Before the Hearing Commissioners
Appointed by the Grey District Council
and West Coast Regional Council

Under	the Resource Management Act 1991
In the matter of	Resource consent applications by TiGa Minerals and Metals Ltd to establish and operate a mineral sands mine on State Highway 6, Barrytown (RC-2023-0046; LUN3154/23)

Summary Statement and Rebuttal Evidence of Gary Charles Teear

2 February 2024

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Summary of evidence

1 My name is Gary Charles Teear

2 I prepared a statement of Coastal Engineering evidence dated 19 January 2024. My qualifications and experience are set out in that statement of evidence.

3 I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court.

4 My role in relation to TiGa Minerals and Metals Limited's (**TiGa**) application (the **Application**) has been to provide coastal engineering and coastal processes advice since December 2023.

Summary

5 The land behind the beach and the lagoons has no effect on, and is independent of the beach processes. The Application site is 250 m from the high water tide mark on the beach with a 20 m setback from the edge of the lagoon. At the estimated conservative rate of combined erosion – existing rate of erosion plus SLR induced recession - it would take in excess of 100 years for the sea to reach the location.

6 The mining operation will have no potential effect on erosion of the coast being behind the natural barrier and well setback. The risk of inundation for the 2130 planning horizon applies for both the existing topography and the reinstated topography. The reinstated level would be an average of 0.8 m below the existing level across the site, but along the western end it would be reinstated to at or above the existing level as per the rehabilitation plan.

7 Filling the mining excavation with the original sand minus the HMC content does not increase the coastal erosion potential once the sea reaches the location because the sand is essentially the same as the sand extracted, and normally consolidated under self weight. The rate of erosion would be close to the same for the refilled area as for the original ground.

8 The mining operation will have no impact either in the short-term or the long-term on coastal processes. The proposed mine areas are well clear of the dynamic coastal area being located landward of the lagoons and have no influence on the coastal processes. The mine will not exacerbate coastal erosion or inundation of surrounding properties.

Response to Dr. Renwick's paragraphs 24-28

9 The SLR estimates quoted by Dr. Renwick are the same as reported, and allowed for, in my evidence being taken from the Ministry for the Environment's 2017 coastal guidance.

10 The application site has natural protection from wave action and the effects of SLR in the form of a MSGB (Mixed Sand Gravel Beach), composite beach form, a wide sandy beach apparent at low tide with a steep gravel bund, natural barrier at the top of the beach. Barrier beaches in a natural state are a resilient feature able to gradually shift landward in response to rising sea-level while retaining their height and integrity so the existing protection from wave action for the hinterland behind the MSGB will continue as SLR continues to increase.

11 As climate change induced SLR accelerates, as indicated by the increasing slope of the SLR graph in figure no.1 of my evidence, a point may be reached later this century where the rate of SLR exceeds the natural ability of the beach to respond. However, that does not preclude the possibility of beach nourishment using gravel extracted from West Coast rivers to boost natural beach processes and defences.

12 The effects of climate change on beach processes are uncertain to the extent that increased extreme rainfall events and associated landslips may substantially increase the supply of sediment to the coast, much as occurred after earlier earthquakes on the Coast. The climate change induced SLR effects will occur irrespective of the mining operation.

Additional Information

13 The results of the drone survey undertaken on the 16th of January were reduced after my original evidence was submitted and are attached with this Summary Statement and Rebuttal evidence as a contour plan of the coastal edge of the Application site, drawing no. DR-231202-004. They assist to illustrate my response to Dr Renwick. The heights are in terms of NZVD 2016. The zero is 0.101 m below Mean Sea Level (MSL). MHWS is 1.34 m above NZVD 2016 zero, MLWS is 1.57 m below NZVD zero. Two cross sections referenced on the contour plot, A and B, are shown on drawing no. DR-231202-005.

14 Cross section B is where washover occurs and the bund is wider and flatter than the gravel barrier further north where the height of the gravel bund is approximately 6 m above NZVD 2016 zero.

15 The historical coastline photographs in my evidence covered the area in front of the Application site. Drawings no. DR-231202-002 and 003 show the length of the Barrytown Flats coastline with the historical vegetation lines and magnified excerpts with measurements of the coastal recession allowing recession rates to

be calculated. These average out at 1m/year north of Canoe Creek and 1.7 m/year south of Canoe Creek.

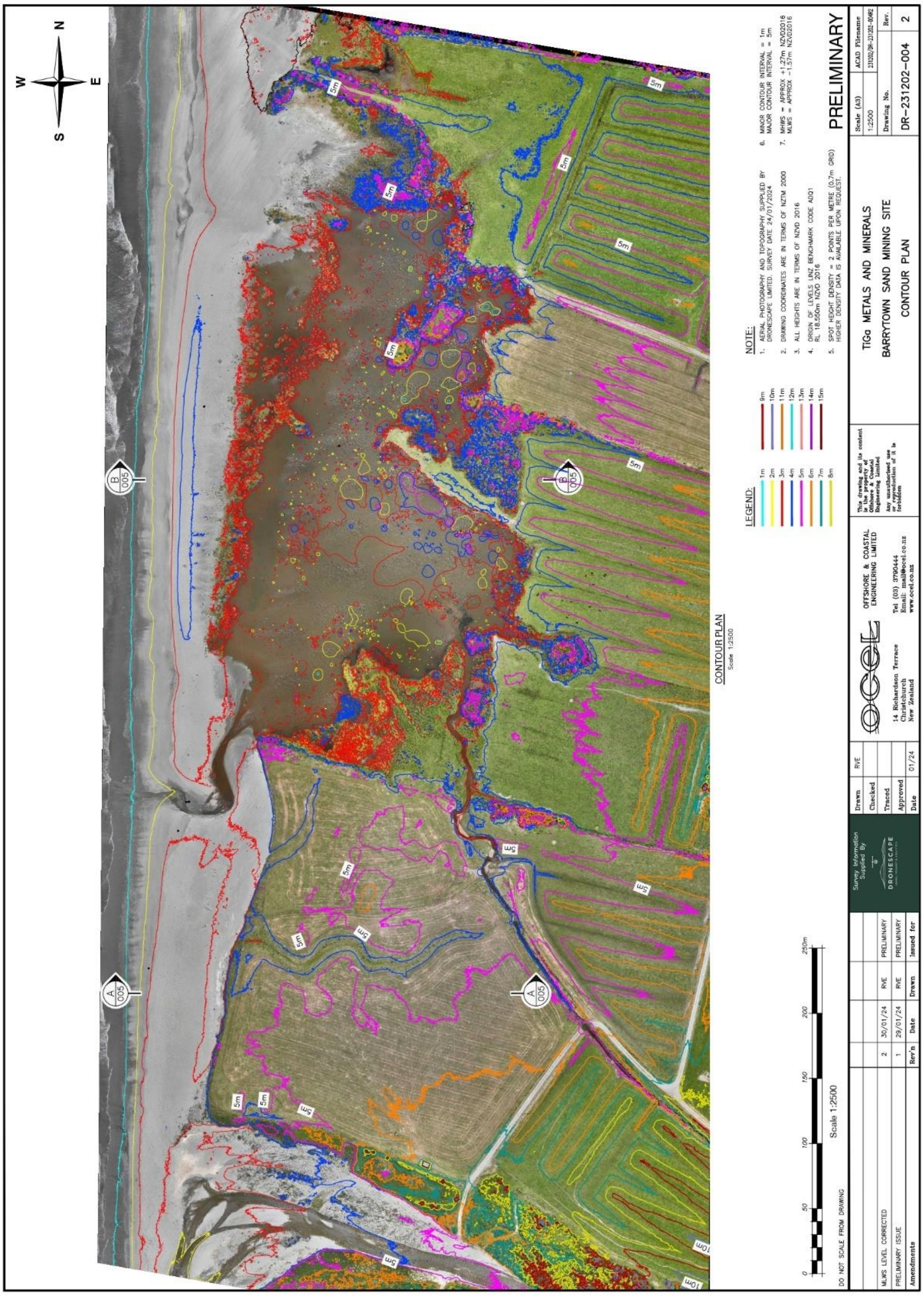
Conclusion

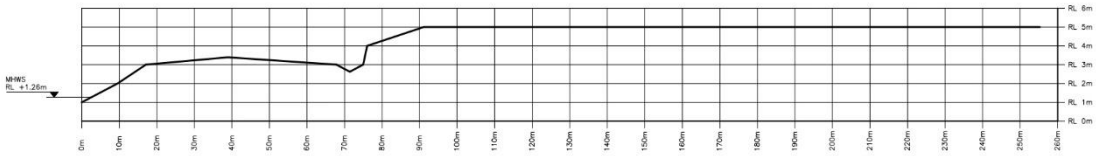
16 Dr. Renwick's evidence doesn't change my conclusions, SLR will happen but the mining operation will not exacerbate the situation in terms of either inundation or SLR induced recession, this will occur irrespective of the mining operation. The MSGB natural defence is a resilient form of natural protection, more so than sand beaches, and can be readily supplemented some time in the future if required. The additional information added via this supplementary evidence adds detail to my earlier evidence and assists to illustrate my response to Dr Renwick.

Gary Charles Teear

Dated this 2nd day of February 2024

DRAWINGS


PRELIMINARY
CONTOUR PLAN
Scale 1:2500
TiGa METALS AND MINERALS
BARRYTOWN SAND MINING SITE
CONTOUR PLAN
DR-231202-004
OFFSHORE & COASTAL ENGINEERING LIMITED
DRONESCAPE



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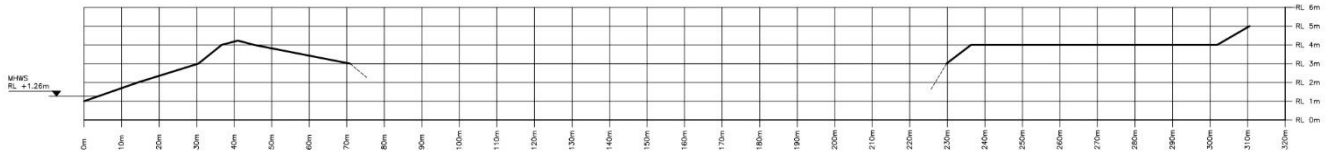

SECTION B 004
HORIZ: 1:1000
VERT: 1:200

Horiz Scale 1:1000

Vert Scale 1:200

DO NOT SCALE FROM DRAWING

NOTE:

1. AERIAL PHOTOGRAPHY AND TOPOGRAPHY SUPPLIED BY DRONESCAPE LIMITED, SURVEY DATE 24/01/2024
2. DRAWING COORDINATES ARE IN TERMS OF NZTM 2000
3. ALL HEIGHTS ARE IN TERMS OF NZVD 2016
4. ORIGIN OF LEVELS LINZ BENCHMARK CODE ADQ1 RL 18.550m NZVD 2016
5. SPOT HEIGHT DENSITY = 2 POINTS PER METRE (0.7m GRID) HIGHER DENSITY DATA IS AVAILABLE UPON REQUEST.
6. MHWS = APPROX +1.27m NZVD2016
   MLWS = APPROX −1.57m NZVD2016

PRELIMINARY

Amendments	Rev'n	Date	Drawn	Issued for
MLWS LEVEL CORRECTED	2	30/01/24	RVE	PRELIMINARY
PRELIMINARY ISSUE	1	29/01/24	RVE	PRELIMINARY

Survey Information Supplied By
DRONESCAPE

Drawn RVE
Checked
Traced
Approved
Date 01/24

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TiGa METALS AND MINERALS
BARRYTOWN SAND MINING SITE
CROSS SECTIONS

Scale (A3)	ACAD Filename
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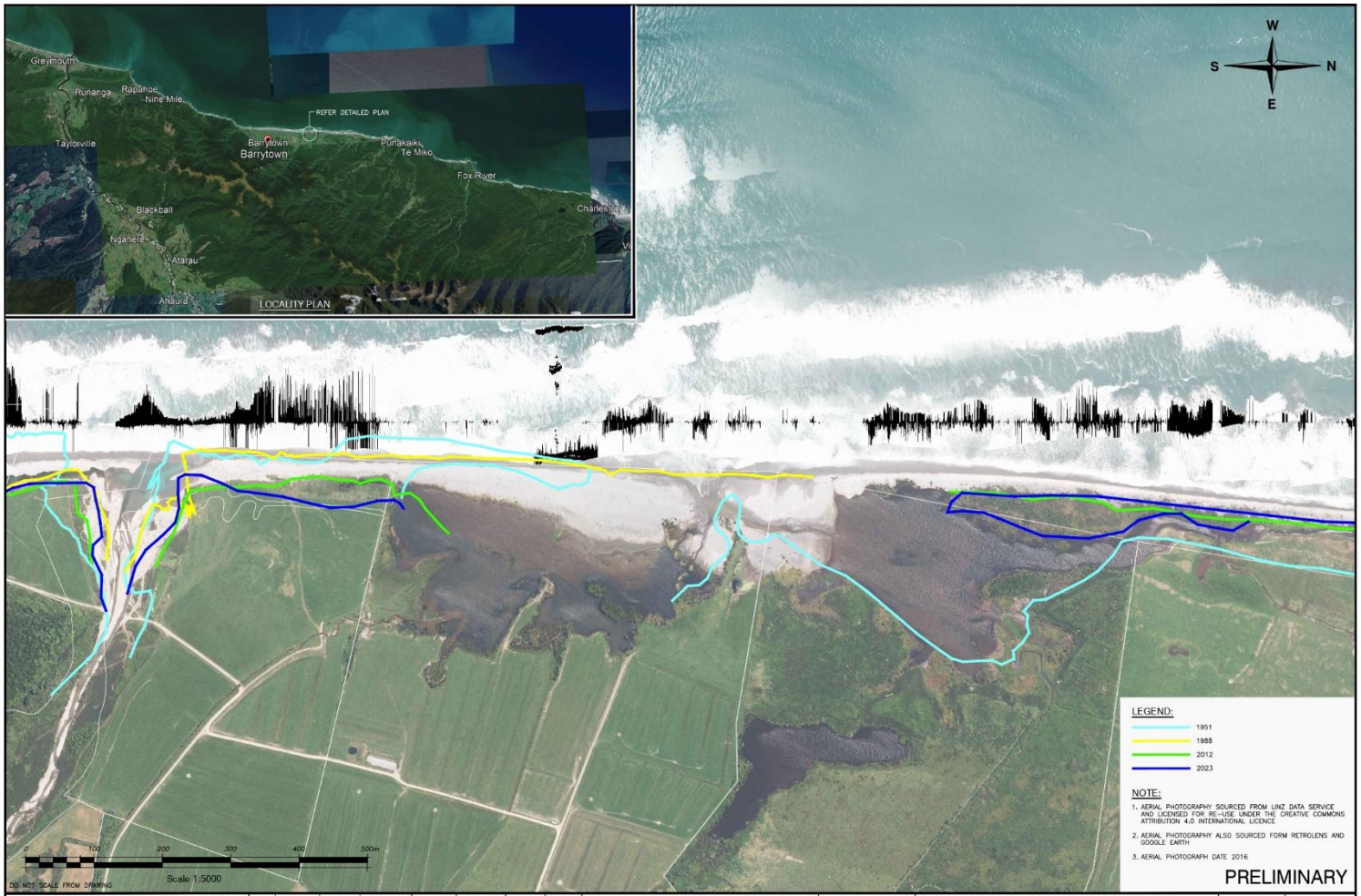
Drawing No.	Rev.
DR-231202-005	2



Amendments	Rev'n	Date	Drawn	Issued for	Checked	Approved
PRELIMINARY ISSUE FOR INFORMATION	1	22/12/2023	RVE	PRELIMINARY		

Drawn RVE
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Date 12/2023

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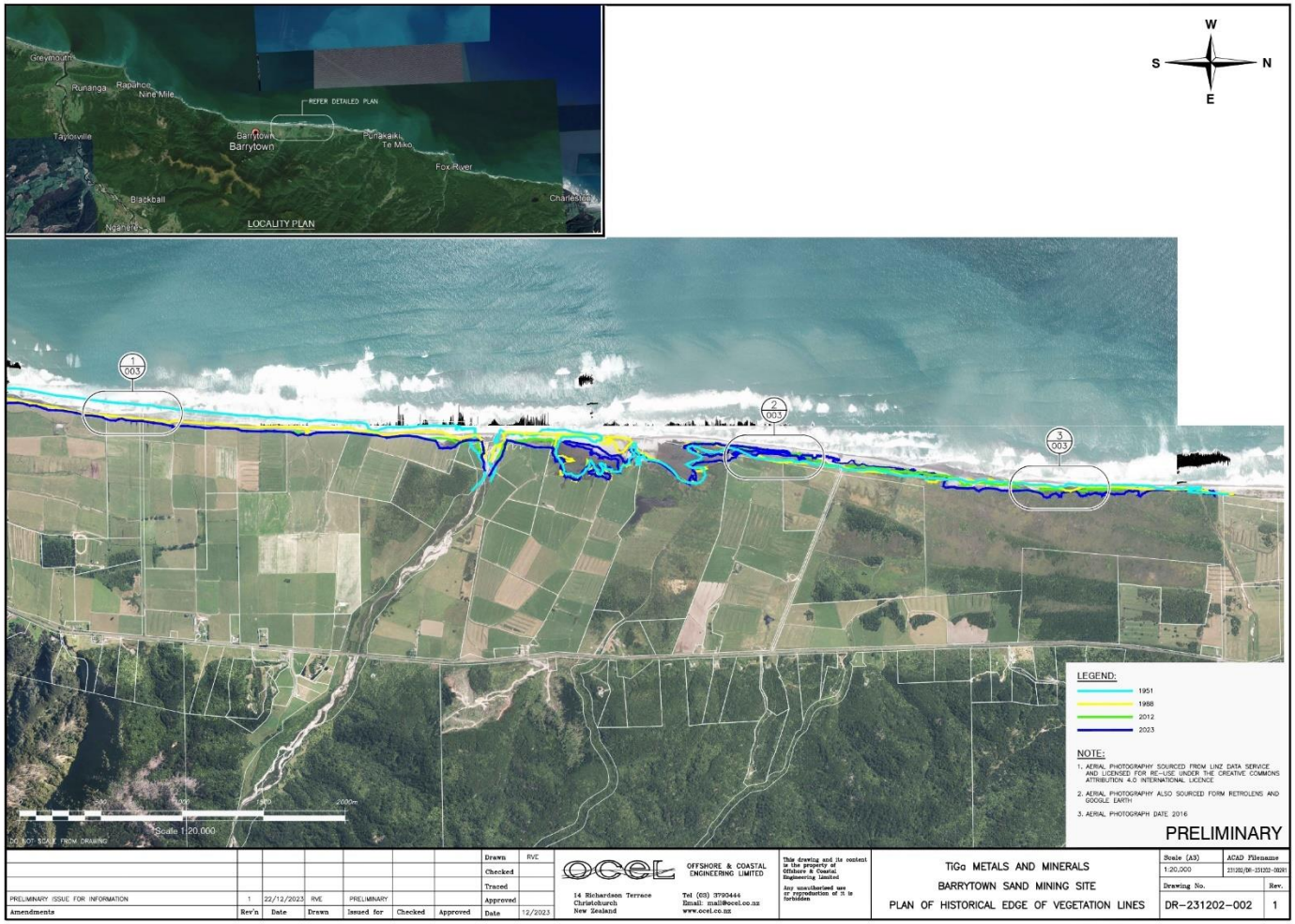
TiGa METALS AND MINERALS
BARRYTOWN SAND MINING SITE
PLAN OF HISTORICAL EDGE OF VEGETATION LINES

Scale (A3)	ACAD Filename
1:5000	231202/DR-231202-001R1
Drawing No.	Rev.
DR-231202-001	1


Greymouth
Runanga
Rapahoe
Nine Mile
REFER DETAILED PLAN
Taylorville
Barrytown
Barrytown
Punakaiki
Te Miko
Fox River
Blackball
Charleston
Nganeiau
LOCALITY PLAN
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1
003
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LEGEND:
1951
1988
2012
2023
NOTE:
1. AERIAL PHOTOGRAPHY SOURCED FROM LINZ DATA SERVICE AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE
2. AERIAL PHOTOGRAPHY ALSO SOURCED FORM RETROLENS AND GOOGLE EARTH
3. AERIAL PHOTOGRAPH DATE 2016
0
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2000m
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Date 12/2023
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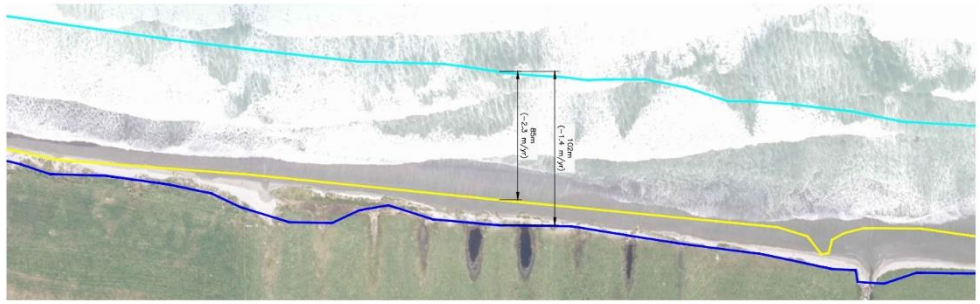
TiGa METALS AND MINERALS
BARRYTOWN SAND MINING SITE
PLAN OF HISTORICAL EDGE OF VEGETATION LINES
Scale (A3) 1:20,000
ACAD Filename 231202/DR-231202-002R1
Drawing No. DR-231202-002
Rev. 1



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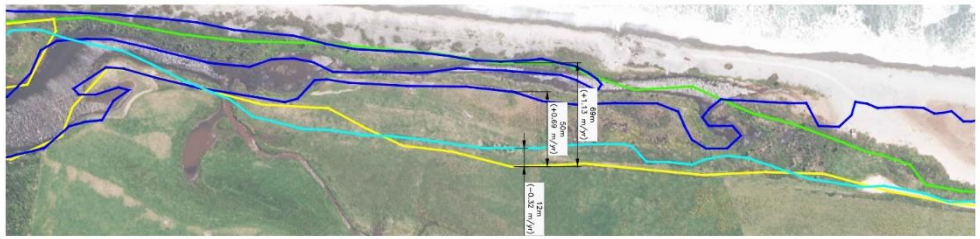

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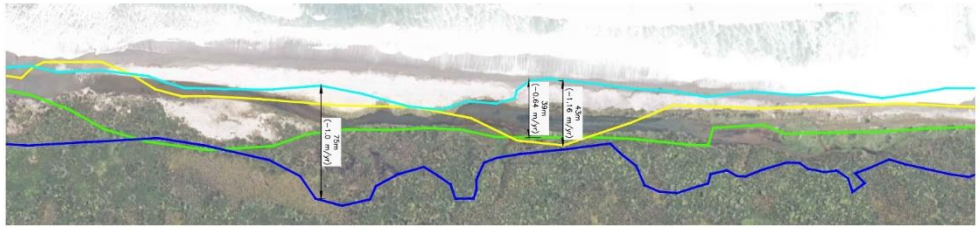

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NOTE:

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3. AERIAL PHOTOGRAPH DATE 2016

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PRELIMINARY ISSUE FOR INFORMATION	1	29/01/2024	RVE	PRELIMINARY		

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TiGa METALS AND MINERALS
BARRYTOWN SAND MINING SITE
DETAILED PLAN OF HISTORICAL EDGE OF VEGETATION LINES

Scale (A3)	ACAD Filename
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Drawing No.	Rev.
DR-231202-003	1