at the seabed*, for Chromium, Copper and Nickel.

Working downwards from the red figure, are the metal readings *taken at 1m intervals in depth*

Each to the right of each depth sample figure is the metal reading from applying different sized grindings – 276 micron, 186 micron, and 23 micron.

Only the outer edge and middle area of the mining area has had sediment samples taken for testing.

¹⁴⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/45c2d7f8ac/EEZ000004-Hadfield-Solute-Dilution-Report-20-March.pdf>

CONDITIONS Schedule 6, 'Monitoring of Indicators' has monitoring of the tailings slurry, and pore water – with no details on the method.

We would like a condition for monitoring the accumulation of metals at the seabed also – much like is required for Oil and Gas. This would assist in recolonisation studies.

There has been no scientific testing or reference to literature, on the impact of these increased concentrations of metals on benthic life. So the EFFECTS are unknown.

CONCENTRATIONS OF METALS				Data below taken from Table 5 & Table 13 of the following report by Dr Vopel, from Auckland University of Technology Report September 2013 http://www.epa.govt.nz/Publications/Sediment_Toxicology_study.pdf											
mg kg ⁻¹				CONCENTRATIONS OF METALS											
				mg kg ⁻¹											
Mining Site	ID	Method of getting sample	SEDIMENT DEPTH	CHROMIUM mg kg ⁻¹	276µm Coarse	186µm Medium	23µm Fine	COPPER mg kg ⁻¹	276µm Coarse	186µm Medium	23µm Fine	NICKEL mg kg ⁻¹	276µm Coarse	186µm Medium	23µm Fine
				Sand: 287µm	Grind	Grind	Grind	Sand: 287µm	Grind	Grind	Grind	Sand: 287µm	Grind	Grind	Grind
Christina	C1	(VQ) Underwater electrical vibrocor	seabed - 0	<0.34				0.42				0.61			
39° 53.637'		CORE	1m below seabed	8.23	42	35	76	0.67	15	14	31	6.37	18	15	28
174° 6.696'			2m below seabed	15.92	42	38	78	0.53	15	16	30	12.25	18	16	29
			3m below seabed	27.75	42	37	78	0.88	15	15	32	21.58	17	15	32
			4m below seabed	42.7	38	39	75	0.99	14	15	31	29.89	16	15	28
Christina	C2	(VQ) Underwater electrical vibrocor	seabed - 0	2.44				0.57				2.51			
39° 53.560'		CORE	1m below seabed	10.76	42	35	76	0.69	15	14	31	8.19	18	15	28
174° 4.565'			2m below seabed	12.01	42	38	78	0.45	15	16	30	8.2	18	16	29
			3m below seabed	9.35	42	37	78	0.48	15	15	32	6.68	17	15	32
			4m below seabed	5.37	38	39	75	0.37	14	15	31	3.88	16	15	28
			5m below seabed	6.84	40	40	77	0.58	15	17	30	5.05	17	15	30
Christina	C3	(VQ) Underwater electrical vibrocor	seabed - 0	0.36				0.31				0.34			
39° 52.128'		CORE	1m below seabed	13.87	42	35	76	0.94	15	14	31	10	18	15	28
174° 3.268'			2m below seabed	15.88	42	38	78	0.75	15	16	30	12.48	18	16	29
			3m below seabed												
			4m below seabed												
Dianna	D2	(VQ) Underwater electrical vibrocor	seabed - 0	0.51				0.3				0.63			
39° 52.636'		CORE	1m below seabed	3.7	42	35	76	0.39	15	14	31	2.68	18	15	28
174° 7.744'			2m below seabed	4.6	42	38	78	0.43	15	16	30	3.45	18	16	29
			3m below seabed												
			4m below seabed												
Dianna	D3	(VQ) Underwater electrical vibrocor	seabed - 0	0.3				0.46				0.43			
39° 52.003'		CORE	1m below seabed	1.33	42	35	76	0.4	15	14	31	1.15	18	15	28
174° 6.775'			2m below seabed	1.2	42	38	78	0.72	15	16	30	0.96	18	16	29
			3m below seabed	3.95	42	37	78	0.46	15	15	32	2.6	17	15	32
			4m below seabed	10.01	38	39	75	0.56	14	15	31	6.36	16	15	28
			5m below seabed	13.54	40	40	77	0.54	15	17	30	8.73	17	15	30

a.

				Data below taken from Table 5 of the following report by Dr Vopel, from Auckland University of Technology Report September 2013 http://www.epa.govt.nz/Publications/Sediment_Toxicology_study.pdf											
				SIZE OF RECEIVED SEABED SAND ON AVERAGE: 287µm											
Mining Site	ID	Method of getting sample	SEDIMENT DEPTH	CHROMIUM mg kg ⁻¹				COPPER mg kg ⁻¹				NICKEL mg kg ⁻¹			
Christina	C1	(VQ) Underwater electrical vibrocor	seabed - 0	<0.34				0.42				0.61			
39° 53.637'		CORE	1m below seabed	8.23				0.67				6.37			
174° 6.696'			2m below seabed	15.92				0.53				12.25			
			3m below seabed	27.75				0.88				21.58			
			4m below seabed	42.7				0.99				29.89			
Christina	C2	(VQ) Underwater electrical vibrocor	seabed - 0	2.44				0.57				2.51			
39° 53.560'		CORE	1m below seabed	10.76				0.69				8.19			
174° 4.565'			2m below seabed	12.01				0.45				8.2			
			3m below seabed	9.35				0.48				6.68			
			4m below seabed	5.37				0.37				3.88			
			5m below seabed	6.84				0.58				5.05			
Christina	C3	(VQ) Underwater electrical vibrocor	seabed - 0	0.36				0.31				0.34			
39° 52.128'		CORE	1m below seabed	13.87				0.94				10			
174° 3.268'			2m below seabed	15.88				0.75				12.48			
			3m below seabed												
			4m below seabed												
Dianna	D2	(VQ) Underwater electrical vibrocor	seabed - 0	0.51				0.3				0.63			
39° 52.636'		CORE	1m below seabed	3.7				0.39				2.68			
174° 7.744'			2m below seabed	4.6				0.43				3.45			
			3m below seabed												
			4m below seabed												
Dianna	D3	(VQ) Underwater electrical vibrocor	seabed - 0	0.3				0.46				0.43			
39° 52.003'		CORE	1m below seabed	1.33				0.4				1.15			
174° 6.775'			2m below seabed	1.2				0.72				0.96			
			3m below seabed	3.95				0.46				2.6			
			4m below seabed	10.01				0.56				6.36			
			5m below seabed	13.54				0.54				8.73			

The percentage increases that occur from the surface level of the seabed down in metre increments are significant in all cases for chromium, copper and nickel. This data reinforces the comments made in point 10 of Vopel's 'Executive Summary' that CONDITIONS SHOULD ASSUME ELEVATED BIOAVAILABILITY OF THESE TRACE METALS.

SEDIMENTATION & OPTICAL QUALITIES: Rebuttal [393-395] & [512-517] FINES

[Transcription \(PDF, 1.4MB\)](#)¹⁴⁹ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

[393] We do have light grinding on board – but it’s basically to segregate clumps of sediment that come out – clumps of iron sands – that come out and burst them apart so that they go through the circuit and we can extract the best of it.

[394] But we’re not actually grinding. And somebody said the other day, “Ah, they’re grinding – they’ll be putting more fines into the discharge – that causes the problems.”

[395] We collect the fines – that’s what we’re after. It’s the coarse material that goes back down, not the fines. So it’s the exact opposite.

512] Natalie Hampson:

[513] And just to clarify – the plume only applies if you inadvertently bring up these silts?

[514] Alan Eggers:

[515] Yes.

[516] There is a plume – even with the heavy mineral sands – and there’s no silts. It will be a plume that settles very quickly – because that’s what they are. And it’s the coarse fraction that’s going back. The fines we keep.

[517] So it settles very quickly.

It is one of the most fundamental aspects for this Taranaki VTM project – the **fines**.

Of critical importance is to understand the seabed material. There are GRADISTAT scale tables showing how we grade sediment . For Plume Modelling it is the grades shown in green and blue that are considered as ‘fines’

- a. from the larger sized sand (categorised from coarse, medium, fine and **very fine**)
- b. to silt (categorised as very coarse, coarse, medium, fine, very fine,
- c. and clay (mud)

¹⁴⁹ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

	1.0	Very coarse sand	
	0.0	Coarse sand	Sand
500	1.0	Medium sand	
250	2.0	Fine sand	
125	3.0	Very fine sand	
63	4.0	Coarse silt	Silt
31	5.0	Medium silt	
15.6	6.0	Fine silt	
7.8	7.0	Very fine silt	
3.9	8.0	Clay	Mud
0.06	14.0		

Source:¹⁵⁰

The Character of each sized ‘fines’ – critical to understand

The sizing of the sediment affects the length of time it *can remain suspended* in the water column, and how much energy is required *to resuspend* it into the water column. We can think of it rather like it’s “character”. Other factors like the temperature of the water, the energy of the ocean – currents and waves, and salinity impact also on these ‘fines’. Biological material can also play a role.

The physics of the Plume at discharge: critical to understand but no detailed modelling done

There is also a lot of physics to take into account when discharging into the ocean – depending on the density of the amount discharged, the depth discharged and how the physics occur when the fines hit the seabed/pit. Hadfield (the NIWA Plume Modeller for TTRL) “*Furthermore the hydro-cyclone discharge will be significantly denser than the ambient water and will form a plume that will sink towards the sea bed, though no detailed modelling of this has been carried out.*”

Flocculation – doubts expressed by a number of experts

In the FastTrack, and second EPA Hearing, some of the smaller sizes ‘fines’ were assumed to flocculate, become bigger in size, fall faster, and stay in the mining pit – rather than become part of

¹⁵⁰ <https://www.planetary.org/space-images/wentworth-1922-grain-size>

the sediment plume. A report included in the FastTrack material, not in previously filed application documents, shows there is the potential for this flocculation to *not* occur.

DOC's reviewer, Dr Longdill, also questioned one of the tests done by HR Wallingford, that was used as a means of supporting the flocculation assumptions.

We note that TTRL's in their final comments in the 2017 EPA Hearing, in relation to DOC – there is *absolute avoidance of the sedimentation issues* DOC's reviewer Dr Longdill had: Mr Holm: "The Department of Conservation, who have statutory responsibility for the protection of marine mammals and who opposed the first application, *did not make a submission on this application, as it was satisfied with the conditions prepared by the applicant in relation to the protection of whales and other marine life.*

K Pratt in her 2016 submission¹⁵¹ emphasised that "Flocculation – which in turn determines the settling rates – is a **critical** aspect. Many factors influence flocculation (particles grouping together). Importantly, there comes a point where flocculation can break apart. No 'limitations and assumptions' were given in the HR Wallingford reports. My submission is full of 'information gaps/limitations' relating to HR Wallingford's testing and modelling (see pgs. 244,245,246,247,251-253,254-255,256,260-279-233)." & "Sediment samples 1 & 2 were missed from a large percentage of the tests (271-279) (251,329,330) (Flocculation: 234,235,244,246,250,264,266,301,303,306,312-316,324,328). It appears the majority of experts did not review the HR Wallingford modelling in detail (200,202,206,209)."

The background 'fines': unsure whether the same settling velocities applied as to similar sized particles in the Near-field Plume Modelling

¹⁵¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Submissions-and-or-comments/dbab83ac37/Pratt-K-Section1-123055.pdf>

2. The “background sediment”

- for the rivers are partitioned as 50% coarse silt (31-63 microns) and 50% fine silt/clay (<8 microns).
- 2% of the seabed is ‘fines’ (<63 microns).

It is also important that the same ‘flocculation’ parameters are applied to the background as to the mining fines of the same size.

Table 2-1: Background sediment parameters.

Label	Source	Nominal size range (µm)	Settling velocity (mm/s)	Critical stress (Pa)	Fraction initially present in seabed
sand_01	River	16–63	0.63	0.200	
sand_02	River	4–16	0.01	0.200	
sand_03	Seabed	500–1000	103	0.431	20%
sand_04	Seabed	128–500	38	0.219	72%
sand_05	Seabed	63–128	6.3	0.200	6%
sand_06	Seabed	16–63	0.76	0.200	1.5%
sand_07	Seabed	4–16	0.01	0.200	0.5%

3. What makes this dredging operation rather different to others, e.g. Namibia diamond mining, and sand extraction around the world – is the beneficiation process, otherwise known as ‘grinding’ that occurs. This process generates additional fines.
4. In the (very old and dated now) 2014 EPA Hearing a TTRL expert Bruce Souter¹⁵² estimated the effect of the combined processing plant on the mined material. *“Approximately 16% to 17% of the material will be retained as product; between 1% and 13% of the material returned to the sea floor has been through the mill; and between 71% and 82% is returned back to the sea floor with no modification to its size i.e. it has bypassed the mill.”*

SEDIMENTATION AND OPTICAL WATER QUALITY: NEW REPORT (2017) NOT AVAILABLE TO EPA EXPERTS PREVIOUSLY – GIVES IMPORTANT INSIGHTS:

¹⁵² <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/19277398ed/EEZ000004-06-Bruce-Souter-Processing-Methodology.PDF>

Forty holes (see fig. 2.1 below) were surveyed and reported on in the 1st June 2017

Callaghan report : *From each ROM sample we have then produced a magnetic concentrate using dry magnetic separation, which has been configured to simulate TTR's expected LIMS1 process. No grinding has been undertaken for any of the work presented here, so all data relates solely to raw unground ironsand particles.*

Key findings - based

- a) Mining depth varies a lot.
At some sites they would need to dig very deep (up to 11 metres) 19 of the 40 holes surveyed to get the full iron-bearing sand, while at others (2 of the 40 holes) only 1 metre would be worth taking. (see Figure 2.3 below)
- b) Iron recovery is patchy.
The amount of iron that could be pulled out with magnets varied widely – from as little as 2.3% to as much as 13.3% in different drill holes. 3 - 4 % of the ROM comprised non-magnetic Fe.
- c) Tailings (waste) still contain iron.
Around 3–4% of the total sand always ends up as iron in the waste stream, because some of the iron is “non-magnetic” and can’t be picked up by the magnets.
- d) Not all samples are equal.
Some drill holes with low iron overall still had a mix of both magnetic and non-magnetic iron, so the total amount recovered doesn’t always match the total iron content in the raw sand.
- e) Fine particles have more iron than coarse ones.
The smaller the grains of sand, the richer they tend to be in iron. Because of this, TTR has thought about separating out the fine fraction before doing any grinding.
 - a. In this study, 8 of the 40 drill holes had material 125–150 microns (“sand” sizing) that contained over 55% iron, without any further processing.
- f) Phosphorus is a complication.
As the iron concentration goes up, phosphorus (a contaminant) also tends to increase. At iron grades above 50%, phosphorus was always above 0.2%. However, the ratio of phosphorus to iron improves at higher iron levels, meaning that if the material is ground further and processed again (a second magnetic step), it might be possible to push the iron content to around 60% (e.g. [by grinding](#) + LIMS2) to lower phosphorus to below 0.18%. in the final LIMS2 concentrate.

The report was downloaded from the ASX listed Company website Manuka Resources. It is not in the Fast-track application reports.

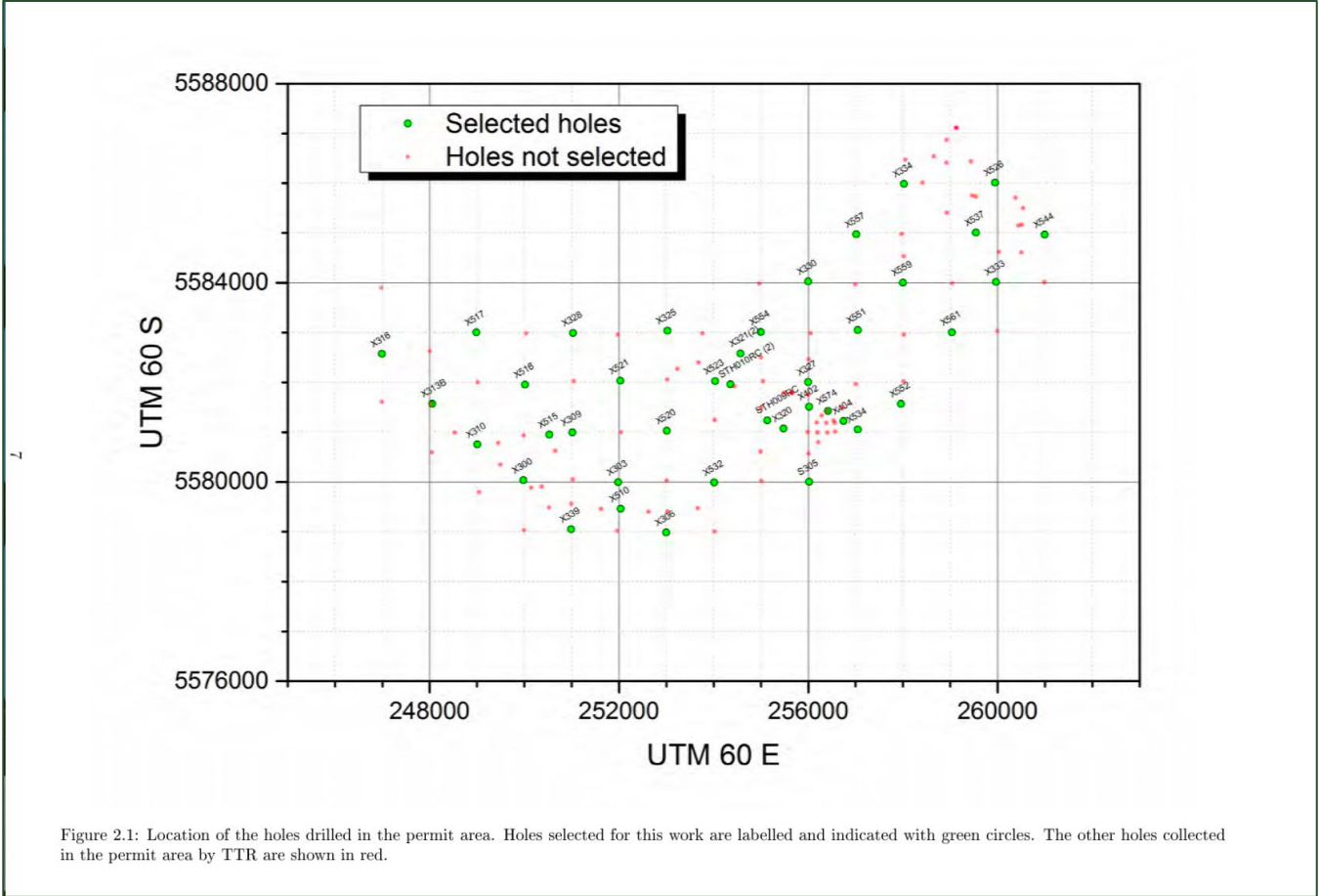


Figure 2.2: Histogram of hole depths

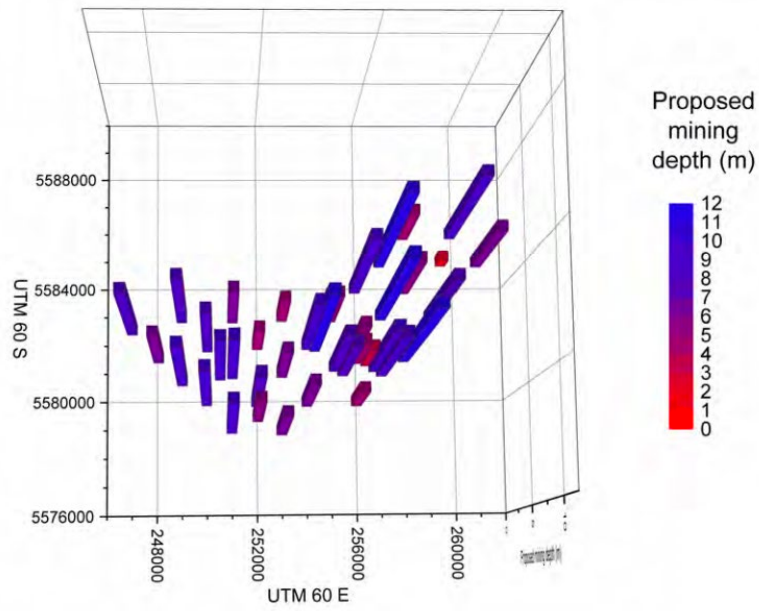


Figure 2.3: Map showing hole depth used for each hole considered within TTR mining permit area

SEDIMENTATION & OPTICAL QUALITY: REBUTTAL

SEDIMENTATION & OPTICAL QUALITY: “WORST CASE” IS NOT THE WORST CASE MODELLED

GHD’s comment on the “worst case”

“The independent experts have *not been provided with the complete reports including a full analysis of the sediment samples and cannot verify the validity of the sediment fractions* that have been used in the modelling. The experts *have had to make assumptions on the PSD and processing rate onboard the IMV based on verbal accounts from Dr Dearnaley, who has been informed by TTR, without being able to review how the values have been derived*”

<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/cc54bfd775/Alexis-Berhot-GHD-Worst-Case-Scenario-Statement-20170330.pdf>

STUC/Project Reef has provided the Fast-track panel with an extra table, that may be useful in understanding the variable time-series applied to the fines in the “worst-case”

NIWA Table

Table 2-2: Suspended source sediment parameters.

Class	Settling velocity (mm/s)	Critical stress (Pa)	A Mound (Kg/s)	B		C		Old rate (Kg/s)
				2.25% ultra fines (Kg/s)		1.65% ultra fines (Kg/s)		
				B1 Waves<2.5m	B2 Waves>2.5m	C1 Waves<2.5m	C2 Waves>2.5m	
sand_08	1.0	0.200	4.5	4.5	4.5	2.9	2.9	1.70
sand_09	0.10	0.200	30.2	15.9	25.4	10.2	16.3	14.35
sand_10	0.01	0.200	15.6	15.6	15.6	10.1	10.1	6.85
Total			50.3	36.0	45.5	23.2	29.3	22.9

STUC/Project Reef table. Source K Pratt

			A	B	C	D	E	F	G
			kg/s Table 7-3 NIWA & HRW	A Mound kg/s	B1 Waves <2.5m kg/s	B2 Waves >2.5m kg/s	C1 Waves <2.5m kg/s	C2 Waves >2.5m kg/s	kg/s p.a.
Hydro-Cyclone	38-90	sand	0.00	0.0	0	0	0	0	
Hydro-Cyclone	16-38	_08	1.70	4.5	4.5	4.5	2.9	2.9	
Hydro-Cyclone	8-16	_09	14.35	30.2	15.9	25.4	10.2	16.3	
Hydro-Cyclone	<8	_10	6.85	15.6	15.6	15.6	10.1	10.1	
			22.90	50.3	36.0	45.5	23.2	29.3	
			In 180 days	20 days twice	20 days twice	20 days twice	40 days three times	40 days three times	Total days
			Total days	40	40	40	120	120	360
			Days of a year	11%	11%	11%	33%	33%	100%
			kg/s	5.59	4.00	5.06	7.73	9.77	32.14

A few examples of why ‘the worst-case’ is not that

Memo: Worse-case parameterisation for source term for use in sediment plume modelling
To inform the Sediment Plume Modelling experts meeting (23rd February 2017)
Prepared by Dr Dearnaley 22nd February 2017

Parameter	As used in Impact Assessment	Recommended for Worse-Case	Comment
Run of Mine	1.60% < 8 µm	1.76% < 8 µm	Increased ultra fines content by 10% to give a worse case material type compliant with proposed Condition 47(e)
Discharge from IMV	65.9 kg/s < 38 µm	79.4 kg/s < 38 µm	20% increase in fines discharge as determined by analysis with plant production model
Characterisation of settling properties	Average of NIWA and HR Wallingford used	Adopt NIWA interpretation: 16%, 31%, 44% and 6% for 0.01, 0.1, 1 and 10 mm/s settling classes	As requested by other experts. Dr Dearnaley considers HR Wallingford interpretation conservative
Retention of fines settling at 0.01, 1 and 10 mm/s in mining pit	5%, 90% and 100% assumed for 900m wide mining lane	No change proposed	
Retention of fines settling at 0.1 mm/s in mining pit	Average of 25% adopted, based on 300m wide pit	Propose 45% for 900m wide mining lane, 2,500m in length.	See MD11 answers regarding occurrence of wave and flows. Assume 5% retention in pore water including for mound and 50% in the pit.
Downtime for mining activity	20% downtime plus no mining during waves > 4m	29% downtime plus no mining during waves > 4m	Include best representation of downtime for long term mining activity
Resuspension properties	Threshold for resuspension, 0.2 Pa Erosion rate 0.0002 kg/m ² /s	No changes proposed	
Overall Effect	Source term for plume: 22.9kg/s	Source term for plume 29.1 kg/s	27% increase in uniform rate of discharge; 11% reduction in time that discharge is generated.

1. The “worst case” uses 5% trapping in the mining pit (fines settling at 0.01mm/s) & 90% trapping (fines settling at 1mm/s) and 100% trapping (fines settling at 10mm/s). This can’t be regarded as a ‘worse’ case. The first Hearing had nil trapping for most of the fines.

2. The “worst case” increases the trapping in the mining pit from 25% to 45% for fines settling at 0.1mm/s. This can’t be regarded as ‘worse’.
3. The “worst case” increased downtime – from 20% to 29%. It is important that this aspect is noted in any comparative statements about the Sediment Plume ‘before and after’ the worst case being run.
4. Resuspension (an important contributor to fines being elevated into the water column) was kept the same at 0.2Pa – so not a ‘worse case’, as in the first Hearing it was 0.1Pa.

Have the same settling parameters been applied to the background fines, as the fines of the Plume Modelling?

The ‘background sediment’ from the rivers contains 31-63 microns, yet this has not been regarded as ‘trapped’ due to flocculation and 100% removed.

Table 2-1: Background sediment parameters.

Label	Source	Nominal size range (µm)	Settling velocity (mm/s)	Critical stress (Pa)	Fraction initially present in seabed
sand_01	River	16–63	0.63	0.200	
sand_02	River	4–16	0.01	0.200	
sand_03	Seabed	500–1000	103	0.431	20%
sand_04	Seabed	128–500	38	0.219	72%
sand_05	Seabed	63–128	6.3	0.200	6%
sand_06	Seabed	16–63	0.76	0.200	1.5%
sand_07	Seabed	4–16	0.01	0.200	0.5%

In the first Hearing, before ‘flocculation’ was applied to the fines, Hadfield discussed the impact on the South Trap.

14. I consider that it is the PSD of the discharges which should be of prime concern when considering impacts and potential consent conditions, as it is primarily the discharges, not the ROM PSD, which determine (in addition to physical forcing of waves, currents, wind, etc.) the SSC plume intensity and extent. H

20. In particular, I refer to the South Trap (Figure 28 of the report to the benthic ecology experts dated 25 March 2014) where it appears that the mining derived SSC load represents a ~+20% increase above background (and bear in mind that this increase may actually be larger as the modelled background is uncertain and may be overestimated by a factor of 2)¹⁵³

1 km and 500 m simulations and compared them.

¹⁵³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/46d8bc6996/EEZ000004-DoC-Peter-Longdill-updated-evidence-28-March.pdf>

At the *surface*, the median and 99th percentile concentrations are *unchanged* by the reduced grid spacing of the 500 m model.

At the *bottom*, there is an increase in both the median (from 68 to 126 mg/L)

and the 99th percentile (from 285 to 501 mg/L). The near-bottom SSCs at the source location are dominated at both model resolutions by the coarsest sediment classes, the ones with a size range of 38–90 µm.

(When the concentration with these classes excluded, the median in the 500 m model is reduced to 39 mg/L and the 99th percentile is reduced to 98 mg/L.) The 38–90 µm sediments fall (at 2.8 mm/s, or 10.4 m/hour) to the bottom and are then re-suspended by waves and tidal currents. They are *fine enough to be lifted into suspension reasonably frequently*, but fall too fast to be transported away from the source rapidly

<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/359e8511a9/EEZ000004-20-Mark-Hadfield-Sediment-plume-modelling.PDF>

SEDIMENTATION & OPTICAL QUALITIES: CONDITIONS

Woodside's Dredging and Spoil Disposal Management Plan February 2023 – best practise should be used

With the materiality of TTRL's operation in terms of volume of extraction, as well as time scale, as well as modelled localised impacts on ESA – the 'duty of care' should be particularly high in the setting of conditions, should approval be granted.

Woodside's Dredging and Spoil Disposal Management Plan February 2023 (not referenced in the Fasttrack materials) provides guidance, and certainly the minimum standard, that should also be expected of TTRL.

https://www.woodside.com/docs/default-source/our-business---documents-and-files/burrup-hub---documents-and-files/scarborough---documents-and-files/scarborough-dsdmp.pdf?sfvrsn=35cb82fe_8

SEDIMENTATION & OPTICAL QUALITIES: CONDITIONS NEED TO ADDRESS SEASONALITY & BEST INTERNATIONAL PRACTISE

Schedule 2 limits in TTRL's FastTrack application, do not account for seasonality. They should be amended so they do. In terms of 'best international practise', Woodside's Dredging project shows the variability in SSC mg/L from summer to winter.

Table 4.1 Baseline mean and 80th percentile SSC values calculated from measurements undertaken during the LNG Foundation Project (2007-2010), categorised into summer and winter seasons for each of the three ecological zones.

Ecological Zone	Season	Mean SSC (mg/L)	80 th Percentile SSC (mg/L)
A	Summer	4.1	5.0
	Winter	1.8	2.3
B	Summer	2.5	2.7
	Winter	1.2	1.6
Offshore	Summer	1.8	1.8
	Winter	0.6	0.9

Hewitt & Thrush (2019) considered the problem of designing monitoring programmes to detect tipping points and concluded that *within-year sampling increases the likelihood of*

*detecting when systems are approaching these. They recommended that ecological knowledge should be utilised when designing long-term monitoring programmes and to increase the likelihood that short-term or infrequent datasets can reveal whether a tipping point has been crossed.*¹⁵⁴

Mining derived plume is more pronounced relative to background in summer

An analysis of mining-derived and background SSCs for the suspended source at location A in summer (December–February) and winter (July–August) indicates that both mining-derived and background concentrations are lower in summer than winter. The net effect is that the mining-derived plume is somewhat more pronounced relative to the background in summer than in winter.

Sedimentation: Seasonal variances & ecological impacts need accounting for

TTRL’s sediment expert, NIWA’s Dr Hadfield, outlined the *ecological* aspects of accounting for seasonality variances:

<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/359e8511a9/EEZ000004-20-Mark-Hadfield-Sediment-plume-modelling.PDF>

Sedimentation: ecological effects can occur on short timeframes

Paragraph 24: Seasonality/variability: The sediment plume modelling predicts SSC and sedimentation on a two-year time scale. This is an appropriate time scale for assessment of effects on coastal processes, but ecological effects of sediment plumes can occur on shorter timescales.

¹⁵⁴ <https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/sediment/research-priorities-for-sediments-in-the-coastal-marine-area-of-aotearoa-new-zealand.pdf>

Sedimentation can make a greater contribution during calm periods

The studies demonstrate the importance of wave re-suspension and river inputs of sediment on nearshore SSC. Mining-related SSC could thus make a greater contribution during calm and/or dry periods than when considered over longer time scales.

Sedimentation – the importance of ecological cycles

The interplay of ecological cycles (e.g. enhanced phytoplankton productivity in spring/early summer (MacDiarmid et al.2011; season variation in growth of the kelp *Ecklonia* (Miller et al. 2011) with such temporal variability of the relative importance of mine-generated suspended solids could produce impacts that would not be predicted on the basis of year-scale model predictions.

Sedimentation: plume behaviour can remain in a constant direction for ten days or more

The animations of the plume of mining-derived sediment show that it is clearly affected by the wind. Winds from the west accelerate the normal movement towards Whanganui; winds from the southeast drive the plume westward. These changes in the plume behaviour can persist for periods of ten days or more.

Sedimentation: Stratification needs consideration: see video animation

So occasional summer stratification is likely to occur and limit the vertical extent of the plume. Several cases where this appears to be happening are visible in the animation of SSC on a vertical slice (Animation 3).

SEDIMENTATION AND OPTICAL EFFECTS: CONDITIONS NEED TO HAVE DISCHARGE LIMITS THAT ARE NOT AVERAGED OVER A MONTH

Condition 4b, limits discharges to 7,190 tonnes per hour *averaged over a monthly period*

Generally, applying a *time-average such as a month* to a data set for the purposes of threshold analysis will result in a *smaller zone of effect* than if shorter time-averaged days are used.

Woodside have determined ‘ecological zones’ depending on taxa. For South Taranaki the research to enable such ecological zones is yet to be conducted.

Table 4.3: The taxa-specific thresholds and appropriate time-averaging periods (related to exposure times from experimental data)

Ecological Zone	Time-Averaged Period (days)	Threshold SSC (mg/L)
A	3	29.1
	7	22.5
	10	19.6
	14	17.6
B	3	19.4
	7	14.7
	10	13.1
	14	11.7
Offshore	28	22.5

“The effectiveness of EIAs has been found to be limited when they have too much focus on baseline work and not enough emphasis on key impacts of the activity [39]. In the development of the New Zealand impact assessment guidelines Clark [47] recommended that key impacts from offshore mining activities should be assessed and structured by receptor or depth range (outlined in Table 2, see also [43]). Specifically, structuring the EIA by receptor or depth enables an understanding of the source and nature of impacts caused by the operation and helps to focus the EIA” J.I. Ellis, M.R. Clark, H.L. Rouse, G. Lamarche, **Environmental**

management frameworks for offshore mining: the New Zealand approach¹⁵⁵, Oct 2017
Marine Policy, Volume 84,2017,Pages 178-192

¹⁵⁵ <https://www.sciencedirect.com/science/article/pii/S0308597X16306972> 2017

CONDITION NEEDED to monitor the fines erosion/resuspension of fines from the cumulative lengths of pits as well as the cumulative length of mounds

Fines contribution from mounds

The erosion potential, and hence the potential source of fines to be suspended in the water column of the cumulative length of pits and mounds is not budgeted for as a contribution to the fines. The mounds *when they are first built (so not a cumulative length)* are used as a 'worst case' scenario but *only applied for 11% of the year*.

A comparison is useful:

The 16-38 micron for the 'worst case' *mound fines* release is **4.5kg/s** applied for 11% of the year, with a 30% downtime - compared to the first EPA Hearing of **31.4kg/s** of 16-38 (hydrocyclone) and **5.3kg/s** (de-ored sand) applied for 100% of the year with a 20% downtime. Under this scenario, the *mound fines contribution* is not a case of being 'the worst case'.

The 8-16 micron for the 'worst case' *mound fines* release is **30.2 kg/s** applied for 11% of the year with a 30% downtime compared to the first EPA Hearing of **13.1 kg/s** (hydrocyclone) and **1.4kg/s** (de-ored sand) applied for 100% of the year with 20% downtime. Under this scenario, the *mound fines* contribution from mound building would be larger, but on an annual contribution basis not.

The <8 micron for the 'worst case' *mound fines* release is **15.6 kg/s** applied for 11% of the year with a 30% downtime compared to the first EPA Hearing of **13.3 kg/s** (hydrocyclone) and **1.4kg/s** (de-ored sand) applied for 100% of the year, with 20% downtime. Under this scenario, the *mound fines* contribution from mound building is about the same - but less on an annual contribution basis.

A	B	C	D	E
Source	size range	Source Rate original 2013/14 kg/s	Oct-15	updated 19th March 14 kg/s
			Dearnaley used	
Hydro-Cyclone	38-90	24.6		16.1
Hydro-Cyclone	16-38	25.7	31.4	31.4
Hydro-Cyclone	8-16	20.3	13.1	13.1
Hydro-Cyclone	<8	28.5	13.3	13.3
de-ored sand	38-90	35		15
de-ored sand	16-38	3.2	5.3	5.3
de-ored sand	8-16	2.4	1.4	1.4
de-ored sand	<8	3.3	1.4	1.4
GRAND TOTALS:		143	65.9	97

			kg/s Table 7-3 NIWA & HRW	A Mound kg/s
Hydro-Cyclone	38-90	sand		0.0
Hydro-Cyclone	16-38	_08		4.5
Hydro-Cyclone	8-16	_09	14.35	30.2
Hydro-Cyclone	<8	_10	6.85	15.6
			22.90	50.3

SEDIMENTATION IMPORTANT NEW REPORT NOT PREVIOUSLY AVAILABLE TO EPA & NOW INCLUDED IN APPENDIX 19.9 HR Wallingford Tailings Plume Review “Independent review of Plume Modelling August 2014” #14 IMPORTANT POINTS FOR PANEL AND EXPERTS TO REVIEW

Dr M Dearnaley, HR Wallingford in his 2023 rebuttal evidence¹⁵⁶ stated:

“I also helped to prepare various reports which formed part of TTR’s application, listed here:

- (a) Support to Trans-Tasman Resources, Laboratory Testing of Sediments (HRW, October 2014);
- (b) Support to Trans-Tasman Resources, Source terms and sediment properties for plume dispersion modelling (HRW, October 2015);
- (c) Support to Trans-Tasman Resources, Worst case scenario sediment plume modelling (HRW, March 2017)”

There is another important document “Independent Review of Plume Modelling (HRW 2014) which has *appeared for the first time* in **Siecap 3a Appendix 19.9** as part of the Fast-track documentation.

1. This document is not in the Footnote ¹⁵⁷ document provided on 9th September 2025.
2. This document has not been included in previous application documents submitted to the EPA – see Dearnaley 2024 Rebuttal Evidence.
3. This document is important and has not been reviewed by the EPA’s independent experts (although, the DOC sedimentation expert, Peter Longdill, lists it as one reviewed, in one of his 2014 reports, (not all) reports he submitted during the Hearing.)
4. The report by H.R. Wallingford/Dearnaley **“Independent Review of Plume Modelling’ 2014 was not available in previous Hearings or resubmissions.** The report clearly outlines how the existing **flocculation assumptions** for the discharge into the seawater, **could be challenged** as well as how the patch source for fines needs to be reassessed as a source of fines for dispersion into the marine environment.

¹⁵⁶ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0013/4306/Report-20a-Rebuttal-evidence-DEARNALEY-Jan-2024.pdf

¹⁵⁷ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0017/11942/Footnote-Index.pdf

5. **The independent EPA reviewers did not review, or have access to the ‘Independent Review of Plume Modelling’ report.** The reviewers were Dr Alexis Berthot as principal reviewer supported by Dr David Petch. Dr Alexis Berthot has more than 16 years’ experience in coastal, ocean and estuarine research as well as consulting experience and has provided professional services for a wide range of coastal and ports projects.
<https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/6361b8e695/GHD-Lodgement-review-of-sediment-mobilisation-transport.pdf>

6. **Extract from 5.1 5.1. Flocculation and salinity**

Krone (1963) found that flocculation quickly reaches an equilibrium situation at a salinity of about 5-10ppt, which is much smaller than that of sea water (~35ppt). The potential for fine particles to flocculate is partly governed by their cohesion and this can vary with mineralogy and the electrolytic level of the suspending fluid. **Inevitably flocculation is controlled by a series of inter-related kinetics that tend to be site specific in nature (Mikeš and Manning, 2010).** In terms of gauging the importance of salt flocculation, engineering practice (as a simple rule-of-thumb) categorises this behaviour in terms of NaCl concentration.

7. **Extract from 5.3. Comments on flocculation resulting from dredging operations**

In predominantly seawater environments (e.g. for marine dredging operations) it could be expected that these critical values of salinity are greatly exceeded. On that basis the role of salt flocculation should not be one that induces a clay mineral dependency. Dredging operations in brackish environments could however lead to slight dependency of mineral type of the clays present.

If we examine the hydrodynamic conditions produced during the proposed dredging operations, during the tailings release the pipe outflow velocity is calculated to be 1.522 m/s (MTI, 2013a). **This fast discharge speed from a 1.1m diameter release pipe (MTI, 2013a), could potentially create a very high level of turbulent shear and create disruption to the flocculation process at the point of discharge. This hydraulic stress would limit floc growth and these ambient conditions would favour smaller, denser aggregates and possibly stronger microflocs, all with slow floc settling velocities.** As the distance increases between the fine sediment fraction and the release pipe in the near bed suspension formed by the release processes the turbulence level would decay to a level more conducive for macrofloc formation. However, flocculation is not an instantaneous process and requires time to occur. This is referred to as the flocculation time (e.g. van Leussen, 1994), *and is a function of shear stress and suspended sediment concentration.*

8. Extract from **6.2. Sand transport patch sources**

We consider that this **approach may need to be reviewed if it can be demonstrated (see Section 3 above) that rather less of the fines is released into the plume at the time of initial discharge because this would tend to imply the development of layers of muddier material overlying less muddy sand in the patch areas.** If more mud remains in the de-ored areas in the form of patches of mud or muddier material overlying a sand deposit it is possible that the first more extreme wave events that each patch receives after completion will lead to localised sources of greater fines content than is presently the case.

It may be possible to manage the placement of the de-ored material back onto the sea bed using sand spreading technology to promote mixing and/or burial of the finest material into the bed to recreate a deposit more similar to the adjacent areas of seabed.

Under calmer conditions when flocculated fine sediment could settle to the bed, thereby reducing the suspended sediment concentrations in the water column, the model will not represent the finer fractions as settling.

9. Extract from **7.2. The implications of the choice of settling velocity**

The fine fractions will normally, especially as in this case where current speeds are not high, form higher concentrations near the bed and reduced concentrations near the surface. **This phenomenon reduces the attenuation of light in the water column** and contrasts with the assumptions used by NIWA that flocculation does not occur to the mining discharges which results in near uniform distributions of the finest sediment fractions included in the through the water column with disproportionate effects on light attenuation within the water body influenced by the plume.

Thus **the choice of settling velocity results in an over-estimate of the turbidity in the water column, particularly in the upper part of the water column and hence results in an overestimate of impact on light reduction.**

10. **3.4** describes the release of sediment from the pipe 4m above the bed: a concentrated near-bed suspension of 800mg/L

The scenario now proposed by TTR involves the combined release of the upper and lower sources i.e. release of 1974 kg/s in a discharge of 10.2 m³/s, at 4 m above the bed with an

additional discharge of **hyper- saline brine**. At present we do not know the volume of brine discharge but **we assume that any such discharge will be small** compared to the overall mixture discharge and small compared to the volume of water entrained into the plume.

A re-run of SEDTRAIL-RW indicates that the discharge will collapse over the bed as a slurry with an initial concentration of around 120 kg/m³, initially a few metres deep, which will then further collapse over the bed as a result of being more dense than the surrounding water. As it does so it will entrain further water at the head of the expanding density current. The sand will settle out **leaving a near bed suspension of fines about 0.25m deep** with a concentration of fines of around **800 mg/l**. As stated above such a concentration is **likely to remain as a concentrated suspension near the bed**.

11. **2.1** of the report, notes “There are some apparent differences in the figures given for in situ fines content in the resource. Table 3-7 of NIWA (2013a) provides an indication of the particle size distribution of seabed material adjacent to the area being mined. This indicates that around the resource the fines content (<63 microns) in the bed is about 2.2% (1.6% less than 38 microns and about half of the 1.2% of material in the 38 to 90 micron fraction).”

Condition 4(d) states that there *will not be an exceedance of 1.8% of the seabed extracted in the <8 micron*. If in (2.1) it notes that 1.6% of the seabed is less than 38 microns. How is Condition 4(d) conservative?

12. **In 2.2** of the report it notes that in the sediment transport modelling NIWA assume (Section 3.1, NIWA2013a) that all the material input from the eleven rivers they include in their inner model is fine (less than 63 microns). NIWA also assume that 50% of the river discharge is in the size range 4 to 16 microns.

13. **In 3.5** of the report it discusses **propeller wash** This source of fines has not been accounted for or quantified in any of the sediment plume modelling, and was raised as an issue by DOC’s expert - Longdill. “A factor that **could result in additional fines being made available from the near bed suspensions** described above **would be the effects of disturbance from propeller wash**”

14. In **6.1** of the report is discusses Calibration of the sediment transport model

These two measures of baseline model performance **do not invite confidence in the baseline sediment transport model and it would be prudent to improve the calibration of the sediment transport model particularly for the fines fractions which are so important for the assessment of optical effects (NIWA 2013b).**

A demonstration of the ability of the model to reproduce the observed vertical distribution of fine sediment through the water column under a range of conditions near the mining site and in the vicinity of the closest sensitive receptors would be valuable. The available offshore measurements in and around the mining site (NIWA 2012) indicate that near surface fine suspended sediment concentrations were in the range 10 to 25 mg/l and that near bed suspended sediment concentrations were in the range 10 to 80 mg/l. It is not clear why this data has not been used for comparison with the baseline modelling.

BENTHIC ECOLOGY Rebuttal [219] ERROR IN VIDEO SHOWN TO FASTTRACK PANEL

[Transcription \(PDF, 1.4MB\)](#)¹⁵⁸ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[219] We did remote observation videos of the seafloor – and in fact, they have videoed entire project area.

[434] We've drilled 789 in this permit area. We've drilled thousands in the South Taranaki Bight – around this area – including in the rest of our resource that's not up for approval at this point.

[435] Each of those drillholes has a camera – I didn't mention before – we have a camera on that when it goes down onto the seabed.

Erroneously, the PowerPoint presentation, slide 30 [The applicant's presentation \(PDF, 17MB\)](#) to the panel by Eggers, as well as the FastTrack application contains a video purporting to be of the mining site ([Page viii](#), of the Taranaki VTM Application). The video has an opening placard describing the site as IKA 1101, 7 May 2012, Event 538, Site 66. Pg. 52 of the FastTrack application shows Site 66 not in the mining site – as can be seen in Fig.2 below.

Recommend: The panel ask for, and upload to the FastTrack website the #20 videos taken at the Project site. It also seems from point [434 & 435] that there are an additional #789 drill-hole camera videos.

Appendix B, lists all sites where videos have been taken within the Project site – of which there were #20 videos taken, namely site **1&2** (IKA1101_361 & IKA1101_384) site **6** (IKA1101_526) Site **11** (IKA1101_369), Site **12** (IKA1101_401), Site **28** (IKA1101_362), site **51** (IKA1101_364), site **59&60** (IKA1101_360 IKA1101_359) site **68-78** (IKA1101_447 IKA1101_448, IKA1101_446, IKA1101_402, IKA1101_400, IKA1101_399, IKA1101_398, IKA1101_367, IKA1101_368, IKA1101_386, IKA1101_358

¹⁵⁸ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

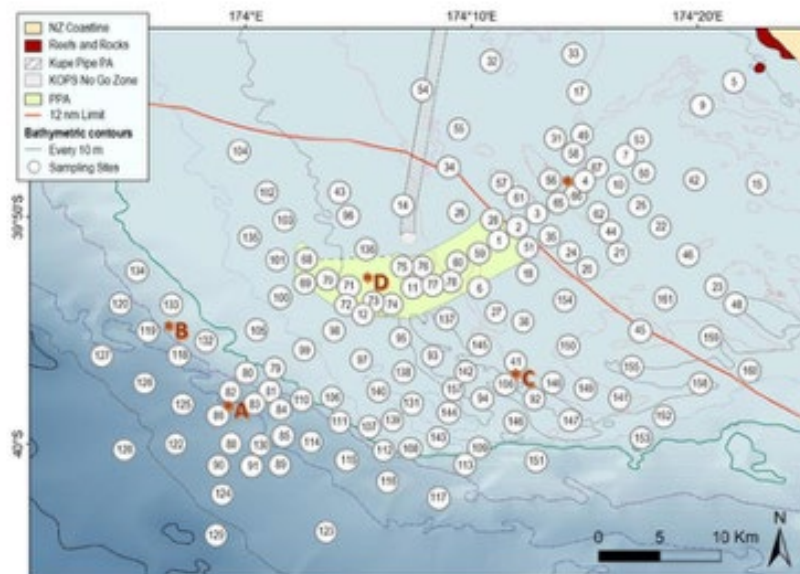


Figure 2: Location of sampling sites across Patea Shoals within the South Taranaki Bight (STB).

MAP¹⁵⁹

SEDIMENTATION AND OPTICAL WATER QUALITY EFFECTS: Rebuttal on [224] AVERAGE 5 METRES DREDGING DEPTH

[224] And we're harvesting the top – on average – five metres.

Important information about the mining schedule has been missing – which makes it difficult to assess the finer details behind ‘on average five meters’ depth for mining. The [Callaghan Innovation’s](#) document is essential reading for the FastTrack panel and not in the FastTrack documents or Footnote list. Callaghan Innovation 2016 report “*Results of Iron-sand Characterisation: “Where is the iron?”*” [Dropbox link](#).

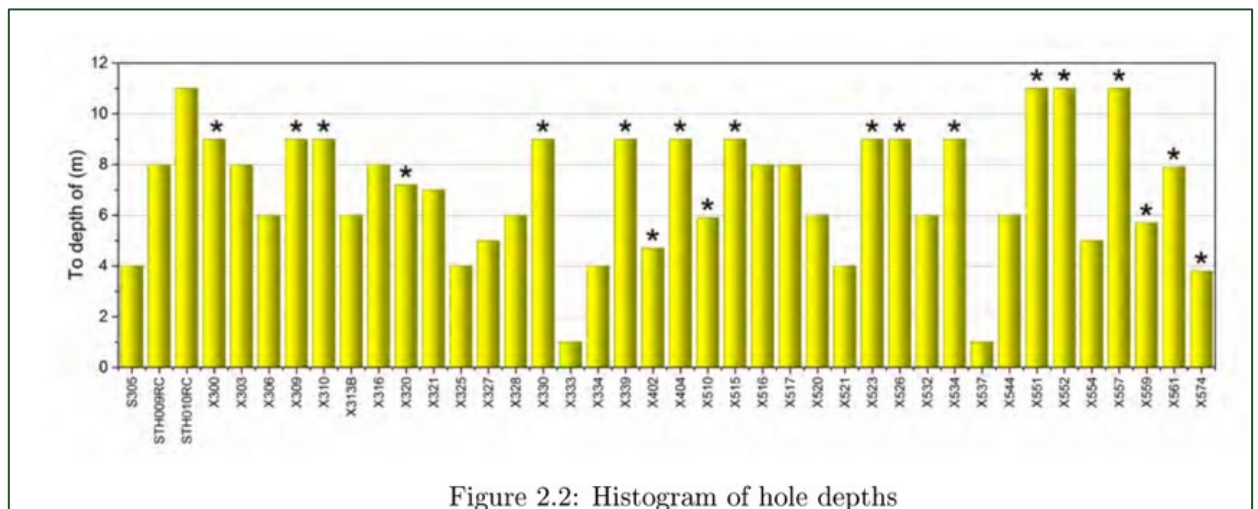


Figure 2.2: Histogram of hole depths

An early pre-feasibility study shows between 8-10m ore depth for Dianne, in the middle of the mining area, and 7-9m ore depth for the outer mining area Christina.

Period	SSED	Min Depth	Max Depth	Ore Depth	
				Max	Min
Y1	X2	-26	-38	8	8
Y2	X2 + Dianne	-25	-42	9	5
Y3	Dianne	-21	-42	10	8
Y4	Dianne	-21	-40	10	8
Y5	Dianne	-23	-41	10	9
Y6	Dianne + Xantia	-18	-41	9	3
Y7	Xantia	-17	-28	4	2
Y8	Xantia	-18	-32	3	2
Y9	Xantia + Christina	-18	-45	7	3
Y10	Christina	-34	-49	9	7

Table 5-11 SSED Scenario - Areas as Scheduled

The SSED, processing plant feed and concentrate product tonnages and grades are summarised below.

SEDIMENTATION AND OPTICAL WATER QUALITY: Rebuttal [530] SPILLAGE

[Transcription \(PDF, 1.4MB\)](#)¹⁶⁰ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

[530] And this plume — once we get a few hundred metres away from the actual redeposition — it's not the sucking up of the sands. It's the redeposition that causes the plume.

[531] We have 1.5 milligrams per litre of sediment, perhaps, in the water column.

1. Spillage is a very important factor in dredging, when “sucking up the sands”.
2. MTI was commissioned (**Siecap Appendix 19.18 - MTI Breach Testing Report**) to review spillage/breach production deposited behind the suction pipe.
 - An extensive 42 page report was produced.
 - Experiments on the suction pipe velocity were done by MTI to determine the range of the suction pipe velocity and the corresponding behaviour of the breaching process.
 - Photographs in the report show the impact of different velocities of suction on spillage.
 - The MTI report states:
 - *“Spillage has not been taken into account and is a point of interest. Spillage will increase as the production is increased and especially when water jets are incorporated. Values of 30% spillage are possible in typical dredging operations. The effect of spillage for the production of a crawler type system and the sideways movement of the crawler boom should be further investigated.”*
3. Spillage was raised as an issue by one of our club members, and Dearnaley’s response in his EXPERT REBUTTAL EVIDENCE OF DR MICHAEL DEARNALEY 23 JANUARY 2024 was *“In my 2016 evidence (paragraphs 46 to 53) I included a section on other sources of material from the mining operation. I did not discuss loss of fines from the action of the cutterhead of the*

¹⁶⁰ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

*crawler. I agree that a few percent of the material in the mining face will be released into the surrounding waters by the cutting operation.”*¹⁶¹

4. DOC's expert, Longdill stated that “Using the annual throughput capacity of 8,000 tonnes/hour, this could suggest an additional sediment release to the surrounding water column of ~240-400 tonnes/hour (of various particle sizes).”
5. Opening Comments DOC: ¹⁶²Dr Longdill's evidence is that the method of agitation and its propensity for the loss discharge of sediment at the extraction face has not been adequately described and quantified. He identifies that the sediment plume modelling provided with the application does not account for any sediment generation at the extraction face. He considers that the sediment loss discharged at the extraction face could potentially be 3 to 5 percent of the agitated volume which, if realised, would represent an additional unmodelled 240 to 400 tonnes of sediment released into the water column every hour mining is undertaken.
6. Best international practise for dredging operations involves quantifying all fine sediment discharges, and taking the precautionary measure of monitoring them.
7. **A CONDITION** that requires all potential sources of fines to be monitored and reported on should be included. While TTRL may state, as has previous EPA Decision's, that the other potential sources are minor in comparison to the Plume – a precautionary approach would be to have a condition that includes all sources of fines outlined by Dr Longdill. It is also best international practise.

¹⁶¹ <https://www.epa.govt.nz/assets/Uploads/Documents/Marine-Activities-EEZ/Activities/EEZ000011-TTRL-Reconsideration/Rebuttal-evidence/DEARNALEY-Rebuttal.pdf>

¹⁶² Pg 110
<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/f8e390f754/EEZ000004-TTR-Transcript-10.03.14.pdf>

NOISE EFFECTS: Rebuttal [653] & [654] HYDROPHONE WORK INADEQUATE & VESSEL NOISE OF IMV UNKNOWN

[Transcription \(PDF, 1.4MB\)](#)¹⁶³ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

[653] This here is, in actual fact, the vessel movements out there for a year.

[654] These vessels — some of them make less noise than us. A lot of them make a hell of a lot more noise than us.

[586] And we've spent many thousands of hours — ourselves — with aerial surveys and monitoring and hydrophones — trying to perceive whether there's anything out there

1. TTRL's work with hydrophones to find ambient noise has been below standard (2014) & the later 2017 work was done 80km away and a depth of 110m - not representative of the mining area.
2. 2014 'below standard' hydrophone recordings:
 - a. In the Memorandum of Council filed by Duncan Currie for KASM 2014 it details concerns about the background sound levels recorded by Mr Hegley.
 - b. A request was made for TTRL's sound recordings to be available for independent analysis as the estimate of 130 dB background noise seems very high compared with the estimates from other parts of New Zealand. The recordings were received Thursday, 17 April 2014.
 - c. Liz Slooten had stated "TTR's background noise estimate of 130 dB was rejected by the expert group as unrealistic. Natural background noise is on the order of 60-70 dB (up to 100 dB in storm conditions). Noise levels of 90 dB are typical of very noisy marine environments (e.g. Boston Harbour). TTR's very high estimate of 130 dB is likely to be due to noise from shipping, the Kupe platform and/or the hydrophone dragging through the water. This invalidates the use of 130 dB as a science-based cut off as a condition for mining noise. It certainly invalidates condition a)."

¹⁶³ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

- d. Upon receipt of the sound recordings, Liz Slooten arranged for Professor Stephen Dawson to analyse them – some of his comments are:
 - e. *I am puzzled by the first few recordings (e.g. SR0 & 1 see below). It seems that the recording level was mismatched, or there was some problem with the recording chain. There is very little waterborne noise in the recording, but there is a considerable amount of “white” noise. It sounds like there was almost no signal from the hydrophone, but the system gain was turned up high. It seems likely that the system Mr Hegley used did not handle the impedance matching that the 8104 hydrophone requires.”*
 - f. *“The next many recordings are clipped. That means that the recording level was much higher than the recorder input could handle. This is unrecoverable.”*
 - g. *“I note also that the hydrophone Hegley used (B & K 8104) is a rather poor choice for ambient sound recordings, because it is rather insensitive. It better suited to recording loud signals at close range”*
3. NIWA placed an acoustic recorder in the STB area (approximately 80km south of the proposed mining area) that was deployed from June 2016 to January 2017. This was used to provide the idea of what the background ambient noise at the mining site would be.
4. Question posed by our STUC member, K Pratt, to TTR’s acoustic expert, Childerhouse 2017: Responses to provided 22 May 2017¹⁶⁴
 - a. QUESTION: Do you agree that the background noise profile from the at the Project Reef, only 15km from the Project would be more accurate than the NIWA ambient data acquired by JASCO approximately 80 km from the mining area?
 - b. ANSWER: Yes I do agree based on the assumption that they would both be collected in the same way. As I understand it, *TTRL are proposing to collect ambient noise data from the within the mining site prior to operations commencing as part of baseline monitoring* which would provide the best information.
 - c. (f) QUESTION: The Project Reef is at 23m depth, and so is comparable to the depth at which TTRL will be operating for some of the time. What was the depth of the NIWA data obtained 80km away?

¹⁶⁴ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/0bbc1c03d1/Response-to-additional-DMC-questions-Childerhouse-23May2017.pdf>

- d. ANSWER: As I understand it the NIWA acoustic recorder from which ambient noise levels were reported was in 110m of water.
5. Eggers comments do not reconcile to the FastTrack application which states on pg.202 'it is not possible to confirm the actual underwater noise from this project prior to it starting', and goes on to state "It is important to note that it is not essential to be able to predict the actual underwater noise levels of the operation as the proposed consent conditions (Condition 11) proffered sets the maximum allowable level of underwater noise from the operation."
6. TTRL reference Pine et al. 2016 with no link.

Without the link to the study the following statement cannot be verified "*The combined noise level estimated to be generated by the SBC unit and IMV combined is 177dB re 1µPa158. This level is significantly lower (i.e., 90% quieter) than the average noise level of 187dB re 1µPa for large vessels (i.e., 100-300m in length) measured in New Zealand and overseas (Pine et al. 2016).*"

7. A 2024 paper by Pine contains a critical aspect not addressed in the FastTrack application 5.9 'Noise Effects' "*Nevertheless, it is not necessarily the increase in ambient sound levels alone that could lead to negative effects on marine wildlife, but also the duration of exposure*"
8. 2020: Dr Matthew Pine provided a detailed underwater noise assessment for sand extraction offshore of Auckland.¹⁶⁵ Styles Group was engaged by Kaipara Ltd to identify and assess the underwater noise effects arising from the proposed extraction of up to 2,000,000m3 of sand over a 20 year consent term (restricted to no more than 150,000m3 of sand per 12 month period) from the Auckland Offshore Extraction Area (the Extraction Area), located in the Mangawhai – Pakiri embayment.

This report describes the underwater dredging noise modelling that has been undertaken in order for the Cawthron Institute to assess the potential for the dredging noise levels to adversely affect marine mammals. The assessment of effects of the underwater dredging noise on marine mammals is set out in the Cawthron Assessment.

Kaipara propose to undertake sand extraction by trailing-suction hopper dredging (TSHD) using a new purpose built TSHD vessel, the William Fraser. The main noise sources associated with the activity will be the drag head making contact with the seafloor, the

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[https://www.aucklandcouncil.govt.nz/ResourceConsentDocuments/CST60343373_S92_Assessment%20of%20Underwater%20Noise%20Effects%20\(Styles%20Group\).pdf](https://www.aucklandcouncil.govt.nz/ResourceConsentDocuments/CST60343373_S92_Assessment%20of%20Underwater%20Noise%20Effects%20(Styles%20Group).pdf)

water jetting and the movement of the sand slurry up the pipe to the hopper. We have based our assessment on the loudest operational stage (active dredging), using measured noise level. data of the William Fraser.

We believe that looking at the *high standard of documentation* provided on a dredging operation of consent in Aotearoa NZ, which equates to **about 140,000 – 200,000 tonnes of sand per year** (2.8 – 4.0 million tonnes over the 20-year consent term) verses TTRL of **50 million tonnes per year**, *highlights the inadequacy of the documentation provided by TTRL for this Fast-track application on the sound profiles.*

The report states that the average source level of the **William Fraser is approximately 168 dB re 1 µPa @ 1m**.^{*} TTRL are proposing the CONDITION for the combined noise of the **Integrated Mining vessel and crawler to be 130 dB re 1 µPa @ 1m.**

The William Fraser is **68m x 16m**, dredging 17km²¹⁶⁶ - verses TTRL's **345 x 60m**

The dredge gear used by the William Fraser was designed in the Netherlands by Holland Dredge Design. "The state of the art, minimal environmental impact dredging gear includes **"green valves" to minimise sediment suspension** and an electric driven sand pump. She is also **powered by environmentally friendly low emission engines** that meet U.S. EPA Tier 4 Final emission standards."¹⁶⁷

*The 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 Sound Trap recorders) used to investigate the noise levels of the William Fraser and propagation losses (used to adjust the acoustic models).

9. Pg.202 also states De Beers Marine seabed mining operation source levels still represent the best available information. This is despite questioning posed by one of our club members – "Do you agree that the vessels used in the DeBeers Study were of 77m in length and 138m in length, and so are unsuitable for providing the estimation of noise of the IMV of 345m length?" and TTRL's expert responding *"Regardless of the length of the IMV, it will be required to comply with the project's noise limit. Therefore comparing the length of the*

¹⁶⁶ https://environment.govt.nz/assets/what-government-is-doing/Fast-track-listed/Bream-Bay-Sand-Extraction-Project/082.09-FTA-082-Bream-Bay-Sand-Extraction-Sch-2A-MfE-assessment-form-Stage-1_Redacted.pdf

¹⁶⁷ <https://mccallumbros.co.nz/launch-of-william-fraser/>

proposed IMV to those used in the De Beers assessments is not a valid comparison as to the potential for noise generation.”

We request the Fast-track panel look at the De Beers seabed mining operation source levels presented in their 1995 report¹⁶⁸, where the pencilled markings on pg. 7 outlines how the tape recorder wasn't working. It also outlines the names of the ships used, which as we point out are considerably smaller in size than TTRL's Integrated Mining Vessel of over 300 metres.

10. Curtin University provided a detailed analysis and was critical of the acoustic work

- Our general assessment from the documentation provided is the underwater sound field predictions presented to support the underwater sand mining operations are inadequate and insufficient on which to base a rational biological risk assessment. As the underlying sound field predictions are inadequate there is little basis for criticising how the biological risk assessment has been made as it would be based on erroneous received levels.
- stating that *‘given all of these factors we expect that median received levels from the mining operation are likely to exceed those given in the AECOM report by at least 9 dB, and possibly higher. The reviewer therefore considers it highly unlikely that this operation will be able to meet the target level of 135 dB re 1 Pa at a range of 500 m, except perhaps for short periods of time when there is little activity.’*

Centre for Marine Science and Technology, Curtin University,

Assessment of: Predicted underwater sound impacts on marine mammals in sand mining area and recommendations Review of modelling of underwater noise from the proposed Trans- Tasman Resource Ltd (TTRL) iron sands extraction operation carried out by AECOM CMST Project 1504,

Report 2017-08, Date Prepared: 18-May-2017

11. Page 202 of the Fast Track application states:

- a. It is important to note that there are no available estimates for the specific underwater noise generated by this proposal as there is no comparable equipment operating anywhere in the world and, therefore, it is not possible to confirm the actual underwater noise from this project prior to it starting. However, it is possible to provide robust and appropriate estimates of the likely underwater noise levels from the activity based on similar operations overseas and expert opinion.

¹⁶⁸ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Evidence/489c23ef2a/EEZ000004-Environmental-Impact-Study-Noise-1995.pdf>

Humpheson used estimates available from the De Beers Marine seabed mining operation as underwater source levels for his modelling. These source levels still represent the best available information about the likely noise level of the proposed operation.

b. 24th May 2017. Darran Humpheson¹⁶⁹

“The individual contributions to this noise budget will only be known once a contractor has been commissioned and detailed engineering design undertaken. I have high confidence that the source level of 171 dB re 1µPa at 1m is attainable. “

NOISE CONDITION – best international standards should be used

International International Standard for Ship Noise Measurement - The International Standardisation Organisation (ISO) has developed an international standard for recording and measuring ship noise (International Organization for Standardization, 2016, 2019)

Reference: Erbe, C., Duncan, A., Peel, D. Smith, J.N. (2021). Underwater noise signatures of ships in Australian waters.¹⁷⁰

NOISE: INTERNATIONAL BEST PRACTISE: The FastTrack application 5.14.1.4 Acoustic Surveys makes no reference to any International standards.

- The acoustic survey proposed in 5.14.1.4 needs to be evaluated by an expert.
- The standard and details of monitoring proposed by TTRL, must at a minimum meet the standards of other large dredging operations.
- Technological advances mean long term deployments of hydrophones can be made.

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<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/9ab34816a4/Humpheson-Memo-TTRLQuestions3-240517.pdf>

170

https://www.nespmarine.edu.au/system/files/Erbe%20et%20al_2021_E2_M1_NE_SP%20ship%20noise%20analysis_FINAL.pdf

Taranaki VTM proposed monitoring:

5.14.1.4: Any effects from acoustic surveys on the water column will be negligible as no physical sample is collected, the hydrophone will not come in contact with the seabed and will only be present in the water column for a short period of time at each distance from the IMV/SBC that the conditions specify (approximately 1 hour). The moored monitoring positions will check compliance at and beyond the identified 120dB contour.

OTHER CONSIDERATIONS, LEGAL: Rebuttal [821] & [380-381] HFO CONSUMPTION – SIGNIFICANT ON A NATIONAL SCALE

[Transcription \(PDF, 1.4MB\)](#)¹⁷¹ We have in **bolded blue**, those parts of the transcript we would like to pass comment on.

[The applicant's presentation \(PDF, 17MB\)](#)

[821] Fuel's a big one — a very low sulphur fuel we use — the lowest emissions possible. We're burning about 7,000 tonnes of fuel oil a month — quite a lot — but that's it. That's all we do.

[380] And we have a very low carbon footprint.

[381] If we're worried about carbon emissions — and that's not what you're here to judge— but these deposits, and the technology we're applying to extract and beneficiate the minerals here, it's very low carbon.

1. We understand that the Taranaki Regional Council (TRC) has in 7.4 covered a number of issues with Heavy Fuel Oil, which we also share concern with and will not duplicate. Matters not addressed in their submission are below:
2. What was not detailed in the TRC's comments was: The *relative scale* of HFO consumption. The consumption tonnages are almost three times the current Aotearoa, NZ, national consumption of Heavy Fuel Oil i.e. domestic consumption 37,800 tonnes v TTRL 108,000 tonnes
 - Using the figures of the IMV consuming 7,500 tonnes per month, and the FSO 1,500 tonnes per month. . . this equates to an annual consumption of 9,000 tonnes x 12 = *108,000 tonnes*.

¹⁷¹ <https://www.fasttrack.govt.nz/projects/taranaki-vtm/conferences,-workshops-and-hearings>

- MBIE's HFO national consumption of HFO¹⁷² is 1.51 PJ $\approx$ 37,800 tonnes of fuel oil.

- The two new interisland ferries:

initial designs for the two new ferries, with diesel electrical hybrid engines, Azimuth thrusters and on-board batteries, have been projected to consume around 20,500 tonnes of fuel oil per year (given a standard timetable, and projected number of round trips). This equates to roughly 66,000 tonnes of CO₂.

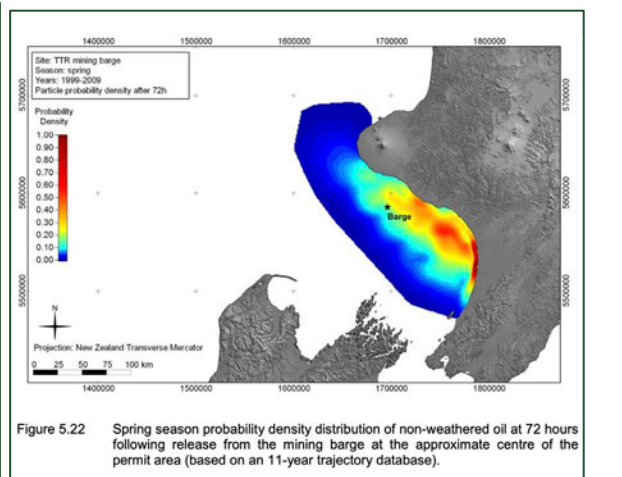
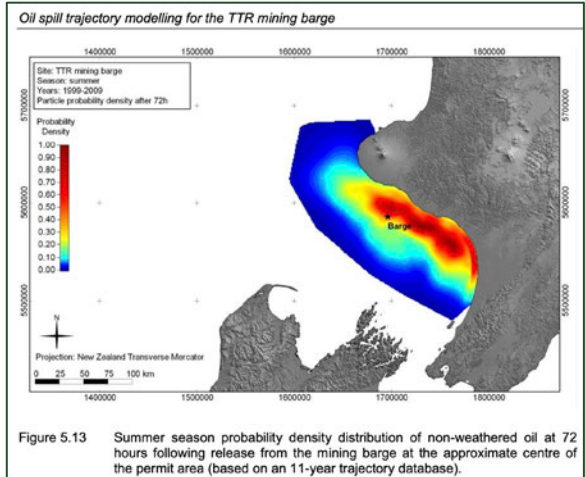
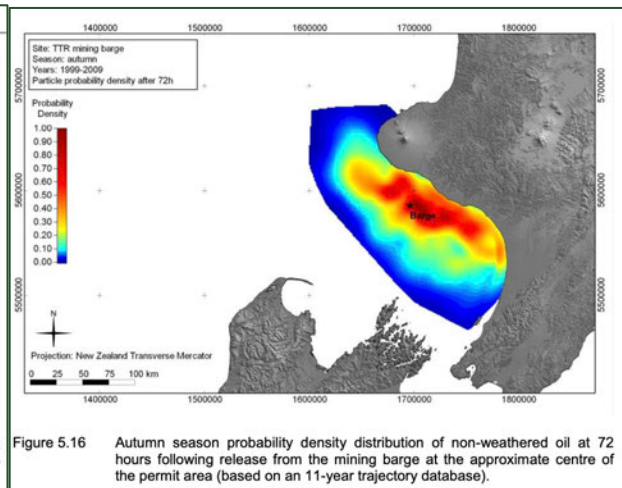
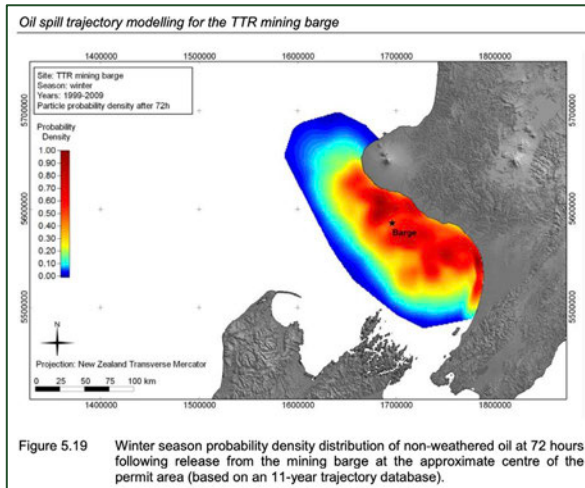
3. The Taranaki VTM project *does not* have a low carbon footprint. 3.1 tonnes of CO₂ per tonne of HFO burned $\approx$ 334,800 tonnes of CO₂ annually. One average petrol car emits $\sim$ 4.6 tonnes of CO₂/year - 334,800 tonnes CO₂ from HFO = emissions from $\sim$ 72,800 cars annually

 Summary Table – Visual Overview		
Emission Type	From 108,000 tonnes HFO/year	Equivalent Impact
CO ₂ (climate)	$\sim$ 334,800 tonnes	$\sim$ 72,800 petrol cars
SO ₂ (acid rain)	$\sim$ 2,900–3,800 tonnes	Extreme vs modern fuel
NO _x (smog)	$\sim$ 7,000–9,200 tonnes	Lung disease contributor
PM2.5 (health)	$\sim$ 30–100 tonnes	Deadliest air pollutant
Black Carbon	Significant	Arctic warming agent
Heavy Metals	Trace, but toxic	Long-lived in marine food web
Discharge Risk	High unless scrubbed	Needs consent under NZ law

Another way to look *at the scale* of the Heavy Fuel for the Taranaki VTM operation is to look at the spill oil modelling:

¹⁷² <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/oil-statistics>

Short-term probability density distributions have been calculated¹⁷³ to show the likely spread of spilled oil from the mining barge at the approximate centre of the permit area, at the T+24, 48 and 72-hour time horizons. A hydrocarbon weathering model has been used to estimate the time-varying release budget for 380 Heavy Fuel Oil. The results are expressed as normalised probability densities, which represent *the relative likelihood of oil visitation* at the given time interval from release.



¹⁷³ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Evidence/9a8d223bc3/3.-Shawn-Thompson-Operational-description.pdf>

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY REBUTTAL [1431-1438]

[1431] I understand that TTR will be engaging in further seabed surveying in the areas immediately around the northern edge of the mining area, to ensure that the location of the most vulnerable rocky reefs is properly documented and known to everyone.

1432] Gavin Kemble:

[1433] When will that occur?

[1434] Dr Alison MacDiarmid:

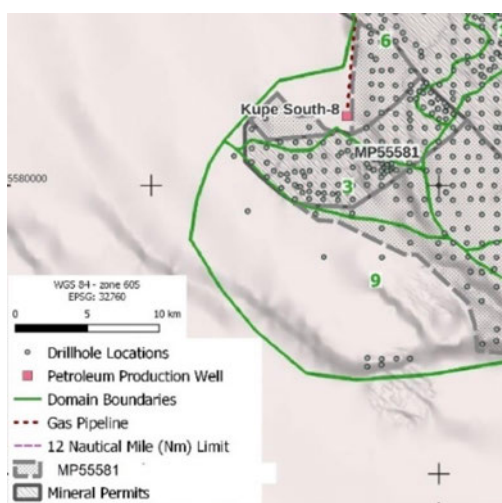
[1435] I presume that will occur in the pre-commencement monitoring period.

[1436] Alan Egger

[1437] There were one or two sites identified during the hearing process by various groups. We took that on board, proposed conditions, and we will survey those sites and include them for monitoring.

[1438] Obviously, we won't go out and do that now — because we don't have any consents — but as soon as we do, it's in that two-year period before production.

TTRL already have a number of drill holes around the northern area of the mining site. In Eggers presentation with the Fast-track panel he stated a camera is on each drill site. Perhaps these drill point footage points could be an expedient and quick way to initially address this matter.



ECONOMICS – OFFSHORE WIND

1. Under the FastTrack legislation, Section 2 (a)(ii) states a Minister may consider whether a project will deliver new regionally or nationally significant infrastructure or enable the continued functioning of existing regionally or nationally significant infrastructure.
2. Our position is that there needs to be a consideration also as to whether the Taranaki VTM project has the capability of doing the opposite – i.e. whether a project will put at risk new regionally or nationally significant infrastructure. . .such as offshore wind.
3. TTRL stated to the FastTrack panel¹⁷⁴
 - i. [196] I can say — they can’t plant big wind towers right where we need to mine. That will become a hazard for navigation and our large vessels out there, and Maritime New Zealand would have a lot to say about that — and that would be to do with safety.
4. **PWC in 2024 did a National Impact Study (NIS) setting out the benefits, costs,** opportunities and challenges associated with establishing an offshore wind industry in New Zealand. ¹⁷⁵ Further down are a number of important economically important aspects outlined from this report.
5. The NZ Infrastructure Commission’s National Infrastructure Plan¹⁷⁶ rightly states that New Zealand’s future is intricately connected with its infrastructure. It recognises the need for a “massive” increase in renewable energy, both to power the economy and slash carbon emissions. They also caution that we must do things right, not just dream and then find we can’t afford the project. “Offshore wind projects and seabed mining operators need to figure out how they can work together”, said Shane Jones (Minister for Resources, and also

¹⁷⁴

https://www.fasttrack.govt.nz/_data/assets/pdf_file/0008/11600/Transcription_with_Paragraph_Numbers.pdf

¹⁷⁵ <https://www.pwc.co.nz/pdfs/2024/national-impacts-report-new-zealand-offshore-wind-industry-mar-2024.pdf>

¹⁷⁶ <https://teawaihanga.govt.nz/draft-national-infrastructure-plan/executive-summary>

regional development) at a public meeting in New Plymouth¹⁷⁷ . . .but as can be seen from Eggers statement above this does not seem an option they support.

6. AraAke¹⁷⁸ in August 2024 outlined “the challenges that New Zealand’s energy sector is currently facing, such as unusually low hydro levels, high wholesale prices, and declining gas reserves, *offshore wind is one solution* that could shore up our future energy supply and open the door to new industries.” A delegation from the United Kingdom visiting Taranaki announcing its interest in supporting the establishment of an offshore wind industry in the region. The UK, which has the second-largest offshore wind market in the world has financing methods, local and international supply chain development, and regulatory alignment. In early 2024 the UK Government commissioned Xodus¹⁷⁹ to undertake a high-level overview of existing domestic capabilities in New Zealand that can support the offshore wind sector, potential gaps where UK supply chain companies could provide support, and barriers which could impede the development of the sector or UK industry participation.

a. Extract from The NZ Infrastructure Commission’s National Infrastructure Plan

- i. *The National Infrastructure Plan is ambitious about the future of New Zealand’s infrastructure. The challenges we face may seem daunting. But for every problem, there is a solution. Our needs sometimes seem like they will outstrip the money that’s available. But to paraphrase the New Zealand physicist Ernest Rutherford, when we don’t have money, we have to think.*
- ii. *Ambition looks different for New Zealand. Quality infrastructure looks different in a small, spread-out country than it looks in a large or densely populated country. And an ageing population and climate change mean future success will look different to the past. Ambition looks like funding our hospitals properly to catch up on the maintenance backlog and catering for the growing needs of an ageing population. It means a transport system like Finland or Sweden, who spend less but get better, safer roads and better public transport in return. **Ambition looks like a massive increase in***

¹⁷⁷ <https://www.thepost.co.nz/nz-news/360762920/minister-urges-offshore-wind-companies-and-seabed-miners-find-common-ground>

¹⁷⁸¹⁷⁸ <https://www.araake.co.nz/news/uk-partnership-could-progress-offshore-wind-in-taranaki>

¹⁷⁹ <https://www.xodusgroup.com/response-forms/aotearoa-new-zealand-development-of-the-offshore-wind-supply-chain/>

renewable electricity generation to power our economy and slash our carbon emissions – and it means making that affordable for New Zealanders. Ambition means setting high standards for ourselves so we get the projects right and protect funding for maintaining and renewing what we've already got.

- iii. *It's time to get on with it. It's time to start fixing up our essential infrastructure assets, rather than seeing them breaking under our feet because we didn't set aside money for maintenance. **It's time to invest in infrastructure that will lift our productivity and cut our carbon emissions. It's time to do new projects right, rather than dreaming big and seeing them constantly delayed, rescope, and cancelled because they're too big for us to afford.** It's time to set out a path that will keep our skilled workers employed here in New Zealand. And it's time to move forward together, so we can all have better infrastructure.*

7. Extracts from **PWC (2024) National Impact Study (NIS)** setting out the benefits, costs, opportunities and challenges associated with establishing an offshore wind industry in New Zealand.¹⁸⁰ Some points are as follows:
- Our electricity sector (representing 26% of national energy consumption and already 89% renewable) is being called on to increase production of renewable electricity to support electrification of the economy and potentially the production of new green hydrogen based synthetic fuels.
 - A synthesis of the NZ energy outlook scenarios indicates that *renewable generation would need to more than triple by 2050 to meet demand*. This is in line with the recent global commitment to triple renewable energy capacity made at the United Nations Climate Change Conference (COP28) and the Government target to double renewables in the same time period.
 - Forecasts by Transpower, Business Energy Council (BEC) and Boston Consulting Group (BCG) indicate that *between 12 TWh and 35 TWh of new wind generation is required just to meet grid based demand for electricity*. (4x-14x New Zealand's current annual wind generation).
 - The **future offshore wind industry is estimated to generate between \$12b and \$94b of Gross Domestic Product (GDP) over the life of the projects**

¹⁸⁰ <https://www.pwc.co.nz/pdfs/2024/national-impacts-report-new-zealand-offshore-wind-industry-mar-2024.pdf>

- A wide range of skilled jobs will be created **and will be** leveraged from existing sectors (e.g. oil and gas) Between 5,000 and 30,000 jobs could be created at the peak of the construction phase.
 - **Offshore wind could unlock significant economic activity** in an associated hydrogen industry, new green industry and export opportunities and will sustain economic activity and jobs in regions affected by the energy transition (e.g. Taranaki).
 - Offshore wind is particularly important for decarbonising hard-to-abate emissions associated with transport fuels and industrial feedstocks as it can unlock high levels of green hydrogen production and Power-to-X synthetic fuels
8. **The PWC report** also pointed out the economic aspects associated with enabling port and energy transmission infrastructure required for Offshore Wind Developments. This will have a **direct impact on the regionally economy** - including
- **Port upgrades at Port Taranaki** and other ports to support assembly, installation and operations of OWFs
 - **Grid capacity upgrades by Transpower** required to transport electricity from Taranaki and Auckland/Waikato based OWFs to key demand centres
 - **Potential new hydrogen storage and pipeline infrastructure** to unlock higher levels of hydrogen production and offshore wind in Taranaki and transportation of larger amounts of renewable energy to the upper North Island.
9. There is an adverse economic impact, if Offshore Wind decides to leave South Taranaki. **Economically lost would be the approx. \$NZ 704 million capital expenditure (2023 estimates) required at Port Taranaki** for its upgrade in order to support the Offshore Wind industry . . .
- a. Capital costs of Port Development – Indicative high level estimates - Estimated cost to strengthen and make an existing wharf suitable: \$US78 million. Estimated cost to develop port hinterland for OSW laydown and storage: \$US135 million Estimated cost of reclamation land, berthage and quayside laydown area: \$US200 million.¹⁸¹

¹⁸¹ <https://www.mbie.govt.nz/dmsdocument/29047-port-taranaki-developing-regulatory-framework-for-offshore-renewable-submission-pdf>

10. There is an **adverse economic impact from lost dividends from the Offshore Wind not happening in South Taranaki and being supported by Port Taranaki – which is 100% owned by the Taranaki Regional Council**, so profits from servicing the Offshore Industry are likely to flow into healthy dividends – and a positive cashflow for the TRC. This in turn is **likely to reduce the rates burden for Taranaki Regional Council ratepayers**.

2018/2028 Long-Term Plan Taranaki Regional Council¹⁸² “Port Taranaki Ltd is forecasting a period of good and improving trading conditions in the short to medium term. This will result in increased dividends. The Council has taken a conservative approach to estimating dividends after consulting with Port Taranaki Ltd. The forecast dividend levels are \$8m pa over the ten years of the 2018/2028 Long-Term Plan. The Council has accepted these estimates of dividend flows. **Dividends are a significant portion of the Council’s revenue streams**. Port Taranaki Ltd operates in a highly- competitive trading environment and there are no guarantees that it will be able to continue to deliver forecast dividend levels. Accordingly there is a risk that profits and dividends may fall at some future point. This is the biggest risk to the delivery of the Council’s proposed programmes.”

11. **The Taranaki Regional Council’s** feed back to the FastTrack panel¹⁸³, has in their Conclusion, point 89 reference to **a gross economic benefit** only.

“On one hand, the project would likely have significant *gross* economic benefits to the nation and region, and this must be given greater weight under the Fast Track Approvals Act 2024 (FTAA). . .”

TRC’s independent obtained economic analysis from M.E.¹⁸⁴ attached to their comments to the FastTrack panel **has not considered net economic benefits and material economic opportunity costs that could arise from the potential loss of offshore wind**.

Looking at the 17th September 2025, Delmore Fast-Track draft Decision **opportunity cost and displacement effects need to be assessed by the Fast-track panel**.

¹⁸² https://www.trc.govt.nz/assets/Documents/Meetings/Ordinary/Earlier/Long-Term-Plan-Statement-of-Proposal.pdf?utm_source=chatgpt.com

¹⁸³ <https://www.trc.govt.nz/assets/Documents/TTR-Seabed-Mining-Documents/Taranaki-Regional-Council-Taranaki-VTM-Project-Written-Comment.pdf>

¹⁸⁴ <https://www.trc.govt.nz/assets/Documents/TTR-Seabed-Mining-Documents/Market-Economics-Taranaki-Ironsands-VTM-Economic-Review.pdf>

ECONOMICS: Matters not covered in the TRC's economic responses¹⁸⁵:Comments in relation to M.E. Consulting's Economic report

In 2.1.2 there is the statement that *the multipliers used are well founded*. It is hard to see this as plausible when the detailed sector and location specific expenditure data is not available. There has been no cross-references to similar analysis carried out for other projects or to established New Zealand regional multipliers, or to the Fast-track information where those multipliers were supplied. It is important to note that this was an issues for the GHD Economic independent reviewers for the EPA. . . .

In the 2016 Key Issues report is states: "GHD state that a rapid research of public-domain information shows that there currently appears to be no specific economic multipliers existing for the project region and TTRL has relied on commissioned multiplier data. Furthermore, GHD notes that there is no discussion in the IA or the Jenkins (2015) report of the economic multipliers being cross-referenced to similar analyses carried out for other projects or the wider New Zealand economy."

In previous EPA Hearings, the following information on employment multipliers was initially redacted information, that was subsequently released.¹⁸⁶

CONFIDENTIAL									
EPA INFORMATION REQUEST									
1. The industry (employment) multipliers generated/applied by Butcher & Partners									
Industry (106 industries)	Employment Multipliers								
	South Taranaki/ Whanganui	Taranaki/ Whanganui	New Zealand	South Taranaki/ Whanganui	Taranaki/ Whanganui	New Zealand	South Taranaki/ Whanganui	Taranaki/ Whanganui	New Zealand
	FTEs/Output (\$1m) (direct)			Type I (direct + indirect)			Type II (direct + indirect + induced)		
Fabricated metal product manufacturing	4.1	4.1	4.1	1.2	1.3	1.8	1.3	1.6	2.5
Exploration and other mining support services	1.6	1.6	1.6	2.3	2.3	3.7	2.8	2.8	5.5
Scientific, architectural and engineering services	6.3	6.3	6.3	1.1	1.2	1.6	1.3	1.5	2.3
Other transport	*	*	*	1.2	1.3	1.8	1.3	1.5	2.5
Basic material wholesaling	-	*	*	-	1.3	1.7	-	1.5	2.3
Legal and accounting services	-	*	*	-	1.2	1.4	-	1.4	2.0
Health and general insurance	-	-	2.5	-	-	2.6	-	-	4.0
Total									

¹⁸⁵ <https://www.trc.govt.nz/assets/Documents/TTR-Seabed-Mining-Documents/Market-Economics-Taranaki-Ironsands-VTM-Economic-Review.pdf>

¹⁸⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Applicants-proposal-documents-Application-documents/be2a480123/TTIS066-s158-Report-3e-Additional-Economic-information.pdf>

M.E. Consulting (TRC's economic expert) stated:

- a. *Without detailed sector- and location-specific expenditure data, it is not possible to cross-check the modelled inputs. However, in our view, the estimated capital and operational expenditures appear reasonable and plausible.*
- b. *The multiplier analysis follows standard practice and is appropriate. The multipliers used to calculate the indirect and induced impacts on the economy are well-founded, and the resulting total impact estimates are reasonable and plausible.*

In 2.1.6 M.E Consulting states that economic impacts, economic benefits are not net of costs – and don't account for displaced activity, efficient use of resources or whether there will be lasting gains. This was the ideal opportunity to outline the potential *opportunity costs* to Taranaki, and Aotearoa NZ, *of not having offshore wind investment* in South Taranaki. Instead, they go on to give the example of production inputs, such as operating costs and wages – which will not be a benefit unless they lead to improved employment outcomes or social well-being. They also give the example of Environment Court in the Okura Holdings Ltd appeal (2019) – where the non-market costs such as environmental should be taken into account in the overall economic evaluation.

2.2.1 States that an economic assessment to examine relative benefits and costs of a Proposal, may encompass environmental, social and cultural aspects - and is not limited to matters which may be monetised and that its scope is broader than consideration of just monetary benefits and costs, and it includes social, cultural and environmental effects. This is important because such effects may influence peoples' wellbeing and behaviours and therefore influence economic activity.

This section fails to raise the potentially lost economic activity derived from offshore wind leaving.
Lost: energy security for NZ, the ability to attract foreign investment , capital investment in the Taranaki Port and its impacts on future dividends based on extra use of port facilities', the cash flow impact for TRC rate payers if more dividends from the Port Company are received, the job opportunities locally, potentially lower domestic power costs for business and individuals, tourism impacts from 'greening' the local and national economy etc.

We believe that M.E's assessment that "However, the legislation does not have an evaluation framework based on direct comparison of costs and benefits, and instead evaluation occurs according to proportionality" – misses out from the insights gained from the Delmore FastTrack

case . . which stated: “The Council submits that *the only reasonable approach is that **economic benefits should be considered on a net basis***. A gross-benefit approach risks perverse outcomes, where projects that may deliver significant gross economic outputs but impose economic costs that outweigh those outputs.”

In **1.2** , M.E. Consulting’s states their approach was to look at the economic impact analysis by NZIER, which they state is focussed on the impacts of VTM *expenditure* through the economy - output, value added/GDP, and employment, which is the employment of a standard input-output (I-O) model, to examine how capital investment and ongoing mining operational expenditure can be expected to flow through the economy.

The reviewer has ***not provided any comments on the second part of the NZIER report*** – export earnings, and contributions to royalties and taxes. Whilst these are revenue streams to the national government, rather than regional government – the reviewer needed to explicitly point out their review was confined to a sub-set of the NZIER report. This point should also have been made explicit in the TRC’s comments to the FastTrack panel.

NZIER: For this EIA, we use updated inputs from TTRL and NZIER’s Input-Output multipliers model to estimate the direct and indirect impacts on economic activity, gross domestic product (GDP) and employment resulting from the Project’s operation.

NZIER: We will also estimate the *additional export earnings* and contribution to *royalties and taxation* paid to the New Zealand Government based on the inputs you provided and more recent data on exchange rates and prices of the relevant commodities.

No references/links or footnotes are provided in M.E. Consulting’s report – either to the Taranaki VTM documents, or to other items of support e.g. multipliers. A reference should have been: Economic Report by NZIER¹⁸⁷. “**NZIER Economic Analysis Economic Impact Assessment of TTRLs Taranaki VTM project report analysis with updated inputs March 2025.**”

¹⁸⁷ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0014/4262/Attachment-2-NZIER-Economic-impact-assessment-of-TTRLs-Taranaki-VTM-project-report_Analysis-with-updated-inputs_Mar-2025.pdf

ECONOMICS – DIRECT LABOUR

It is informative to compare the NZIER figures, to those uses in the Martin Jenkins (2015) report. No commentary on the shifts have. been given by NZIER or M.E. Consulting.

The NZIER report 2.3.1 states “**All direct employment by TTRL for the Project will be in the Taranaki/Whanganui region**, adding a total of 303 full-time equivalents (FTEs). Of those, 77 FTEs will be located in the local area (South Taranaki/Whanganui). Note that the six FTEs for bunkering will be employed by TTRL’s third-party bunker fuel supplier based in New Plymouth.”

The situation seems vastly different from when the Martin Jenkins report (2015) stated “TTR has advised that it envisages that, **at project initiation, approximately 30 percent of all TTR employed persons would be New Zealand citizens** with approximately **10 percent of those being from local South Taranaki and Whanganui communities**. It is TTR’s aspiration that after five years of operation, sufficient technology and skills transfer has taken place that 80 percent of the people employed directly will be New Zealand citizens, and that a significant proportion of those would be from South Taranaki/Whanganui communities.”

Table 4 Direct employment by activity and region

Number of FTEs

Activity	South Taranaki/ Whanganui	Taranaki Region/ Whanganui
IMV and FSO vessels	52	173
Anchor Handling Tug	0	36
Bunkering	0	6
Geotechnical Survey Vessel (GSV)	18	18
General and admin	7	35
Head office	0	35
Total	77	303

Source: TTRL

Table 5 summarises the number of direct FTEs created in the local and regional areas by the relevant industry classification.

DIRECT LABOUR:

Employees	Martin Jenkins Economic Report pg 19/20	Martin Jenkins Economic Report page 18	
122	IMV Processing Vesel	Grade 1 15+ years	11
51	FSO Holding Vessel	Grade 2 10+ years	19
36	AHT Anchor holding tug	Grade 3 10+ years Technical Degree/Diploma	22
17	GSV Geotechnical Vessel	Grade 4 10+ years Trade/Technical Qualification	107
226		Grade 5 5+ years Trade Qualification	17
		Grade 6 2+ years	51
			227

ECONOMICS – VANADIUM REVENUE SHOULD NOT BE INCLUDED AS A REVENUE SOURCE & MATCHING COSTS NOT INCLUDED

1. In reviewing Trans-Tasman Resources Limited's (TTRL) projected financial statements and export earnings, the principles of revenue recognition and the matching costs associated with deriving that revenue have not been properly applied. This has the effect of overstating potential benefits to New Zealand and misrepresenting the financial viability of the project.

Revenue Recognition Misapplied

- a) The projected financial earnings statements should also have some evidential basis behind recognising earnings from Vanadium. As Appendix 19.17 - Metallurgical Review- Recovery of vanadium from the Taranaki VTM Project states: "Vanadium is present as a co-product in the TTR resource and *would be* a substantial source of the metal or its compound *from future processing*. (Siecap 3b)
- b) TTRL's financial modelling includes export earnings **that assume** the extraction and refining of Vanadium Pentoxide (V_2O_5) from iron ore mined offshore.
- c) However, commercial-scale extraction of vanadium in New Zealand is not proven. The pilot plant remains untested at scale, and **no viable processing pathway has been demonstrated domestically**.
- d) As a result, **the vanadium remains** locked in the ore, **and any export earnings attributed to Vanadium Pentoxide are** speculative and premature. Revenue cannot be recognized from a product that is not yet technically or commercially recoverable.

Matching Principle Ignored

- a) The matching principle requires that expenses be recorded in the same period as the revenues they generate, so that profitability reflects true economic performance.
- b) TTRL's statements present export revenues from refined vanadium **but fail to include the** substantial costs **that would be incurred in developing, constructing, and operating a vanadium processing facility (if it were even possible)**. Preliminary estimates (Siecap 3b, Appendix 19.17) for just a pilot plant,

let alone for a commercial production, has labour and reagent costs – neither of which are included in the OPEX figures for the Taranaki VTM project. “The report states developing a full operating expense (OPEX) estimate for a pilot plant is impractical as they are designed to test process feasibility and scalability rather than achieve optimised, steady-state operations.

- c) This means revenues for Vanadium, based on commercial production, are being shown without matched costs, inflating apparent project profitability and overstating the contribution to national export earnings.

Implications for Fast-track panel:

- a) These matters are not minor technicalities. They directly affect the credibility of TTRL’s economic case.
- b) **Presenting unproven vanadium revenue streams without matched costs** overstates the value proposition to New Zealand, while understating risks to investors, government, and affected communities.
- c) Decision-makers should therefore treat the reported export earnings from NZIER with caution.
- d) Iron ore concentrate: Produced by mining and magnetic separation, yielding a material with a higher proportion of iron **but still containing vanadium and titanium locked within the magnetite structure.**
- e) **Key point:** This concentrate is **not equivalent to V_2O_5** . It is a raw mineral product that would require extensive downstream processing to extract and refine vanadium.
- f) V_2O_5 is a refined chemical product; **iron ore concentrate is a raw mineral feedstock.**
- g) No proven process exists in New Zealand to extract vanadium economically from VTM iron sands at commercial scale.

The information in Siecap 3b, Appendix 19.17 states “The additional bench scale testing and development of the proposed pilot plant will confirm and derisk the process further, providing empirical data *to feed into the bankable feasibility study to allow a full evaluation of vanadium pentoxide as a separate product stream as compared to just selling a vanadium rich iron concentrate.*”

- h) Exporting iron ore concentrate means the vanadium remains locked in the magnetite and does not generate vanadium pentoxide revenue.

- i) **To reach V₂O₅, the concentrate would need** further beneficiation, roasting, leaching, and refining, **none of which are part of TTRL's current, proven operations.** Critical Minerals – September 2024 New Zealand Draft Critical Mineral List Prepared for the New Zealand Ministry of Business, Innovation & Employment page 12 ¹⁸⁸

New Zealand's Critical Minerals List includes the minerals that are economically important to New Zealand, in demand by NZ's international partners, and whose supply is at risk. Vanadium is ranked as 'high risk' by NZ and its international partners due to supply being held by a few countries. **This is because the processing of the ores is only done in a few countries.**

- j) The NZIER report¹⁸⁹ states (see the bolded words in blue) **\$196 million Vanadium Pentoxide export earnings. This is based on 19,000 tonnes of V₂O₅.**

NZIER was tasked with simply using figures supplied by TTRL with no critical analysis/reasonableness tests to be applied.

Siecap 3b lists the environmental considerations – none of which from an expenses angle are included in the OPEX. Yet the revenue Streams from vanadium have been included.

¹⁸⁸ <https://www.mbie.govt.nz/dmsdocument/29467-draft-critical-minerals-list-for-public-consultation-september-2024-pdf>

¹⁸⁹ https://www.fasttrack.govt.nz/_data/assets/pdf_file/0014/4262/Attachment-2-NZIER-Economic-impact-assessment-of-TTRLs-Taranaki-VTM-project-report_Analysis-with-updated-inputs_Mar-2025.pdf

Environmental Considerations

The salt roasting and water leaching process for vanadium extraction involves several steps that may impact the environment. To ensure sustainable and responsible operations, it is critical to identify, assess, and mitigate potential environmental challenges. Below are key considerations:

Emissions from Salt Roasting

- Carbon Dioxide (CO₂) Emissions: The high-temperature roasting process will release CO₂.
- Volatile Organic Compounds (VOCs): The roasting process will release minor quantities of VOCs depending on feedstock impurities.
- Particulate Matter (PM): Dust and fine particles generated during processing

Sodium Salt Usage and Residue Management

- Sodium Carbonate Residues: The roasting process generates residues containing unreacted sodium salts and other by-products.
- Effluent Control: Sodium-rich effluents from water leaching can contribute to salinity issues.

Wastewater and Solid Waste

- Water Leaching Effluents: Wastewater from the leaching stage may contain dissolved salts, trace metals, and other impurities.
- Solid Waste from Residue: Post-leach residues must be safely managed.

Energy Intensity

- Energy Consumption: The roasting process is energy-intensive due to the high temperatures required. To reduce environmental impact, options such as waste heat recovery, process optimisation, or shifting to lower-carbon energy sources (e.g., biomass or solar thermal energy) should be explored.

Resource Efficiency

- Water Usage: Water demand for leaching must be managed. Recycling and reuse systems can help reduce freshwater dependency.
- Material Recycling: Reagents used in the process can potentially be recovered and reused, reducing raw material consumption and associated environmental impacts.

Mitigation Strategies

To address these considerations, an integrated environmental management approach is recommended:

1. Implement advanced emissions control systems to minimise air pollution.
2. Adopt closed-loop water management systems to reduce water usage and effluent discharge.
3. Recover and reuse reagents to enhance resource efficiency.
4. Optimise energy use through process innovations and renewable energy integration.
5. Develop comprehensive waste management plans to safely handle solid and liquid residues.

By proactively addressing these environmental considerations, the salt roasting and water leaching process can be developed into a more sustainable and environmentally responsible method for vanadium extraction.

ECONOMICS - REGIONAL SPEND BY TTRL INFLATED BY HEAVY FUEL OIL

An example of data being accepted by NZIER, with no evidence of a 'reasonableness test' having been done - is the line item 'Basic Material Wholesaling' – which is shown in Martin Jenkins 2015 report as 'Heavy Fuel Oil'. We accept that the 'reasonableness testing' was not part of what they NZIER was commissioned by TTRL to do.

NZIER states although TTRL will source IFO through its supplier located in New Plymouth, IFO will be imported by TTRL's third-party supplier who will buy IFO 380 from a supplier "based in New Plymouth."

- a) The supplier is importing it from Singapore (the nearest refinery hub).
- b) This means the majority of spend goes offshore (purchase price of the IFO itself).
- c) A small fraction of spend goes domestically (port handling, supplier margin, logistics, local jobs related to storage/transfer).
- d) GDP Impact - perhaps 85–90% is an import cost (leaves NZ economy, no GDP contribution).
- e) Only 10–15% reflects local services (supplier overhead, wages of staff at New Plymouth terminal, port fees, trucking, etc. There will be an amount used for the Anchor Handling Tug operating out of Port Taranaki).
- f) Therefore, **in GDP terms, the bulk of this expenditure does not boost NZ's economy.**
- g) When TTRL includes HFO costs in its operational expenditure, it may present this as "domestic spend." But in GDP terms: the **effect on NZ GDP is minimal, limited only to the local service margin, while the majority share of the cost flows offshore.**
- h) There **is a negative impact on NZ's Balance of Payments**
- i) 'Basic Material Wholesaling' is the Heavy Fuel Oil (HFO). It is over-inflating local expenditure to include this item.

ECONOMICS - REGIONAL SPEND – ‘REASONABLENESS TEST’ HAS BEEN MISSED

Below is an extract from the NZIER report. We have highlighted important context for the Fast-track panel. In effect data has been accepted, with no evidence of a ‘reasonableness test’ having been done.

Indeed in the NZIER report it states in 2.3 **Key inputs and assumptions is that TTRL provided us with their planned employment and expenditure for the Project’s operational activities** and capital expenditure in New Zealand involved in the Project’s setup. These are the inputs for our regional I-O multipliers analysis to estimate the economic impacts of those activities on the local, regional and national areas.

*An EIA was undertaken by Martin Jenkins in 2015 on the Trans-Tasman Resources Offshore Iron Sands project **based on data inputs provided by TTRL**. For this EIA, **we use updated inputs from TTRL** and NZIER’s Input-Output multipliers model to estimate the direct and indirect impacts on economic activity, gross domestic product (GDP) and employment resulting from the Project’s operation. We will also estimate the additional export earnings and contribution to royalties and taxation paid to the New Zealand Government **based on the inputs you provided** and more recent data on exchange rates and prices of the relevant commodities.*

ECONOMICS “Reasonableness Test” De-Beers have the maintenance and manning contract & the expenditure for 3rd party provision of services has tripled

Applying a ‘reasonableness test’: The ‘Exploration and other mining support’ line item of **\$99 million** (which the Martin Jenkins report shows as **3rd party provision of services to offshore mining**) could be considered largely composed of *payment overseas to DeBeers for managing the operation*. This line item has tripled since 2016 – from \$34.4 million to \$99.58 million. In 2016 half was budgeted for expenditure outside the Taranaki Whanganui region, and in 2025 100% is to be spent in the Taranaki Whanganui region

ECONOMICS “Reasonableness Test” for Corporate Expenditure 100% in Taranaki/Whanganui region

TRL’s NZ\$15m p.a. for Corporate Expenditure has no expenditure outside Taranaki/Whanganui. Conducting a ‘reasonableness test’ NZ\$15m every year for professional & corporate services spend locally (Taranaki/Whanganui) is substantially above the routine combined legal audit/assurance figures publicly reported by major NZ corporates, which are often well under NZ\$5m combined. Fonterra spent \$8m on audit fees.

Compare NZ Expenditure 2016 (\$132 million)¹⁹⁰ v 2025 (\$237 million)

R& M work on vessels	\$21million (2016) and 16 million (2025)
<u>3rd Party provision of services</u>	<u>\$34.4 million (2016) and \$99.58 million (2025)</u>
Other Technical Support Services	\$15.8 million (2016) and \$13.49 million (2025)
Direct labour costs	\$10.4 million (2016) and \$23.78 million (2025)
Heavy Fuel Oil	\$32.6 million (2016) and \$52.36 million (2025)
Corporate Expenditure	\$14.2 million (2016) and \$15.41 million (2025)
Insurance costs	\$3.9 million (2016) and \$4.61 million (2025)
Advertising, market research & mgmt..	NIL \$12.33 million (2025)

¹⁹⁰ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Submissions-and-or-comments/dbab83ac37/Pratt-K-Section1-123055.pdf> see page 32

KAREN PRATT SUBMISSION 2016

EXPENDITURE		
TTR Impact Assessment	Economic Report by Martin Jenkins	
Fabricated metal product manufacturing	R&M work on vessels	21.3
→ Exploration & other mining support	3rd party provision of services to the offshore mining vessel	34.4
Scientific, architectural and engineering	other technical support services	15.8
Other transport	direct labour costs	10.4
→ Basic Material Wholesaling	Heavy Fuel Oil	32.6
Legal & Accounting services	corporate expenditure	14.2
Health & Insurance	insurance costs	3.9
		132.6
LABOUR	Table drawn up by K Pratt, to show the differences	

			Wanganui & South Taranaki	North Taranaki	Wanganui & North & South Taranaki	Outside Taranaki Wanganui	NEW ZEALAND
Economic Report by Martin Jenkins							
R&M work on vessels	21.3	100%	21.3	0	21.3	0	21.3
3rd party provision of services to the offshore mini	34.4	22%	7.6	9.6	17.2	17.2	34.4
other technical support services	15.8	23%	3.7	12.1	15.8	0	15.8
direct labour costs	10.4	19%	2	8.4	10.4	0	10.4
Heavy Fuel Oil	32.6	0%	0	6.5	6.5	26.1	32.6
corporate expenditure	14.2	0%	0	2.1	2.1	12.1	14.2
insurance costs	3.9	0%	0	0		3.9	3.9
	132.6		34.6	38.7	73.3	59.3	132.6

Table 7 The Project's direct operational expenditure in New Zealand

\$million, NZD, per annum

Industry	South Taranaki/ Whanganui	Taranaki Region/ Whanganui	New Zealand
Exploration and other mining support services	\$27.86	\$99.58	\$99.58
Basic material wholesaling	0	\$52.37	\$52.37
Fabricated metal product manufacturing	\$8.04	\$16.09	\$16.09
Other transport	\$0.83	\$23.78	\$23.78
Scientific, architectural and technical services	\$4.10	\$13.49	\$13.49
Health and general insurance	0	\$0.92	\$4.61
Legal and accounting services	\$3.08	\$15.41	\$15.41
Advertising, market research and management services	\$0	\$12.33	\$12.33
Total	\$43.92	\$233.97	\$237.65

Source: TTRL, NZIER estimates

In the 2015 Martin Jenkins report it states: “Of the estimated **\$254 million in annual spend**, just over half (52.2 percent) is expected to be in New Zealand. Of this **\$73.4 million is expected to be spent in the Taranaki/Whanganui region**, with just under half of this again (**\$34.6 million**) spent within South Taranaki/Whanganui.”¹⁹¹

LEGAL: NATIONAL POLICY STATEMENT TRC: Renewable Energy Generation

1. Section 67 of the RMA specifies that regional plans must give effect to:
 - (a) any national policy statement,
 - (b) any New Zealand coastal policy statement, and
 - (c) any regional policy statement.
2. The Taranaki Regional Council’s comments (TRC)¹⁹² *did not* include comment on one of the National policy statements (NPS) to which regional plans must give effect - this was the *National Policy Statement for Renewable Electricity Generation 2011*, which sets out objectives and policies for managing renewable energy generation.
3. The TRC likewise did not make comment on the *Government’s recent consultation on proposals*¹⁹³ to prepare or amend national direction, including amending the National Policy Statement for *Renewable Electricity Generation* with Consultation having closed on 27 July 2025.
4. The amendment states “Meeting Aotearoa New Zealand’s climate and electrification targets including through renewable energy generation is a *nationally significant issue*.” And that the current objective is outdated and was developed before New Zealand’s targets for *reducing emissions became law*. *Climate action is now an urgent global and domestic issue*, and the *electrification* of the New Zealand economy is *the most important enabler* for decarbonising New Zealand’s energy system.

¹⁹¹ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000011/Other/a492a42fe3/Report-40-Martin-Jenkins-Economic-Impact-Analysis-October-2015.pdf> page 19

¹⁹² <https://www.trc.govt.nz/environment/resource-consents/fast-track-approvals-act>

¹⁹³ <https://environment.govt.nz/assets/publications/RMA/attachment-1.2-national-policy-statement-for-renewable-electricity-generation.pdf>

5. The proposed amendment to policy A: a) Decision-makers must recognise and provide for the national significance and benefits of renewable energy generation activities at a national, regional and local scale. The benefits of REG activities, include, but are not limited to:
 - i. *avoiding and reducing greenhouse gas emissions* to provide positive effects for people, communities and the environment;
 - ii. contributing to the *security, resilience and independence of electricity supply* at national, regional and local levels through diverse REG sources and locations;
 - iii. providing for the *social, economic and cultural well-being of people and communities* and for their health and safety;
 - iv. increasing *resilience and long-term stability* by using renewable rather than finite sources of energy;
 - v. *avoiding reliance on imported fossil fuels* for the purposes of generating electricity; and
6. Offshore wind has the greatest potential to accelerate and scale renewable energy production which may prove critical to keep us on track to meet our net zero target by 2050
7. Offshore wind contributes to energy security through diversity of supply and higher levels of energy generation and availability during winter and dry years. When paired with hydrogen fuelled thermal ‘peakers’, electrolyser flex, and batteries it can support more firm renewable supply.
8. Investors in Aotearoa NZ, ASIA is still heavily reliant on fossil fuels and actively looking at New Zealand as a source of green fuel & NZ could be *a manufacturing base* to decarbonise part of their group portfolio. This could have both regional and national economic benefits.
9. Park Wind & JERA -50/50 JV - see TTRL as a risk for the projects, both in terms of technical realisation, financing and insurance. They are expected to make go/no-go decision on whether to proceed to feasibility license application in Q3 2025.
10. Offshore Wind help with achieving the strategies outlined in the Government’s 2025 90% renewable electricity target.
11. New Zealand Energy Strategy,
12. New Zealand Energy Efficiency and Conservation Strategy,
13. and the renewable electricity target

14. As part of Electrify NZ, the Government has committed to enabling investment and delivering clean energy at scale. The Offshore Renewable Energy Bill disclosure statement Nov 2024¹⁹⁴ stated “There is urgency to address these problems since there is *global competition for access to offshore renewable energy infrastructure resources*, and because Aotearoa New Zealand *needs to increase its supply of renewable energy at pace*.”
15. The Climate Change Response Act 2002 requires the Government to set emissions budgets, following recommendations from the Climate Change Commission. The second emissions reduction plan (ERP2) was released in December 2024 and will come into effect at the end of 2025 (for the period 2026–2030.)

ECONOMICS – Corporate Accountant rather than an economist is best placed to advise on likely Royalty and Income Tax flows

Royalty commitment for MP 55581 is 1% of net sales revenue when net sales revenues exceed NZD\$100,000;

and be the greater of 1% of net sales revenue or a 5% accounting profits royalty when net sales revenues exceed NZD\$1,000,000.

In terms of the cash inflow to the NZ Government – this requires some Corporate Accounting assessment. There are deductions for capital expenditure which can be made – which inflates operating expenses (thus reducing profits). There are tax losses that can be carried forward (thus reducing profits). Certain costs can be “inflated” e.g. Management Fees, which can reduce profits and therefore income tax payable. There are also structuring aspects used by Corporates which can influence various line items in the Taranaki VTM financial statements (Taranaki VTM being owned by Manuka Resources).

A Corporate Accountant could advise what costs would be likely netted off against sales, to find a net sales figure.

¹⁹⁴ <https://disclosure.legislation.govt.nz/bill/government/2024/102/>

None of these aspects are addressed in Economic Analysis and as such the Fast-track panel does not have the 'best available information' in front of them – in terms of the likely impacts on TTRL's net sales/accounting profits, that is the basis for calculating royalties.

The Tax Rules - Prospecting expenditure can be immediately deductible in the year incurred. Exploration expenditure is also immediately deductible, subject to a claw-back rule. Development expenditure, once the project is past exploration and in "development" these costs must be capitalised and then deducted over the life of the mine.

Losses, if in the final years of a mine (or when operations cease) there are net losses such that there isn't sufficient income to use them, those losses can be converted into a refundable tax credit.

FAST TRACK LEGISLATION: INFRASTRUCTURE & CLIMATE CHANGE MITIGATION

12. FastTrack legislation ¹⁹⁵

(2) For the purposes of subsection (1)(a), the Minister may consider—

(a) whether the project—

(i) has been identified as a priority project in a central government, local government, or sector plan or strategy (for example, in a general policy statement or spatial strategy), or a central government infrastructure priority list:

(ii) will deliver new regionally or nationally significant infrastructure or enable the continued functioning of existing regionally or nationally significant infrastructure:

(iii) will increase the supply of housing, address housing needs, or contribute to a well-functioning urban environment (within the meaning of policy 1 of the National Policy Statement on Urban Development 2020):

(iv) will deliver significant economic benefits:

(v) will support primary industries, including aquaculture:

(vi) will support development of natural resources, including minerals and petroleum:

(vii) will support climate change mitigation, including the reduction or removal of greenhouse gas emissions:

(viii) will support climate change adaptation, reduce risks arising from natural hazards, or support recovery from events caused by natural hazards:

(ix) will address significant environmental issues:

(x) is consistent with local or regional planning documents, including spatial strategies:

(b) any other matters the Minister considers relevant.

¹⁹⁵ <https://www.legislation.govt.nz/act/public/2024/0056/63.0/whole.html#LMS943260>

SEDIMENTATION 28th March LONGDILL FOR THE DIRECTOR GENERAL OF CONSERVATION – INFORMATION NOT REFERENCED IN FAST-TRACK DOCUMENTATION

14. I consider that it is the PSD of the discharges which should be of prime concern when considering impacts and potential consent conditions, as it is primarily the discharges, not the ROM PSD, which determine (in addition to physical forcing of waves, currents, wind, etc.) the SSC plume intensity and extent.

16. It is clear that the major advantages in terms of a ‘reduced’ plume arises from the ‘updated’ grinding and processing technology relied upon by the revised model. The grinding and processing operation on board the FSPO (and FSO) is critical to the intensity and magnitude of any sediment plume generated.

19. The increase in the discharge of the size class 16-38 micron is potentially relevant to the benthic experts, as it may result in increased deposition or SSC at some sites. This size class is “mobile enough to reach the coast, but which sinks fast enough to settle near the coast”¹ Accordingly, I suggest that the revised model results are carefully checked by the benthic experts, as it may not be a simple case that the revised model results in lower SSC concentrations and depositions at all sites.

20. In particular, I refer to the South Trap (Figure 28 of the report to the benthic ecology experts dated 25 March 2014) where it appears that the mining derived SSC load represents a ~+20% increase above background (and bear in mind that this increase may actually be larger as the modelled background is uncertain and may be overestimated by a factor of 2)²

SEDIMENTATION - DIRECTOR GENERAL, DOC, DISCHARGES NOT INCLUDED WITHIN THE MODELS – INFORMATION NOT REFERENCED IN FAST-TRACK DOCUMENTATION

21. The following discharges have not been included within the plume model (and hence their propensity to contribute to a SSC plume and sediment deposition has not been quantified

21.1. Sediment discharge from the hyperbaric filter.

21.2. Sediment releases from the agitation face (sediment agitated but not sucked up the pipe for processing).

22. I can accept that under 'normal' conditions the magnitude and consequences of these releases will be minor relative to the other discharges from the proposed operation (i.e. hydro-cyclone overflow and underflow/tailings). However, the following factors lead me to be of the opinion that the contribution of these sources may not necessarily be insignificant at all times:

22.1. That the hyperbaric filter discharge occurs 1 m below the surface, and not near the seabed.

22.2. It is not clear if there is potential for the discharge from the hyperbaric filter to vary in terms of density, mass, and PSD from the TTR advised values as indicated in the 25 March 2014 hyperbaric filter sediment discharge report.

22.3. That the potential for sediment to be agitated by the crawler head but not entrained into the suction pipe will depend upon the operation method of the crawler (i.e. speed of movement, nature of active face) and the nature of the material being actively mined (i.e. fines content and presence of mud layers).

2014 Director General Attachment 1 "Condition 3(b) limits extraction to a rate of 8000 tonnes per hour. It is important to record the hourly rate per hour and monthly average (or other such time period as may be specified at Condition 3(b)) to demonstrate compliance with the condition and also because the rate of extraction has a direct influence on the characteristics of the sediment plume.

The Director-General is not aware of technical expert evidence that has been advanced to support monthly averaging of extraction rates. The first reference to monthly averaging in conditions appears to be in Appendix A of the Summary Evidence of Garry Venus dated 15 April 2014 available only after expert caucusing and examination of experts.

Introduction of a monthly average effectively allows: a substantially higher increase in extraction (and deposition) rates over shorter timescales (e.g. < 2 weeks), provided there is correspondingly reduced periods within the 'monthly average'. Allowing such a pattern gives rise to the potential for high (relative to those assessed) concentration SSC plume pulses.

24.6. Unintentional losses from the agitation face could be accounted for by requiring the operator to quantify these (and having this quantification subject to independent review). Any realised losses from this process could be subtracted from the other permitted discharge sources. Methods for quantification of these losses have been employed previously on dredging projects, and the applicant has already advised that it is possible to use visualisation sonars and optical cameras to observe if this is indeed occurring.

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: TRANSCRIPT OF LOCAL FISHERMEN AND DIVERS 2014 New Plymouth 02.05.14¹⁹⁶

2nd May 2014 – lengthy transcript with Mr Purser and Mr Boyd – local fishermen and divers, talking about the local marine environment to the DMC.

Link to Purser's Photos: Snapper and Fishing Spots

<https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/6c3460bdf/EEZ000004-23-Patea-District-Boating-Club-photo-of-fish-and-fishing-zone-maps.pdf>

¹⁹⁶ <https://www.epa.govt.nz/assets/FileAPI/proposal/EEZ000004/Hearings/9a3ac0bc9f/EEZ000004-23-TTR-Transcript-02.05.14.pdf> Page 2592 onwards

LOCAL ECOLOGICAL KNOWLEDGE AND BIOGENIC HABITATS – EXTRACTS FROM REPORT IN RELATION TO SOUTH TARANAKI

Regional scale/case studies

Robust dog-cockles. *Tucetona* beds are known from around New Zealand in high current areas. Extensive beds have been reported from the Noises Islands in the Hauraki Gulf (Morrison et al. 2014a; Dewas and O'Shea 2012), on the continental shelf in the South Taranaki Bight (STB) in sloping habitats with high current in water depths of 25–55 m (Beaumont et al. 2015), and in the Rangitoto

South Taranaki Bight *Euchone* Tubeworm fields: Extensive tubeworm fields comprising dense populations of the surface-living tubeworm, *Euchone* sp. A, have also been recorded across the northern mid-shelf region of the South Taranaki Bight in water depths of 20-70 m, with densities highest in depths of 30-50 m (Figure 3-56 and Figure 3-32a; Beaumont et al. 2015 – referred to as wormfields). *Euchone* sp A is a small undescribed suspension-feeding worm that lives within vertical tubes (often 4 x longer than the worm itself) that it constructs by cementing sand grain together (Geoff Read, NIWA pers. obs.). This species is associated with fine-medium grained sediments, where they can occur in extremely high densities (up to 10.8 thousand per m²; mean 1,137.52 ± 180.95 SE per m² - Beaumont et al. 2015 and NIWA, unpublished data), making them important habitat stabilisers in these high-energy west-coast environments.

Regional scale/case studies

Localised studies have identified a variety of non-calcareous tubeworm fields (also termed beds or meadows) in a variety of soft-sediment habitats; some occurring in remarkably high densities (e.g. >120 individual Chaetopterids per 0.02 m² in northeast New Zealand (R. Creese unpublished data, cited in Tricklebank et al. 2001) and up to 216 individual Sabellids per 0.02 m² off the South Taranaki Bight (Beaumont et al. 2015). We present several examples below.

newly discovered species are endemic crypto-species (G. Read pers. comm.). Many tubeworm fields, even those that encompass very large areas, are often unnamed and undescribed (e.g. *Euchone*-like species A [unnamed species, termed sp A by G. Read] forms one of the densest tubeworm beds in New Zealand and covers an extensive (est. 400 km²) area of seabed across the mid-to-north shelf of the South Taranaki Bight (Beaumont et al. 2015). The recent discovery of several extensive tubeworm fields on the continental shelf of New Zealand (see examples below), indicates that tubeworm fields are likely to be widespread but vastly under-represented in national and regional datasets. Some tubeworm fields are also known to support commercially important fishery species (e.g. the wireweed or 'Tarakihi-weed' fields where tarakihi are commonly caught and have been observed sheltering in-amongst the wireweed fields (Jones et al. 2016; and review in Morrison et al. 2014a).

BENTHIC ECOLOGY & PRIMARY PRODUCTIVITY: KEY BIOGENIC HABITATS – FULLER DESCRIPTIONS OF KELP, ALGAL MEADOWS AND BRYOZOAN THICKETS

Review of New Zealand's Key Biogenic Habitats Prepared for the Ministry for the Environment
January 2019

3.1 Kelp *Ecklonia radiata* (Brown algae Order, Laminariales, Family Lessoniaceae) Kelp forests provide three-dimensional canopy cover to a wide range of flora and fauna, by provision of food and refugia for invertebrates and fish. The structure of the plant itself is known to host a wide range of species, within and around their holdfasts (Ojeda and Santelices 1984, Ronowicz et al. 2018), on and in their stipe and fronds host different species (e.g. gammarid amphipods and isopods, Taylor and Cole 1994) Kelp forests are also important nursery and refuge grounds for fish. Large regional scale climatic changes that effect coastal water temperate, such as El Nino effects and upwelling events, can stress plants overs large spatial scales (Cole and Syms 1999). Kelp forests are also likely to be affected by future acidified ocean conditions (Law et al. 2017) Increase of sediment and turbidity will decrease the sunlight available for the photosynthesis.

3.4.1 Algal meadows provide low-lying three-dimensional structure that can stabilise sediments (in the same way seagrass does) and provide low-lying canopy-cover for a variety of invertebrates and fishes. Macroalgal assemblages often consist of one or more dominant species e.g. *Caulerpa flexilis*. Large or patchy meadows can provide living structure to a wide range of flora and fauna, where they can provide habitat, food, refuge for fish and invertebrate.

Bryozoan thickets 3.6.1 Habitat description and definition Bryozoans (sometimes referred to in other parts of the world as sea mats, moss animals or false lace corals) are creatures that form colonies somewhat resembling small corals. Each colony is made up of tiny individuals, each with a miniscule gut and a crown of tentacles that capture microscopic food particles. The most significant habitat-forming bryozoans are those that are rigidly erect, widely distributed, and provide three-dimensional structure.

Included among these, and found at Project Reef, are *Cinctipora elegans*, *Celleporaria agglutinans*, & *Galeopsis porcellanicus* [Link](#)

OTHER CONSIDERATIONS – “AGREED LIST OF ISSUES” NOT ON EPA WEBSITE BUT ADDED HERE, FOR EASE OF FAST-TRACK PANEL

On 13th March 2024, Morgan Slyfield TTRL’s Barrister, contacted our STUC member K Pratt:

“In accordance with the DMC’s request that we work together to finalise an Agreed Statement of Issues that captures everyone’s interests completely, we had a meeting earlier this evening between counsel for TTRL, Fisheries Submitters, KASM/Greenpeace and Karen Pratt. We went through the changes requested by Climate Justice Taranaki. We agreed to change paragraph 5 as requested, and agreed to change paragraph 10 as requested, but with a refinement so that the ‘alternatives’ aspect is put forward as a part (not the whole) of the best available information question. **We then went through Karen’s proposed amendments and agreed many of them. I won’t attempt to describe all those changes, but they are at 1, 2, 3, 9, 23, 25 and 27 of the attached version.** On this basis the attached version is a list as agreed by TTRL, Fisheries Submitters, KASM/Greenpeace, Climate Justice Taranaki and Karen Pratt.”

Morgan Slyfield’s email contained the following details in a Word Document:

The DMC’s task.

1. What is the correct approach and scope to the reconsideration?
2. What is the significance of the factual findings of the DMC that were endorsed by the Supreme Court, and how are these impacted by new information since the Court Hearing and 2017 Hearing?

Material harm bottom line

3. To which of the following topics must the DMC apply the “material harm” bottom line test in s 10(1)(b)?
 - Fine sediment cumulative sources & effects
 - Benthic life and sub-tidal reefs
 - Sensitive habitats

- Remediation and recovery
 - Plume nature and effects
 - Noise
 - Tikanga
 - Effects on seabirds and marine mammals
 - Fish
 - Recreational, customary and commercial fisheries
 - Ocean productivity
4. Did the 2017 DMC make findings of material harm on these topics, and if so do these need to be reconsidered?
 5. If the 2017 DMC findings on these issues are to be reconsidered, then what are the relevant spatial, temporal, qualitative and quantitative dimensions in the assessment of material harm, including of cumulative effects?
 6. Does the updating evidence demonstrate a greater or lesser level of harm compared with the 2017 evidence?
 7. In relation to the topics identified in question 3, do the proposed conditions avoid remedy or mitigate “material harm” to a level where it is no longer material?

Information principles

8. Are the information gaps identified by the Supreme Court exhaustive or merely examples?
9. Has adequate new information been provided to address deficits/ information gaps including those identified by the Supreme Court?

10. Does the DMC have the “best available information”?
11. What are the remaining areas of uncertainty or inadequacy in the information available?
12. If there is uncertainty or inadequacy in the information available, would granting the consents, subject to conditions, favour caution and environmental protection?
13. Is the available information about the existing environment (“baseline”) sufficient to enable the effects of the project to be assessed? If not, what are the consequences?
14. Can post-decision monitoring rectify an insufficient baseline?
15. Is the pre-commencement monitoring regime in conditions 48–51 an acceptable approach?

Tikanga, existing interests of iwi and te Tiriti o Waitangi

16. What are the effects (both physical and spiritual) of the proposed activities on the tikanga of iwi?
17. Does the material harm test apply to these effects, and if so, do these effects amount to material harm?
18. What are the effects (both physical and spiritual) of the proposed activities on existing interests of iwi, including:
 - (a) Kaitiakitanga/kaitiaki responsibilities;
 - (b) rights claimed under the Marine and Coastal Area (Takutai Moana) Act 2010;
 - (c) interests under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992?
19. Does the material harm test apply to these effects, and if so, do these effects amount to material harm?
20. Would granting consent be inconsistent with Treaty principles and rights?

21. Are the effects or impacts on tikanga, existing interests of iwi, and Treaty principles and rights consistent with sustainable management?

Conditions

22. Is the pre-commencement monitoring regime in conditions 48-51 of the 2017 DMC decision ultra vires?
23. Does condition 4 of the 2017 DMC decision adequately manage the potential discharge of fine sediments ? If not, what is the significance of that?
24. Does TTR's proposed changes to conditions 9 and 10 address the Supreme Court's concerns?
25. Are there material risks a bond would address that would not be met by public liability insurance, or are there other reasons why a bond condition is required?
26. Are the conditions that provide for deemed approval of the management plans appropriate?
27. Are the existing conditions fit for purpose?

Other marine management regimes

28. What is the consequence of the application being inconsistent with a bottom line in a marine management regime?
29. What are the relevant bottom lines in the RMA and subsidiary instruments?
 - What bottom lines are contained in the NZCPS?

- Is s 107 of the RMA a bottom line?
 - What bottom lines are contained in the Taranaki Regional Policy Statement, Taranaki Regional Coastal Plan, and the Horizons One Plan?
 - Would granting consent be inconsistent with any of these bottom lines?
30. Is granting consent inconsistent with the “nature and effect” of the RMA and its subsidiary planning instruments?
31. What is the nature and effect of the Fisheries Act 1996? Does it contain any applicable environmental bottom lines, and if so has the applicant provided information to show these bottom lines will be satisfied?

The “agreed list of issues” remained in draft form and not finalised, due to TTRL pulling out of the Reconvened Hearing.

K Pratt’s suggested amendments, *and reasonings* are listed here – **as the draft list is not on the EPA website**. Red are where K Pratt added comments which were largely accepted by TTRL, to be added to the ‘agreed list of issues’.

The following list of issues is agreed between counsel for TTRL and the “certain named parties” (Parties) identified in Minute 15. TTRL wishes to record that rather than submit its own list (which it had prepared and circulated to the Parties for comment on Friday in advance of seeing the Parties’ proposed list) it has acceded to the Parties’ proposed list as a draft with some amendments. It has done so in the interests of dispatch bearing in mind the proximity of the first hearing. The inclusion of any issue on the list is not an indication that the parties have agreed the significance (if any) of the issue which is a matter that will be addressed in TTRL’s legal submissions.

The DMC’s task.

1. What is the correct approach and scope to the reconsideration? ~~What findings from the 2017 DMC are “safe”?~~

(A = justification)

A

Recommend delete the second sentence. What is actually meant by “safe”?

Did the Supreme Court address findings from the 2017 DMC that are “safe”, or provide direction about the DMC considering “safe” findings? I cannot see in their judgement that this was done.

In November 2023 I responded to the invite by the DMC to submit on the nature and scope of the reconsideration process directed by the Supreme Court, in light of the observations in the judgments of the Supreme Court, and in the judgment of the High Court on the application for directions. We were not asked to submit on “safe” findings.

What is meant by “safe”? Does it mean “points that all four members (i.e. Decision View and Alternative View in the DMC Decision document are in agreement over? Although the importance of these agreement points may be enhanced due to new information and so worthy of further exploration.

Does “safe” mean “legally safe” i.e. can’t be challenged?

2. What is the significance of the factual findings of the DMC that were endorsed by the Supreme Court? and how are these impacted by **new information** since the Court Hearing and 2017 Hearing. (B = justification)

B What is the significance of the factual findings of the DMC that were endorsed by the Supreme Court? and how are these impacted by new information since the Court Hearing and 2017 Hearing.

The factual findings of the DMC, now have a different lens with which to be seen - new information could enhance/strengthen their findings.

Material harm bottom line

3. To which of the following topics must the DMC apply the “material harm” bottom line test in s 10(1)(b)?

- Fine sediment cumulative sources & effects (C = justification)
- Benthic life & sub-tidal reefs. (D = justification)
- Sensitive habitats (E = justification)
- Remediation and Recovery (K = justification)
- Plume nature and effects
- Noise
- Tikanga
- Effects on seabirds and marine mammals
- Benthic life and traps
- Fish
- Recreational, customary and commercial fisheries
- Ocean productivity

4. Did the 2017 DMC make findings of material harm on these topics, and if so do these need to be reconsidered?

5. If the 2017 DMC findings on these issues are to be reconsidered, then what are the relevant spatial, temporal, qualitative and quantitative dimensions in the assessment of material harm?

6. Does the updating evidence demonstrate a greater or lesser level of harm compared with the 2017 evidence?

7. In relation to the topics identified in question 3, do the proposed conditions avoid remedy or mitigate “material harm” to a level where it is no longer material?

C Fine sediment cumulative sources & effects

My submissions address why I believe this is important for the DMC to address, but to use a few examples – the Patch is a potentially significant source now that different trapping assumptions have been used in 2017, than were used in 2014. The mounds and fine sediments released from them have never been accounted for. The cutterhead calculations I have done show significant releases & experts have supported that these should be accounted for, and monitored.

‘Plume’ is a subset of the source of fines into the marine environment from the operations.

As the applicant states the discharges from sources other than the IMV are immaterial, they should have no issues with including this condition. Peter Longdill (DOC) in his evidence said that conditions restricting the volume of sediment discharged, including at the agitation face, is reasonable and such requirements have been applied in major dredging projects, as it would more directly control the ecologically relevant discharges of SSC (verses the indirect limitation such as mine throughput). My submission also provides Woodside as an example of this kind of best practise.

D Benthic life and subtidal reefs

Sub-tidal reefs (rather than ‘traps’). The DMC’s decision, as well as Supreme Court’s findings addressed impacts on far more than ‘the traps’.

Use The word ‘traps’ is inaccurate. I questioned the EPA on this, and they have confirmed what was meant was ‘North & South Traps’. I do see that in [185] the Supreme Court described them as “The Traps”. I also see that the point of the Supreme Court was to use this as an example of ‘some locations’ within the Pātea Shoals. I suggest using ‘sub-tidal reefs’ as this can incorporate EEZ and Territorial reefs, as well as sensitive habitats, blue cod nurseries and TRC’s ONF’s.

[185] In other words, the DMC did not recognise the impact of the fact that the proposed activities would have **adverse effects in some locations, such as “The Traps” (an area within the Pātea Shoals and some 26–28 km east of the mining site).** It is, as the Court of Appeal found, seriously arguable that if the same activities had occurred in the CMA, this would have resulted in those activities being prohibited

The ‘North and South traps’ are included in the TRC’s Coastal Plan and that is perhaps why the Supreme Court expressly mentioned them in 185, but since the Supreme Court Hearing, the ‘Project Reef’ is also included in the Coastal Plan as an outstanding natural feature.

If the reason for including ‘The North and South Traps’ is due to impact, there are reefs determined as having greater environmental impact. TTRL’s expert Professor Cahoon’s conclusions about potential impacts on primary production stated

- isolated rocky reef outcrops immediately east of the proposed mining site, **if they support macroalgae, could be more severely impacted by sediment from Site A.**
- there will be a reduction in colonisation depth and growth rates of macroalgae at **Graham Bank (significant)** and **The Traps (minor)**

(Morrison at el. documented through multi-beam mapping (2020) and drop-cam work (2021) a blue cod nursery and sponge garden reef at the base of **Graham Bank**, found subsequent to these statements by Cahoon).

[228] Mr Fowler illustrated the point by reference to some of the findings of the DMC, for example, the finding that the modelling “*indicates that there will be significant adverse effects within [ecologically sensitive areas] to the east-southeast of the mining site extending to at least Graham Bank*”. 364 In that context, *the DMC also considered the effect on primary production would be significant at ecologically sensitive areas such as the Crack and the Project Reef*.³⁶⁵

E Sensitive Habitats

Important category for inclusion, as sponge gardens and macro-algal beds meet this definition, and there are thousands more acres of subtidal reefs scientifically documented, than previously known during the 2017 Hearing and at the Supreme Court. Some of these reefs have coverage that meets the sensitive habitat definition.

K This is an important error of law that needs addressing under s10(1)(b) Material Harm.

[270] ... Nor does it address the length of time before remediation and whether it will occur within a reasonable period, taking into account the bottom line of environmental protection in s 10(1)(b).⁴⁴³ In this respect, the DMC majority seems to rely on its view that the effects will not be permanent, rather than assessing whether recovery will occur within a reasonable period taking into account the fact that the longer the total period of unremedied harm before remediation, the more likely the bottom line in s 10(1)(b) will be breached.⁴⁴⁴ This was an error of law.. .

Information principles

8. Are the information gaps identified by the Supreme Court exhaustive or merely examples?

9. Has adequate new information been provided to address the deficits/ information gaps including those identified by the Supreme Court?

10. Does the DMC have the “best available information”?

11. What are the remaining areas of uncertainty or inadequacy in the information available?

12. If there is uncertainty or inadequacy in the information available, would granting the consents, subject to conditions, favour caution and environmental protection?

13. Is the available information about the existing environment (“baseline”) sufficient to enable the effects of the project to be assessed? If not, what are the consequences?

14. Can post-decision monitoring rectify an insufficient baseline?

15. Is the pre-commencement monitoring regime in conditions 48–51 an acceptable approach?

Has new information been provided since the 2017 Hearing, and since the Supreme Court, that raise new deficits/information gaps? (F = justification)

F

Has new information been provided since the 2017 Hearing, and since the Supreme Court, that raise new deficits/information gaps?

Point 9, Information Principles, is addressing the deficits and information gaps *that existed in the past*. Point 9 does not address those that *have arisen subsequent* to the 2017 Hearing and Supreme Court.

There are now deficits in terms of no macroalgal experts having been involved e.g. in assessing impacts and assessing appropriateness of conditions & monitoring (in light of the macro-algal densities on extensive reef systems offshore documented subsequent to the 2017 Hearing)

New methodologies for assessing risk have been developed, and this is now ‘best practise’.

Climate Change stressors – there has been no assessment of this factor during the past Hearing, and it is now current practise in marine sectors to include this in any assessments of the resilience of the ocean environment.

Are the existing conditions fit for purpose? (G = justification)

I think an exploration of the existing conditions is important, not only due to their existing weaknesses, but also in terms of the direction from the Supreme Court; As the Supreme Court noted [319] **I do not exclude the possibility that a decision-maker would want to impose conditions** to mitigate, remedy or avoid adverse effects even though the threshold of material harm will not be met.

1. One reason for including this question is due to point 12:

If there is uncertainty or inadequacy in the information available, would granting the consents, subject to conditions, favour caution and environmental protection

There is an unspoken assumption in point 12, that existing conditions, are adequate.

For example: As my submission details, condition 7 was rushed on the last day of the Hearing, without experts in the field having any input, nor the ability of participants in the Hearing to comment on it. Those drafting it, had a degree of discomfort with it.

2. E.g. Schedule 4, Benthic Ecology Monitoring sites need to include the Project Reef, The Crack, and important ecologically important reefs such as the one by Graham Bank, and possibly the one in the EEZ located close to the Project site.
3. E.g. Schedule 2 include ecological zones, seasons and receptors (especially sensitive habitats macro-algal beds and sponge gardens) to better favour caution and environmental protection? Sub-tidal reefs
4. E.g. If Schedule 2 is amended as suggested above, then 5c needs amending also, as the significant change is as determined over any 12 month period being more than 10%. This should be determined on a seasonal basis.
5. E.g. Is the existing Condition 51, (enabling changes in numerical values of the SSC Limits in Schedule 2 to not be by way of a consent condition, but a change to the EMMP) acceptable in relation to advice given to the EPA by their independent experts?
6. E.g. Inconsistencies in Conditions
e.g. Condition 54 & Schedule 6. Schedule 6 doesn't include benthic flora, and Condition 54 says 'primary production', which is unclear as to whether macro-algae is included. Condition 54 needs more precise wording, and Schedule 6 needs to include macro-algae.
7. E.g. Condition 11 – monitoring of sound – is currently in relation to 'full production' of 8,000 tonnes per hour (which won't happen all the time necessarily). There should in addition be the ability to monitor at less than full production. Technology has moved on greatly since the development of this condition, and data capture could be continuous, rather than for example 11(f)iv 'every five years'. This would be applying the precautionary principle.
8. Use of 'de-ored' in condition 4c – is this terminology appropriate, when the discharge is from de-ored sand and hydrocyclone, deposited through one pipe (previous Hearing it was two).

Tikanga, existing interests of iwi and te Tiriti o Waitangi

16. What are the effects (both physical and spiritual) of the proposed activities on the tikanga of iwi?
17. Does the material harm test apply to these effects, and if so, do these effects amount to material harm?
18. What are the effects (both physical and spiritual) of the proposed activities on existing interests of iwi, including:
 - (a) Kaitiakitanga/kaitiaki responsibilities;
 - (b) rights claimed under the Marine and Coastal Area (Takutai Moana) Act 2010;
 - (c) interests under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992?
19. Does the material harm test apply to these effects, and if so, do these effects amount to material harm?
20. Would granting consent be inconsistent with Treaty principles and rights?
21. Are the effects or impacts on tikanga, existing interests of iwi, and Treaty principles and rights consistent with sustainable management?

Conditions

22. Is the pre-commencement monitoring regime in conditions 48-51 of the 2017 DMC decision ultra vires?
23. Does condition 4(d) **an extraction condition** of the 2017 DMC decision adequately manage the potential *discharge* of fine sediments ? If not, what is the significance of that? **(H = justification)**

H

23. Does condition 4(d) **an extraction condition** of the 2017 DMC decision adequately manage the potential *discharge* of fine sediments ? If not, what is the significance of that? I have added these words, as I think this is important, as the greatest source of fines is through the

beneficiation process, which has nothing to do with extraction. It reminds us that point 23 is only addressing one component of the discharge

Does condition 4(b) and (c) of the 2017 DMC decision adequately manage the potential discharge of fine sediments ? If not, what is the significance of that?

Note: You could **amend point 23**, in the Agreed list of issues, to be **Condition 4, without any subclauses**. That way the sub-clause 4(d) which is an *extraction* condition, and the *discharges* conditions 4(b) and (c) are available to be points of discussion.

It is important to be able to address Conditions 4(b) and (c) as they relate to discharges and *only control <38 microns*.

- The 38-90 microns are material in nature (tonnage) and material in nature (the way this fraction moves/resuspended/time in the domain). It is also the fraction that has had the most reductions in tonnage during the first and second Hearing based on TTRL's advice, which is not independently verified.
- 4(b) has also been challenged by the EPA expert.

24. Does TTR's proposed changes to conditions 9 and 10 address the Supreme Court's concerns?

25. Is a bond condition required?

26. Are the conditions that provide for deemed approval of the management plans appropriate?

Does condition 4(b) and (c) of the 2017 DMC decision adequately manage the potential discharge of fine sediments ? If not, what is the significance of that? (I = justification)

Are there material risks a bond would address that would not be met by public liability insurance. (J = justification)

Other marine management regimes

27. What is the consequence of the application being inconsistent with a bottom line in a marine management regime?

28. What are the relevant bottom lines in the RMA and subsidiary instruments?

- o What bottom lines are contained in the NZCPS?

- o Is s 107 of the RMA a bottom line?

- o What bottom lines are contained in the Taranaki Regional Policy Statement, Taranaki Regional Coastal Plan, and the Horizons One Plan?

- o Would granting consent be inconsistent with any of these bottom lines?

29. Is granting consent inconsistent with the “nature and effect” of the RMA and its subsidiary planning instruments?

30. What is the nature and effect of the Fisheries Act 1996? Does it contain any applicable environmental bottom lines, and if so has the applicant provided information to show these bottom lines will be satisfied?

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Are there material risks a bond would address that would not be met by public liability insurance.

I think it is of benefit to express the issue more finely.

CEO of Manuka Resources stated once EPA approval obtained, they would look to transfer TTRL to another entity and look to sell it – how does this impact the bond?

For Maritime NZ the public liability insurance cover for Part 25 (ships) or 26A (installations) applicable under the Maritime Transport Act is different. For installations the upper limit for public liability insurance cover is **\$27million**. The IMV is deemed an installation. (This question was asked by the DMC before).

Questions:

20. What public liability insurance does MNZ require? What environmental effects is that public liability insurance intended to insure against?

The relevant Marine Protection Rules require that either a contract of insurance or other financial security is in place providing public liability coverage of a kind and scope suitable to meet the owner's potential liability under Part 25 (for ships) or part 26A (installations) of the Maritime Transport Act 1994. Any insurance or other financial security must cover statutory liability for pollution clean-up costs and liability for damage caused by pollution. Under the MTA pollution damage means damage or loss of any kind and:

- includes the costs of any reasonable preventive measures taken to prevent or reduce pollution damage and any damage or loss occurring as a result of those measures; and
- includes the costs of reasonable measures of reinstatement of the environment that are undertaken or to be undertaken; and
- includes losses of profit from impairment of the environment; but
- does not include any costs in relation to the impairment of the environment other than the costs referred to in paragraphs (b) and (c).

The amount varies dependent on whether it is a vessel or an installation. For an installation the upper limit of public liability insurance is approximately NZ\$27 million (the limits are in Special Drawing Rights so the actual amount varies according to currency exchange rates). For vessels the limit would be dependent on the vessel size in accordance with marine protection rules Part 102.