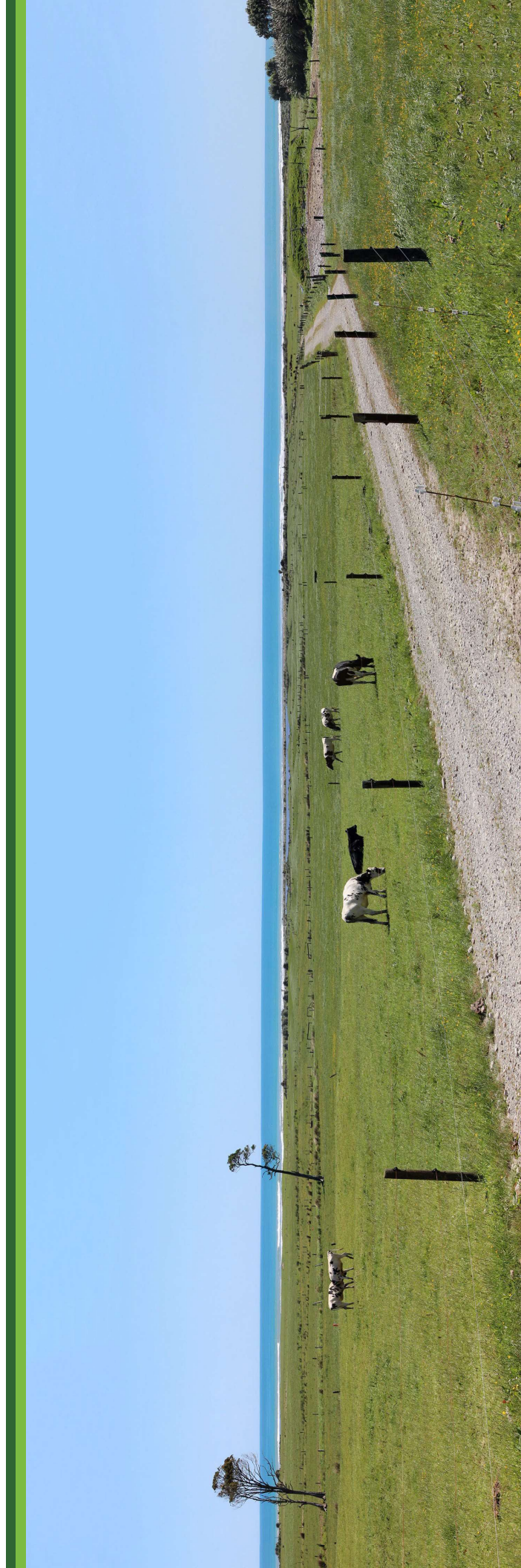




BARRYTOWN MINERAL SANDS MINING PROJECT




LANDSCAPE AND VISUAL ASSESSMENT OF EFFECTS
GRAPHIC SUPPLEMENT
APRIL 2023

CONTENTS

1.0 WIDER CONTEXT PLAN	3	26.0 INDICATIVE LANDSCAPE PLANT SPECIES AND GROWTH RATES	40
2.0 SITE LOCATION PLAN	4	27.0 RECOMMENDED EXTERIOR COLOUR PALETTE	41
3.0 PUBLIC CONSERVATION AREAS, SCENIC RESERVES AND WALKWAYS	5		
4.0 GREY DISTRICT COUNCIL: OPERATIVE DISTRICT PLAN ZONING	6		
5.0 TE TAI O POUTINI PLAN: PROPOSED ZONING	7		
6.0 TE TAI O POUTINI PLAN: PROPOSED ZONING (LANDSCAPE FEATURES)	8		
7.0 CHARACTER IMAGE LOCATIONS	9		
8.0 CHARACTER IMAGES	10		
9.0 VIEWPOINTS PLAN: INSIDE THE SITE	11		
10.0 VIEWPOINTS PLAN: OUTSIDE THE SITE	20		
11.0 NEIGHBOURING PROPERTIES	25		
12.0 THE PROCESSING PLANT AND ASSOCIATED INFRASTRUCTURE	26		
13.0 THE PROCESSING PLANT BUILDING DETAILS	27		
14.0 MINING STAGING PLAN	28		
15.0 MINING PANEL PLAN	29		
16.0 PROPOSED REHABILITATED SITE	30		
17.0 LANDSCAPE MITIGATION PLAN	31		
18.0 LANDSCAPE MITIGATION REFERENCE PLAN	32		
19.0 LANDSCAPE MITIGATION PLAN: STATE HIGHWAY 6 BOUNDARY	33		
20.0 LANDSCAPE MITIGATION SECTIONS: STATE HIGHWAY 6 BOUNDARY	34		
21.0 LANDSCAPE MITIGATION LONG SECTION: FROM SH6 TO THE MINE PIT	35		
22.0 LANDSCAPE MITIGATION PLAN: COLLINS CREEK	36		
23.0 LANDSCAPE MITIGATION SECTIONS: COLLINS CREEK	37		
24.0 LANDSCAPE MITIGATION PLAN: COASTAL EDGE	38		
25.0 LANDSCAPE MITIGATION SECTIONS: COASTAL EDGE	39		

1.0 WIDER CONTEXT PLAN



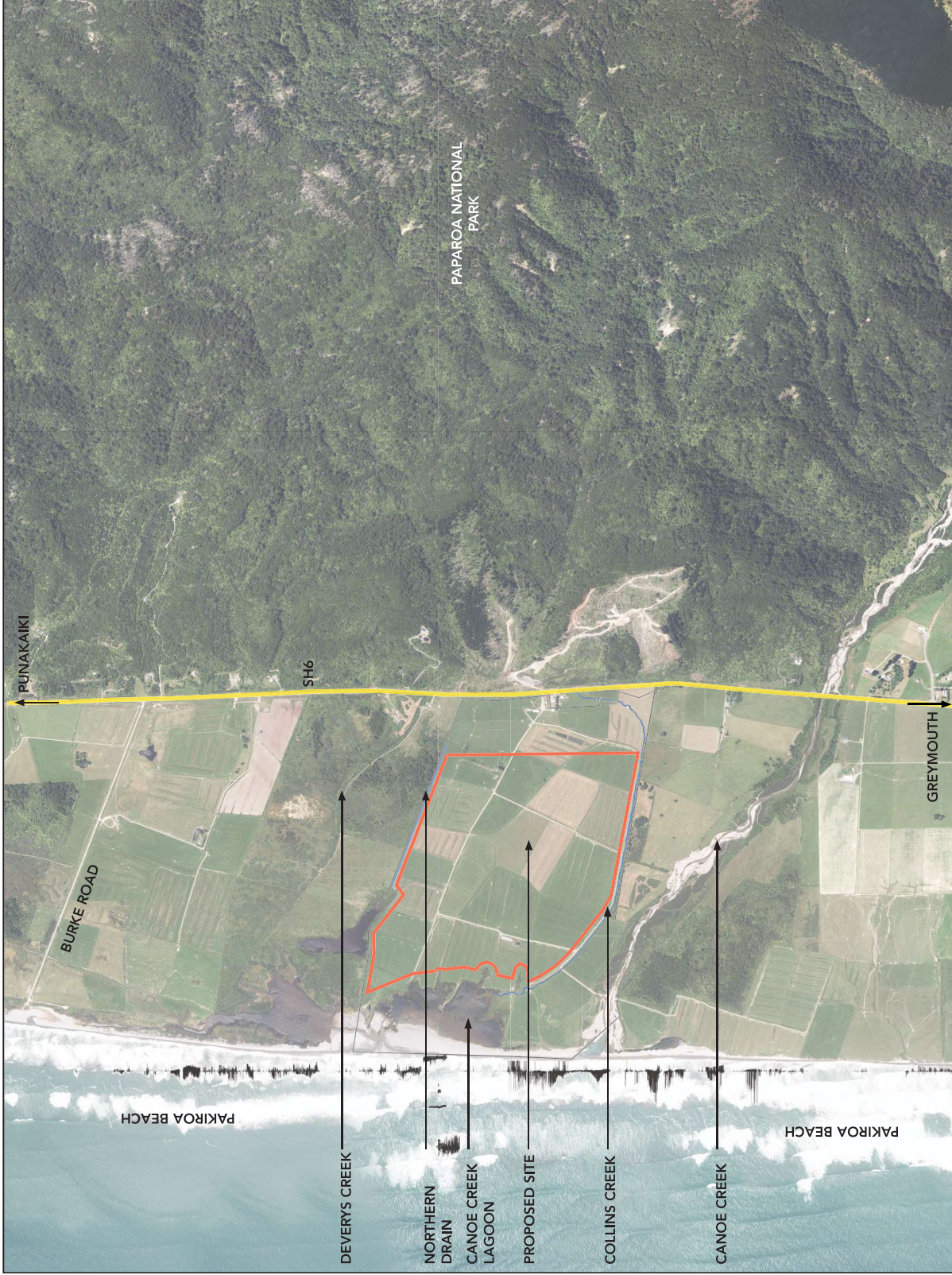
KEY	
	STATE HIGHWAY 6
	MINING DISTURBANCE AREA

Basemap credit: Department of Conservation



SCALE: 1: 333.333@ A3

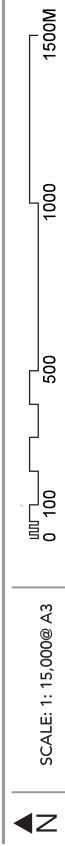
2.0 SITE LOCATION PLAN



KEY








- APPLICATION AREA
- MINING DISTURBANCE AREA
- STATE HIGHWAY 6
- DRAINAGE AND WATER SYSTEMS

Basemap credits: Land Information New Zealand (LINZ) and Glasson Huxtable



3.0 PUBLIC CONSERVATION AREAS, SCENIC RESERVES AND WALKWAYS

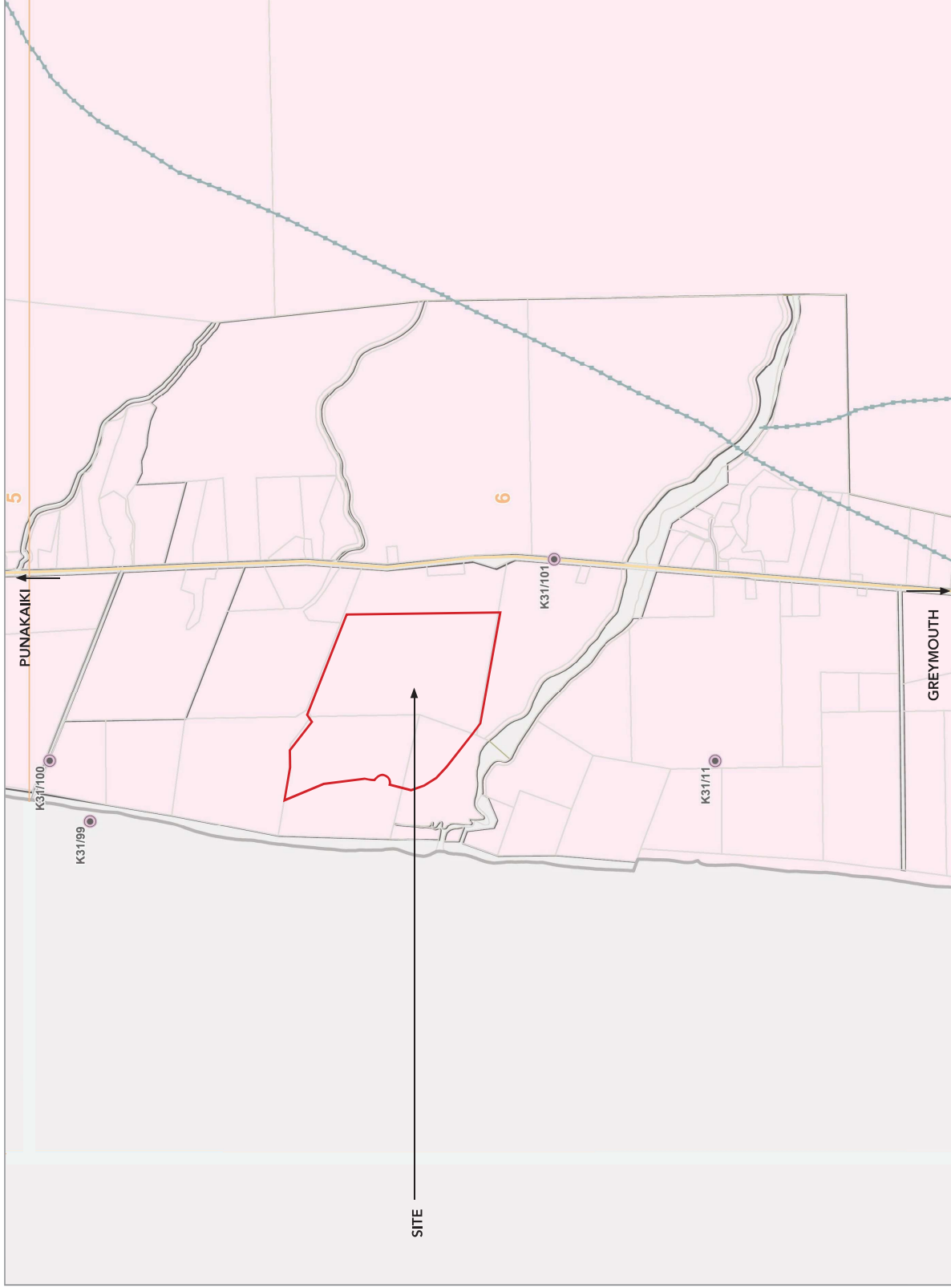


KEY	
	NATIONAL PARK
	CONSERVATION AREA
	PUNAKAIKI MARINE RESERVE
	WATER BODY (TASMAN SEA)
	WALKING TRACKS
	MINING DISTURBANCE AREA
	STATE HIGHWAY 6

Basemap credits: Department of Conservation



4.0 GREY DISTRICT COUNCIL: OPERATIVE DISTRICT PLAN ZONING



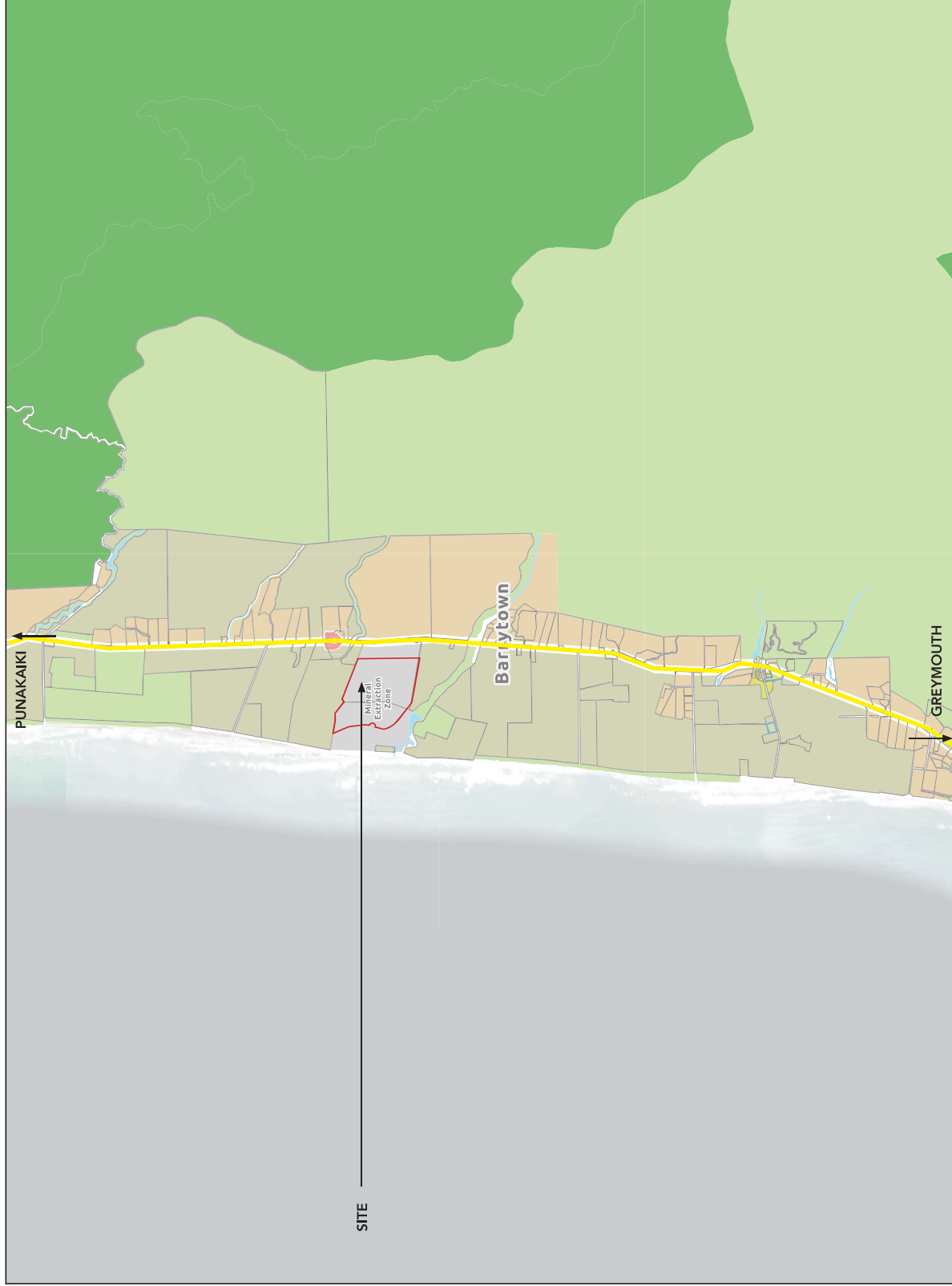
KEY

- RURAL ZONE
- ARCHAEOLOGICAL SITE
- FAULTLINE
- STATE HIGHWAY 6
- MINING DISTURBANCE AREA

Basemap credits: Grey District Council



5.0 TE TAI O POUTINI PLAN: PROPOSED ZONING

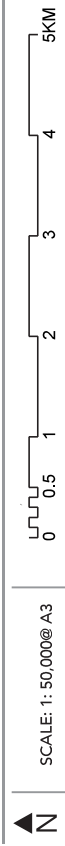


KEY

- NATURAL OPEN SPACE ZONE
- OPEN SPACE ZONE
- RURAL LIFESTYLE ZONE
- GENERAL RURAL ZONE
- MINERAL EXTRACTION ZONE
- SETTLEMENT ZONE
- WATERBODY
- STATE HIGHWAY 6
- MINING DISTURBANCE AREA

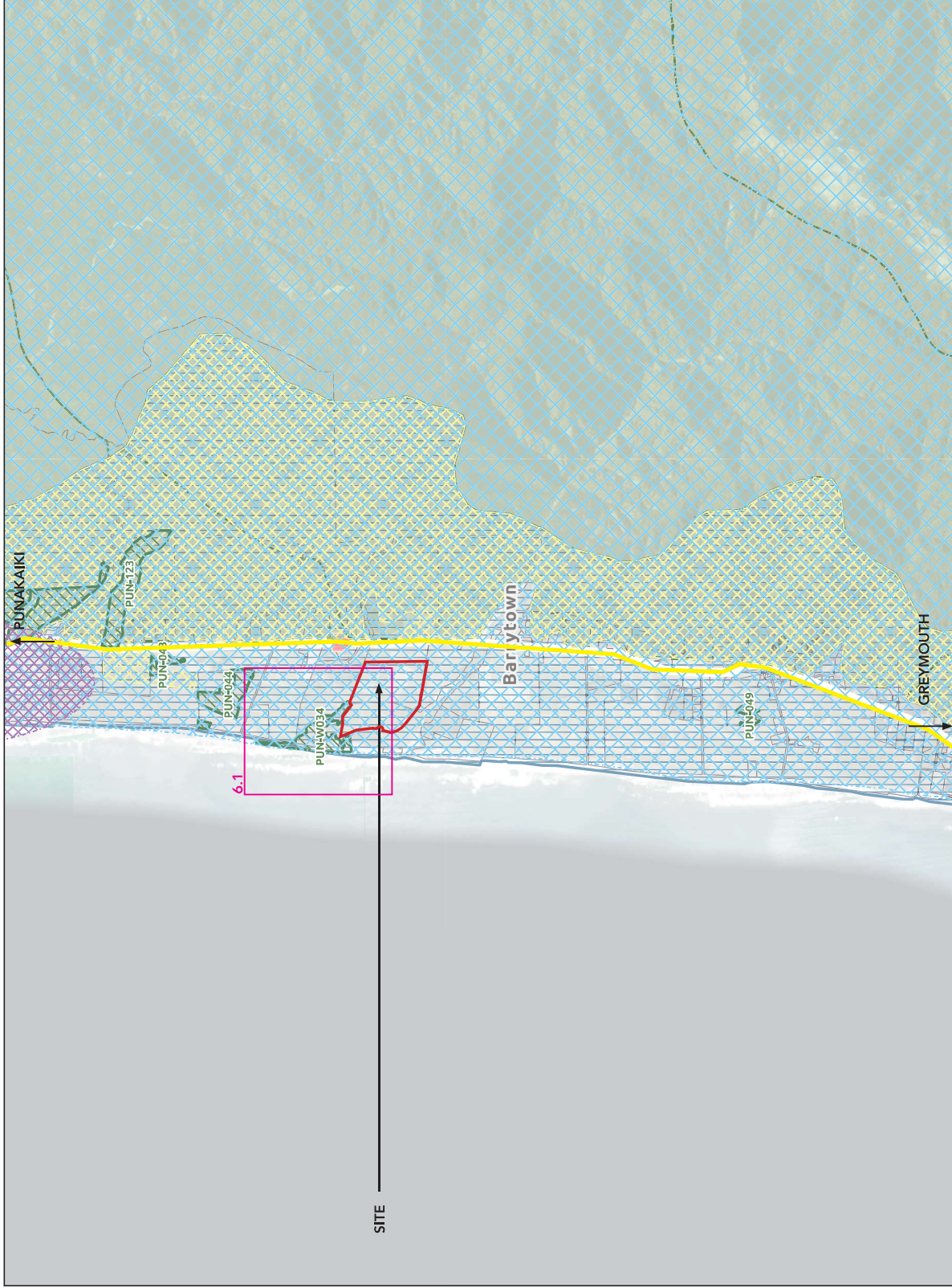
Note: Te Tai o Poutini Plan is a proposed plan. As such, it has been given limited consideration by the accompanying Landscape and Visual Assessment.

Basemap credit: Te Tai o Poutini Plan, West Coast District



SCALE: 1: 50,000@ A3

6.0 TE TAI O POUTINI PLAN: PROPOSED ZONING (LANDSCAPE FEATURES)

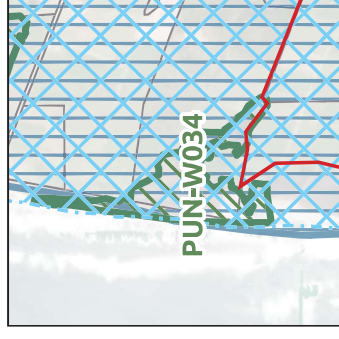


KEY	
	OUTSTANDING NATURAL LANDSCAPE
	SITES AND AREAS OF SIGNIFICANCE TO MĀORI
	OUTSTANDING NATURAL CHARACTER
	POUNAMU MANAGEMENT AREAS
	SIGNIFICANT NATURAL AREAS
	COASTAL ENVIRONMENT
	MINING DISTURBANCE AREA
	STATE HIGHWAY 6

Basemap credit: Te Tai o Poutini Plan, West Coast

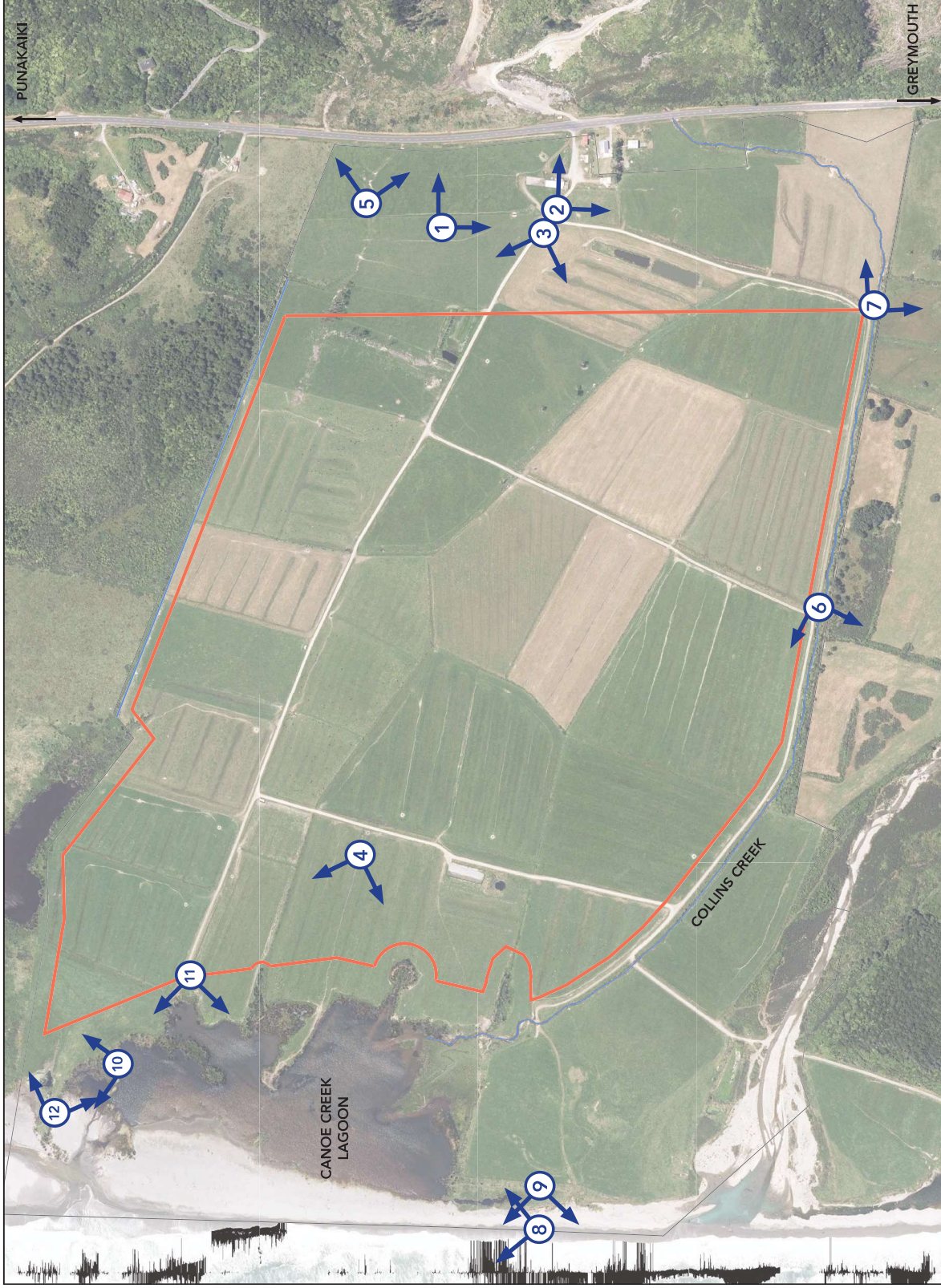
6.1 PUN-W034 ZOOM IN

'PUN-W034' is proposed as a Significant Natural Area under the TTPP. This is the Punakaiki Lagoon and Coastal Wetland Sequence. The proposed SNA adjoins the north-western boundary of the site.



SCALE: 1: 50,000@ A3

7.0 CHARACTER IMAGE LOCATIONS



KEY:

CHARACTER IMAGE LOCATION

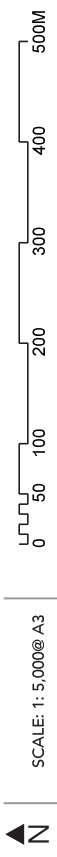
APPLICATION AREA

MINING DISTURBANCE AREA

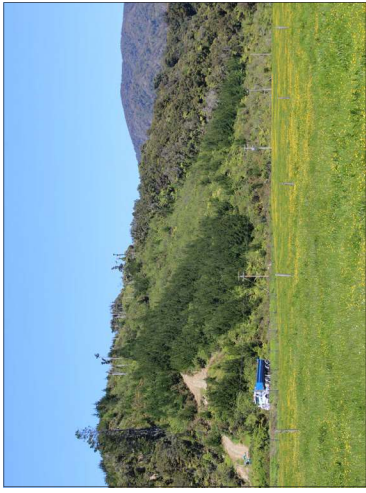
DRAINAGE AND WATER SYSTEMS

Viewpoints shown on this page correspond with character images shown on the following page.

Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable



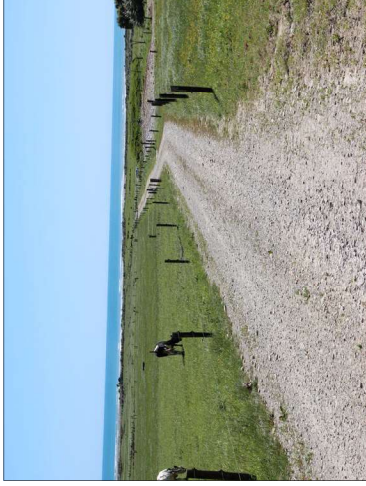
8.0 CHARACTER IMAGES



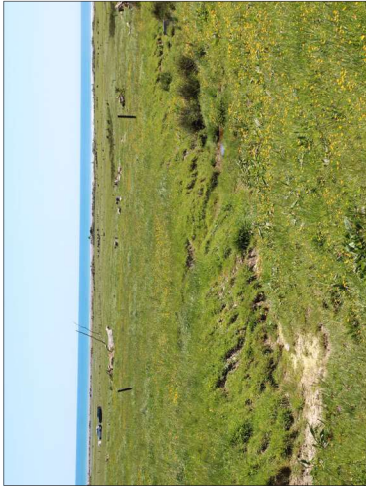
1.0: View of traffic using State Highway 6 from the site.



2.0: Existing farmhouse and ancillary buildings on site.



3.0: Typical farm access track.



4.0: Existing humps and hollows on site.



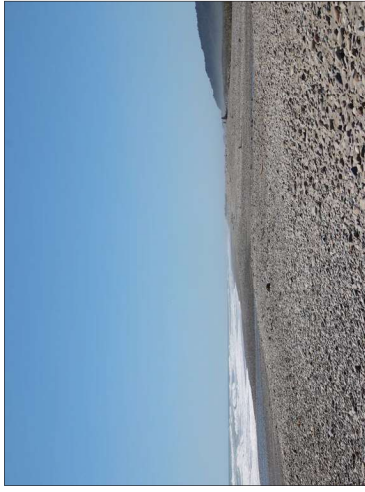
5.0: On site drainage channels.



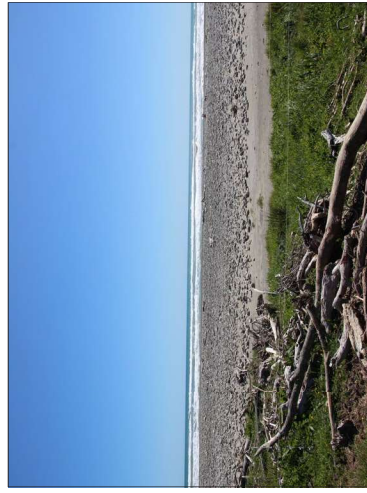
6.0: Collins Creek (looking west).



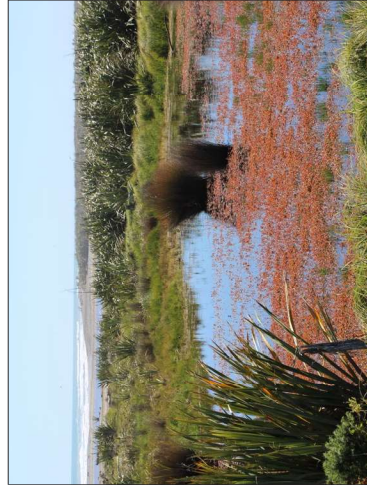
7.0: Collins Creek (looking east).



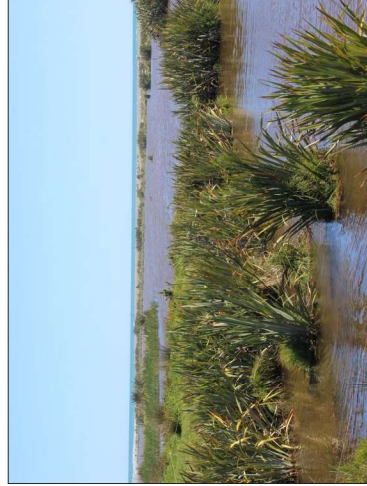
8.0: Pakiroa Beach (looking north).



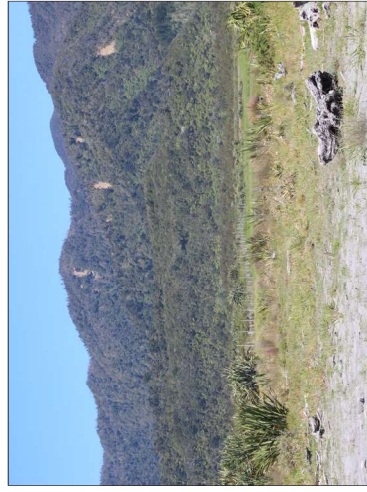
9.0: Typical Pakiroa Beach character.



10.0: Canoe Creek Lagoon.



11.0: Canoe Creek Lagoon.



12.0: View of houses on flanks of hillsides (as viewed from Pakiroa Beach).

9.0 VIEWPOINTS PLAN: INSIDE THE SITE



KEY:

- PRIVATE VIEWPOINT
- APPLICATION AREA
- MINING DISTURBANCE AREA
- DRAINAGE AND WATER SYSTEMS

Viewpoints shown on this page correspond with the panoramas shown on the following pages.

Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable

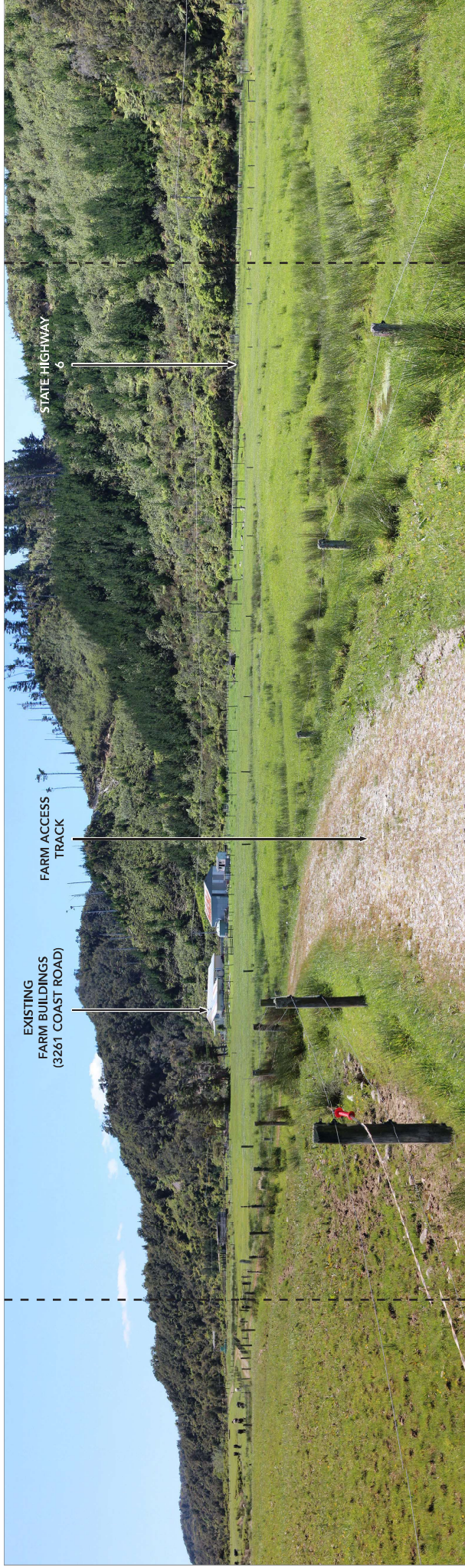
GPS CO-ORDINATES:

- Private viewpoint 1: 171°19'41.47"E 42°12'20.13"S
- Private viewpoint 2: 171°19'45.71"E 42°11'58.15"S
- Private viewpoint 3: 171°19'47.00"E 42°12'7.12"S
- Private viewpoint 4: 171°19'25.28"E 42°12'17.63"S
- Private viewpoint 5: 171°19'26.49"E 42°12'15.65"S
- Private viewpoint 6: 171°18'55.39"E 42°12'8.06"S
- Private viewpoint 7: 171°18'54.58"E 42°12'7.79"S
- Private viewpoint 8: 171°18'52.13"E 42°12'7.67"S
- Private viewpoint 9: 171°19'5.49"E 42°11'51.65"S
- Private viewpoint 10: 171°18'57.21"E 42°11'45.67"S
- Private viewpoint 11 & 12: 171°18'59.75"E 42°11'46.52"S
- Private viewpoint 13: 171°19'30.78"E 42°11'59.77"S



VIEWPOINT 1.0: THE SITE AS VIEWED FROM THE SOUTH EASTERN CORNER

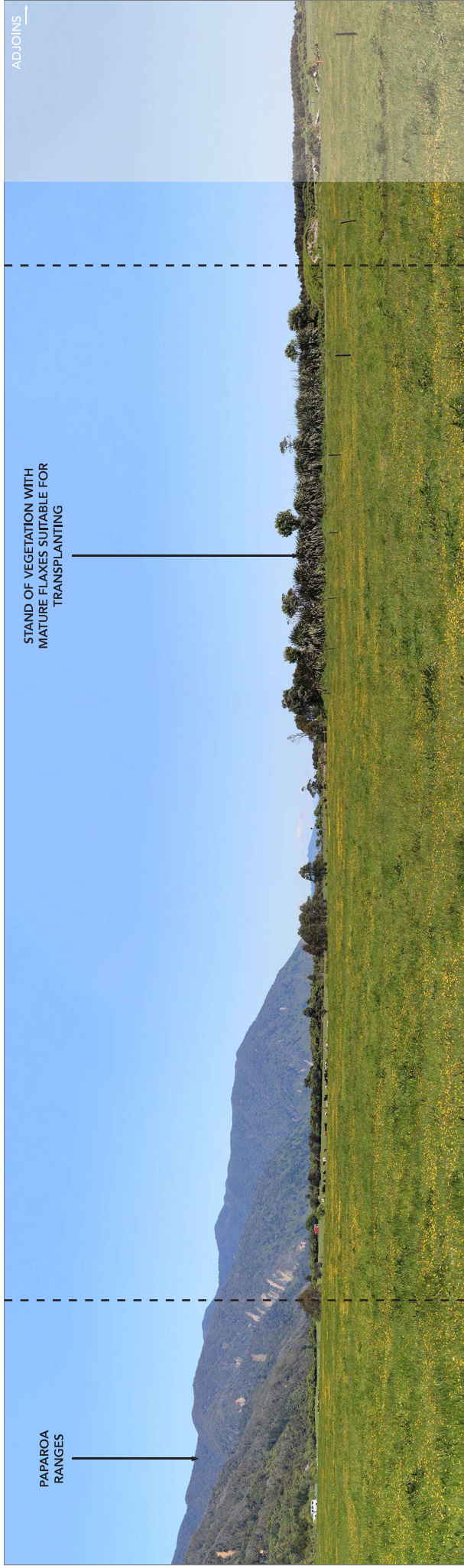
124° PRIMARY FIELD OF VIEW EXTENT



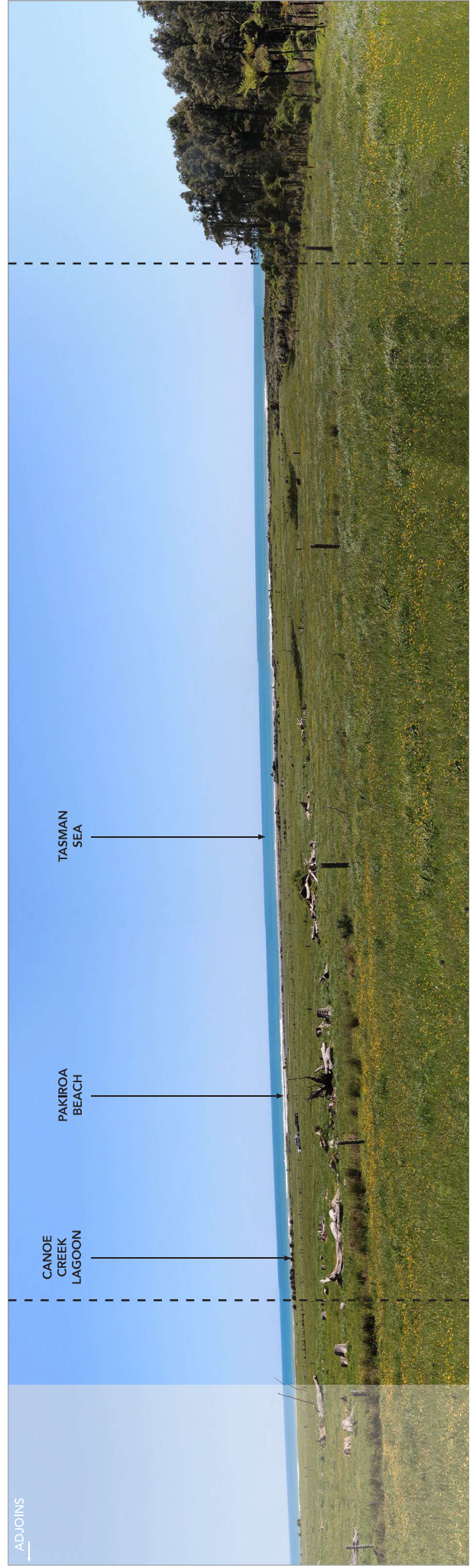
Viewpoint 1: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 2.0: THE SITE AS VIEWED FROM THE NORTH EASTERN CORNER

124° PRIMARY FIELD OF VIEW EXTENT



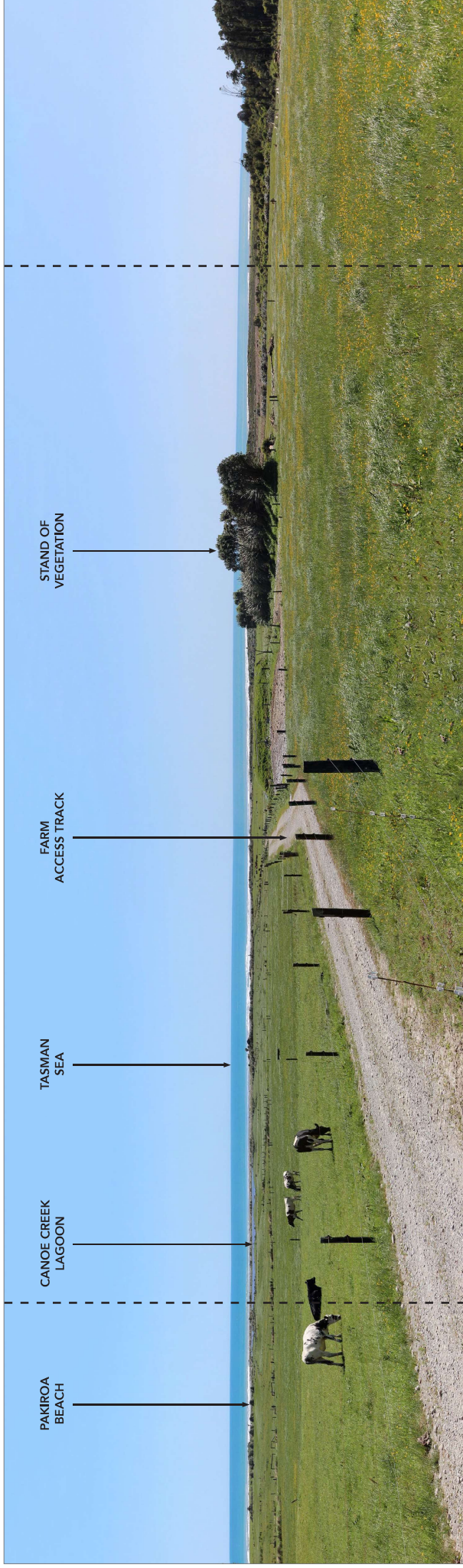
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 2: Date Taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 3.0: LOOKING DOWN THE MAIN FARM ACCESS TRACK ON THE SITE TOWARDS THE COAST

124° PRIMARY FIELD OF VIEW EXTENT



PAKIROA BEACH

CANOE CREEK LAGOON

TASMAN SEA

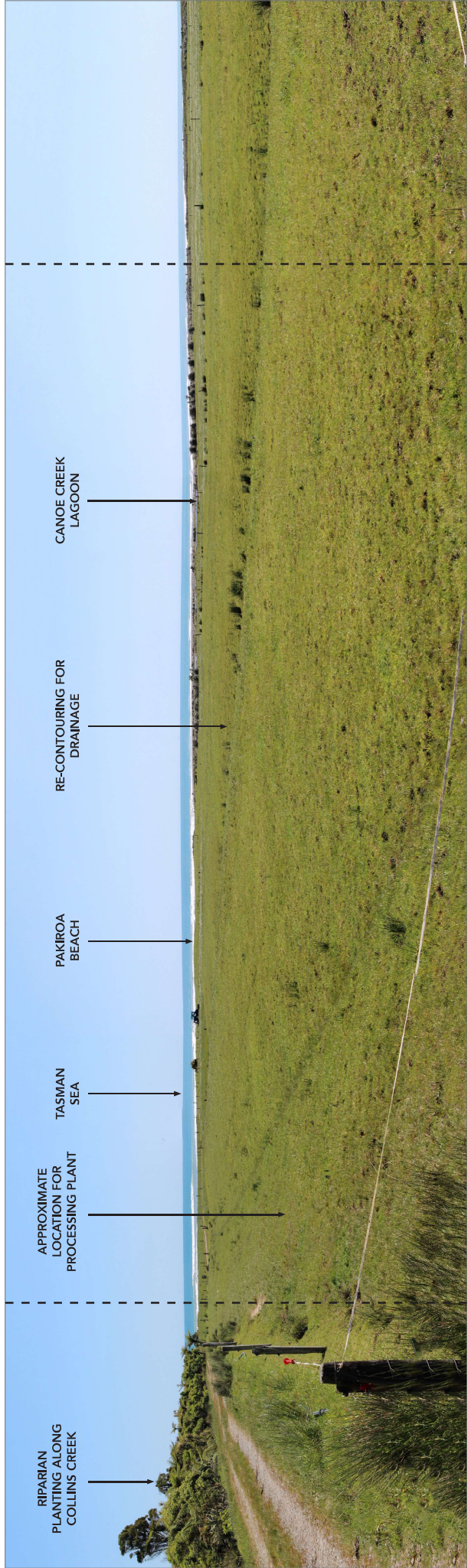
FARM ACCESS TRACK

STAND OF VEGETATION

Viewpoint 3: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 4.0: THE SITE AS VIEWED FROM NEAR THE SOUTHERN BOUNDARY

124° PRIMARY FIELD OF VIEW EXTENT



RIPARIAN PLANTING ALONG COLLINS CREEK

APPROXIMATE LOCATION FOR PROCESSING PLANT

TASMAN SEA

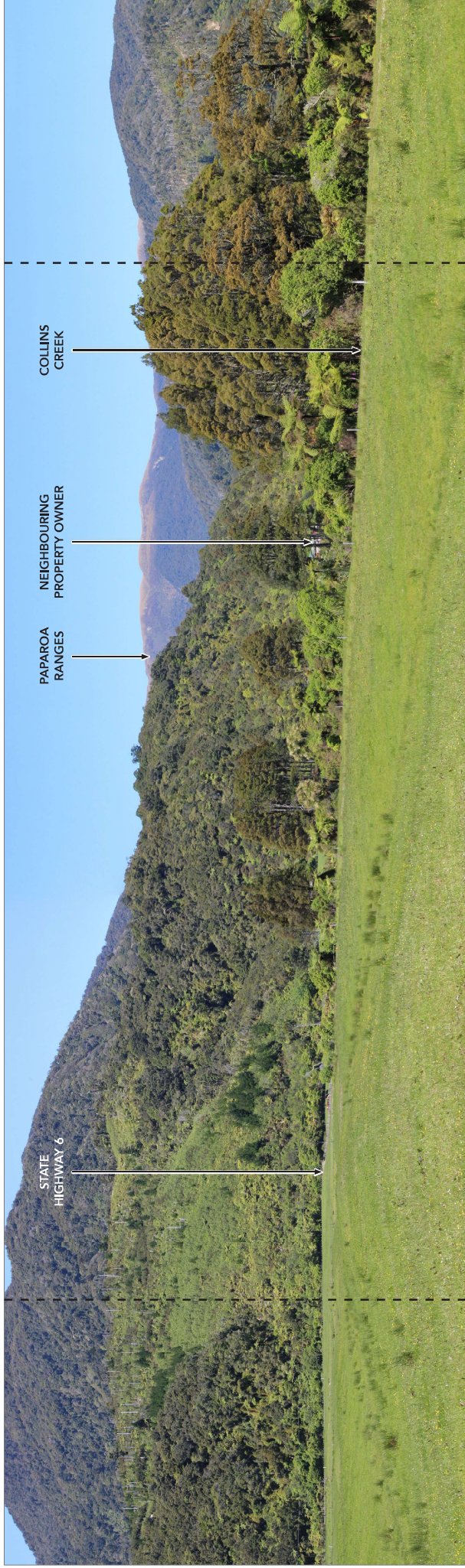
PAKIROA BEACH

RE-CONTOURING FOR DRAINAGE

CANOE CREEK LAGOON

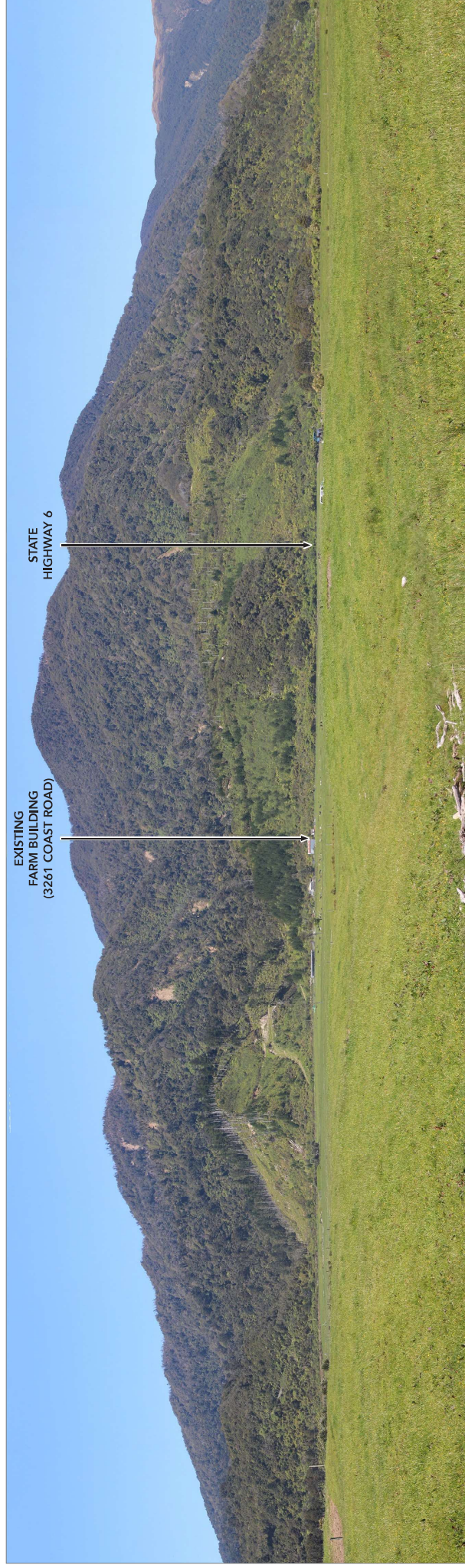
Viewpoint 4: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 5.0: LOOKING FROM THE SITE TOWARDS THE PAPAROA RANGES



Viewpoint 5: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 6.0: THE SITE AS VIEWED FROM THE SOUTH-WESTERN CORNER



Viewpoint 6: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 7.0: LOOKING TOWARDS THE SITE FROM A DRY STREAM BED ON THE FORESHORE

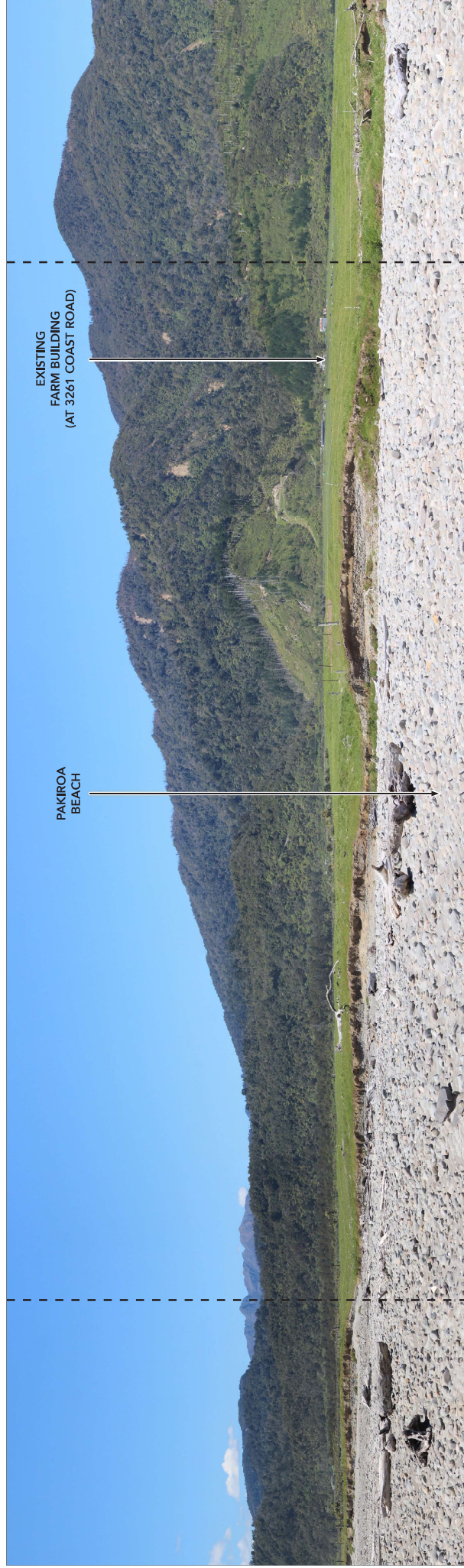
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 7: Date taken 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 8.0: LOOKING TOWARDS THE SITE FROM THE HIGH TIDE MARK ON PAKIROA BEACH

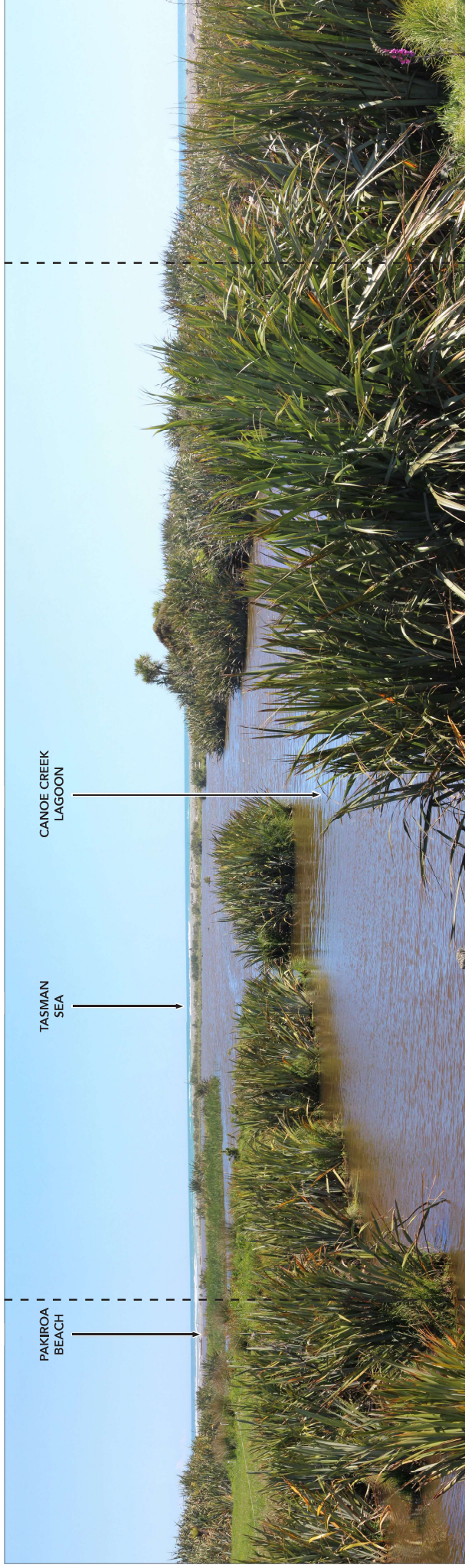
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 8: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 9.0: CANOE CREEK LAGOON

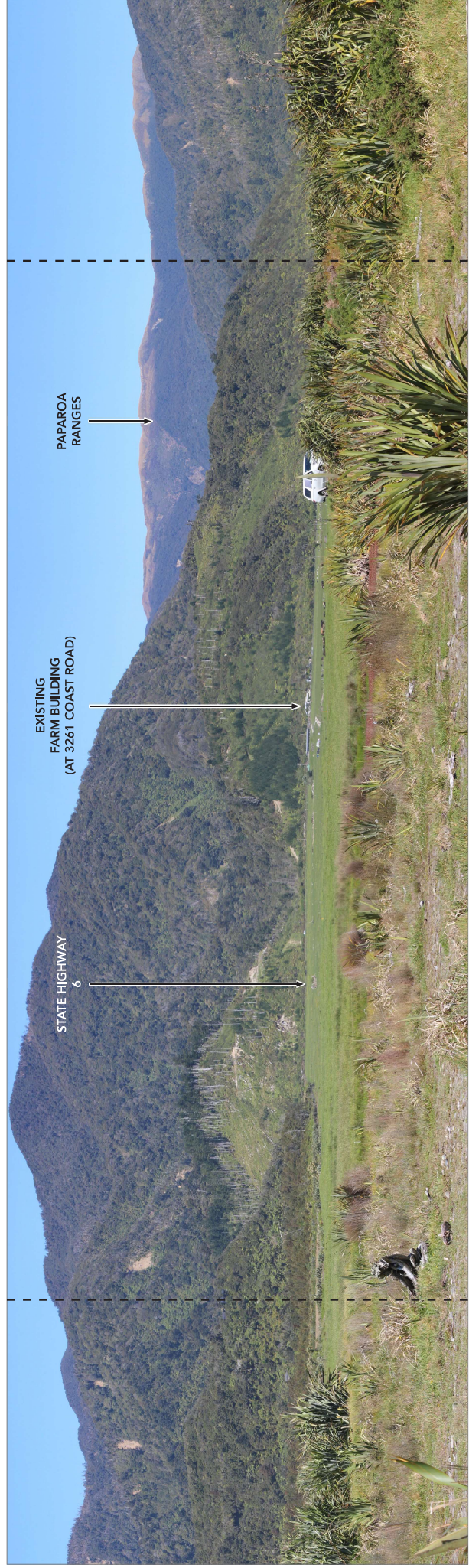
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 9: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 10.0: LOOKING TOWARDS THE SITE AND THE PAPAROA RANGES FROM PAKIROA BEACH

124° PRIMARY FIELD OF VIEW EXTENT



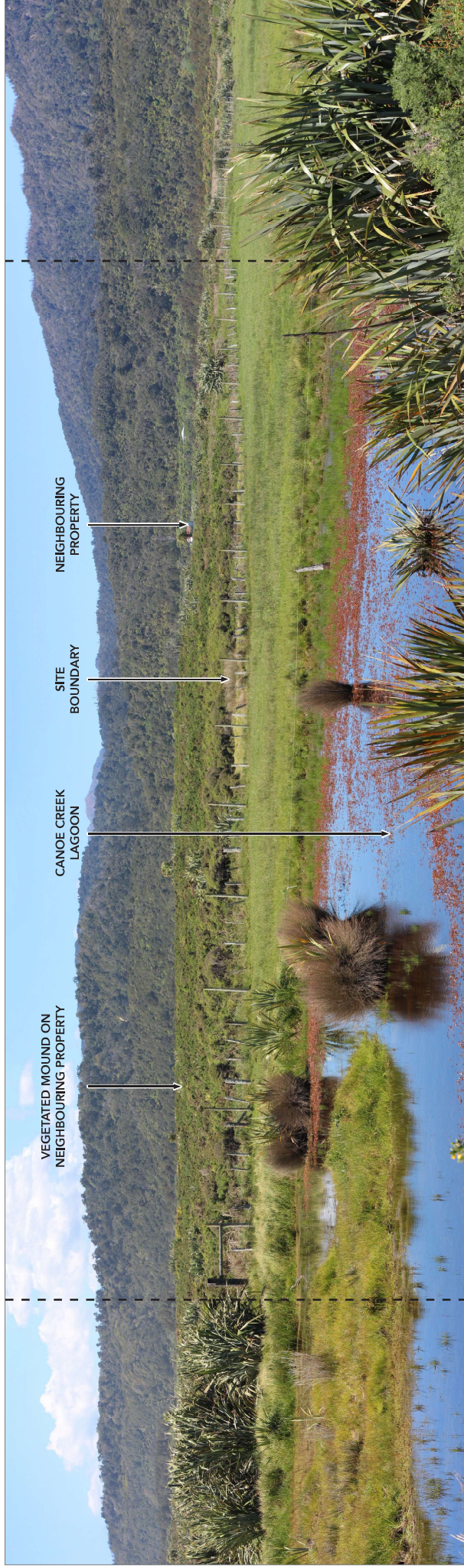
Viewpoint 10: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 11.0: TYPICAL BEACH VIEW FROM THE NORTHERN EDGE OF THE SITE



Viewpoint 11: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

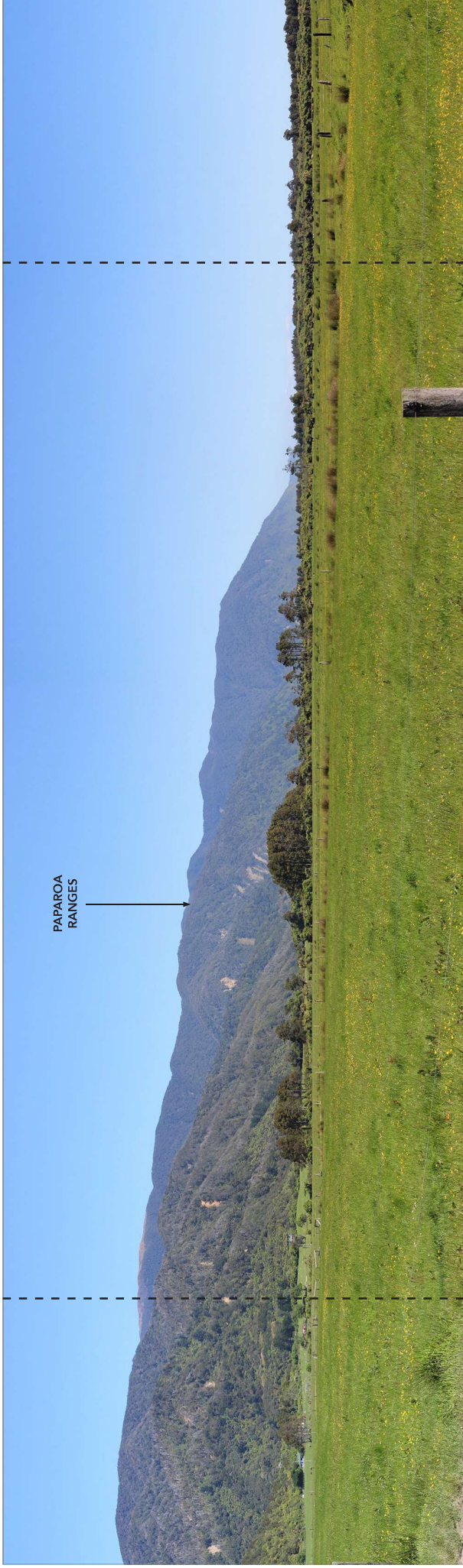
VIEWPOINT 12.0: NORTHERN END OF CANOE CREEK LAGOON



Viewpoint 12: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

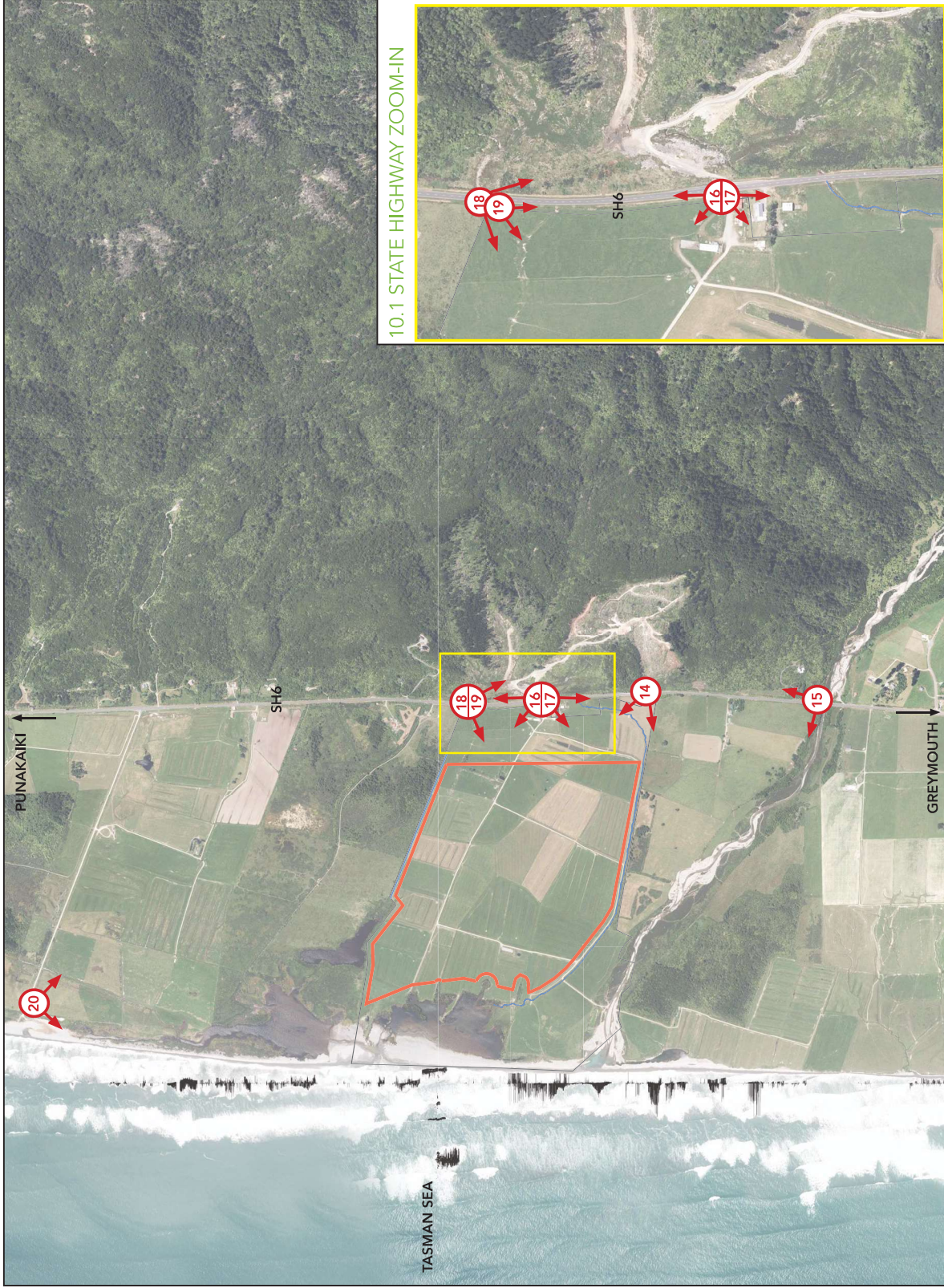
VIEWPOINT 13.0: THE CENTRAL PART OF THE SITE

124° PRIMARY FIELD
OF VIEW EXTENT



Viewpoint 13: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a private viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

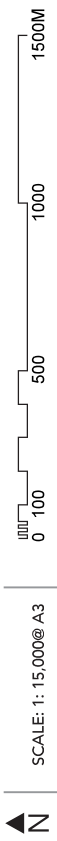
10.0 VIEWPOINTS PLAN: OUTSIDE THE SITE



10.1 STATE HIGHWAY ZOOM-IN



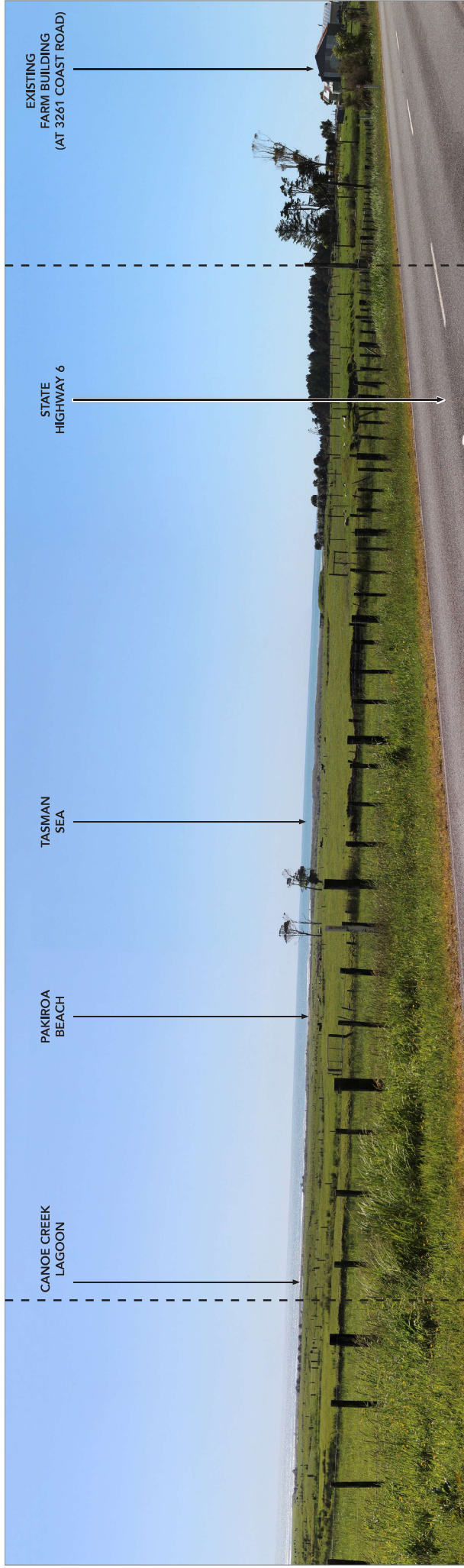
KEY:  PUBLIC VIEWPOINT  ZOOM-IN  APPLICATION AREA  MINING DISTURBANCE AREA  DRAINAGE AND WATER SYSTEMS	Viewpoints shown on this page correspond with the panoramas shown on the following pages.
	Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable
	GPS CO-ORDINATES: Public viewpoint 14: 171°19'52.95"E 42°12'19.60"S Public viewpoint 15: 171°19'51.33"E 42°12'38.51"S Public viewpoint 16 & 17: 171°19'51.14"E 42°12'3.63"S Public viewpoint 18 & 19: 171°19'51.59"E 42°11'57.07"S Public viewpoint 20: 171°19'3.02"E 42°11'5.61"S
	GPS CO-ORDINATES DISTANCES FROM SITE: Public viewpoint 14: 0.01km Public viewpoint 15: 0.54km Public viewpoint 16 & 17: 0.01km Public viewpoint 18 & 19: 0.01km Public viewpoint 20: 1.25km



SCALE: 1: 15,000@ A3



VIEWPOINT 14.0: VIEW FROM SH6, LOOKING NORTH WEST ACROSS THE SITE



Viewpoint 14: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 15.0: VIEW FROM THE DRIVEWAY OF 3172 COAST ROAD, SOUTHERN APPROACH TO THE SITE



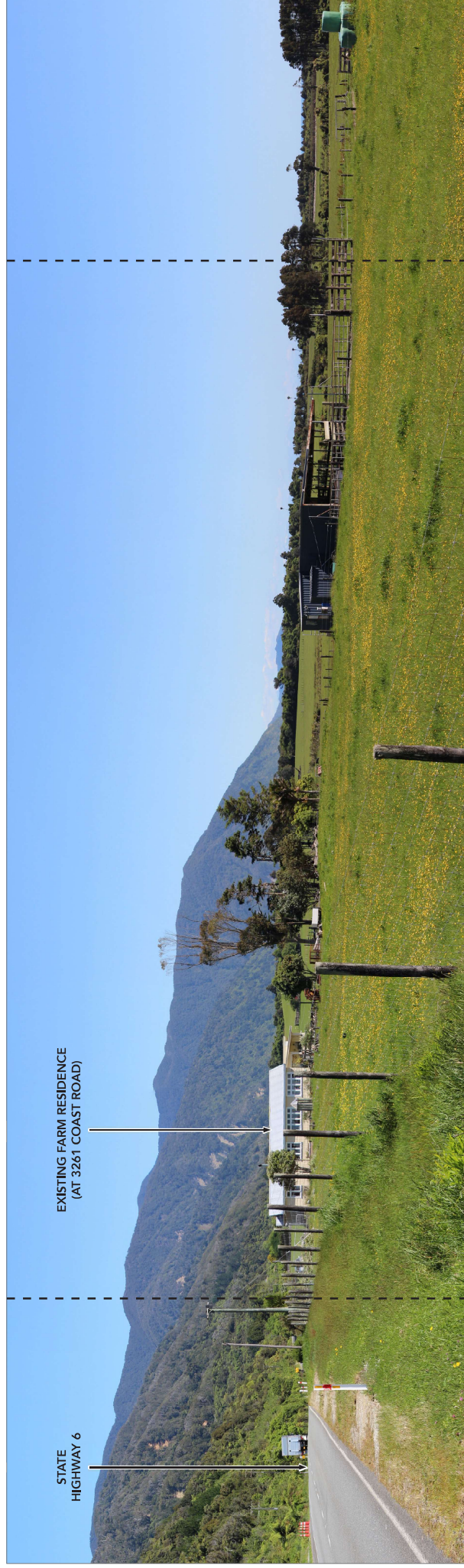
Viewpoint 15: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 16.0: VIEW FROM SH6, LOOKING NORTH-WEST (SITE IN FOREGROUND)



Viewpoint 16: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 17.0: VIEW FROM SH6, LOOKING SOUTH-WEST AT THE SITE



Viewpoint 17: Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints should be viewed at approx. 500mm distance from eye level (recommended), A3 size prints should be viewed at approx. 250mm.

VIEWPOINT 18.0: VIEW FROM SH6 ILLUSTRATING THE NORTHERN APPROACH TO SITE

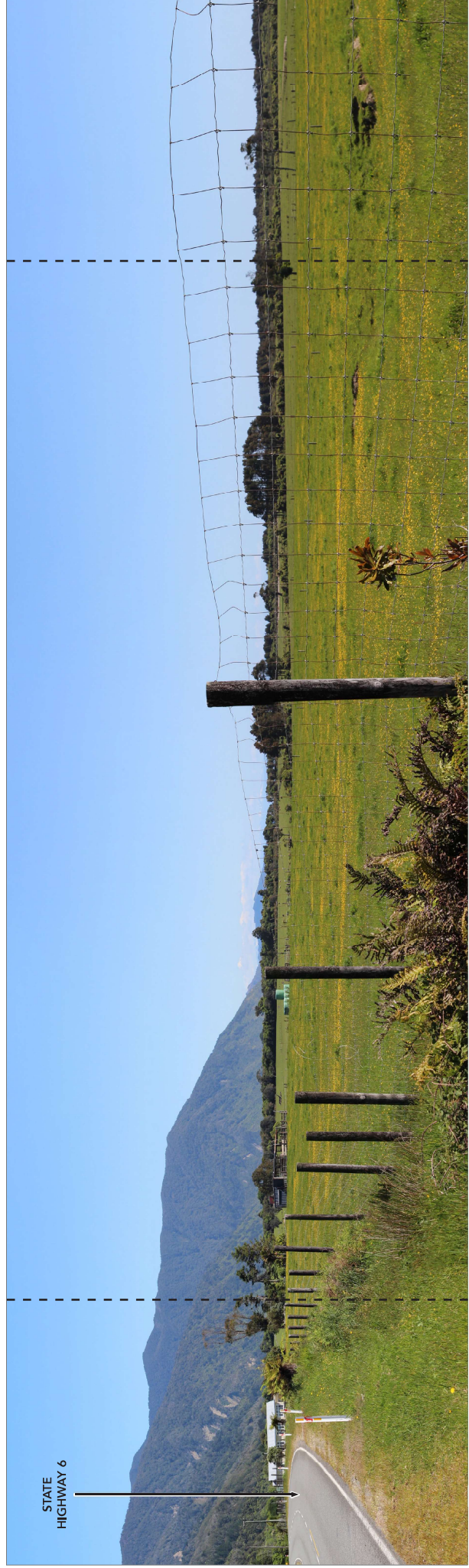
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 18.0. Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended). A3 size prints to be viewed at approx. 250mm.

VIEWPOINT 19.0: VIEW FROM SH6 ILLUSTRATING THE NORTHERN APPROACH TO SITE

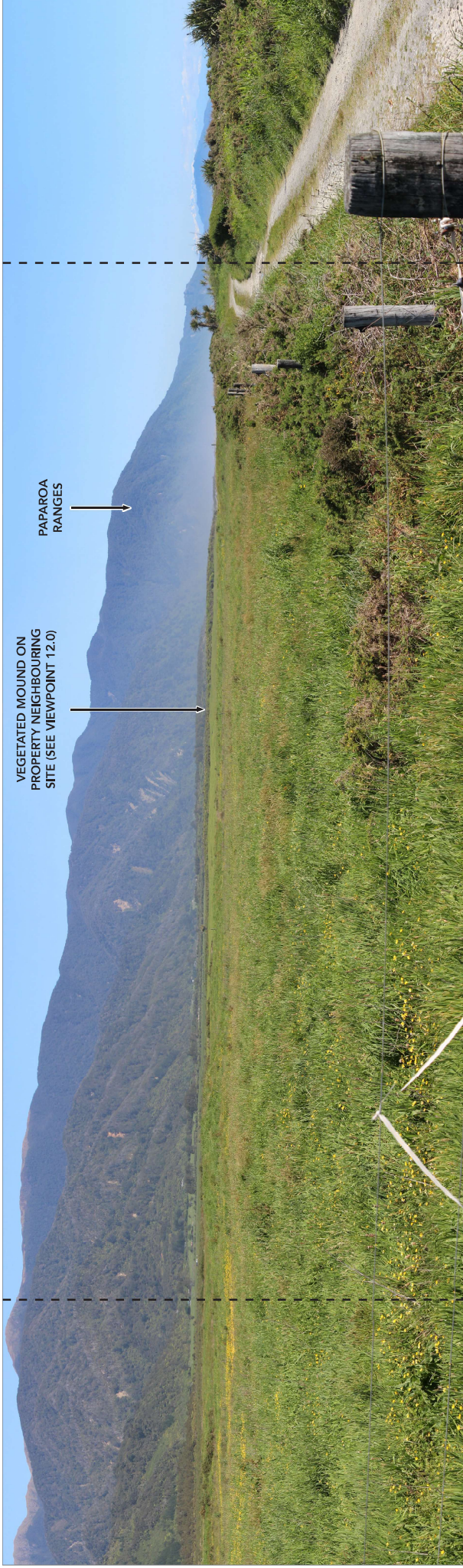
124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 19.0. Date taken: 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended). A3 size prints to be viewed at approx. 250mm.

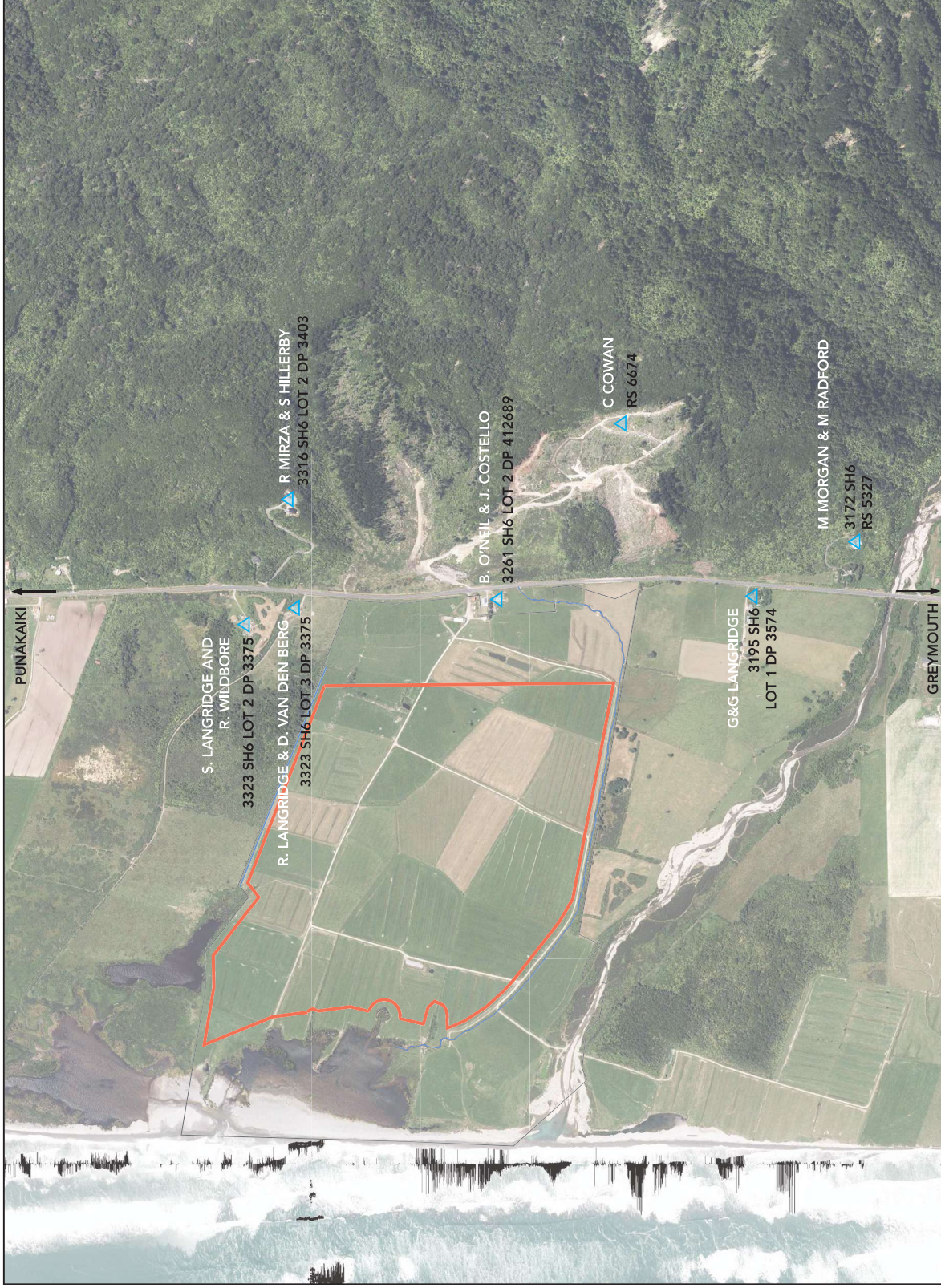
VIEWPOINT 20.0: LOOKING TOWARDS THE SITE FROM THE NORTH WESTERN END OF BURKE ROAD

124° PRIMARY FIELD OF VIEW EXTENT



Viewpoint 20.0: Date taken 14th November 2022. Taken with a Canon 600D camera with a 50mm lens. This is a public viewpoint. A1 size prints to be viewed at approx. 500mm distance from eye level (recommended), A3 size prints to be viewed at approx. 250mm.

11.0 NEIGHBOURING PROPERTIES



KEY:

- APPLICATION AREA
- MINING DISTURBANCE AREA
- △ NEIGHBOURING PROPERTIES
- DRAINAGE AND WATER SYSTEMS

NOTE: State Highway 6 and Coast Road are synonymous.

Many property owners possess more than one parcel of land. The supplied parcel numbers on the plan relate to the dwelling associated with each address.

Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable

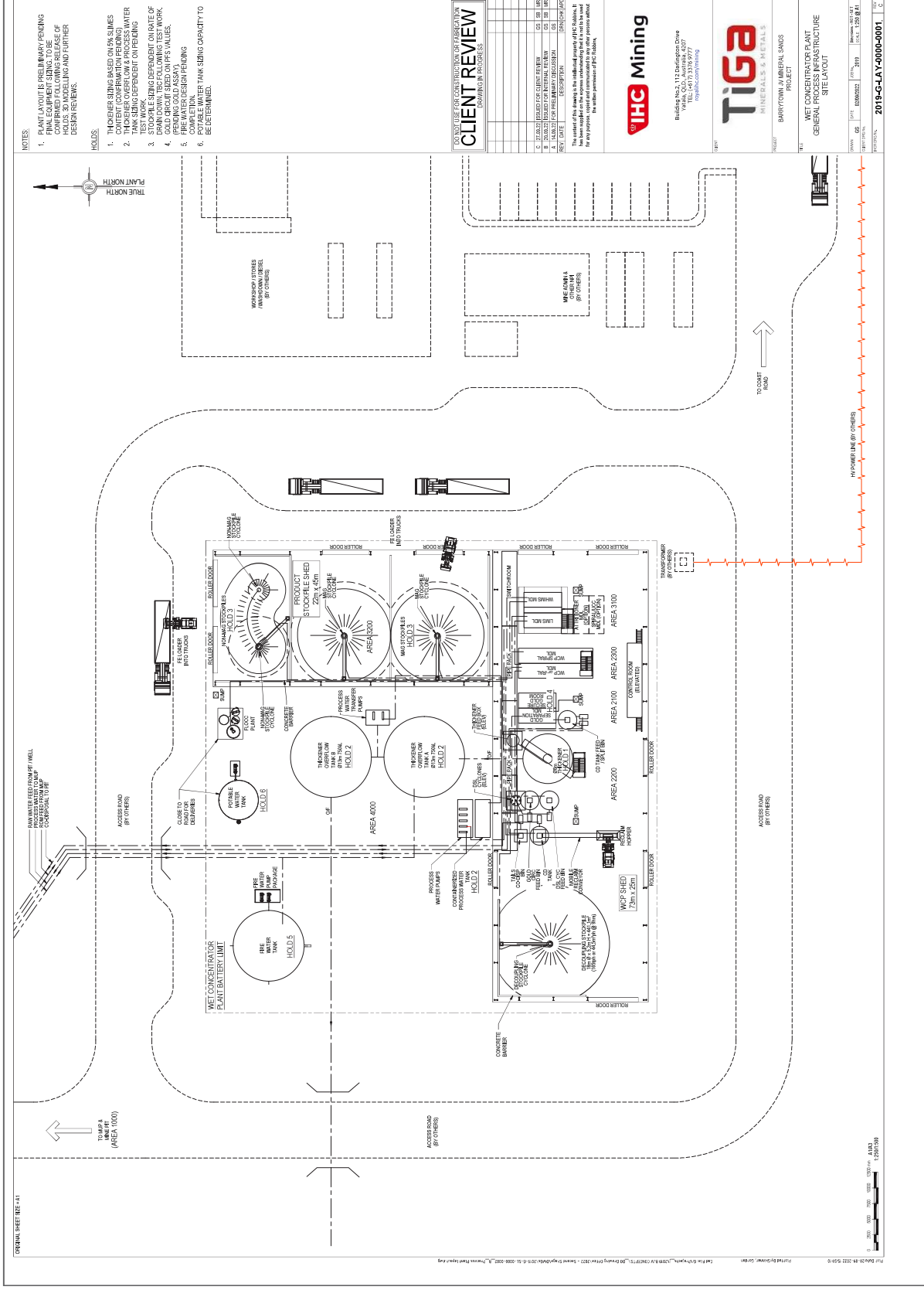
GPS CO-ORDINATES DISTANCES FROM SITE:

- 3141 SH6: 0.72km
- 3142 SH6: 0.82km
- 3172 SH6: 0.58km
- 3195 SH6: 0.30km
- 3261 SH6: 0.00km
- 3316 SH6: 0.26km
- 3320 SH6: 0.25km
- 3375 SH6: 0.10km
- 3323 SH6: 0.22km

SCALE: 1: 10,000@ A3



12.0 THE PROCESSING PLANT AND ASSOCIATED INFRASTRUCTURE



- NOTES:**
1. PLAN AND SITE FROM WORKSHEET COMPRISED FOLLOWING RELEASE OF HOLDINGS TO WORKING AND FURTHER DESIGN PHASES.
 2. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK.
 3. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK.
 4. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK.
 5. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK.
 6. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK. HOLDINGS TO BE RELEASED ON THE BASIS OF THE FOLLOWING TEST WORK.

CLIENT REVIEW

FOR USE FOR CONSTRUCTION OF FABRICATION OF MINERAL SANDS

REV.	DATE	DESCRIPTION	DESIGNED BY	CHECKED BY
1	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
2	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
3	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
4	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
5	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
6	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
7	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
8	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
9	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR
10	12/01/2019	ISSUED FOR CLIENT REVIEW	CSH	SHR

IHC Mining

Building No. 3, 112 Devonshire Drive
 Victoria, VIC 3121
 Tel: +61 3 9596 9777
 royalhills.com/mining

TiGa

MINERALS & METALS
 BARRYTOWN MINERAL SANDS
 PROJECT

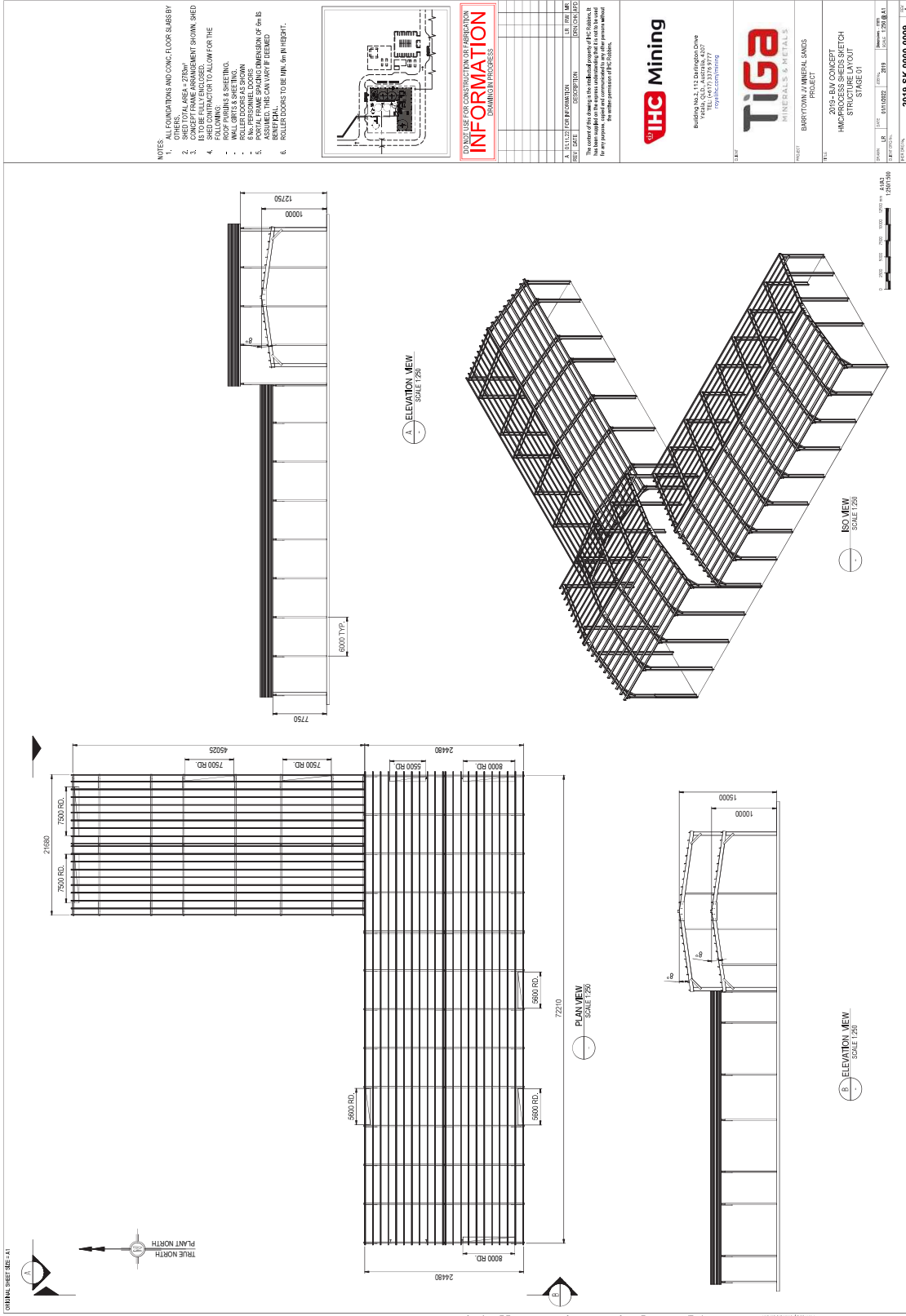
**WET CONCENTRATION PLANT
 GENERAL INFRASTRUCTURE
 SITE LAYOUT**

DATE: 12/01/2019
 DRAWN BY: CSH
 CHECKED BY: SHR
 PROJECT NO: 2019-G-LAY-0000-0001
 SHEET NO: 12.0

SCALE: NTS

Image credits: TiGa Minerals and Metals

13.0 THE PROCESSING PLANT BUILDING DETAILS



SCALE: NTS

Image credits: TIGA Minerals and Metals & IHC Robbins

14.0 MINING STAGING PLAN



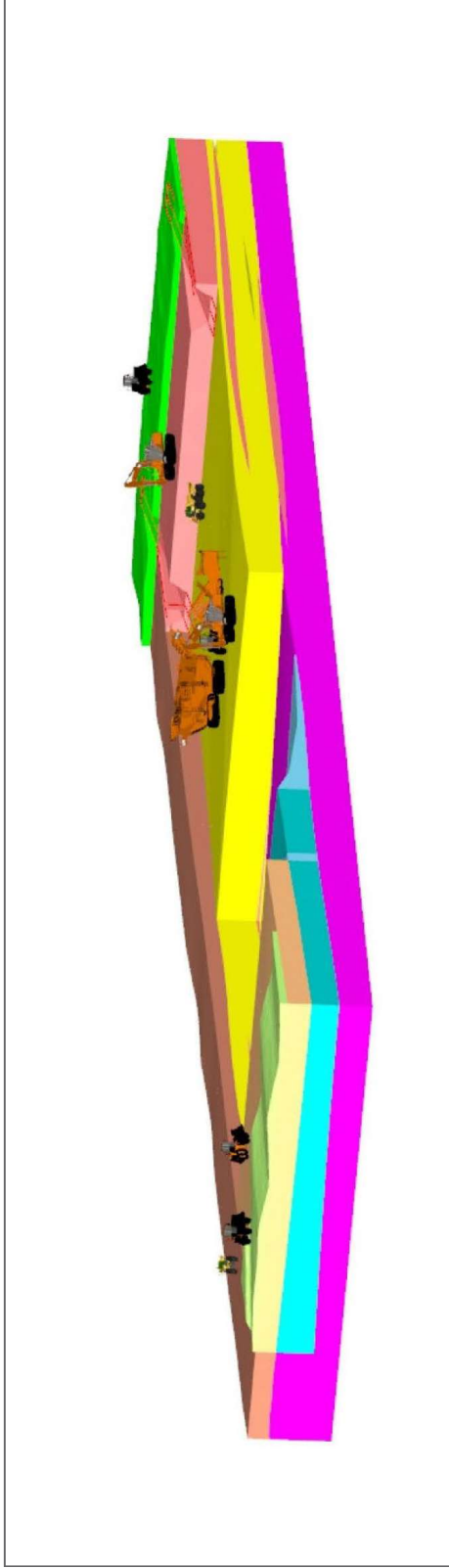
Mining starts in the southwest of the mining disturbance area, and progressively moves eastwards. Each subsequent panel of mining is located north of the previous panel (apart from panels 9 and 10)



SCALE: NTS

Image credits: TiGa Minerals and Metals and Glasson Huxtable

15.0 MINING PANEL PLAN

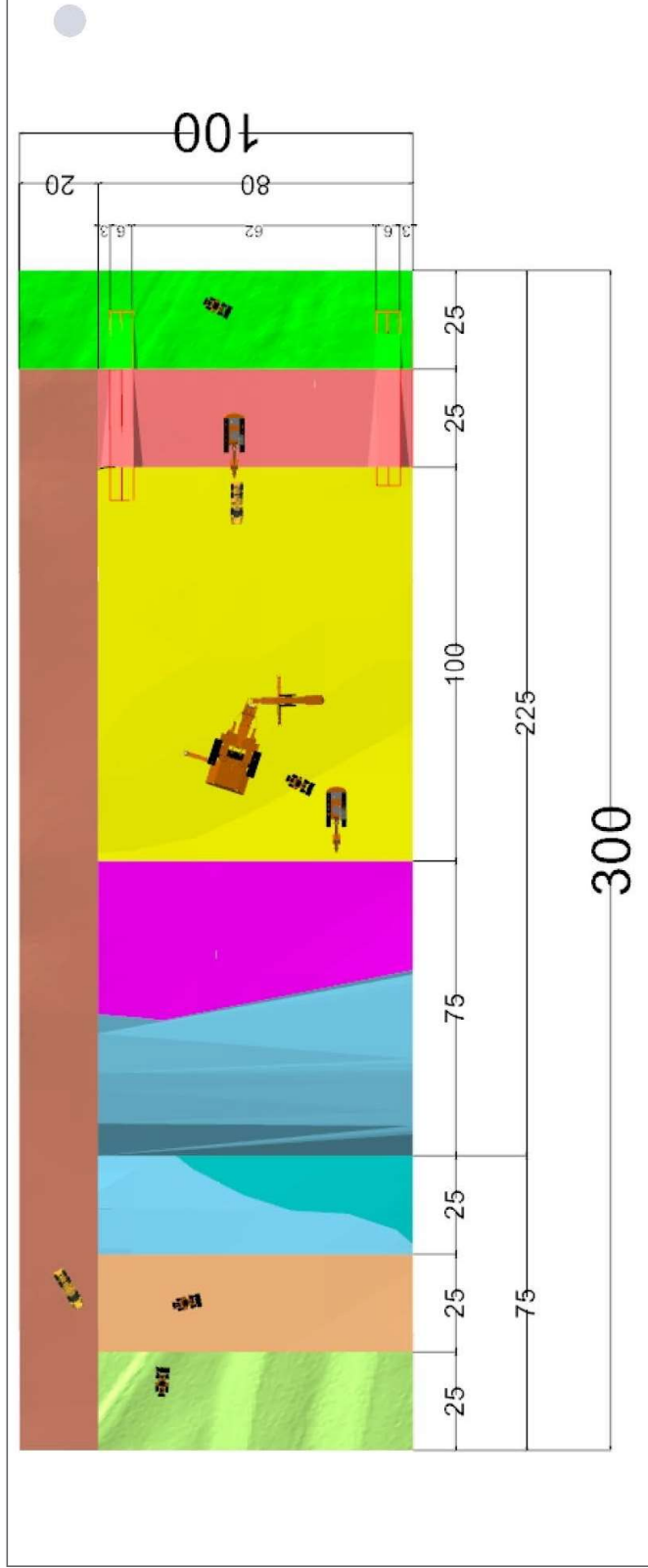


KEY

Mining will progress in strips, with dimensions of 100m wide (strip width) and 300m long. Mining will be limited to a single 3.0-hectare mining panel at any one time.

Within this, there will be 0.5 hectares of stripping occurring ahead of the 2.0 hectare mine pit and 0.5 hectares of progressive rehabilitation occurring behind.

There is also a 2.0-hectare contingency in addition to the 3.0 hectare mine panel for progressive rehabilitation, to allow for weather and seasonal impacts. In winter grass may be slower to establish. At a rate of advance of 35 metres per week on average, 2.0 hectares will provide approximately 6 weeks contingency.

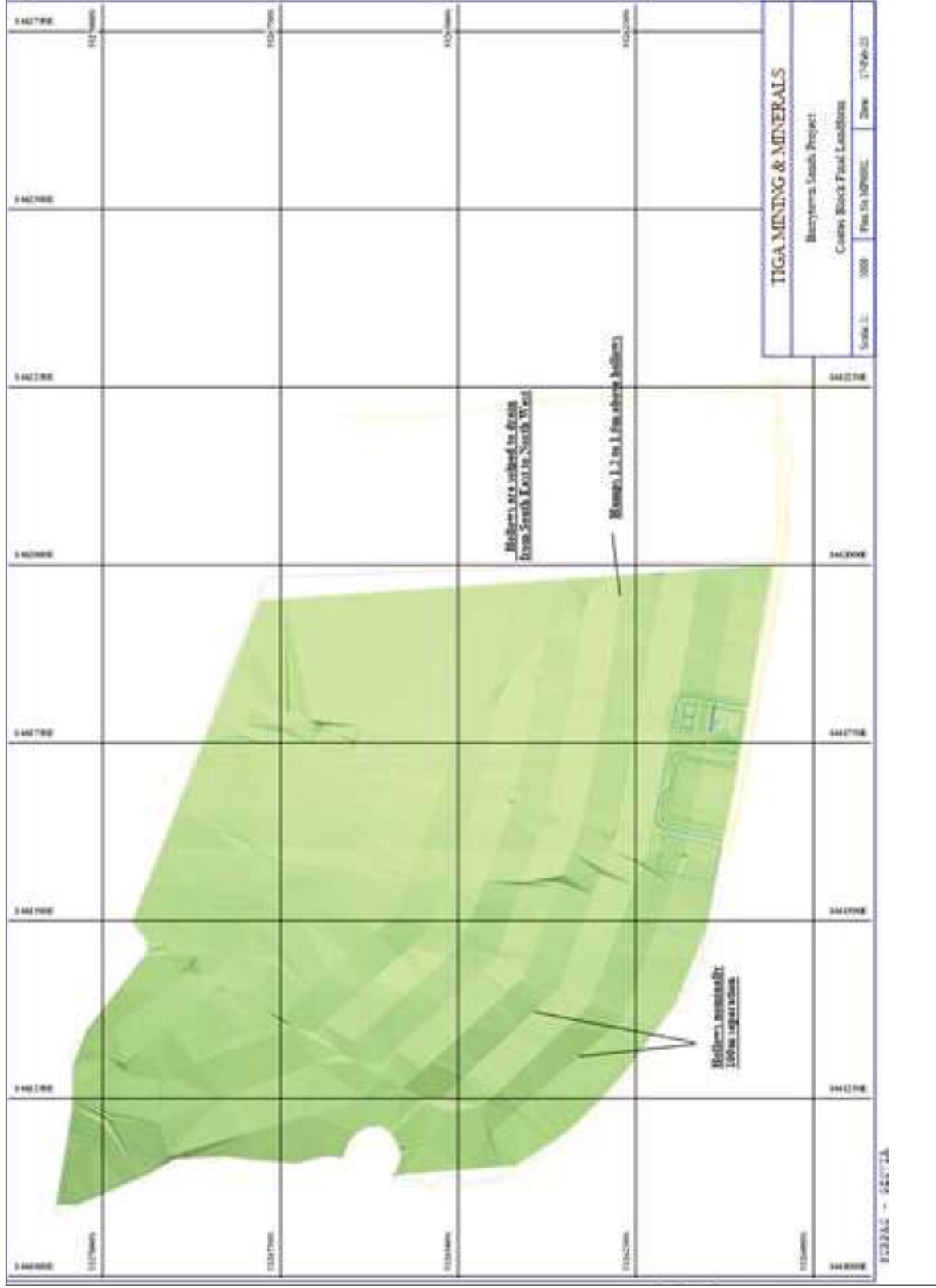


SCALE:1:1250 [PLAN]



Image credits: TiGa Minerals and Metals

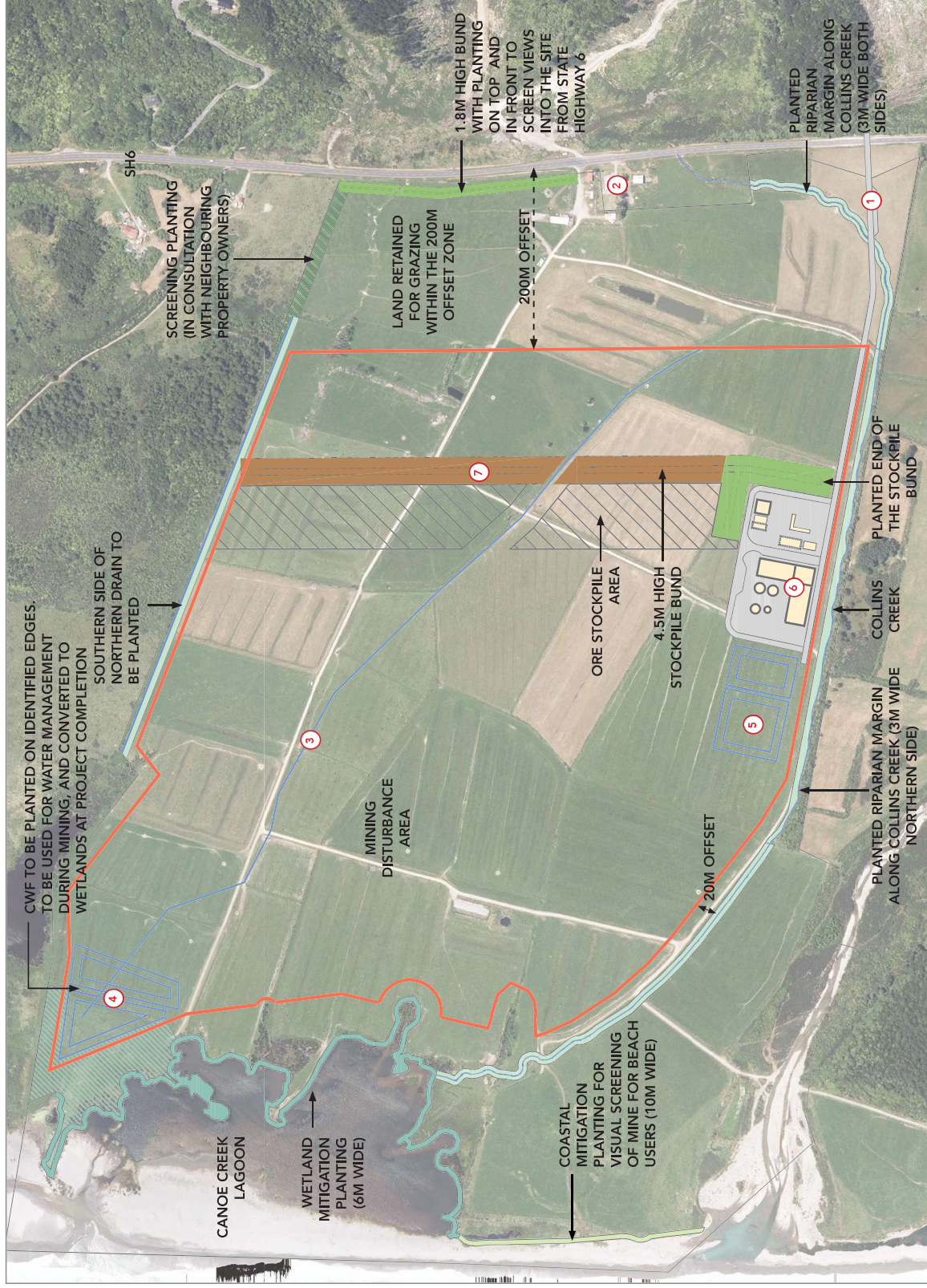
16.0 PROPOSED REHABILITATED SITE



SCALE: NTS

Image credits: TIGA Minerals and Metals

17.0 LANDSCAPE MITIGATION PLAN



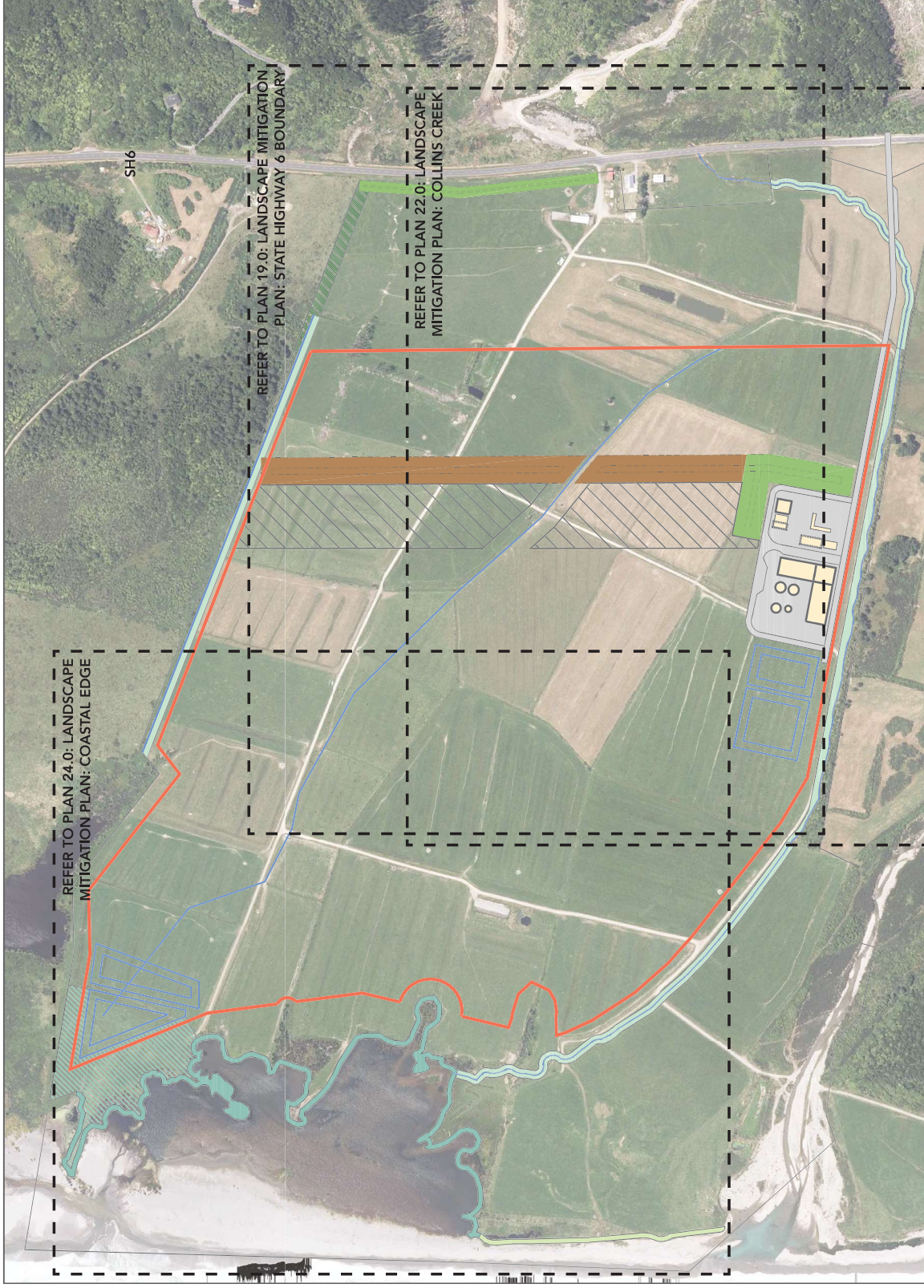
KEY	
	BUND MITIGATION PLANTING
	RIPARIAN MITIGATION PLANTING
	WETLAND MITIGATION PLANTING
	COASTAL MITIGATION PLANTING
	NEIGHBOURING MITIGATION PLANTING
	CLEAN WATER FACILITY MITIGATION PLANTING
	PROCESSING PLANT AND ASSOCIATED FACILITIES
	NEW ACCESS ROAD AND HARDSTAND
	ORE STOCKPILE AREA
	STOCKPILE BUND (EASTERN BUND) FOR TOPSOIL AND OVERBURDEN
	APPLICATION AREA
	MINING DISTURBANCE AREA
	DRAINAGE AND WATER SYSTEMS

KEY MINE FEATURES	
	NEW INTERNAL ACCESS ROAD
	EXISTING RESIDENCE: 3261 COAST ROAD (RETAINED)
	CENTRAL DRAIN
	CLEAN WATER FACILITY
	MINE WATER FACILITY
	PROCESSING PLANT AND ASSOCIATED FACILITIES
	STOCKPILE BUND



Note: Refer to the plans and cross sections on the following pages which provide more details on the proposed landscape mitigation.

18.0 LANDSCAPE MITIGATION REFERENCE PLAN



KEY

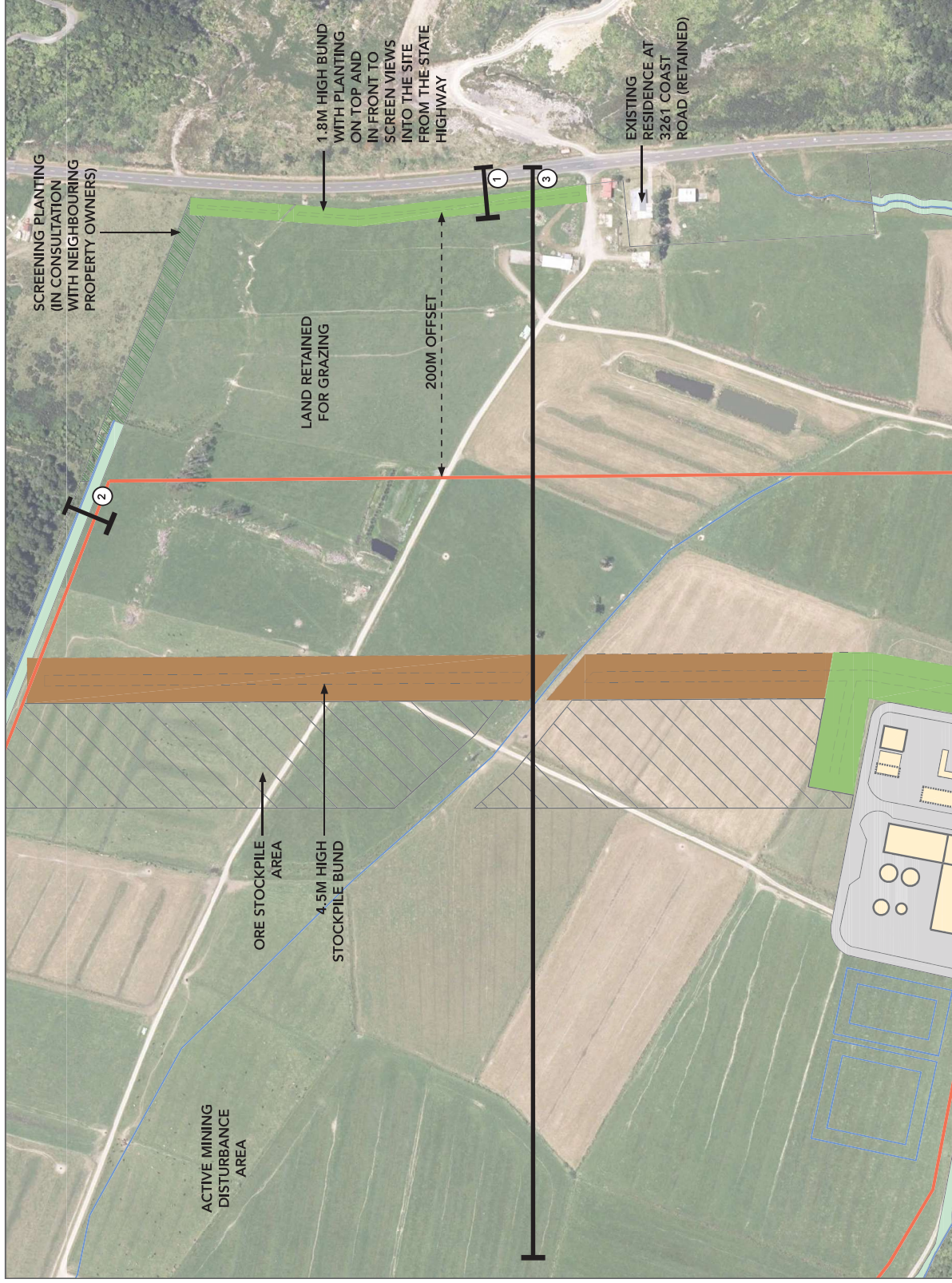
- BUND MITIGATION PLANTING
- RIPARIAN MITIGATION PLANTING
- WETLAND MITIGATION PLANTING
- COASTAL MITIGATION PLANTING
- NEIGHBOURING MITIGATION PLANTING
- CLEAN WATER FACILITY MITIGATION PLANTING
- PROCESSING PLANT AND ASSOCIATED FACILITIES
- NEW ACCESS ROAD AND HARDSTAND
- ORE STOCKPILE AREA
- STOCKPILE BUND (EASTERN BUND) FOR TOPSOIL AND OVERBURDEN
- APPLICATION AREA
- MINING DISTURBANCE AREA
- DRAINAGE AND WATER SYSTEMS

Note: Each of the dashed boxes above represent a corresponding plan on the following pages.

Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable



19.0 LANDSCAPE MITIGATION PLAN: STATE HIGHWAY 6 BOUNDARY



KEY

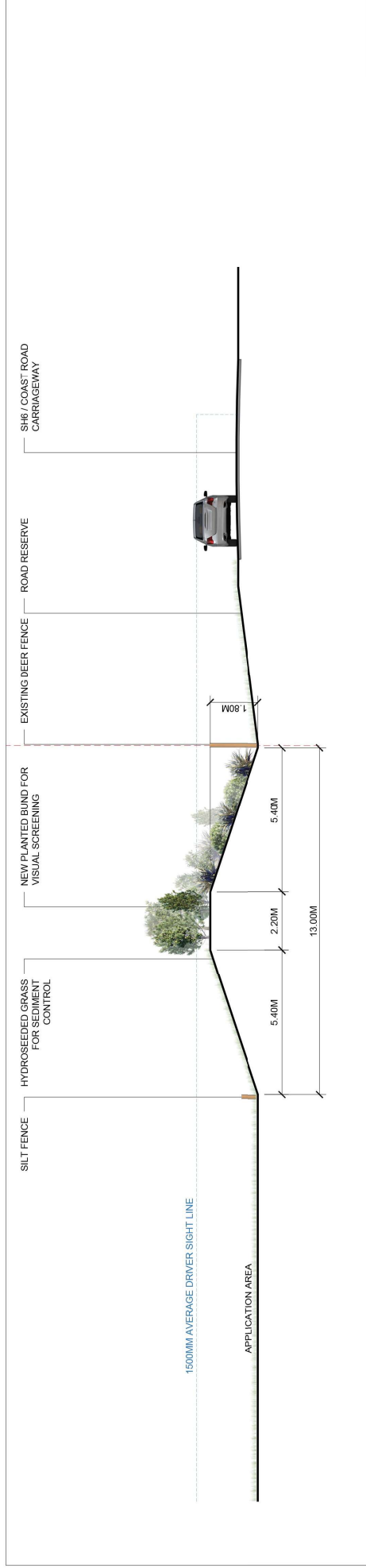
- BUND MITIGATION PLANTING
- RIPARIAN MITIGATION PLANTING
- NEIGHBOURING MITIGATION PLANTING
- PROCESSING PLANT AND ASSOCIATED FACILITIES
- NEW ACCESS ROAD AND HARDSTAND
- ORE STOCKPILE AREA
- STOCKPILE BUND (EASTERN BUND) FOR TOPSOIL AND OVERBURDEN
- APPLICATION AREA
- MINING DISTURBANCE AREA
- DRAINAGE AND WATER SYSTEMS

- ① LANDSCAPE MITIGATION SECTION: BUND WITH MITIGATION PARALLEL TO STATE HIGHWAY 6 (SHEET 20)
- ② LANDSCAPE MITIGATION SECTION: MORTHERN DRAIN RIPARIAN PLANTING (SHEET 20)
- ③ LANDSCAPE MITIGATION LONG SECTION: FROM SH6 TO THE MINE PIT (SHEET 21)

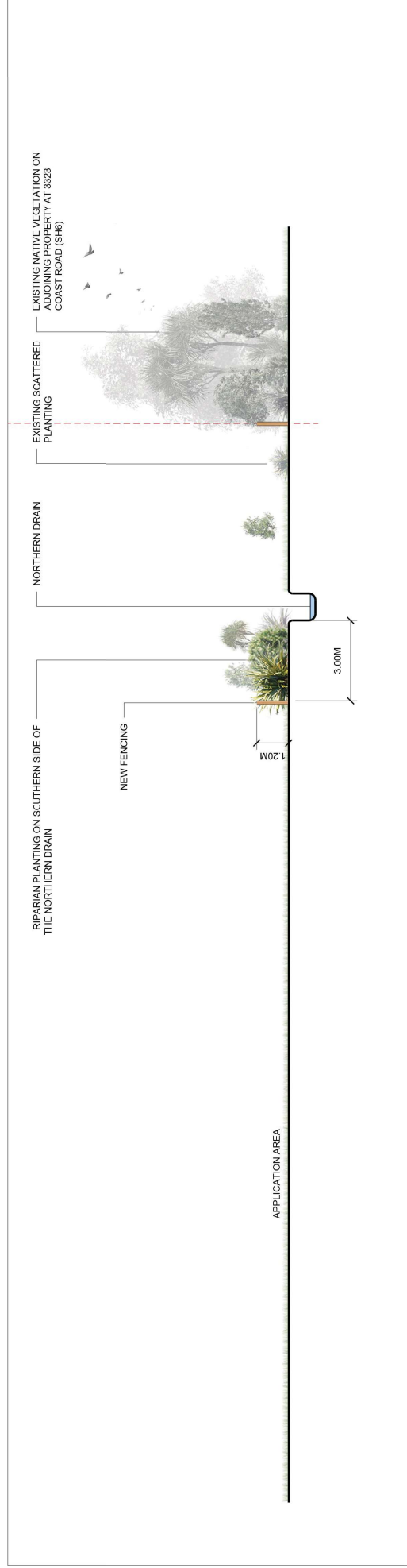
Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable

20.0 LANDSCAPE MITIGATION SECTIONS: STATE HIGHWAY 6 BOUNDARY

Note: Plant size shown is approximate to 4 years of growth.



1 BUND WITH MITIGATION PLANTING PARALLEL TO STATE HIGHWAY 6
Scale: 1:150



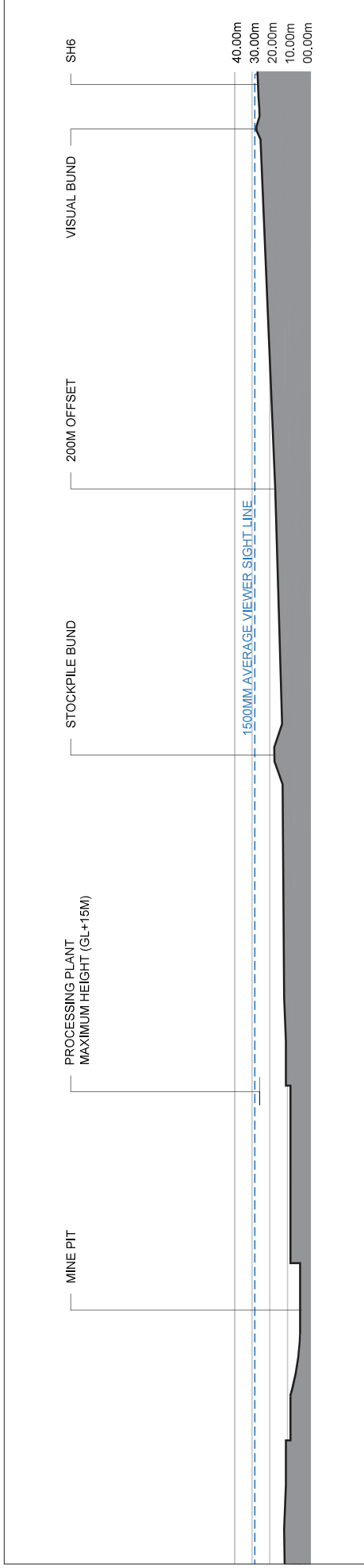
2 NORTHERN DRAIN RIPARIAN PLANTING
Scale: 1:150

SCALE: 1: 150@ A3 0 1 5 10 15M

SCALE: 1: 150 0 1 5 10 15M
2003_TiGa Metals and Minerals LTD_Barrytown Mineral Sands Mining Project_Lby Classon Huxtable Ltd. 34

21.0 LANDSCAPE MITIGATION LONG SECTION: FROM SH6 TO THE MINE PIT

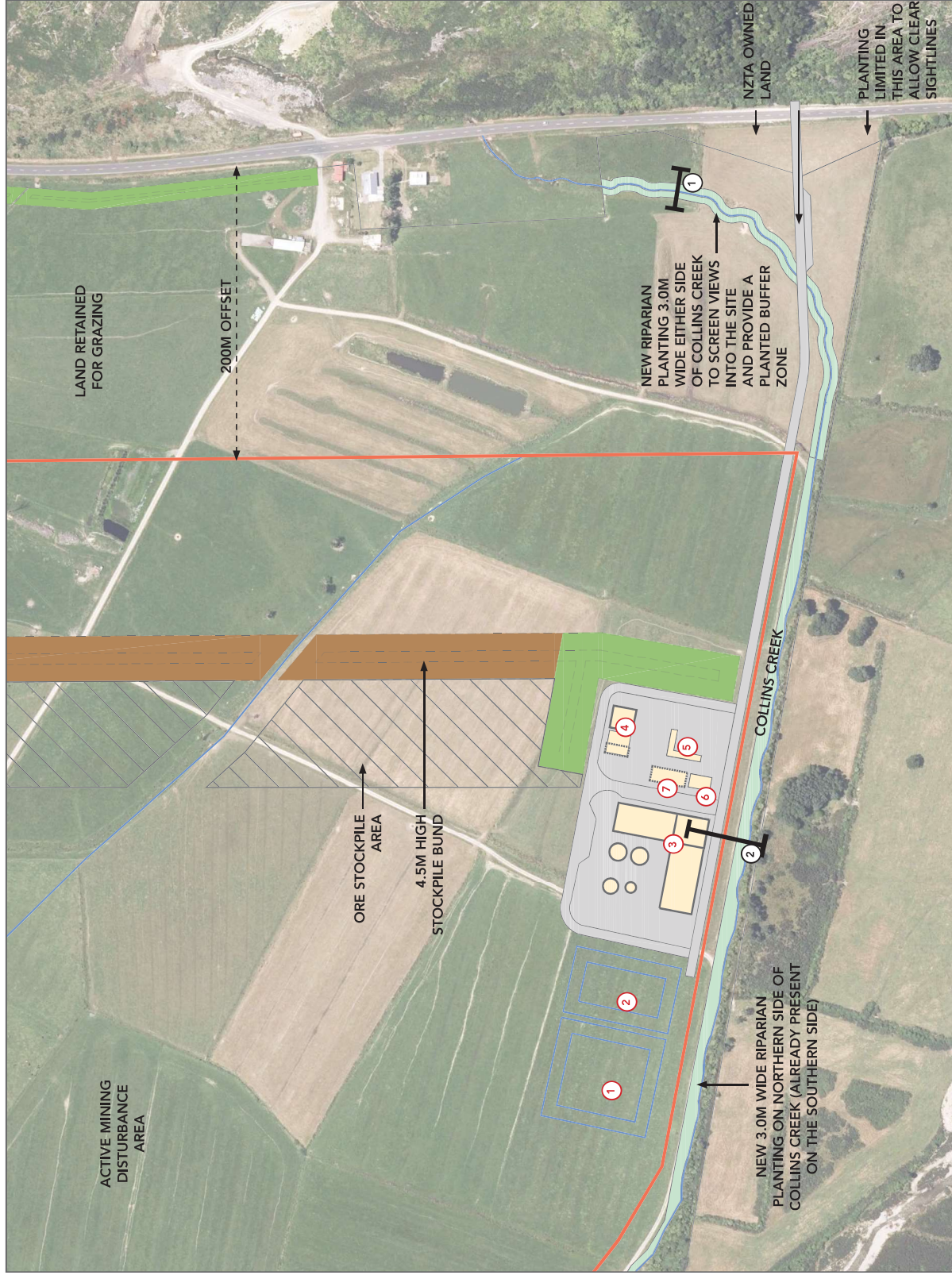
Note: This long section illustrates the downward slope across the site and the necessity for planting atop the visual bund adjacent to SH6. The screening value of the stockpile bund is nullified by the seawards slope (an average fall of 23m across the site). The planting atop the visual bund adjacent to SH6 mitigates wider views, providing the best screening over time.



3 LONG SECTION FROM STATE HIGHWAY 6 TO THE MINE PIT

Scale: 1:2250

22.0 LANDSCAPE MITIGATION PLAN: COLLINS CREEK



KEY

- BUND MITIGATION PLANTING
- RIPARIAN MITIGATION PLANTING
- NEW ACCESS ROAD AND HARDSTAND
- ORE STOCKPILE AREA
- STOCKPILE BUND (EASTERN BUND) FOR TOPSOIL AND OVERBURDEN
- PROCESSING PLANT AND ASSOCIATED FACILITIES
- APPLICATION AREA
- MINING DISTURBANCE AREA
- DRAINAGE AND WATER SYSTEMS
- ① CROSS SECTION OF COLLINS CREEK SOUTH EASTERN CORNER (SHEET 23)
- ② CROSS SECTION OF COLLINS CREEK ADJACENT TO ACCESS ROAD (SHEET 23)

KEY MINE FEATURES

- ① MINE WATER FACILITY: POND 1
- ② MINE WATER FACILITY: POND 2
- ③ PROCESSING PLANT
- ④ MINE AND PLANT WORKSHOP AREA
- ⑤ OFFICE AREA AND CAR PARKING
- ⑥ GENERATORS
- ⑦ FUEL BAY

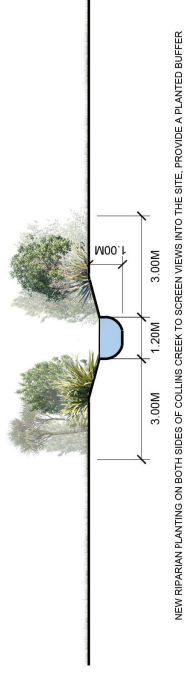
Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable



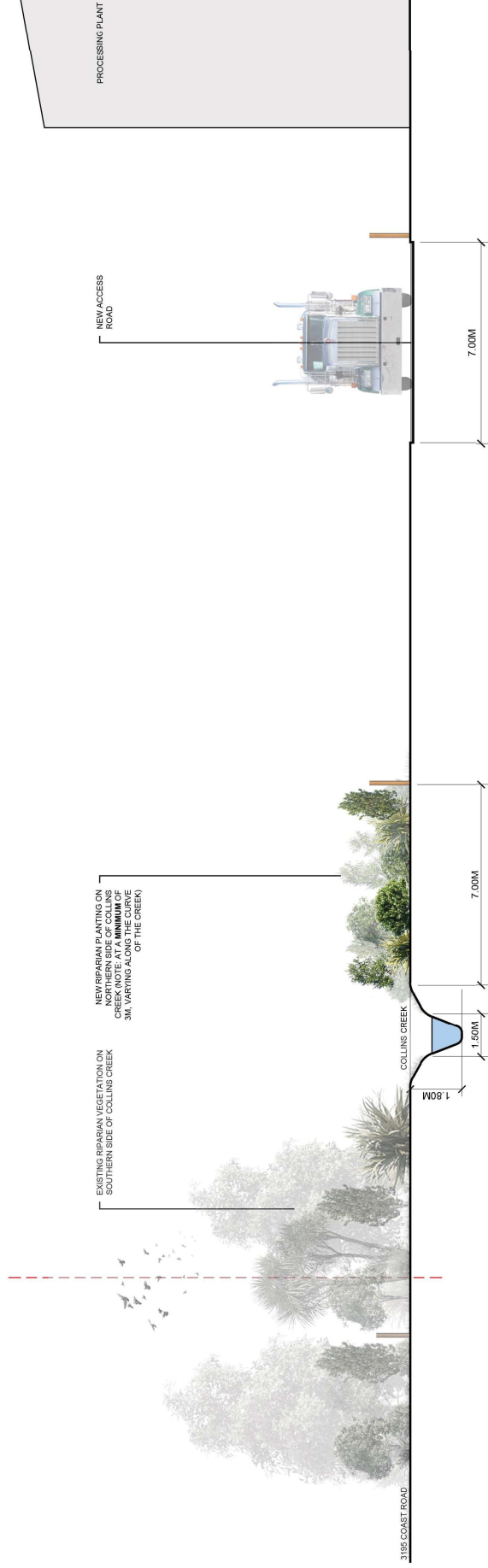
SCALE: 1 : 3,000@ A3

23.0 LANDSCAPE MITIGATION SECTIONS: COLLINS CREEK

Note: Plant size shown is approximate to 4 years of growth.



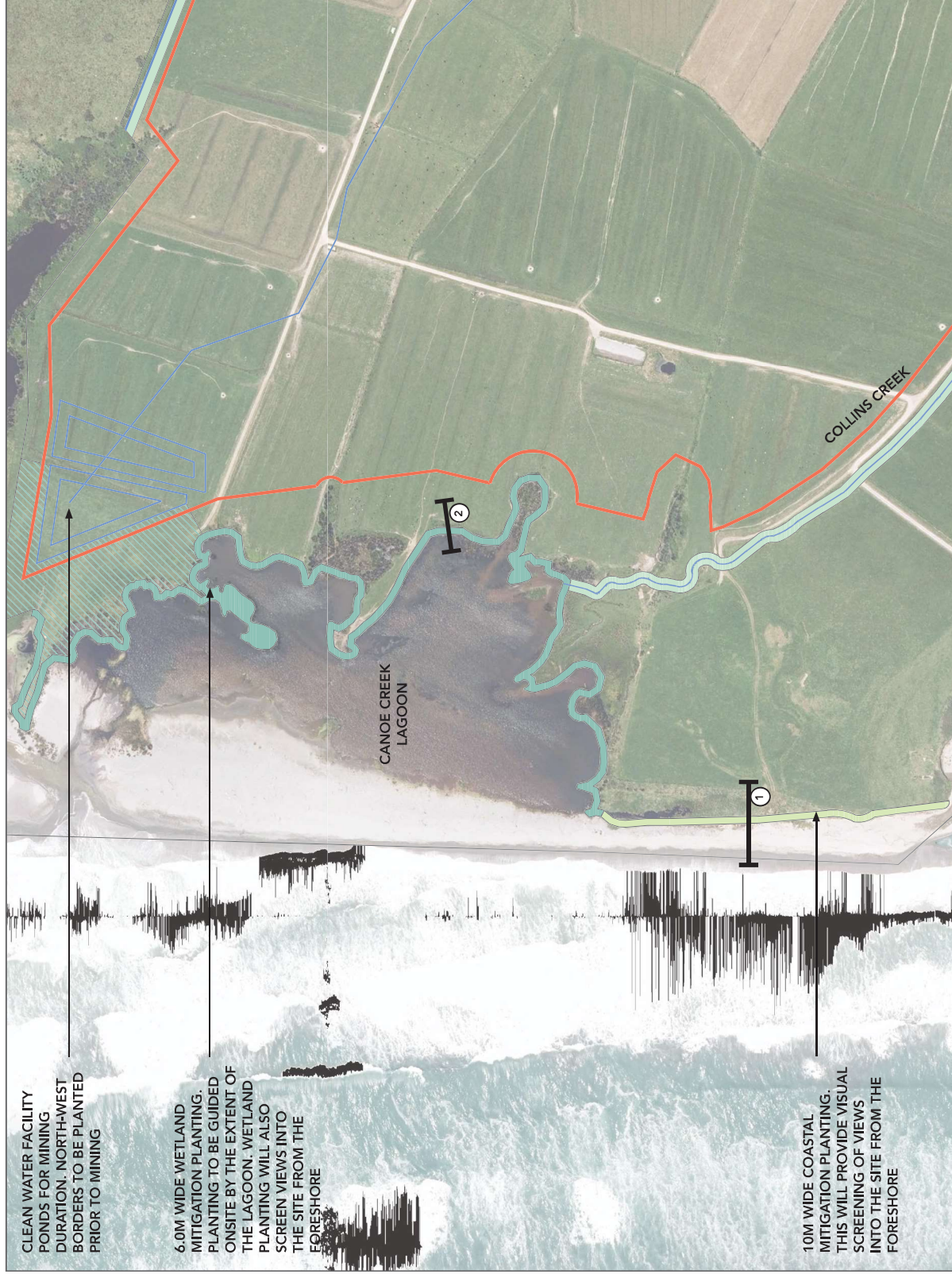
1 COLLINS CREEK PLANTING, SOUTH EAST CORNER OF THE SITE
Scale: 1:150



2 COLLINS CREEK PLANTING ADJACENT TO THE ACCESS ROAD AND MINE PLANT
Scale: 1:150

SCALE: 1: 150@ A3 0 1 5 10 15M

24.0 LANDSCAPE MITIGATION PLAN: COASTAL EDGE



CLEAN WATER FACILITY PONDS FOR MINING DURATION. NORTH-WEST BORDERS TO BE PLANTED PRIOR TO MINING

6.0M WIDE WETLAND MITIGATION PLANTING. PLANTING TO BE GUIDED ON-SITE BY THE EXTENT OF THE LAGOON. WETLAND PLANTING WILL ALSO SCREEN VIEWS INTO THE SITE FROM THE FORESHORE

10M WIDE COASTAL MITIGATION PLANTING. THIS WILL PROVIDE VISUAL SCREENING OF VIEWS INTO THE SITE FROM THE FORESHORE

KEY

- WETLAND MITIGATION PLANTING
- COASTAL MITIGATION PLANTING
- CLEAN WATER FACILITY MITIGATION PLANTING
- APPLICATION AREA
- MINING DISTURBANCE AREA
- DRAINAGE AND WATER SYSTEMS
- ① CROSS SECTION OF SOUTH WESTERN COASTAL EDGE (SHEET 25)
- ② CROSS SECTION OF SOUTH WETLAND EDGE (SHEET 25)

Note: Planting extents shown are indicative only and will be guided by outside extents of lagoon.

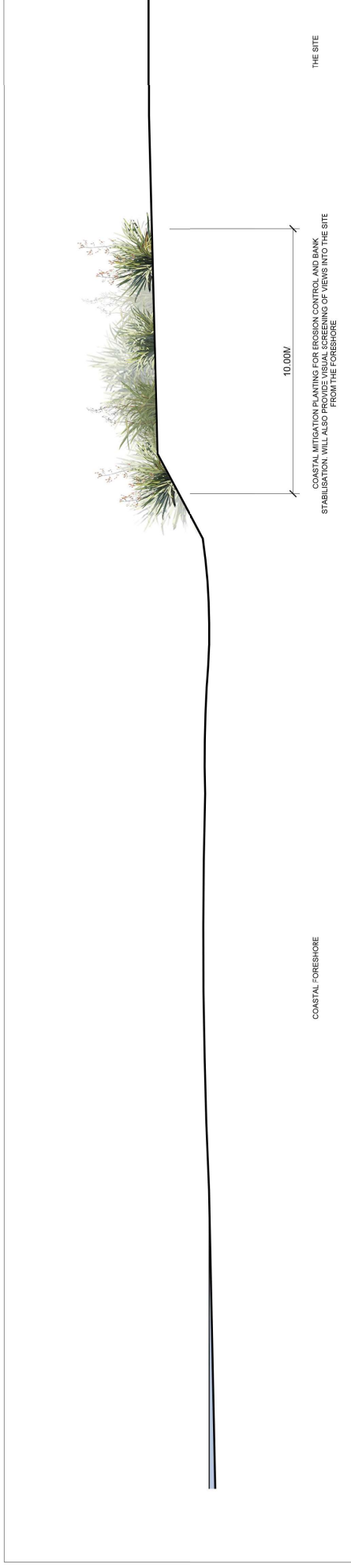
Map credits: Land Information New Zealand (LINZ) and Glasson Huxtable



SCALE: 1 : 3,500@ A3

25.0 LANDSCAPE MITIGATION SECTIONS: COASTAL EDGE

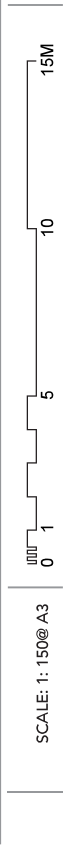
Note: Plant size shown is approximate to 4 years of growth.



1 EROSION AND VISUAL MITIGATION ON COASTAL EDGE
Scale: 1:150



2 INDICATIVE WETLAND PLANTING
Scale: 1:150



26.0 INDICATIVE LANDSCAPE PLANT SPECIES AND GROWTH RATES

SCIENTIFIC NAME	COMMON NAME	BUND	RIPARIAN	WETLAND	COASTAL
<i>Aristotelia serrata</i>	makomako, wineberry	x	x		
<i>Carex geminata</i>	rautahi	x	x	x	x
<i>Carex secta</i>	purei		x	x	x
<i>Carex virgata</i>	pukio		x	x	x
<i>Coprosma robusta</i>	karamu	x	x	x	x
<i>Coprosma propinqua</i>	mikimiki	x	x		
<i>Cordyline australis</i>	tī kouka, cabbage tree	x	x	x	x
<i>Dacrycarpus dactyloides</i>	kahikatea, white pine		x	x	
<i>Juncus edgariae</i>	Edgar's rush			x	
<i>Meliccytus ramiflorus</i>	māhoe, whiteywood	x	x		
<i>Phormium tenax</i>	harakeke, korari, New Zealand flax	x	x	x	x
<i>Pittosporum eugenioides</i>	tarata, lemonwood	x	x		
<i>Pittosporum tenuifolium</i>	kohuhu	x	x		
<i>Typha orientalis</i>	raupō, bull rush			x	

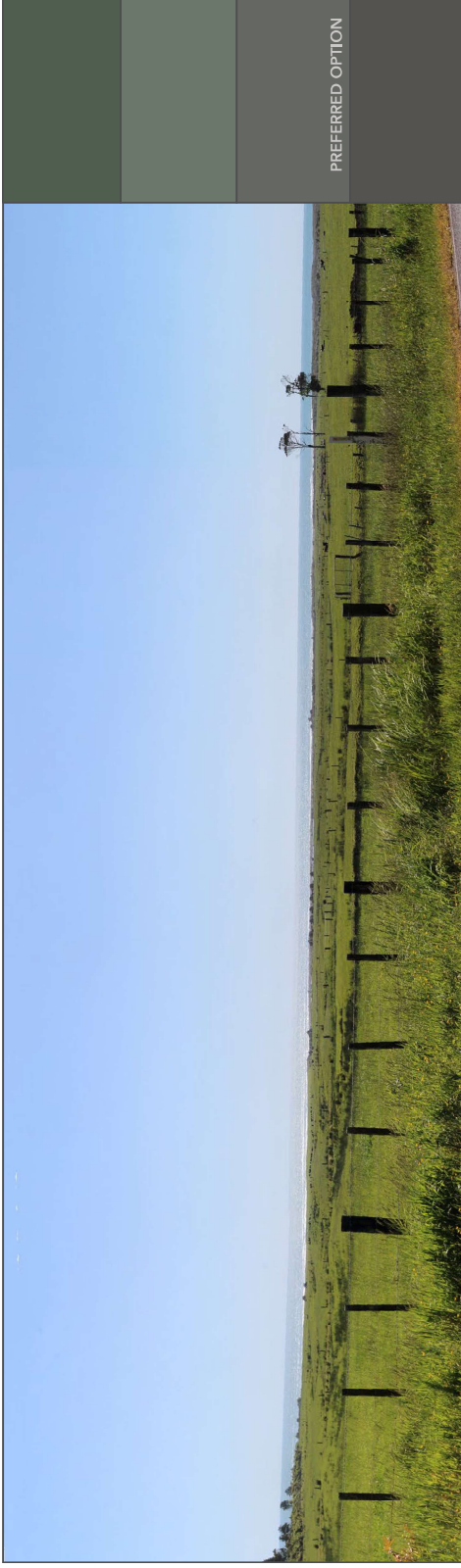
PLANT GROWTH			
PROJECT YEAR	MINE STAGE	NATIVE PLANT HEIGHT	
1	-	Seed Collection	
2	-	0.5m at planting	
3	1	0.90M	
4	2	1.30m	
5	3	1.70M	
6	4	2.10M	
7	5	2.50M	
8	6	2.90M	
9	7	3.30M	

Notes:

- Plant species and palettes provided will be subject to further refinement through detailed planting plans, accompanying plant schedules, and consultation with the project ecologist.
- Plant size shown in the previous cross sections are approximate to 4 years of growth.
- An approximate growth rate of 0.40-0.60m per year has been determined in consultation with the project Landscape Architect (Naomi Crawford), project ecologist (Gary Bramley) and neighbouring landowner Sharon Langridge. The combined experience of these three individuals notes that these plants will sit at a lower growth rate for the first two years following planting, and will have an increase in growth rates in following years. It is also noted that larger individual specimens have a longer 'sitting' period than smaller ones.
- Growth rates can be influenced by seasonal fluctuations, maintenance, moisture / precipitation, exposure, ground conditions, and type of plant species.
- The species list was presented to Sharon Langridge of West Coast Native Plants on 16-02-2023 and received her support.

27.0 RECOMMENDED EXTERIOR COLOUR PALETTE

It is recommended to choose one of these ColorCote swatches for the exterior (cladding and roofing) of the buildings within the site so they are viewed as a recessive colour against the background environment.



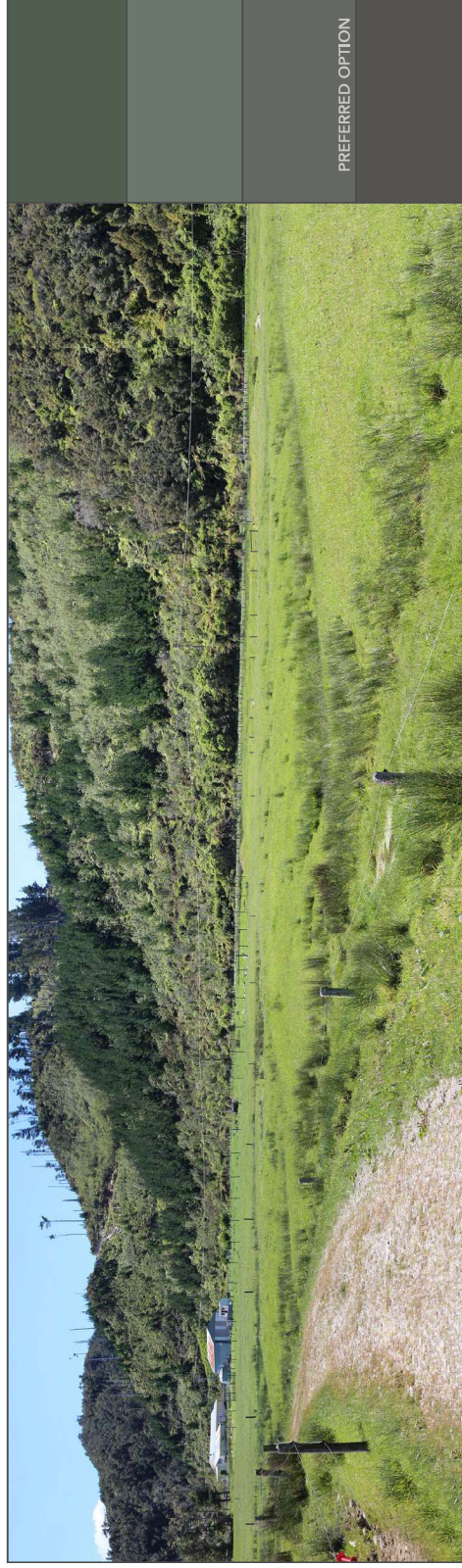
ColorCote Colour	Hex Value:	LRV*:
Permanent Green	#495d50	10.66%

ColorCote Colour	Hex Value:	LRV*:
Rivergum	#6a776a	18.13%

ColorCote Colour	Hex Value:	LRV*:
Mudstone	#656663	16.08%

ColorCote Colour	Hex Value:	LRV*:
Ironsand	#545250	9.55%

Recommended colours against views from road (majority).



ColorCote Colour	Hex Value:	LRV*:
Permanent Green	#495d50	10.66%

ColorCote Colour	Hex Value:	LRV*:
Rivergum	#6a776a	18.13%

ColorCote Colour	Hex Value:	LRV*:
Mudstone	#656663	16.08%

ColorCote Colour	Hex Value:	LRV*:
Ironsand	#545250	9.55%

Recommended colours against views from the beach (minority).

*Colour names and LRV from ColorCote.co.nz

Glasson Huxtable Ltd.
149 Victoria Street
Christchurch 8141

Phone: (64) 03 365 4599
www.ghla.co.nz
naomi@ghla.co.nz