

BARRYTOWN MINERAL SANDS PROJECT: SOUTHERN BLOCK



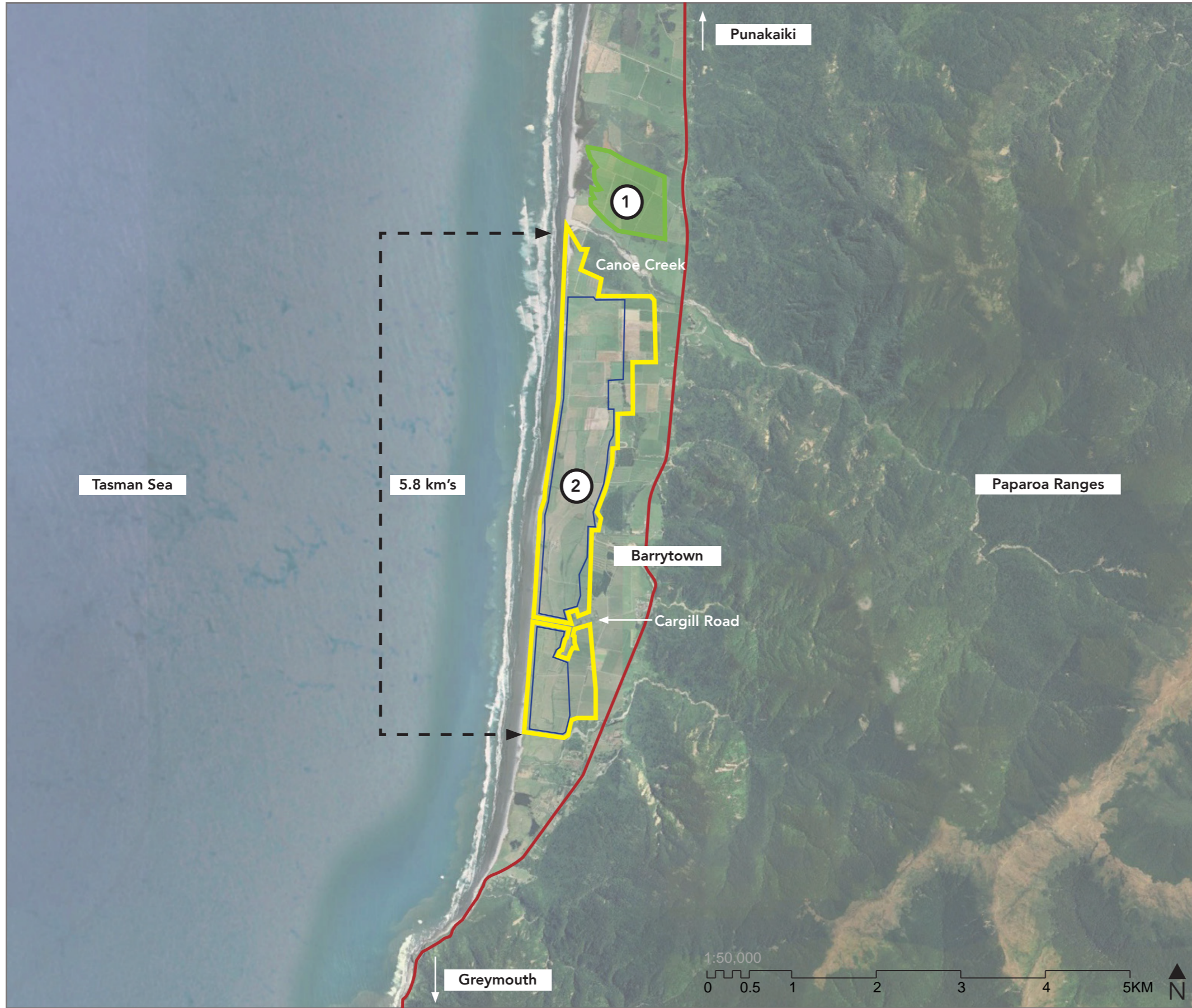
LANDSCAPE MITIGATION PACKAGE

MAY 2026 - REVISION H

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1.0 PROPOSED MINING AREA

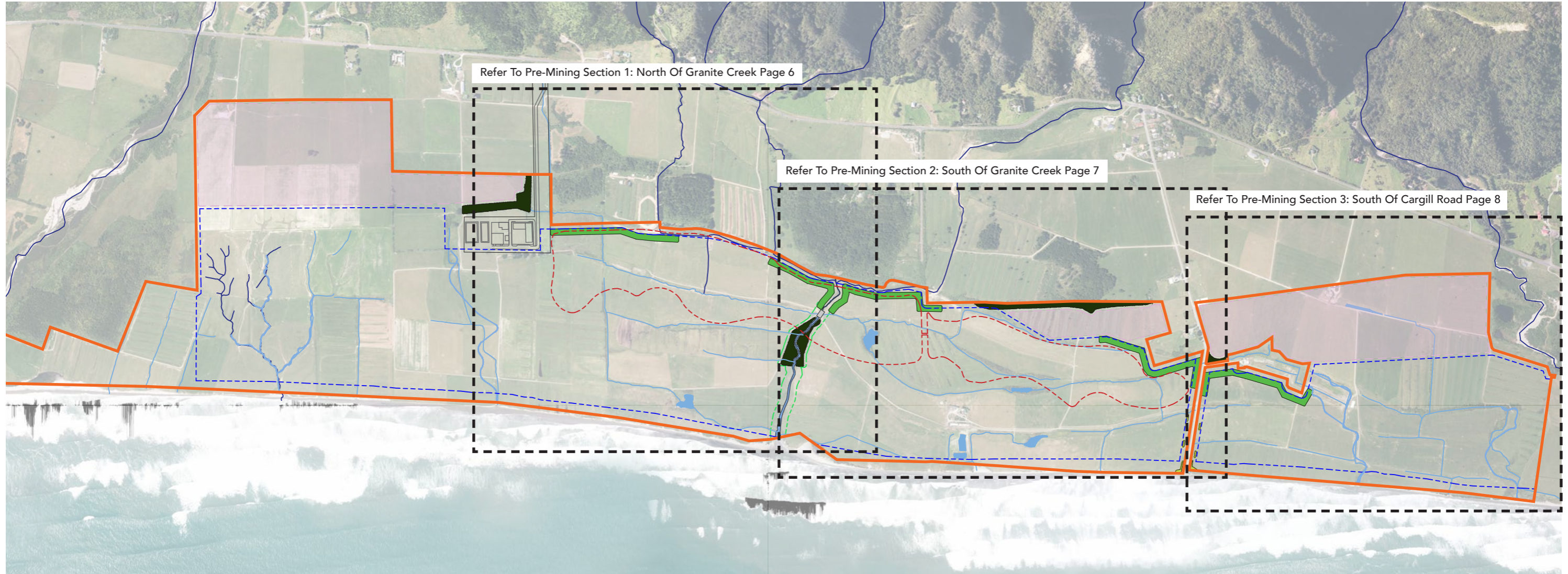


KEY

- Previous Application Area (Consented)
 - Proposed Application Area
 - Proposed Mining Disturbance Area
 - Coast Road/ State Highway 6
-
- ① **Central Block (CB)**
A favorable decision for the CB mineral sands project was delivered by commissioners in April 2024 but was subsequently appealed. A successful resolution was reached in October 2024.
This area is not part of this application.
 - ② **Southern Block (SB)**
This area is part of this fast track application and includes the mining disturbance area.

LANDSCAPE MITIGATION - PRE-MINING

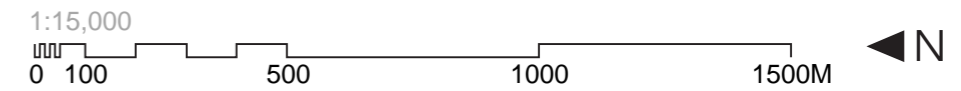
2.0 LANDSCAPE MITIGATION - PRE-MINING KEY PLAN



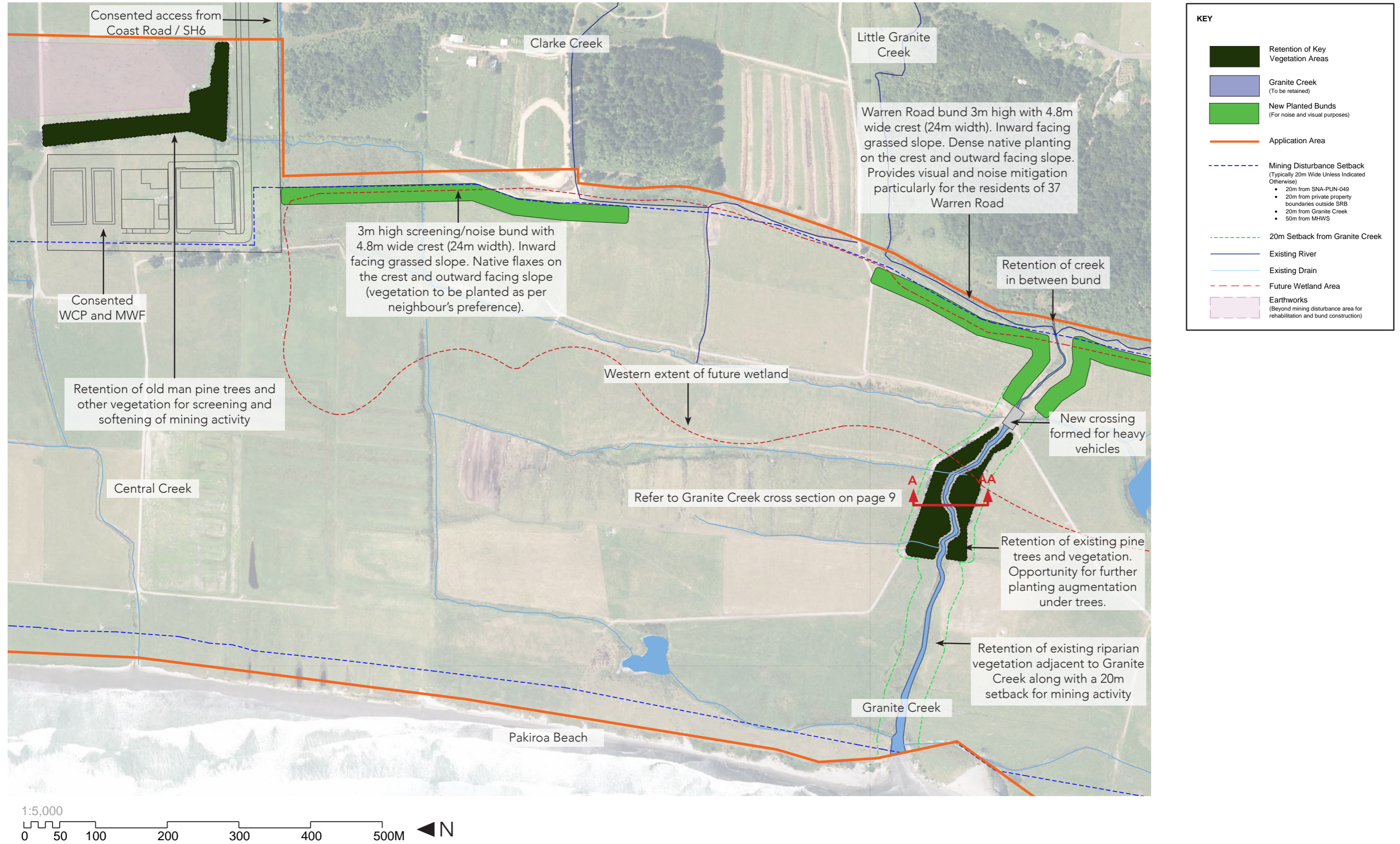
KEY

	New Native Vegetation
	Retention of Key Vegetation Areas
	New Planted Bunds (For noise and visual purposes)
	Granite Creek (To be retained)
	Application Area
	Mining Disturbance Setback (Typically 20m Wide Unless Indicated Otherwise)
	<ul style="list-style-type: none"> • 20m from SNA-PUN-049 • 20m from private property boundaries outside SRB • 20m from Granite Creek • 50m from MHWS
	20m Setback from Granite Creek
	Existing River
	Existing Drain
	Future Wetland Area
	Earthworks (Beyond mining disturbance area for rehabilitation and bund construction)

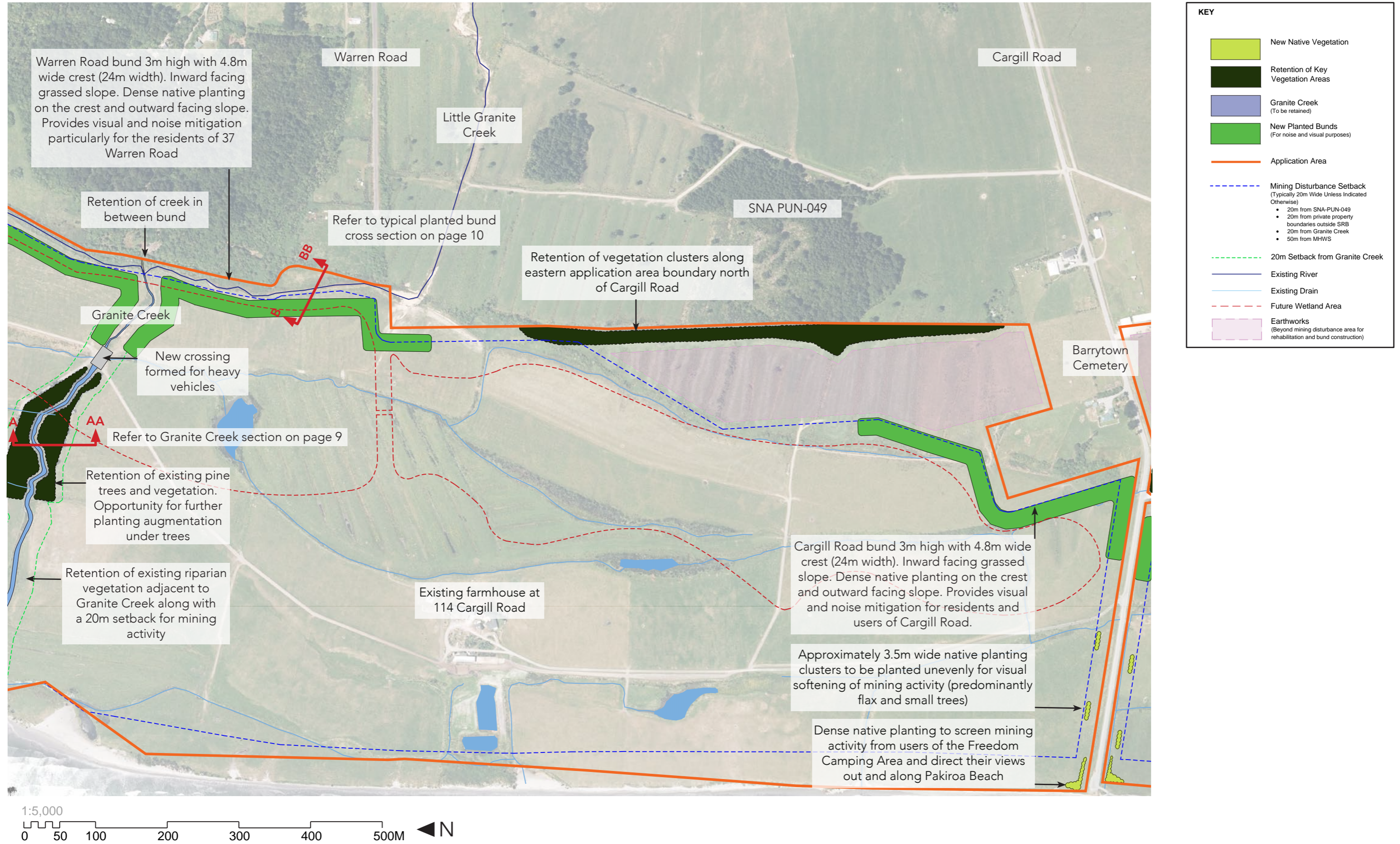
Note:
The aim of this Pre-Mining Key Plan is to set out the different landscape areas to undergo landscape mitigation prior to mining commencing. Each of the black boxes refers to an individual sheet (page) which follows. These pages correspond with the Mining Sections (stages) outlined in the Project Description accompanying the application.



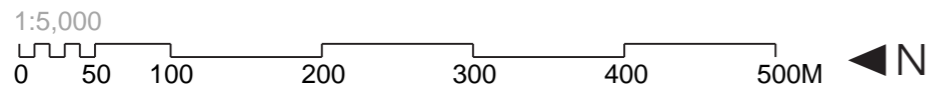
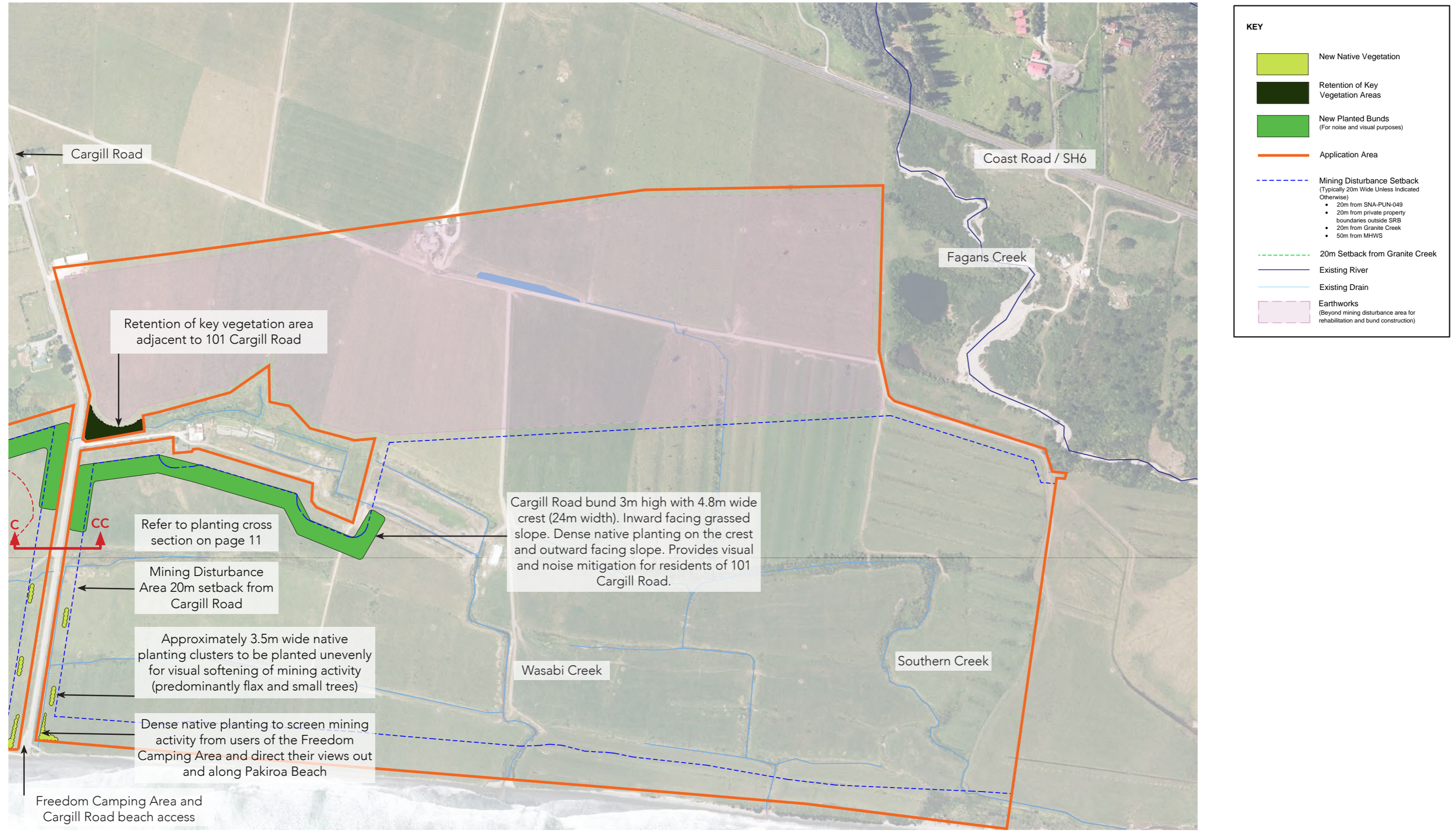
3.0 LANDSCAPE MITIGATION - PRE-MINING SECTION 1: NORTH OF GRANITE CREEK



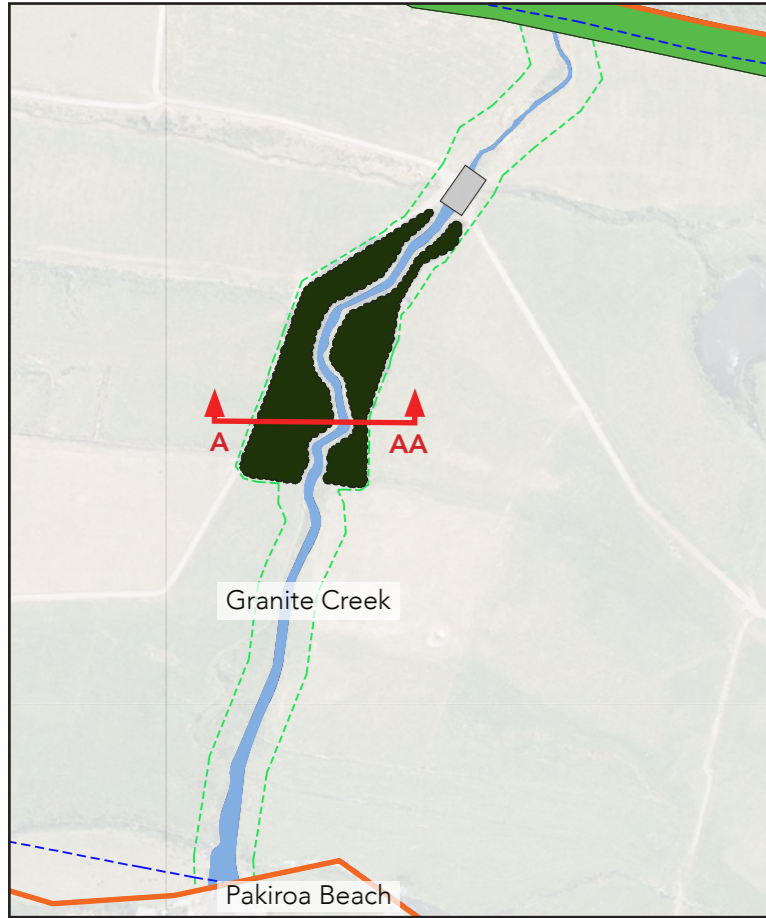
4.0 LANDSCAPE MITIGATION - PRE-MINING SECTION 2: SOUTH OF GRANITE CREEK



5.0 LANDSCAPE MITIGATION - PRE-MINING SECTION 3: SOUTH OF CARGILL ROAD



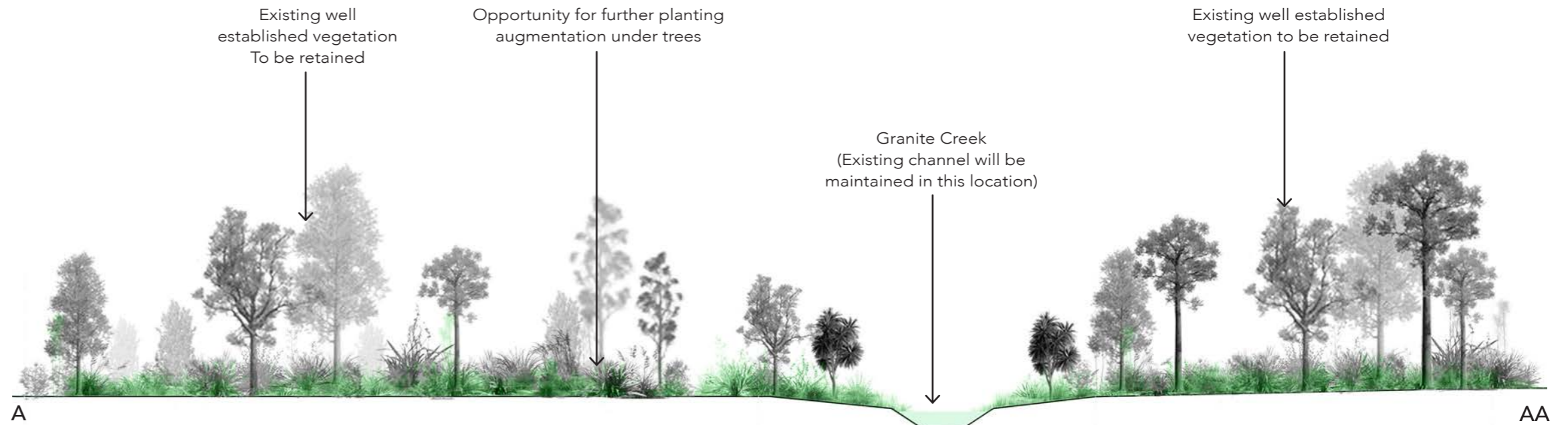
6.0 LANDSCAPE MITIGATION - PRE-MINING GRANITE CREEK



Key Plan - Pre Mining Section 1 From Page 6

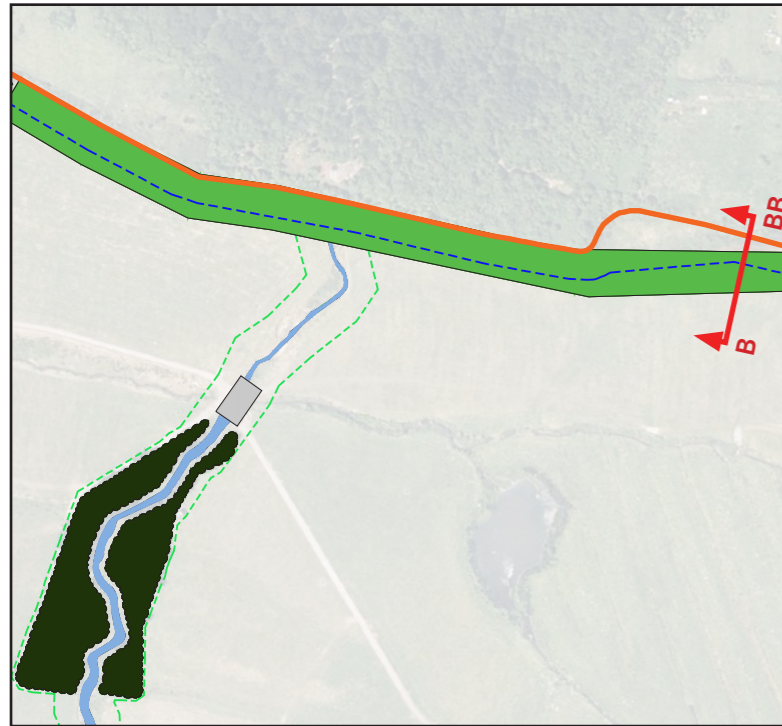


Existing planting adjacent to Granite Creek (to be retained)



Section A-AA:
Granite Creek Section - Vegetation To Be Retained

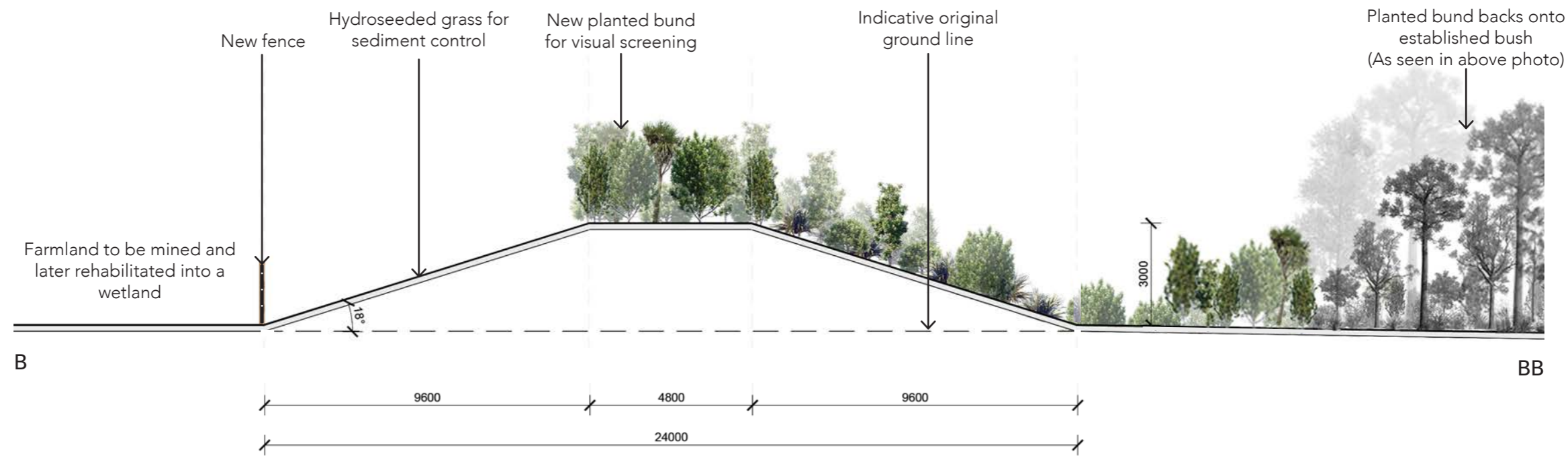
7.0 LANDSCAPE MITIGATION - PRE-MINING PLANTED BUNDS



Key Plan - Pre-Mining Section 2 From Page 7

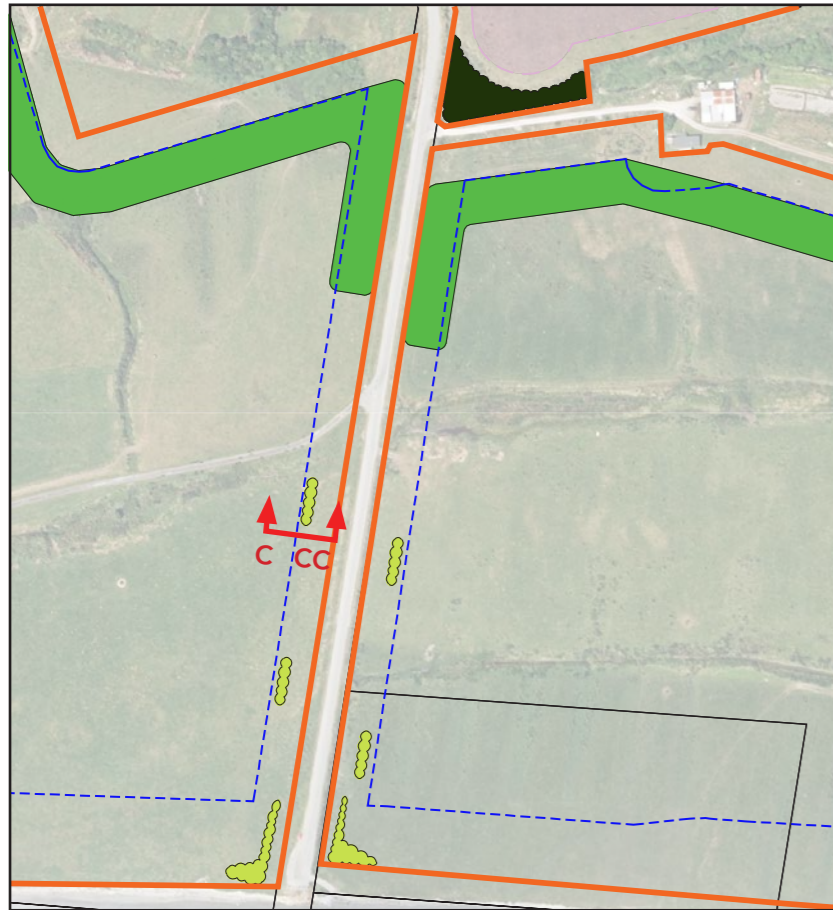


Existing farm environment and adjacent bush, near where the new Warren Road planted bund will be located



Section B-BB:
Bund Typical 3m High Bund Section

8.0 LANDSCAPE MITIGATION - PRE-MINING CARGILL ROAD NATIVE PLANTING



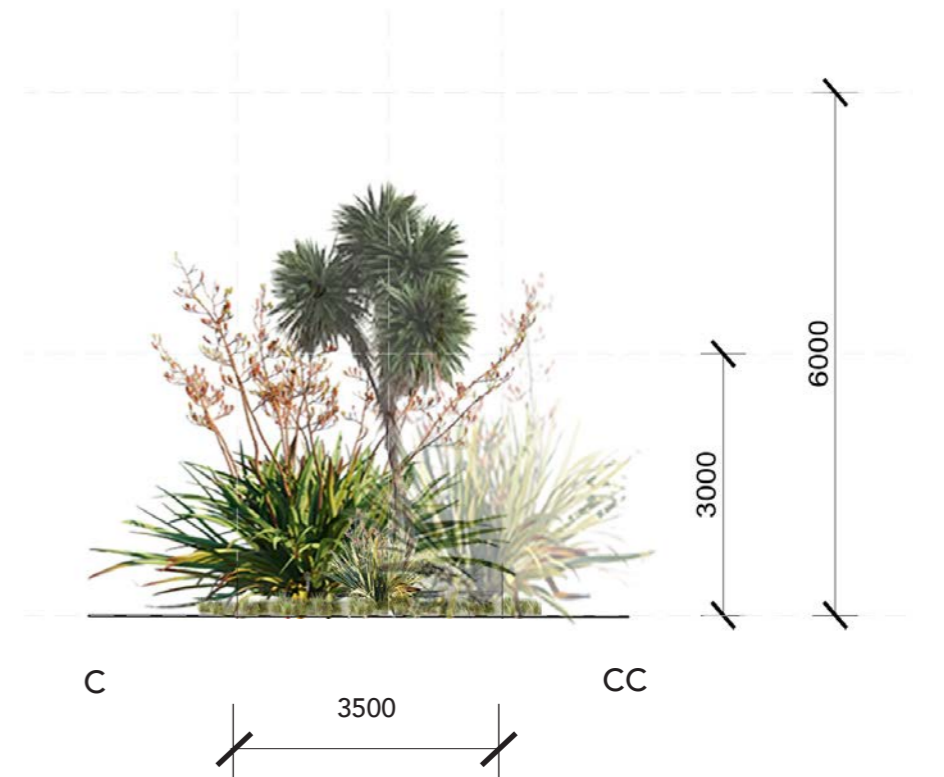
Key Plan - Pre Mining Section 3 From Page 8

Notes:

The section shows a typical design for the clusters of planting that will be implemented along Cargill Road within the 20 metre setback area. The aim is to screen and soften some of the mining activity when it comes closest to Cargill Road. This is balanced with the desire to maintain some views up and down the coast and not create a 'tunnel' effect along Cargill Road.



Indicative Cluster Screening Planting - Plan
Scale 1:100

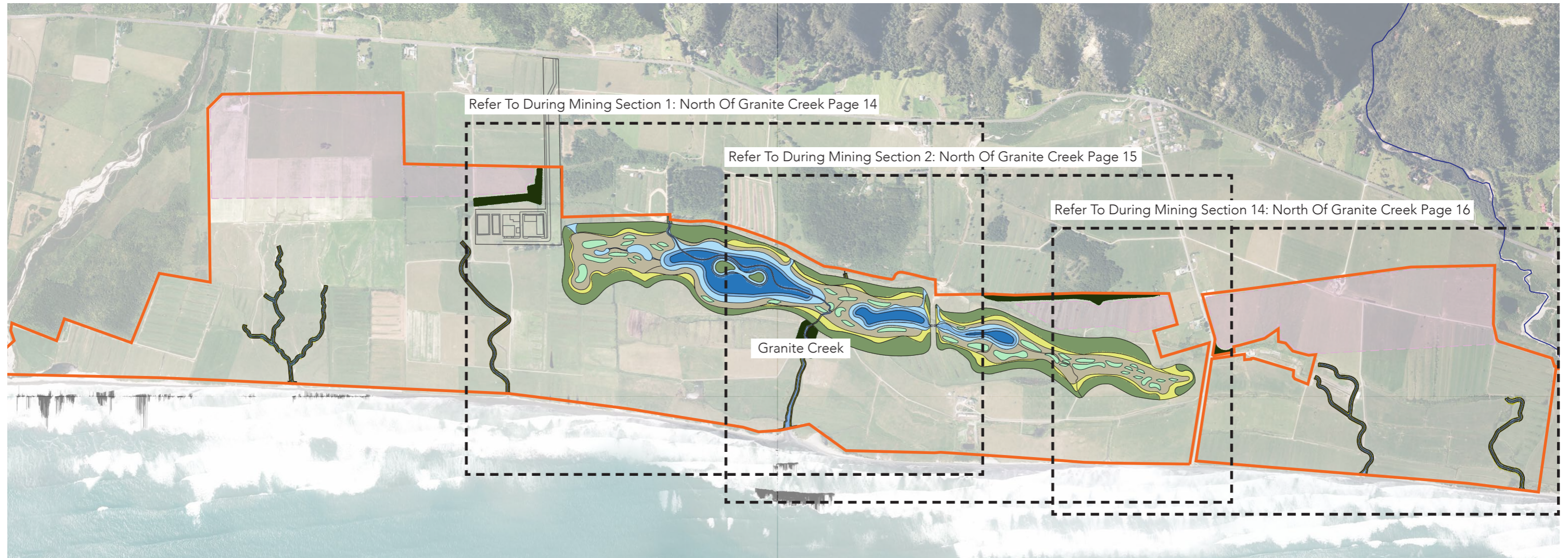


Indicative Cluster Screening Planting - Section C-CC
Scale 1:100

Multiple rows of staggered visual Screening for softening of mining activities (mixture of flax and small trees).

LANDSCAPE REHABILITATION - DURING MINING

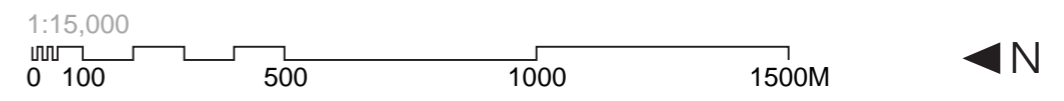
9.0 LANDSCAPE REHABILITATION PLAN - DURING MINING KEY PLAN



KEY	
	Shallow Marsh - Average Depth 0.4m
	Mid-depth Water - Average Depth 1m
	Deep Open Water - Average Depth 2m
	Flaxland and Dry Edge Vegetation
	Carex Rushlands
	Raupo Wetland
	Raised Islands
	Riparian Planting
	Existing Planting to be Retained
	Application Area
	Earthworks (Beyond mining disturbance area for rehabilitation and bund construction)

Note:
The aim of this During Mining Key Plan is to set out the different landscape areas to be rehabilitated into a large wetland and smaller riparian margins during mining. Each of the black boxes refers to an individual sheet (page) which follows. These pages correspond with the Mining Sections (stages) outlined in the Project Description accompanying the application. The end goal is to have a well functioning large connected wetland of approximately 53.1 hectares in size.

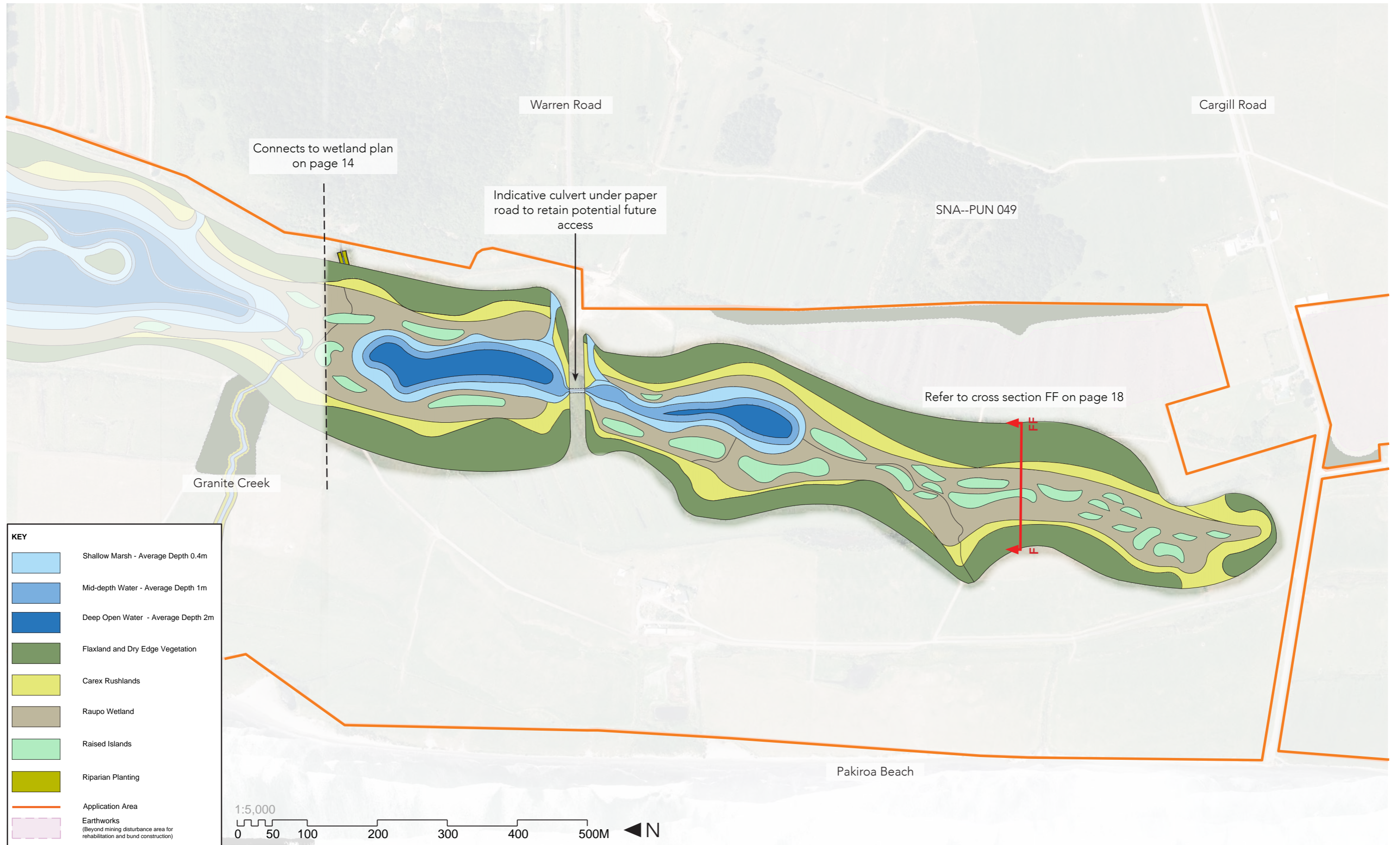
The design and layout of the well functioning large connected wetland has been informed by Landscape Architects, Ecologists and Hydrologists working together. Refer to the **Rehabilitation Management Plan** for further detail.



10.0 LANDSCAPE REHABILITATION PLAN - DURING MINING SECTION 1: NORTH OF GRANITE CREEK



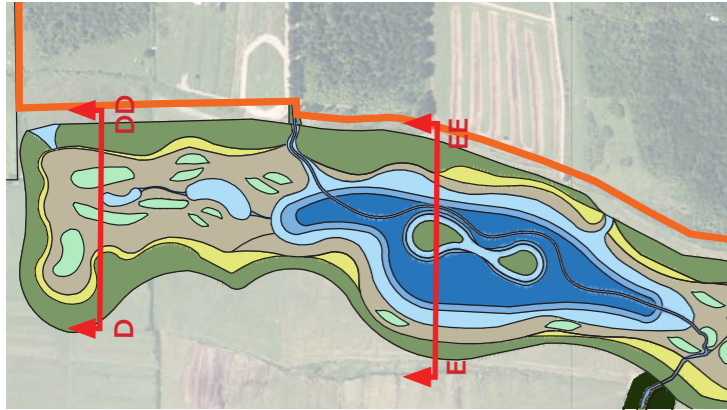
11.0 LANDSCAPE REHABILITATION PLAN - DURING MINING SECTION 2: SOUTH OF GRANITE CREEK



12.0 LANDSCAPE REHABILITATION PLAN - DURING MINING SECTION 3: SOUTH OF CARGILL ROAD



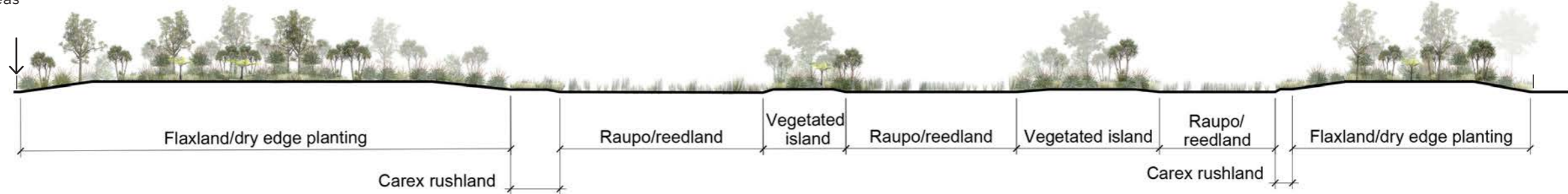
13.0 LANDSCAPE REHABILITATION - DURING MINING SECTION 1: NORTH OF GRANITE CREEK



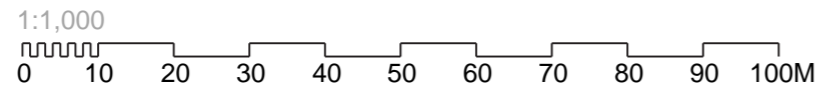
Notes:
 The design and layout of the well functioning large connected wetland has been informed by Landscape Architects, Ecologists and Hydrologists working together. Refer to the **Rehabilitation Management Plan** for further detail.

Key Plan - During Mining Section 1 From Page 14

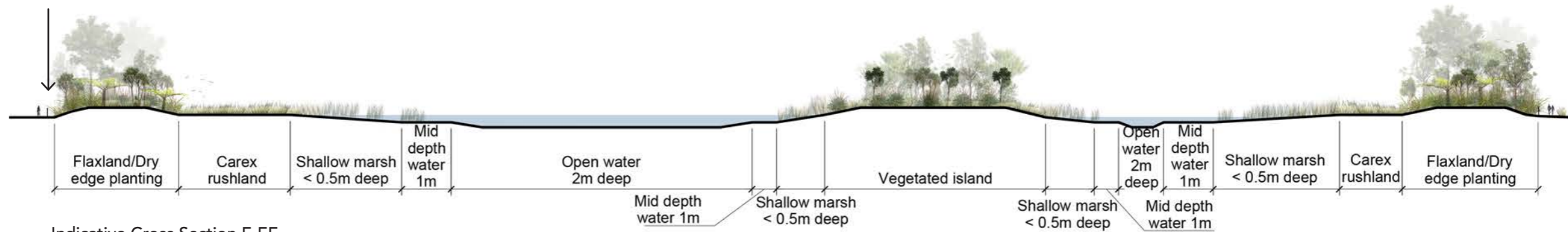
New stock proof fencing on the outside of all the planting areas



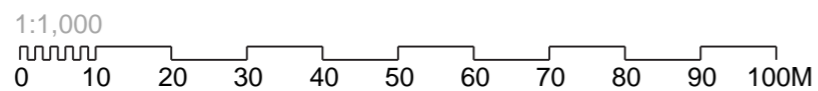
Indicative Cross Section D-DD



New stock proof fencing on the outside of all the planting areas



Indicative Cross Section E-EE

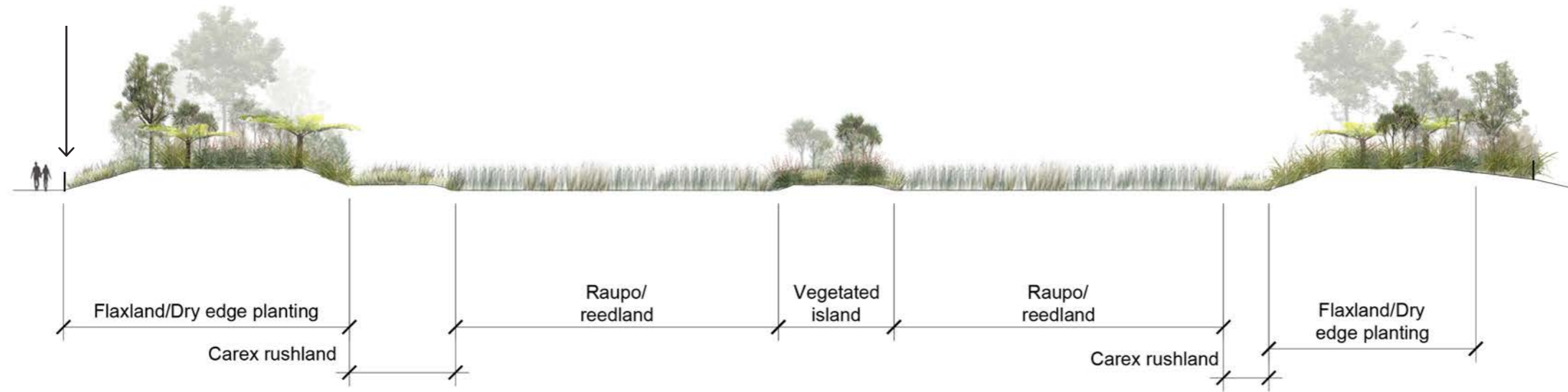


14.0 LANDSCAPE REHABILITATION - DURING MINING SECTION 2: SOUTH OF GRANITE CREEK

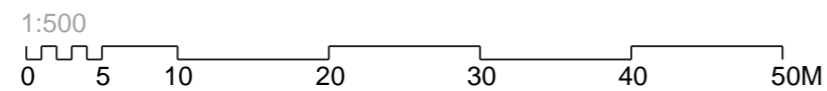


Key Plan - During Mining Section 2 From Page 15

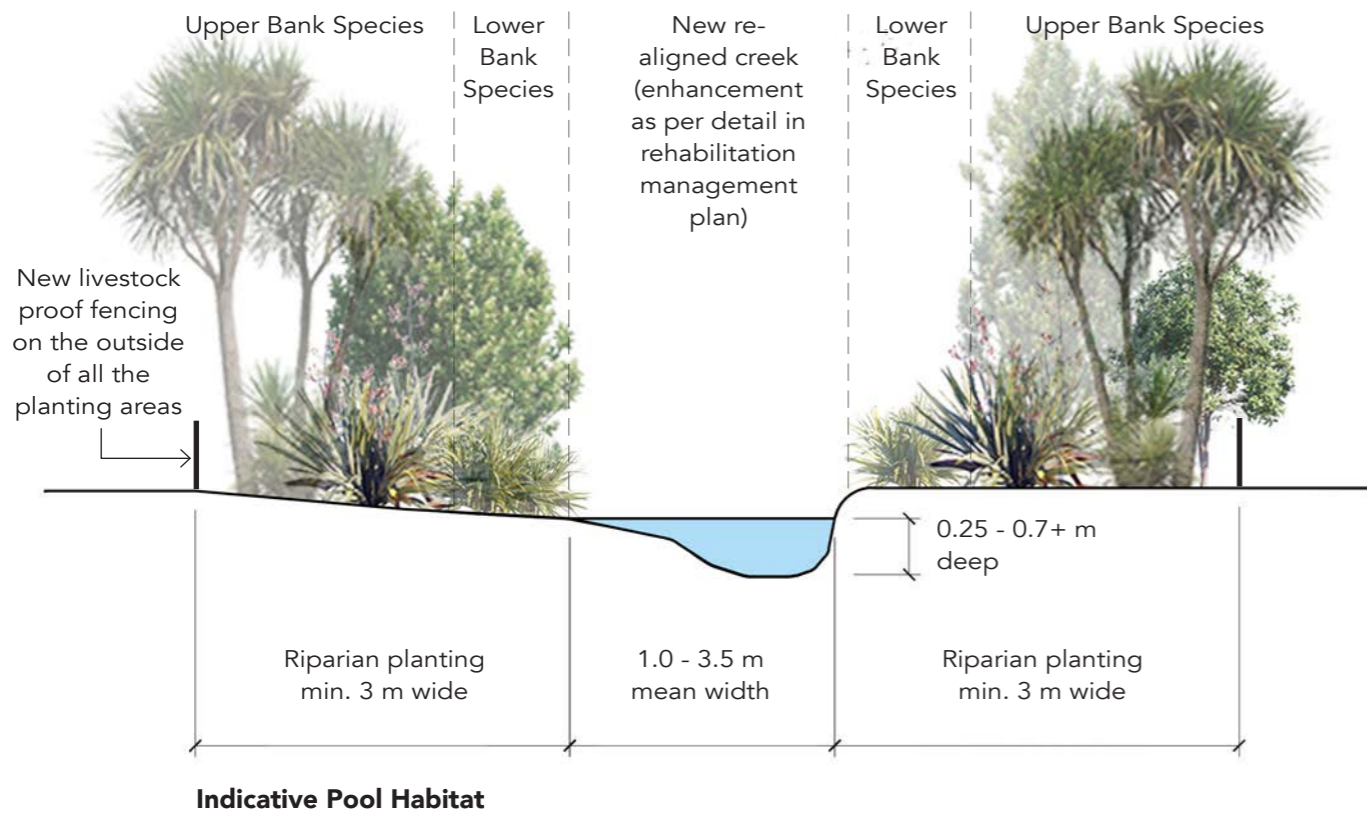
New stock proof fencing
on the outside of all the
planting areas



Indicative Cross Section F - FF



15.0 LANDSCAPE REHABILITATION - DURING MINING SECTION 2: REALIGNED CREEKS



Realigned Creeks - Typical Cross Sections

This page includes three typical cross sections to illustrate how the five realigned creeks (Northern, Central, Clarke, Wasabi and Southern) will work once mining has gone past. Each of these creeks will have riparian planting a minimum of 3.0 metres width on either side. There will be no loss of extent of the creeks once mining is complete. Design details will be further developed through the **Rehabilitation Management Plan**.

Of note, Granite Creek and Little Granite Creek will not be disturbed by mining activity. Granite Creek will be enhanced with riparian planting a minimum of 5.0 metres width on either side.

Habitat sequences, widths and depths

The aim is to have: run -> riffle -> pool habitat sequences. There will be meandering channels with variable widths and depths as this will encourage the formation of different habitats. Floodplains will also be incorporated. There will typically be deeper pools on bends, moderately deep runs on straighter sections, and shallow riffles that can flow into pools or between runs. Habitat depths will depend on the future hydrology and catchment size.

Pool habitat

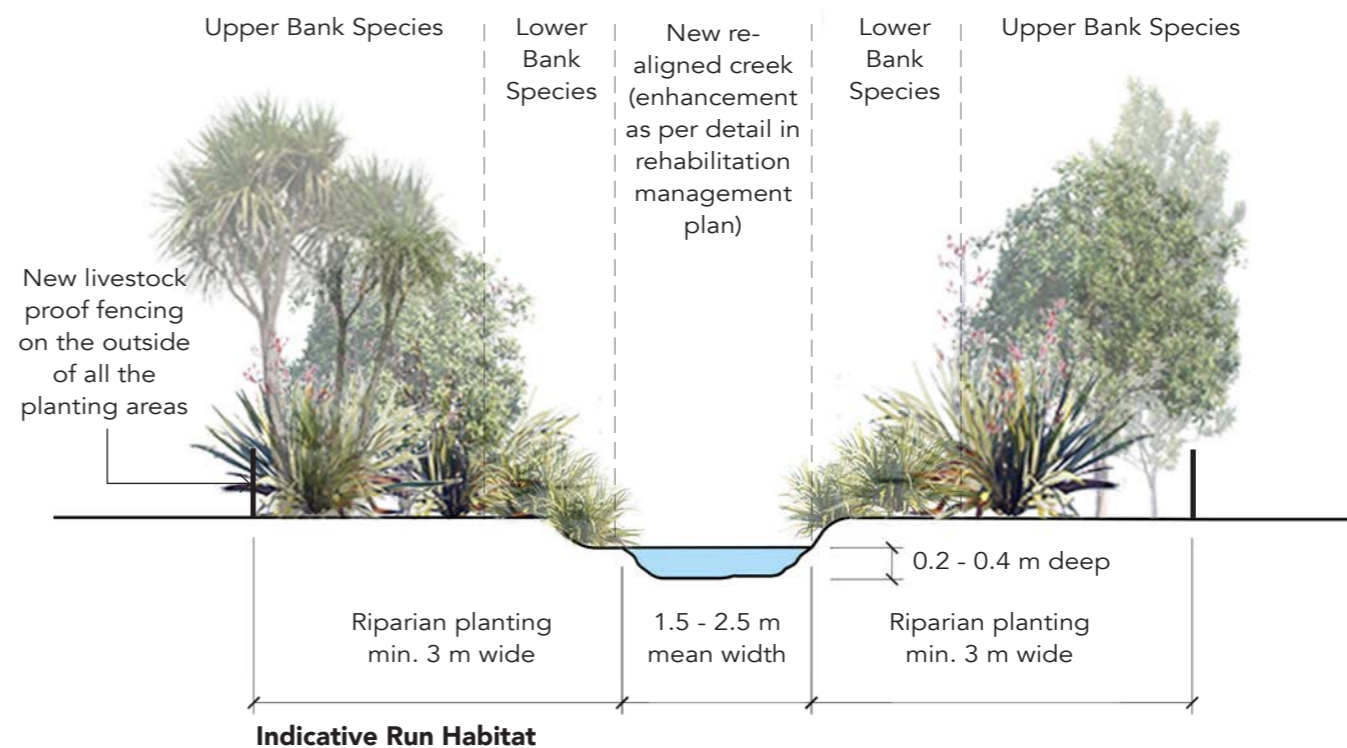
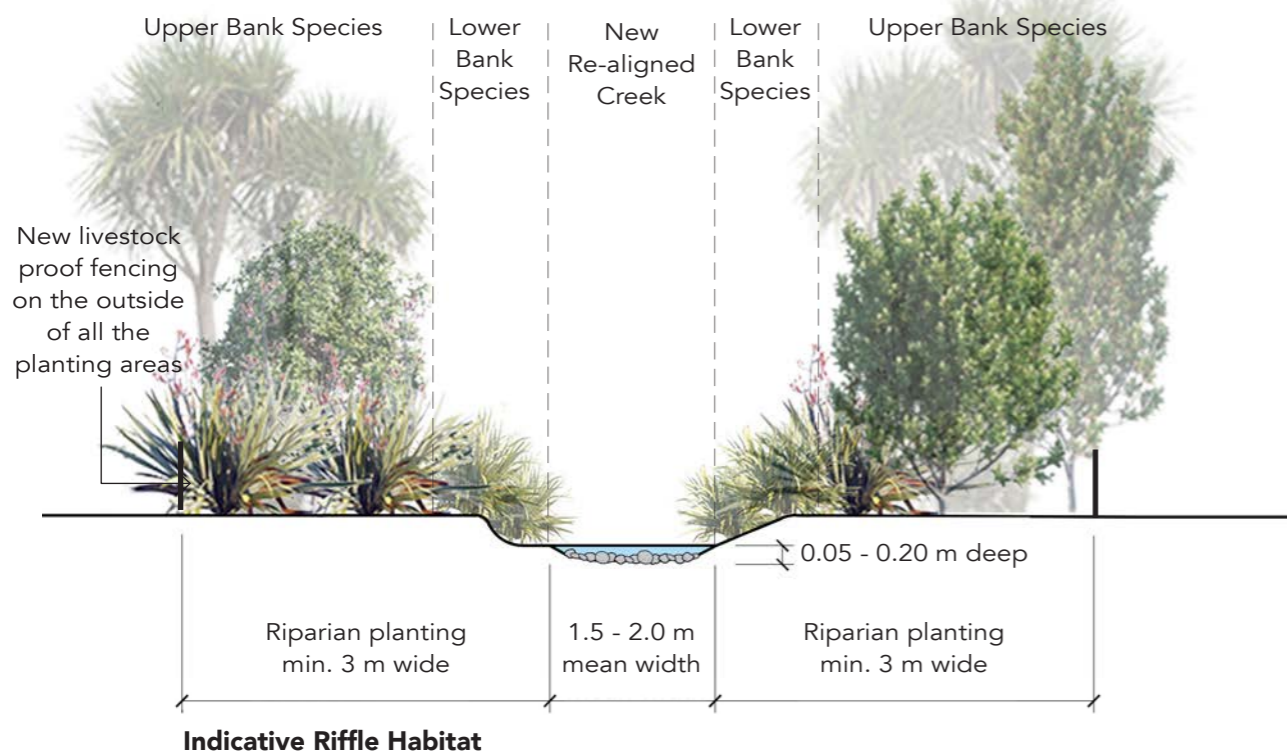
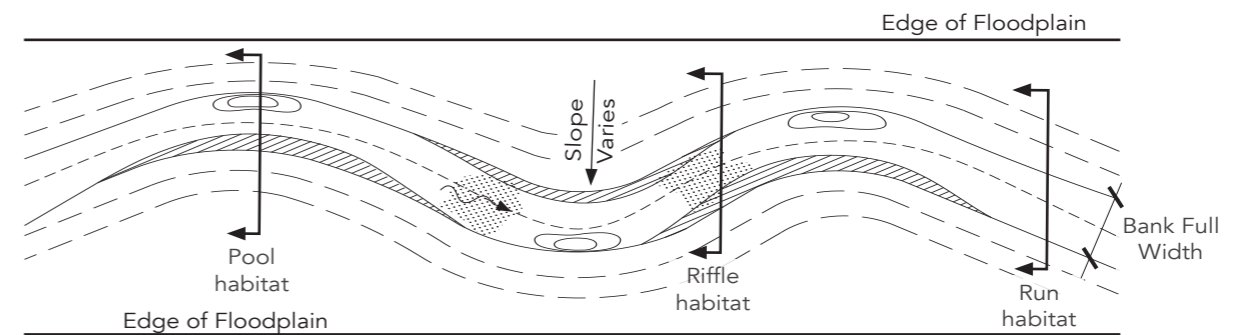
- Located on the meander bends of a channel
- Typically has fine sediment or small gravel
- Naturally grades from shallow on the inside of the bends to deeper on the outside
- Wider floodplains may occur on the inside of bends adjacent to pools

Riffle habitat

- Shallowest habitat
- Generally less common in lowland streams
- Bed has medium to large gravel plus small/large cobble plus the occasional boulder
- Typically narrower than pools and runs (but not always)

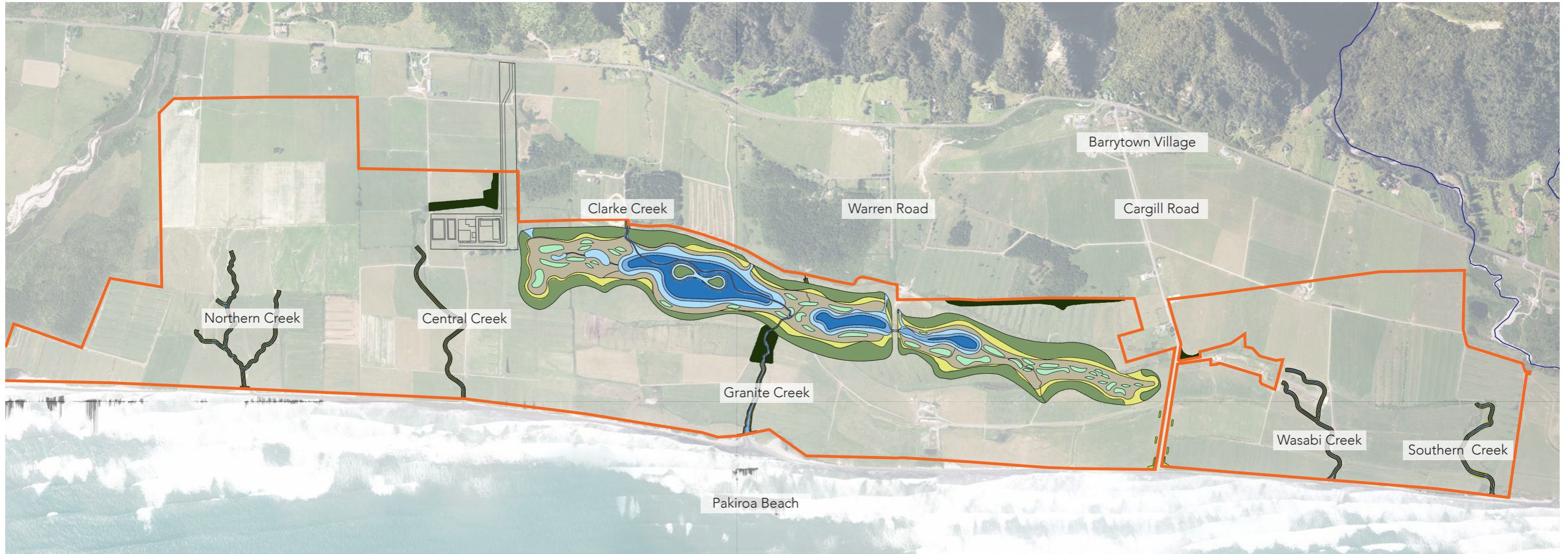
Run habitat





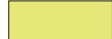

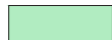



- Located on straighter sections of a channel
- Typically dominated by small to large gravel
- Can be more 'U' shaped but with variable depths if possible
- Typically narrower than pools



LANDSCAPE REHABILITATION - POST MINING

16.0 LANDSCAPE REHABILITATION PLAN - POST MINING FINAL OUTCOME: SECTIONS 1, 2 & 3 COMBINED



KEY	
	Shallow Marsh - Average Depth 0.4m Total Area: 5.3ha
	Mid-depth Water - Average Depth 1m Total Area: 2.8ha
	Deep Open Water - Average Depth 2m Total Area: 4.8ha
	Flaxland and Dry Edge Vegetation Total Area: 16.8ha
	Carex Rushlands Total Area: 5.9ha
	Raupo Wetland Total Area: 14.3ha
	Raised Islands Total Area: 3.2ha
	Riparian Planting 3-5m in width either side of channel
	Existing Planting to be Retained
	Application Area
TOTAL WETLAND AREA: 53.1ha Approximately	

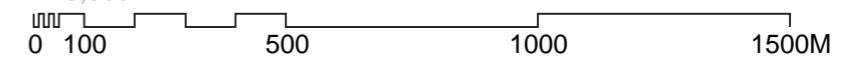
Note:

At the completion of mining activity the application area will have:

- The existing planting areas that were retained
- Clusters of new planting along Cargill Road
- New riparian planting along creeks (five primary ones which have been realigned, plus Granite Creek)
- An extensive well functioning connected new wetland of approximately 53.1 hectares.

Refer to the **Rehabilitation Management Plan** for further details.

1:15,000



17.0 LANDSCAPE SPECIES AND INDICATIVE GROWTH RATES

Below are the plant species that will be used for mitigation and rehabilitation planting.

- An approximate growth rate of 0.40-0.60m per year has been determined in consultation with the project Landscape Architect [Mrs Crawford] and project Ecologist [Mr Bramley]. The combined experience of these two 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.
- Note: The plant species proposed to be used are shown in Schedule of Species below, although other similar species may be used in addition to those listed (e.g., if a particular species is unavailable to source or if for any reason a species is deemed unsuitable at a later stage).

INDICATIVE PLANT GROWTH	
Year of growth	Native Plant Height
1	Seed Collection
2	0.4 - 0.6m at planting
3	0.8 - 1.2m
4	1.2 - 1.8m
5	1.6 - 2.4m
6	2.0 - 3.0m
7	2.4 - 3.6m
8	2.8 - 4.2m
9	3.2 - 4.8m

SCIENTIFIC NAME	COMMON NAME	SCREENING	BUND	RIPARIAN	WETLAND	ULTIMATE SIZE (m) w x h
<i>Aristotelia serrata</i>	makomako, wineberry		x	x		3 x 6
<i>Carex geminata</i>	rautahi			x	x	1 x 1
<i>Carex secta</i>	purei			x	x	1.5 x 1.5
<i>Carex virgata</i>	pukio	x	x	x	x	0.5 x 1
<i>Carmichaelia australis</i>	broom	x	x	x	x	2 x 3
<i>Coprosma propinqua</i>	mikimiki	x	x	x	x	2.5 x 5
<i>Coprosma robusta</i>	karamu	x	x	x	x	2.5 x 5
<i>Cordyline australis</i>	tī kōuka, cabbage tree	x		x	x	2 x 6
<i>Dacrycarpus dacrydioides</i>	kahikatea, white pine			x	x	5 x 50
<i>Juncus edgariae</i>	edgar's rush			x	x	1 x 1
<i>Metrosideros robusta</i>	northern rata		x	x	x	3 x 15
<i>Melicytus ramiflorus</i>	māhoe, whiteywood		x	x	x	2.5 x 8
<i>Phormium tenax</i>	harakeke, korari, New Zealand flax	x	x	x		2 x 3
<i>Pittosporum eugenioides</i>	tarata, lemonwood		x	x		3 x 6
<i>Pittosporum tenuifolium</i>	kohuhu		x	x	x	3 x 6
<i>Rhopalostylis sapida</i>	nīkau	x	x			3 x 15
<i>Solanum aviculare var. aviculare</i>	Poroporo	x	x			2 x 3
<i>Typha orientalis</i>	raupō, bull rush				x	1.5 x 2.3

18.0 PLANTING PALETTE

TREES



Aristolotelia serrata
Makomako / Wineberry



Carmichaelia australis
Broom



Cordyline australis
Cabbage tree



Dacrycarpus dacrydioides
Kahikatea / White Pine



Metrosideros robusta
Northern Rata



Melicytus ramiflorus
Mahoe / Whiteywood

NATIVE SHRUBS



Pittosporum eugenioides
Tarata / Lemonwood



Pittosporum tenuifolium
Kohuhu / Black Matipo



Rhopalostylis sapida
Nīkau



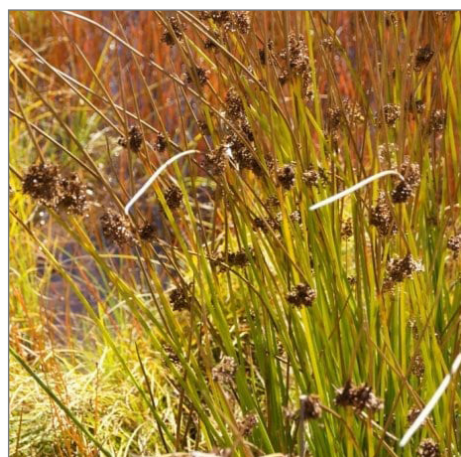
Carex geminata
Rautahi, Cutty grass



Carex secta
Makura Sedge



Carex virgata
Pukio / Swamp Sedge



Juncus edgariae
Wiwi



Coprosma propinqua
Mingimingi



Coprosma robusta
Karamu



Phormium tenax
Harakeke / NZ Flax



Solanum aviculare var. aviculare
Poroporo



Typha orientalis
Raupo / Bull rush

