Fingerboards Mineral Sands Project Inquiry and Advisory Committee Technical Note

TN No: TN 039

Date: 25 June 2021

Subject: Project overview - response to the IAC's request for information dated 26 May 2021 (Tabled Document 401), question 9

Can the Proponent provide a succinct (no more than ten pages) consolidated overview of the project proposed in its current form.

The Project can be summarised as follows:[1]

- **Mining**: Mining an estimated 8 million tonnes of heavy mineral concentrate (HMC) via overburden stripping, mixing the underlying sandy ore with water to make a slurry, pumping the slurry to a wet concentrator plant (WCP) for separation (to separate the HMC from coarse and fine tailings), transporting the HMC to the Port of Geelong via rail in sealed containers for bulk shipping overseas, pumping the coarse tailings from the WCP back to the mine void for backfilling, pumping the fine tailings to relocatable centrifuge plants (located nearer to the active mine void) for further dewatering before trucking the dewatered fine tailings back to the mine void for backfilling.
- **Water management**: Maintaining a series of 'disturbed' and 'undisturbed' catchments via water management dams (19 in total) to prevent mine contact water leaving the site prior to treatment. Water take is from surface water (Mitchell River, via winter fill when river flow above 1400ML/day) and/or groundwater (the deep Latrobe Valley aquifer) with total take of about 2.8GL per year. Rainfall runoff captured on site (e.g., via water management dams from disturbed catchments, sumps and collector drains within the mine void etc.) will be reused as process water, or treated via a Dissolved Air Flotation (DAF) plant and released to the Mitchell River (via pipe to the proposed Mitchell River Pump Station). Releases from the DAF back to the Mitchell River will balance take associated with rainfall runoff capture.
- **Rehabilitation**: Progressive rehabilitation of mining after backfilling using a manufactured sub-soil of approximately 0.7m depth comprising tailings, overburden and chemical and physical amendments, covered by 0.2 to 0.3m of topsoil (previously stripped and amended, as required, including to reduce weed load). Reinstated landforms include a number of domains including plateaus targeted for grazing end uses with planted pasture (similar to existing), vegetated waterways and gullies, planted and vegetated roadsides (with an emphasis on native species) and a Native Grassy Woodland Reserve (restoration project) of approximately 200ha.
- **Roads**: Progressive diversion of roads through the active mining area to accommodate mine staging, with some roads to be reconstructed on new (permanent) alignments (e.g., the Fingerboard's intersection is moved south and becomes a roundabout) and others reinstated to their existing location (e.g., Bairnsdale-Dargo Road east). HMC transport to Port of Geelong will be via rail, involving truck transport of HMC via Lindenow South and

[1] More detailed summaries are provided in the Proponent's Part A submission (Tabled Document 243) and the updated project description, EES Chapter 3 (Tabled Document 122).

Princess Highway to the existing Bairnsdale (Fenning) siding or via a private haul road to a purpose built (new) siding at Fernbank East.

Specific questions from IAC

a) Location of proposed roads

[Note: We understand that this question relates to the diverted / new roads within the mining area and the site access / new Fingerboards roundabout, rather than a query as to the transport paths for HMC generally. We assume the Option 1 and 2 HMC transport paths, and various mitigations suggested in the EES (usefully illustrated on pp 22-24 of Mr Carter's presentation, Tabled Document 324), are clear. Relatedly, Kalbar no longer pursues the Pre-Avon River Bridge HMC transport options (i.e., truck transport to port). This is explained further in item (h) below.]

Two road layouts and staging have been presented:

1. as per the EES (refer to Figure 1 below); and
2. as per Tabled Documents 45-54 (refer to Figure 2 below) (the "**January Plans**").

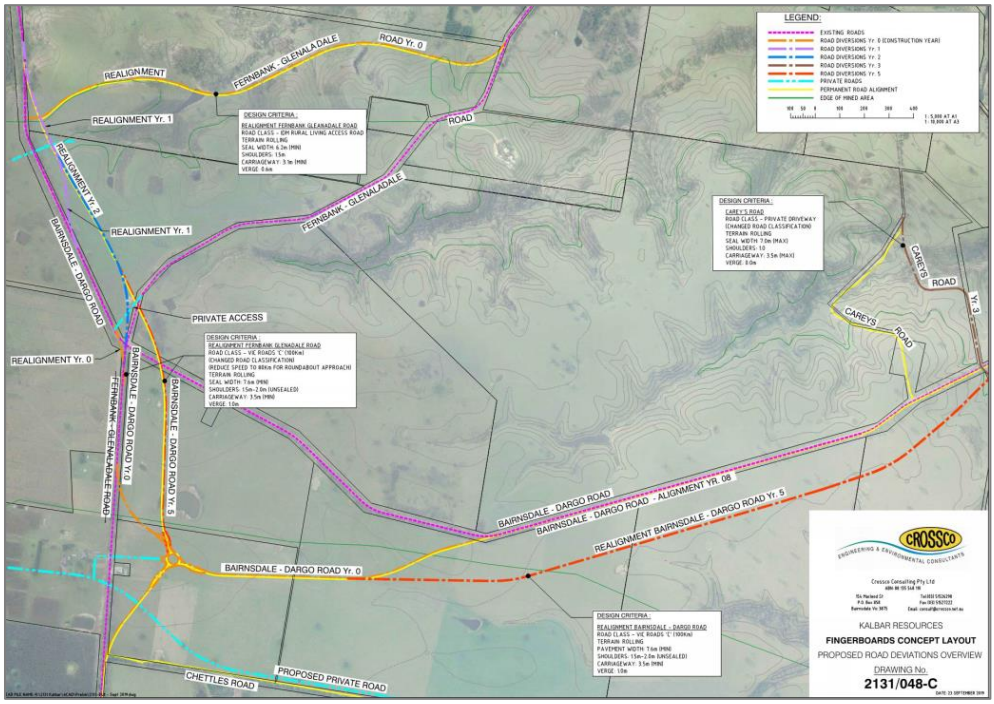

Figure 1 EES proposed road network - diversions and staging[2]

[2] EES Appendix A012 – Traffic and Transport Impact Assessment, Figure 10, pdf p 35.

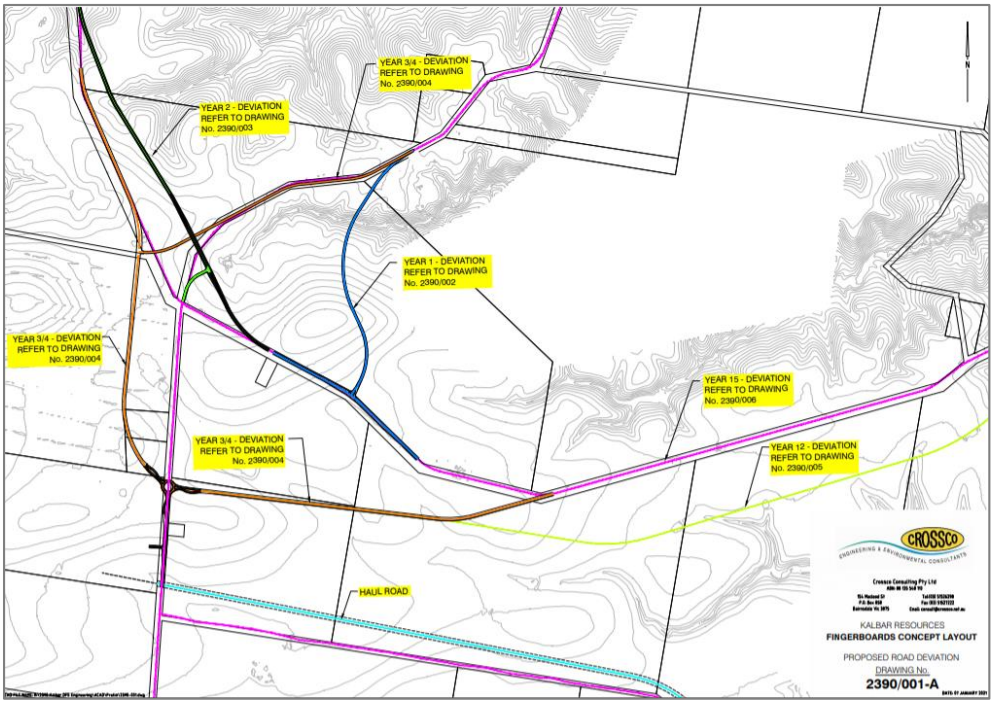

Figure 2 January tabled plans – proposed road network - diversions and staging (Tabled Document 45)

The rationale for the changes in the January Plans was explained in Tabled Document 44. In short, these revisions facilitate more efficient mine sequencing, reduce the extent of 'interim' roads and locate the northern interim section of Fernbank Glenaladale Road (see blue in Figure 2) over less challenging topography.

Both sets of plans were assessed by Mr Hunt and Mr Carter in their evidence. Ultimately, the functionality achieved by both options is similar and acceptable, but would require road geometry refinements in accordance with Austroads design standards and detailed design to the satisfaction of the Department of Transport and East Gippsland Shire Council. Both options are either within the mine project area or infrastructure options area under the Specific Controls Overlay. Having regard to these factors, Kalbar is not asking the IAC to make a finding as to which of the road alignments is preferred, but rather to find that either would be acceptable, subject to the mitigations outlined in the EES and evidence, and subject to the controls proposed (i.e., the Traffic and Transport Management Plan requirements provided in the DoT's version of the Incorporated Document).

A related issue is whether an underpass (per Mr Hunt's recommendations) or signals (per Mr Carter's evidence) is required for the HMC haul crossing of Fernbank-Glenaladale Road. Both witnesses accepted that this could be determined through detailed design to the satisfaction of the road authorities (despite their starting preferences). Kalbar does not oppose either option in principle, but considers it would be prudent for this particular matter to be determined by the road authorities.

Having said the above, the January Plans present Kalbar's preferred road layout, for staging and efficiency reasons, whilst acknowledging that the road authorities will likely require refinements. The staging arrangements for these plans are shown via various colours and annotations. A simpler presentation of the January Plans is included as Attachment 1 to further assist the IAC and submitters (with the various stages shown on separate sheets, rather than differentiated through colours).

b) Previous and proposed mining licence extent

The EES contemplates that the mining licence would encompass the 'Project area' (refer Figure 3).

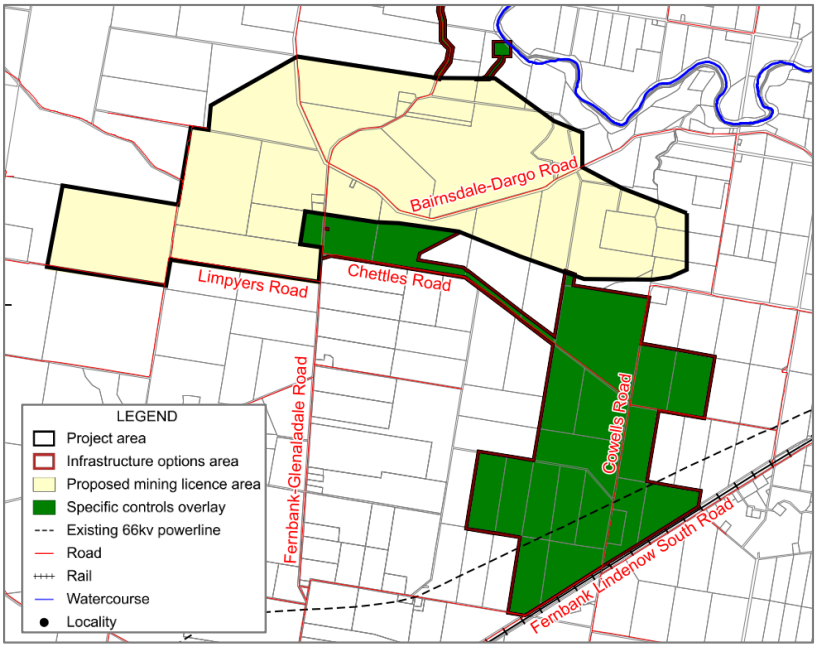

Figure 3 Location of proposed Specific Controls Overlay and mining licence area (part extract, EES Chapter 12, Figure 1, pdf p 12)

As explained in TN 032 (Tabled Document 518), on 13 May 2021, Kalbar lodged its application for a mining licence over a larger area than the Project area.

Figure 4 below shows the Project area, together with the mining licence application area (as per the May 2021 application). The change to mining licence application area does not change the area of land proposed to be mined (see further discussion in item (c) below).

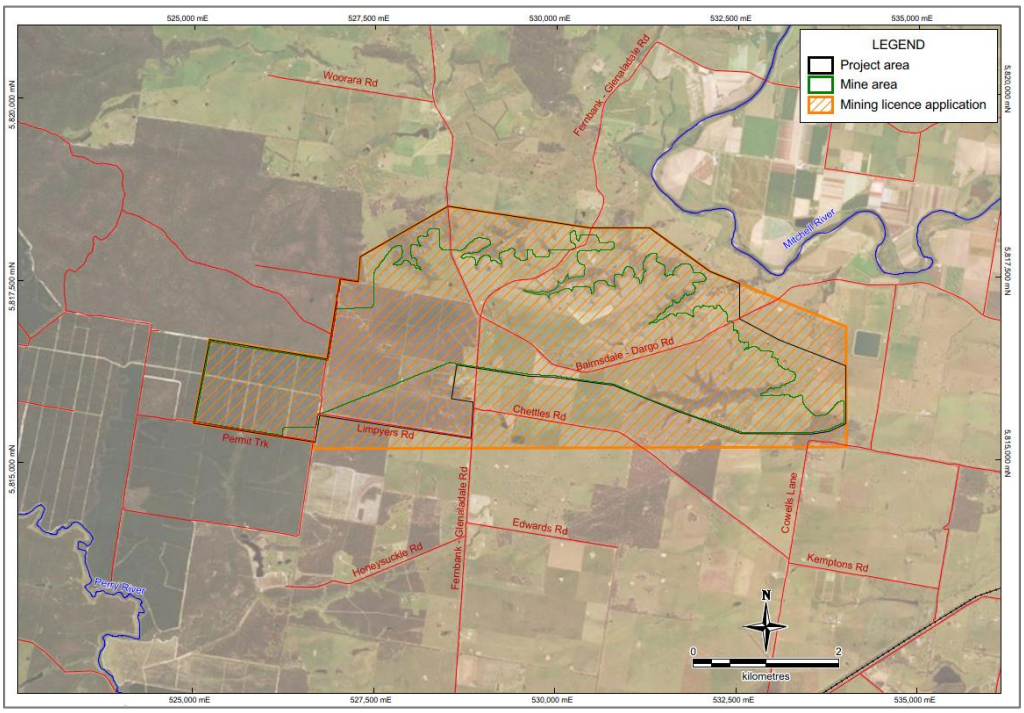

Figure 4 Project area and mining licence application (May 2021) area

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c) Area of land to be potentially mined

The proposed mine footprint is shown by the green line in Figure 4 above. This is the same mine footprint shown in the EES (see, e.g., Figure 3 of the EES map book).

d) location of all proposed dams, including sequencing

The information for the proposed surface water management dams is contained in the *Conceptual surface water management strategy and water balance* technical report (EES Appendix A006: App A).

Figure 4.5 within that report shows the indicative dam locations for the surface water management dams (extracted in Figure 5 below). The sequencing for those dams can be found in Figure 4.4 of that document (extracted in Figure 6 below).

Other water infrastructure, including the freshwater storage dam, process and contingency water dams is shown in Figure 3.4 of the EES Project Description (Chapter 3) (extracted in Figure 7 below).

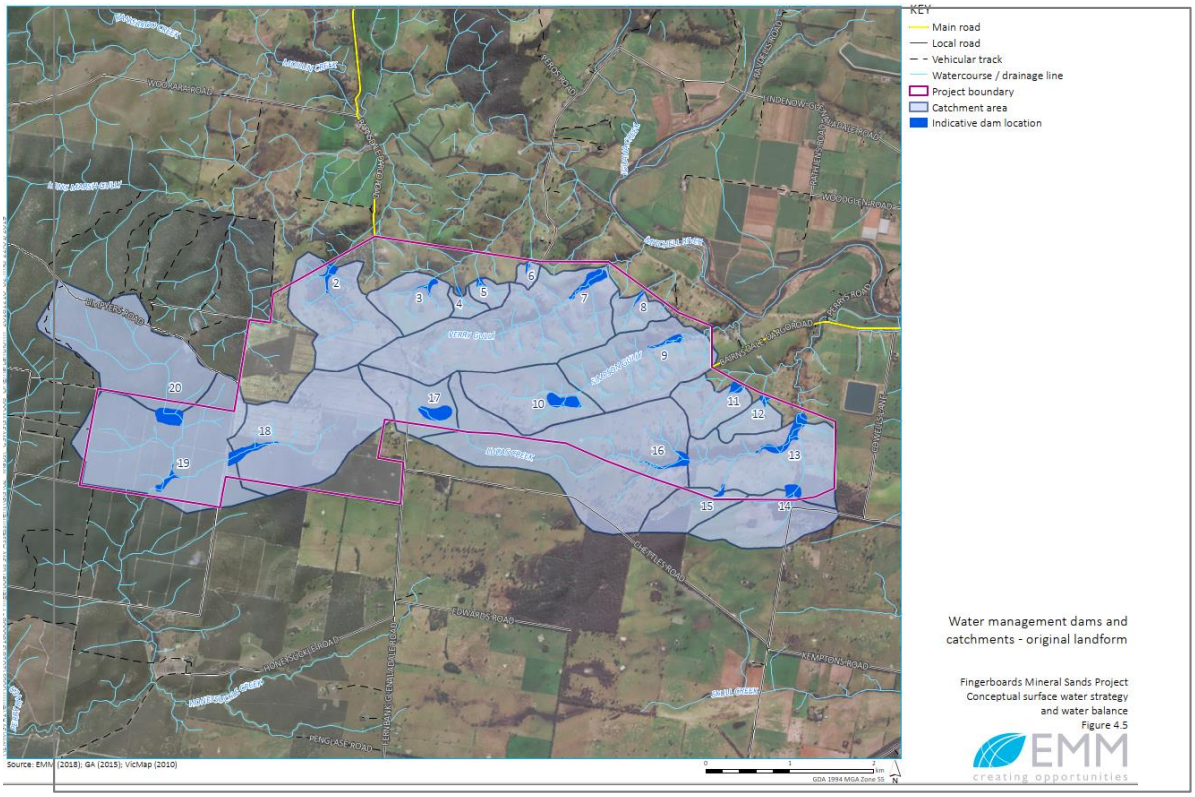

Figure 5 EES Appendix A006: App A extract, pdf p 42

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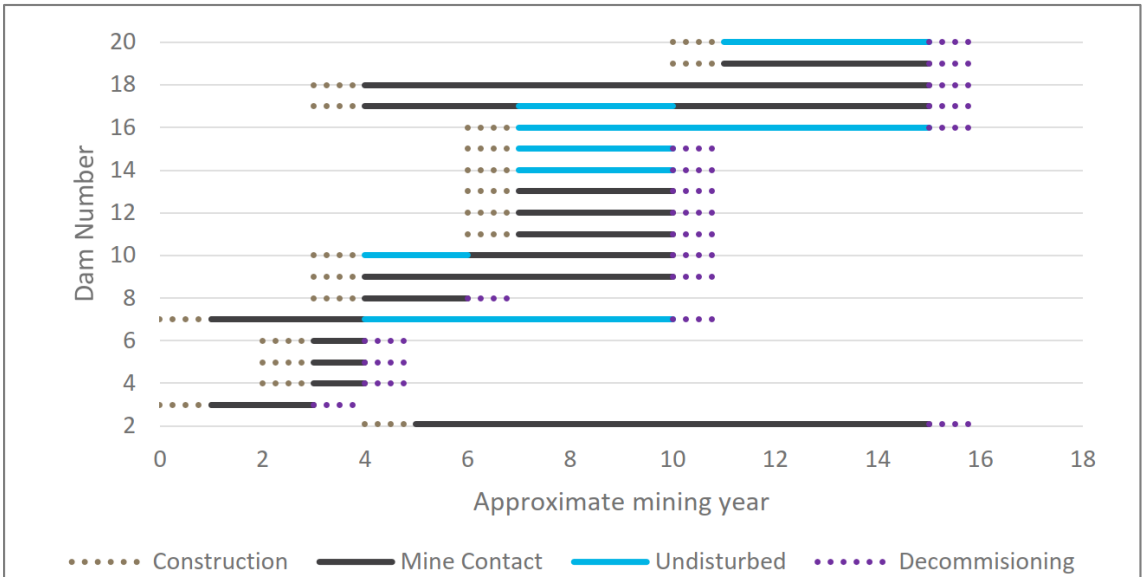

Figure 4.4 Indicative staging of water management dams

Figure 6 EES Appendix A006: App A extract, pdf p 40

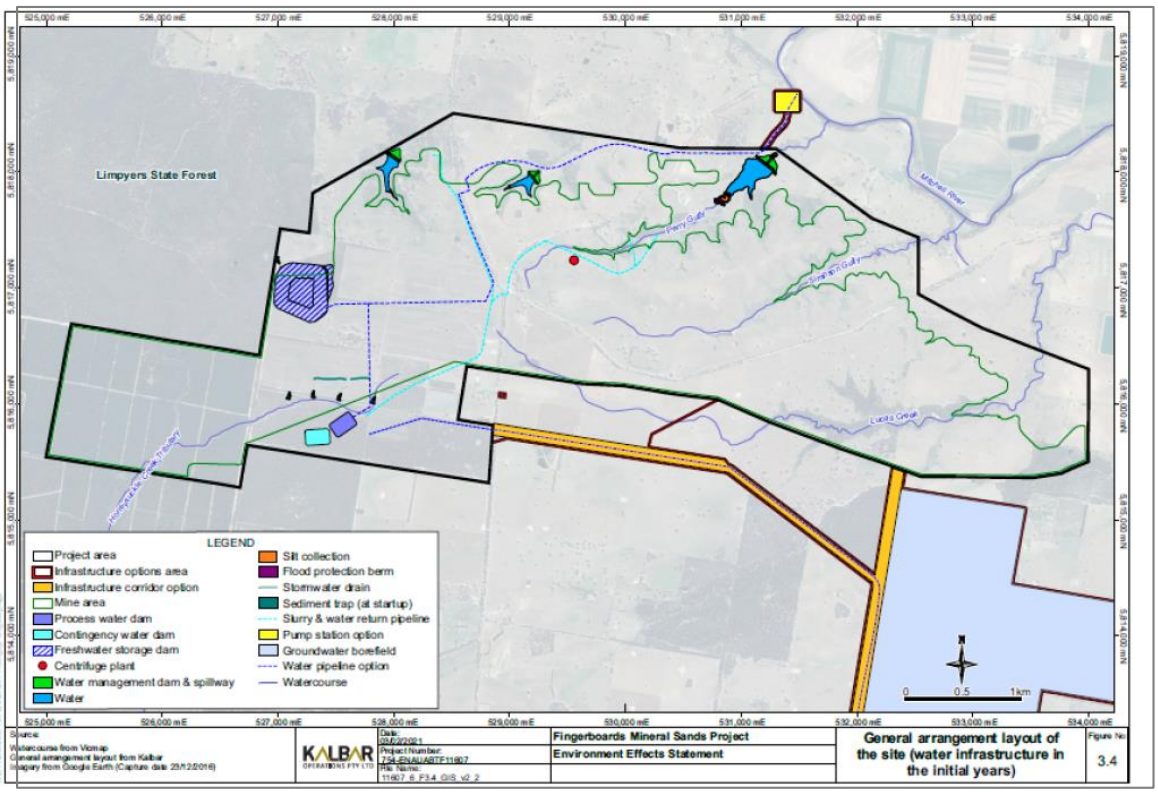

Figure 7 Extract from updated EES Chapter 3 (Project Description), Tabled Document 122, pdf p 6

e) Current agreed water balance including expected take from surface water and groundwater, over what period

In line with information contained in Tabled Document 273 (Expert witness evidence errata of Jarrah Muller); the following volumes are year 5, 8 and 15 - expected surface water and groundwater take for dry, median and wet annual rainfall years:

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Year	Surface water (ML)	Groundwater (ML)	Total
Low rainfall			
5	2,759	25	2,784
8	2,779	35	2,814
15	2,787	72	2,859
Median rainfall			
5	2,744	8	2,752
8	2,742	18	2,760
15	2,790	18	2,808
High rainfall			
5	2,685	1	2,686
8	2,723	3	2,726
15	2,758	2	2,760

As the water balance is potentially affected by climate change, Kalbar requested EMM to prepare additional water balances for two climate scenarios – one using a 1975 baseline and one assuming a step change in 1997 – based on the climate change modelling requested by the IAC. The water balances for these scenarios are set out below:

1975 baseline climate

Year	Surface water (ML)	Groundwater (ML)	Total
Low rainfall [1]			
5	2,348	254	2,602
8	2,351	271	2,621
15	2,350	296	2,646
Median rainfall			
5	2,733	14	2,747
8	2,756	47	2,803
15	2,771	40	2,811
High rainfall			
5	2,652	0	2,652
8	2,690	0	2,690
15	2,783	1	2,784

1997 step change climate

Year	Surface water (ML)	Groundwater (ML)	Total
Low rainfall [1]			
5	1,926	576	2,502
8	1,929	598	2,527
15	1,928	621	2,549
Median rainfall			
5	2,736	41	2,777
8	2,759	75	2,834
15	2,770	69	2,839
High rainfall			
5	2,704	0	2,704
8	2,732	0	2,732
15	2,804	0	2,804

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In both climate scenarios, the total groundwater and surface water take in low rainfall years is lower than the site water requirement of median and high rainfall years as the model did not fully replenish the fresh water dam in low rainfall years ie part of the water demand was supplied from storage.

f) Location and scale of centrifuge building units and other fixed infrastructure and plant

Centrifuge locations

Refer to Figure 8 of the Corrected TN01 (Implementation of centrifuges for water recovery and tailings management), Tabled Document 43a, for proposed centrifuge locations.

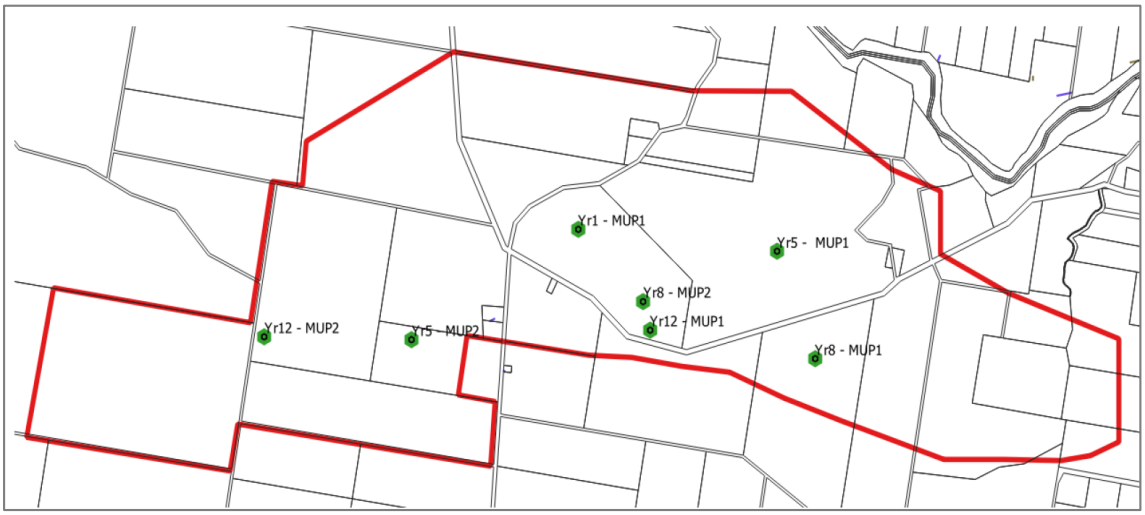

Figure 8 Extract of Figure 8 from TN01 (corrected), Tabled Document 43a

Centrifuge plant size

There are two relocatable centrifuge plants being proposed, known as MUP1 and MUP2. The full extent of the centrifuge plant is measured at 75.6m W x 54.2m D x 12.5m H. This includes all buildings and potential maximum stockpile footprint (refer extract from engineering plans in Figure 9 – with the full plan provided at Attachment 2).

8

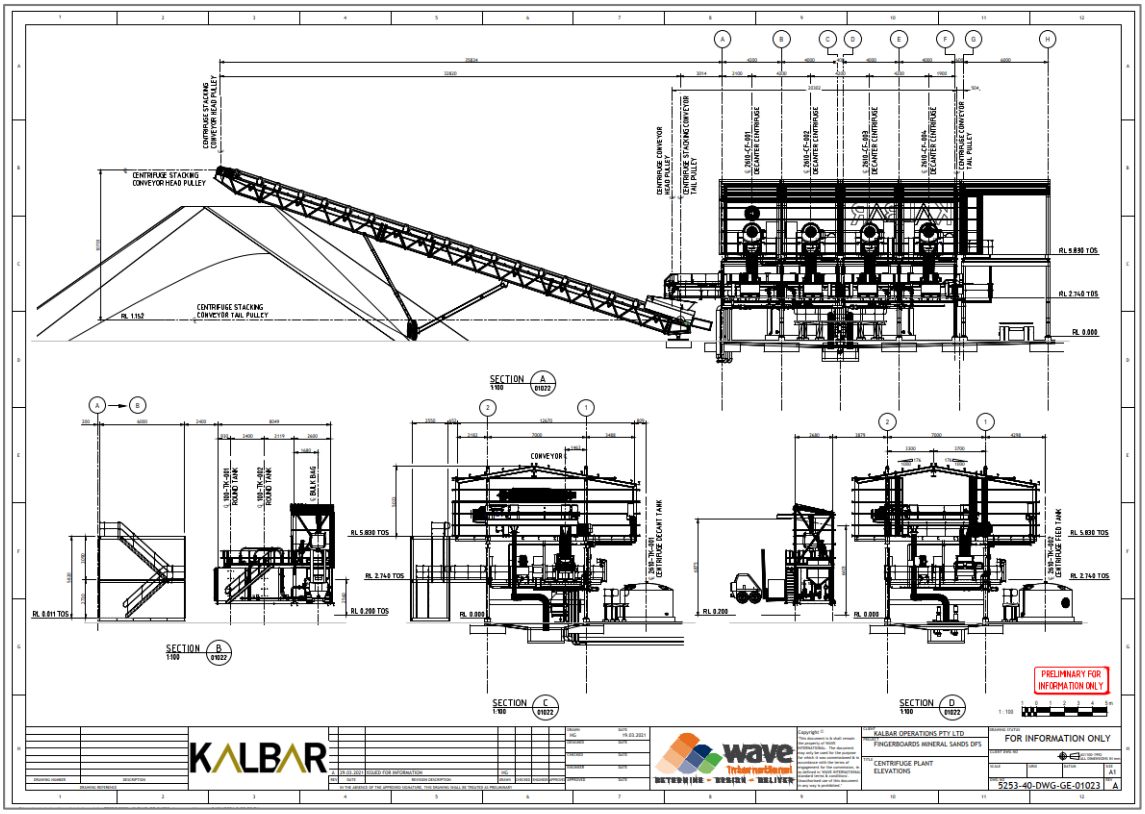

Figure 9 Centrifuge plant (MUP) including stockpiles – elevations

g) Final agreed statistics on flora and fauna species impacted - including area and number impacted

As set out in slide 14 of the presentation of Aaron Organ (Tabled Document 299), the final agreed statistics of impacted flora and fauna species are as follows:

- 223.58 Ha of native vegetation
- 373 large trees in patches and 461 scattered trees
- 1.74Ha of Gippsland Red Gum Grassy Woodland ecological community (nationally significant)
- 9.91 of Forest Red Gum Grassy Woodland ecological community (state significant)
- Removal of State significant flora species: Slender Wire-lily (33 plants), Blue Mat-rush (3 plants), Sandfly Zieria (10 plants)
- Removal of known habitat for the following fauna species of national, State and regional significance: Grey-headed flying fox, Yellow-bellied Sheathtail Bat, Masked Owl, Emu, Eastern Long-necked Turtle

h) Clarity on whether road-based transport options to Melbourne are still being considered or not

No – road based transport of HMC (the 'Pre-Avon River Bridge' option in the EES) is no longer being pursued. Transport will be by rail only.

If there is a short term rail outage, Kalbar will store containers for the required period of time and, if necessary, slow operations, until the rail service is restored.

The EES has assessed two rail-based HMC transport options, named Option 1 (private siding at Fernbank East) and Option 2 (Bairnsdale Fenning siding). It is acceptable for the EES and the IAC to

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assess these two options and make findings in relation to both.[3] As the IAC is aware, Kalbar favours Option 1. If Option 1 is favourably assessed by the Minister for Planning, and final consent is given by the rail authorities, then Kalbar will proceed with Option 1. However, because these are contingent matters, Option 2 has also been assessed in the EES and prosecuted by Kalbar as an acceptable option through the course of the hearing. Accordingly, Option 2 should also be the subject of findings and recommendations from the IAC.

The issue of 'interim' use of the Bairnsdale (Fenning) siding was raised in the Council submissions and Mr Hunt's evidence. To be clear, Kalbar will only construct and use one option. Option 2 requires various road upgrades and intersection treatments. Therefore, from Kalbar's perspective, it is only sensible to proceed with one option, not a hybrid.

i) Proposed location of expanded borefield

Figure 10 shows the existing (exhibited – hatched) and potential revised borefield area (blue) (see Attachment 4 for original plan).

All property owners within these areas (existing and expanded) have granted access for the purpose of groundwater exploration drilling and the future use of the borefield.

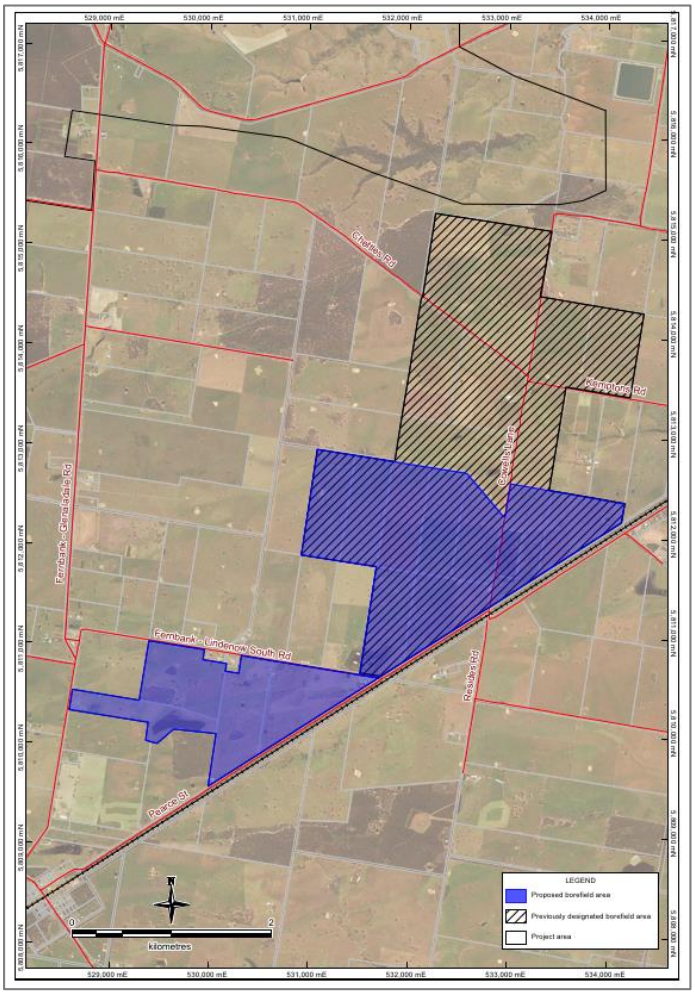


Figure 10 Potential revised bore field location

[3] See *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* (7th ed., 2006), pdf p 17 under the heading 'Description and assessment of relevant alternatives'.

j) Location of all sensitive receptors.

Sensitive receptors within 2km and 5km of the Project are shown in Figure 1 and Figure 2 of TN 004 (Tabled Document 145).

Kalbar notes the submissions made regarding potential discrepancies / errors in its identification of sensitive receptors, in particular, by reference to the receptor map shown on page 478 of Submission 813, extracted in Figure 11 below for reference.

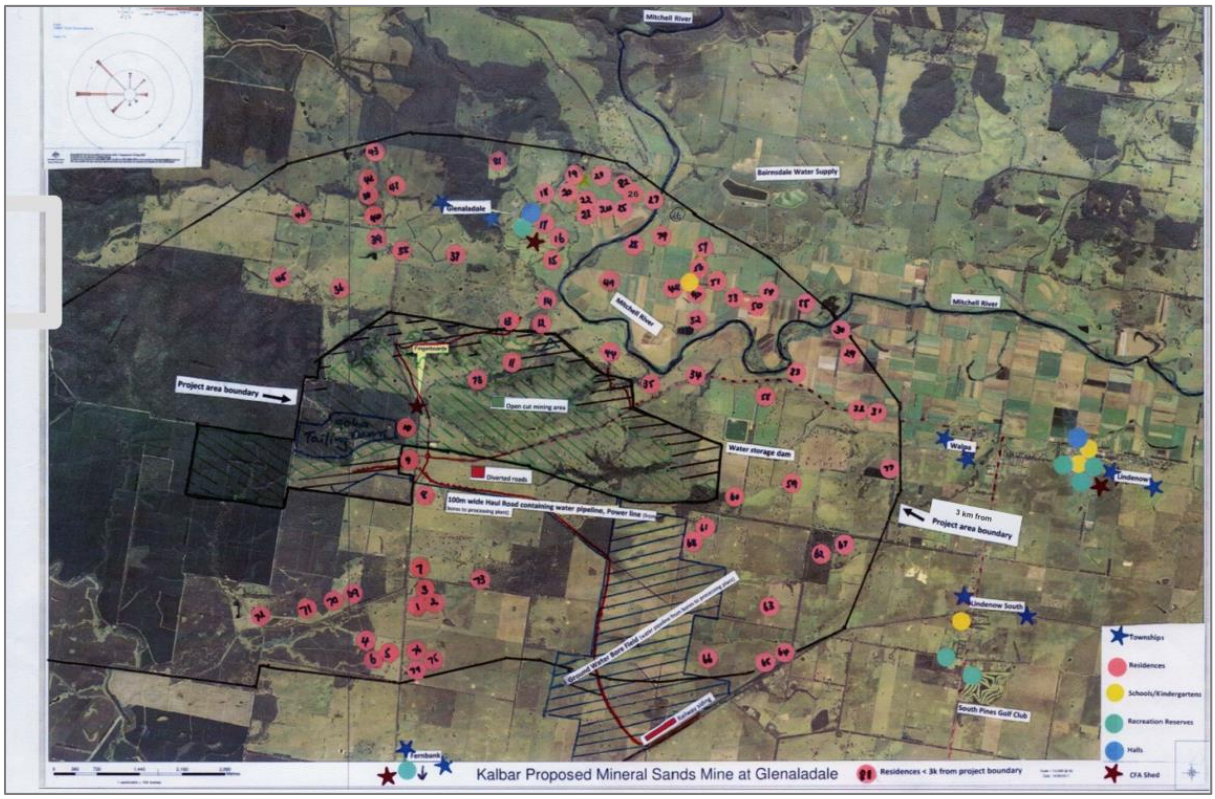


Figure 11 Extract from Tabled Document 483 (higher resolution version of the map included on p on page 478 of Submission 813)

Kalbar checked its sensitive receptor GIS information against Submission 813 after receiving this submission, prior to the IAC hearing and in light of further submissions at the hearing concerning this map, has rechecked this again.

To that end, Attachment 5 provides a table matching the submission 813 receptor numbers with the corresponding receptor number in TN004.

Some of the receptors in the submission 813 map cannot be verified by Kalbar – i.e., appear to be either a farm dam, or vacant black. These instances are noted in the table.

Only one instance was identified where a residence was shown in the submission 813 map and not identified (i.e. missed) in the TN004 map. This is receptor 65. Refer Figure 12.

11

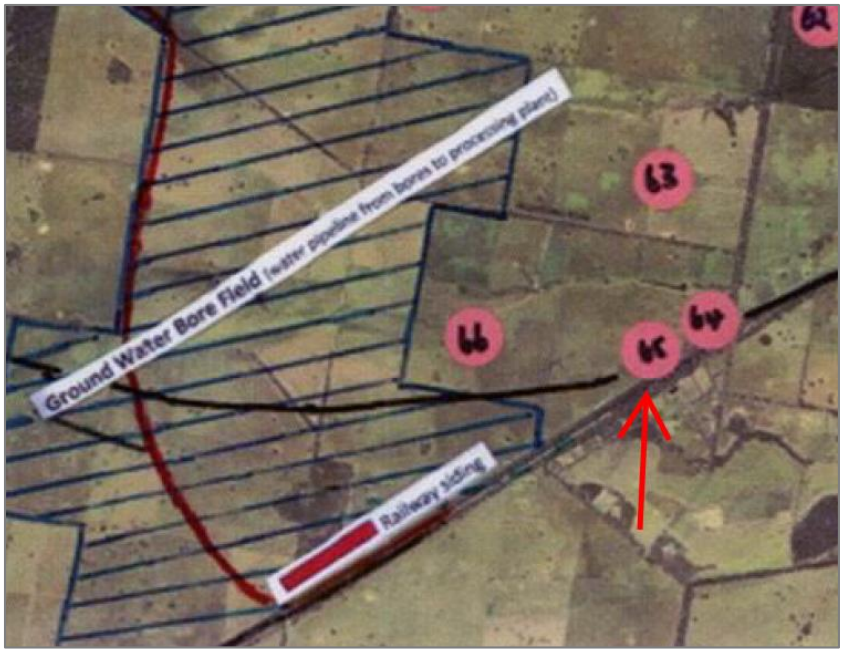


Figure 12 Submission 813 map extract showing receptor 65 (red arrow)

Several additional receptors are shown in the TN004 map closer to the rail siding than no. 65, as can be seen in Figure 13.

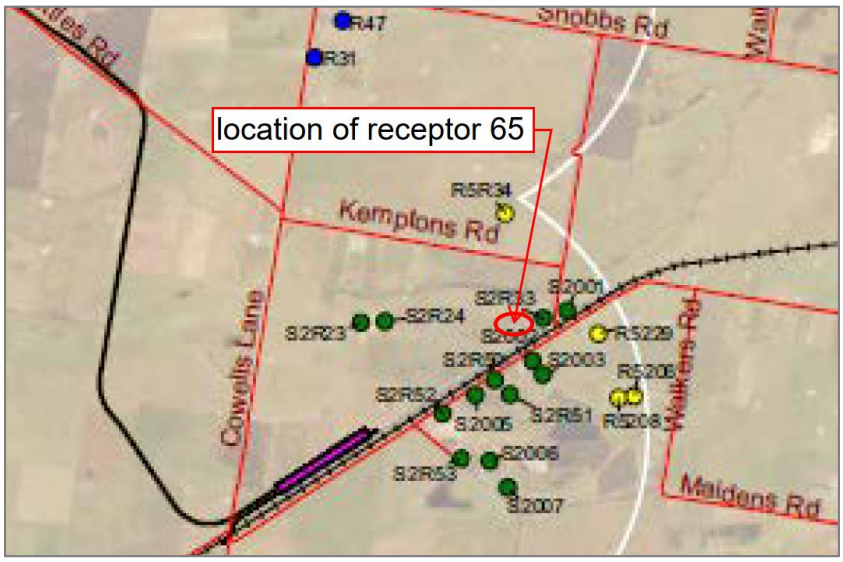


Figure 13 Extract from TN004 (Figure 1 – sensitive receptors within 2km of the Project including siding)

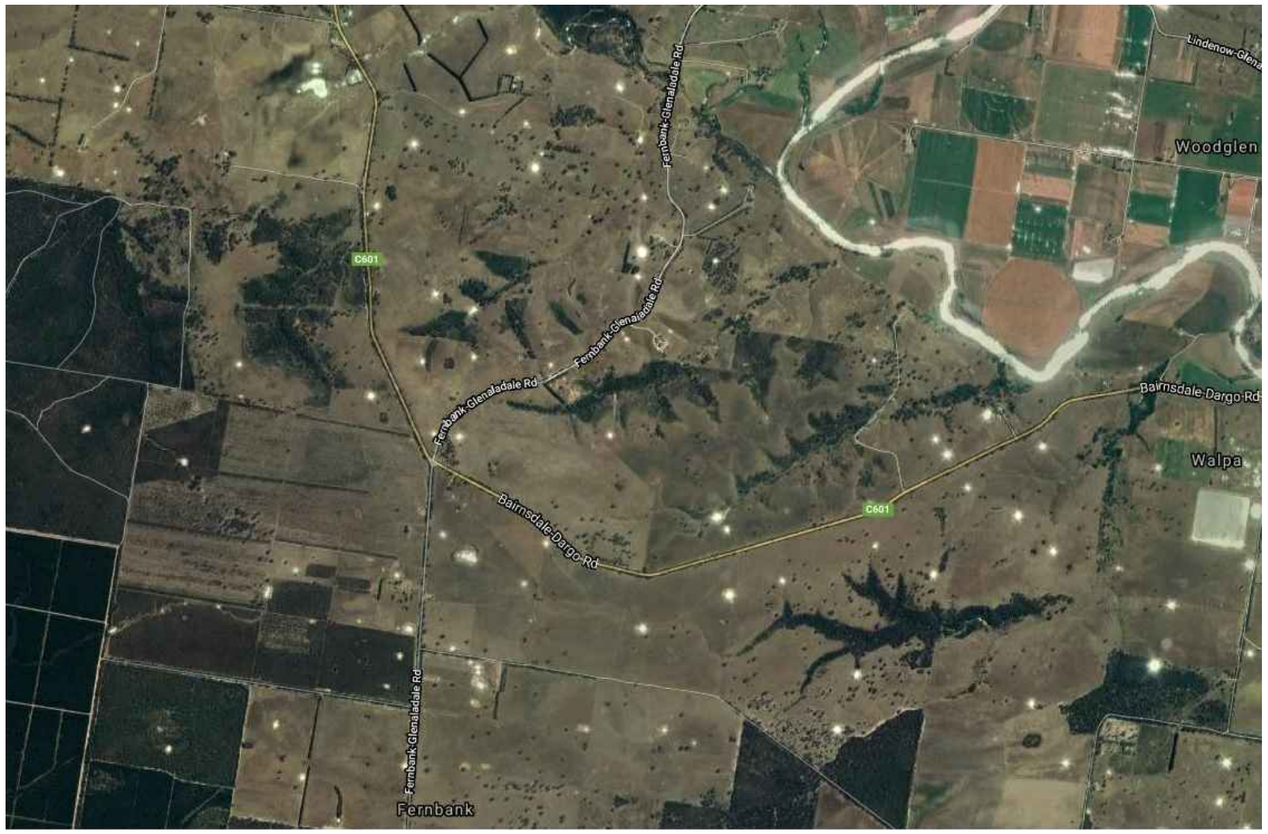
Accordingly, the identification of the additional receptor 65 will not affect the conclusions of the air and noise assessments.

Attachments (combined package – source plans referenced above)

1. January Plans – staging sheets
2. Mining licence application area plan
3. Centrifuge plant and stockpile – engineering plan elevations
4. Potential revised borefield location plan
5. Receptor correlation table and map extracts

12

DRG. No.	DESCRIPTION
2390/1100	LOCALITY PLAN AND DRAWING LIST
2390/1101	PROPOSED YEAR O TO 1 LAYOUT
2390/1102	PROPOSED YEAR 2 LAYOUT
2390/1103	PROPOSED YEAR 3/4 LAYOUT
2390/1104	PROPOSED YEAR 12 LAYOUT
2390/1105	PROPOSED YEAR 15 LAYOUT
2390/1106	PROPOSED YEAR 16 PLUS LAYOUT



LOCALITY PLAN
NOT TO SCALE

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KALBAR RESOURCES
FINGERBOARDS CONCEPT
LOCALITY PLAN & DRAWING LIST
DRAWING No.
2390/1100-A
DATE: 22 JUNE 2021

CAD FILE NAME: R:\2390 Kalbar DFS Engineering\ACAD\Prelim\2021-06-22 CONCEPT - YEARLY PROGRESSION\2390-1100.dwg

EXISTING BAIRNSDALE-DARGO ROAD

DEMOLISH - YEAR 1

EXISTING FERNBANK-GLENALADALE ROAD

YEAR 1 - FERNBANK-GLENALADALE ROAD DEVIATION

N

LEGEND:

- EXISTING ROADS
- PROPOSED DEMOLISHED ROADS
- PROPOSED ROAD DEVIATIONS
- PROJECT AREA

EXISTING BAIRNSDALE - DARGO ROAD

100 50 0 100 200 300 400 500

1 : 8,000 AT A1
1 : 16,000 AT A3

YEAR 0 (PRE COMMENCEMENT) - CONSTRUCT SITE ACCESS AND PRIVATE HAUL ROAD

EXISTING LIMPYERS ROAD

EXISTING CHETTLES ROAD

EXISTING FERNBANK-GLENALADALE ROAD

HAUL ROAD TO CONTINUE TO TRAIN LOADING AREA

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KALBAR RESOURCES

FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 0 TO 1 LAYOUT

DRAWING No.

2390/1101-A

DATE: 22 JUNE 2021

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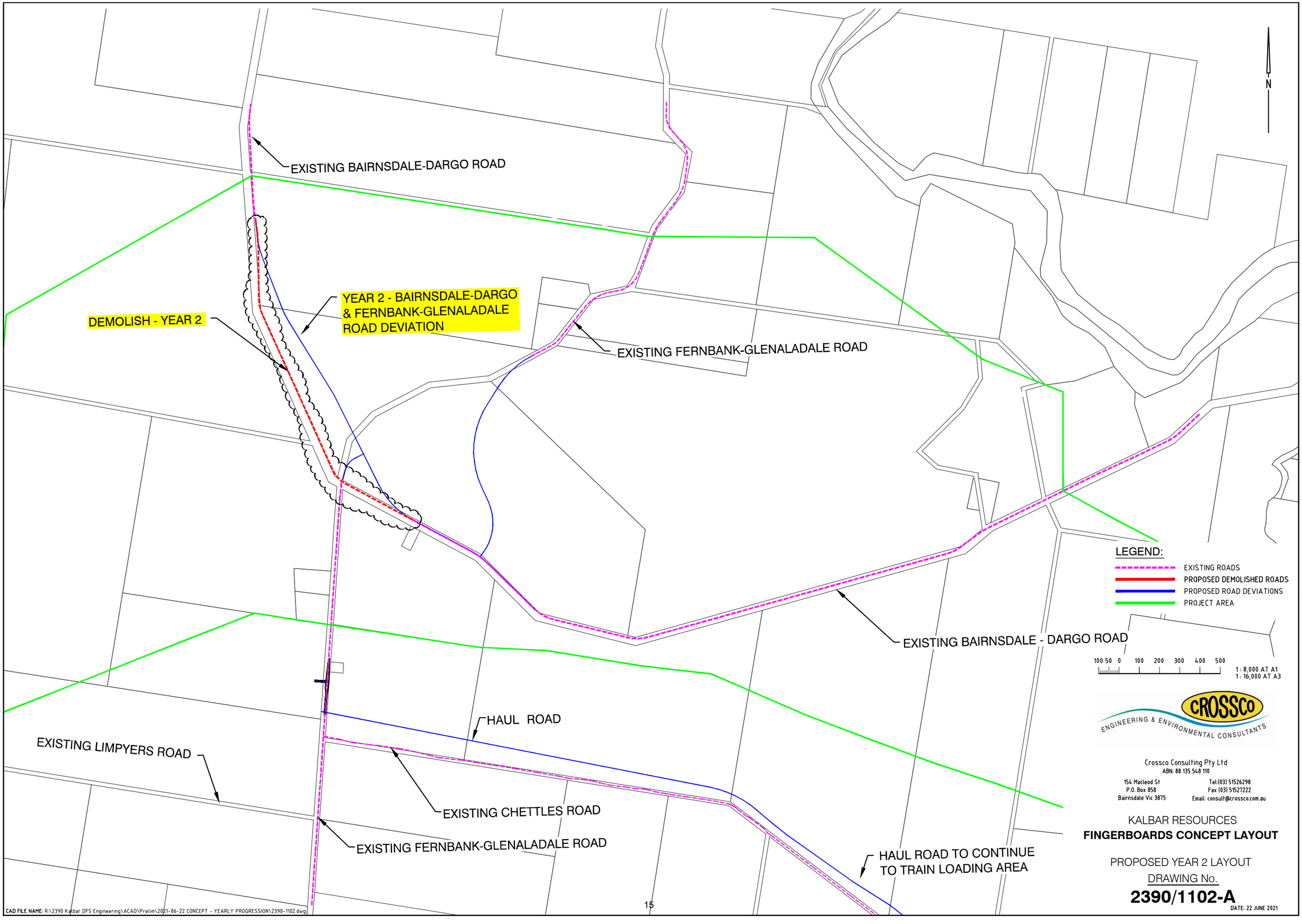

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FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 2 LAYOUT

DRAWING No.

2390/1102-A

DATE: 22 JUNE 2021

CAD FILE NAME: R:\2390 Kalbar DFS Engineering\ACAD\Prelim\2021-06-22 CONCEPT - YEARLY PROGRESSION\2390-1102.dwg

EXISTING BAIRNSDALE-DARGO ROAD

DEMOLISH - YEARS 3-4

YEAR 3-4 BAIRNSDALE-DARGO ROAD NORTH DEVIATION

EXISTING FERNBANK-GLENALADALE ROAD

YEAR 3-4 FERNBANK-GLENALADALE ROAD DEVIATION

DEMOLISH - YEARS 3-4

EXISTING BAIRNSDALE - DARGO ROAD

YEAR 3-4 ROUNDABOUT

YEAR 3-4 BAIRNSDALE-DARGO ROAD SOUTH DEVIATION

HAUL ROAD

EXISTING LIMPYERS ROAD

EXISTING CHETTLES ROAD

EXISTING FERNBANK-GLENALADALE ROAD

HAUL ROAD TO CONTINUE TO TRAIN LOADING AREA

N

LEGEND:

- EXISTING ROADS
- PROPOSED DEMOLISHED ROADS
- PROPOSED ROAD DEVIATIONS
- PROJECT AREA

100 50 0 100 200 300 400 500

1 : 8,000 AT A1
1 : 16,000 AT A3

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FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 3/4 LAYOUT

DRAWING No.

2390/1103-A

DATE: 22 JUNE 2021

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KALBAR RESOURCES

FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 12 LAYOUT

DRAWING No.

2390/1104-A

LEGEND:

- EXISTING ROADS
- PROPOSED DEMOLISHED ROADS
- PROPOSED ROAD DEVIATIONS
- PROJECT AREA

EXISTING BAIRNSDALE-DARGO ROAD

EXISTING FERNBANK-GLENALADALE ROAD

EXISTING BAIRNSDALE - DARGO ROAD

DEMOLISH - YEAR 12

YEAR 12 - BAIRNSDALE-DARGO ROAD DEVIATION

HAUL ROAD

EXISTING LIMPYERS ROAD

EXISTING CHETTLES ROAD

EXISTING FERNBANK-GLENALADALE ROAD

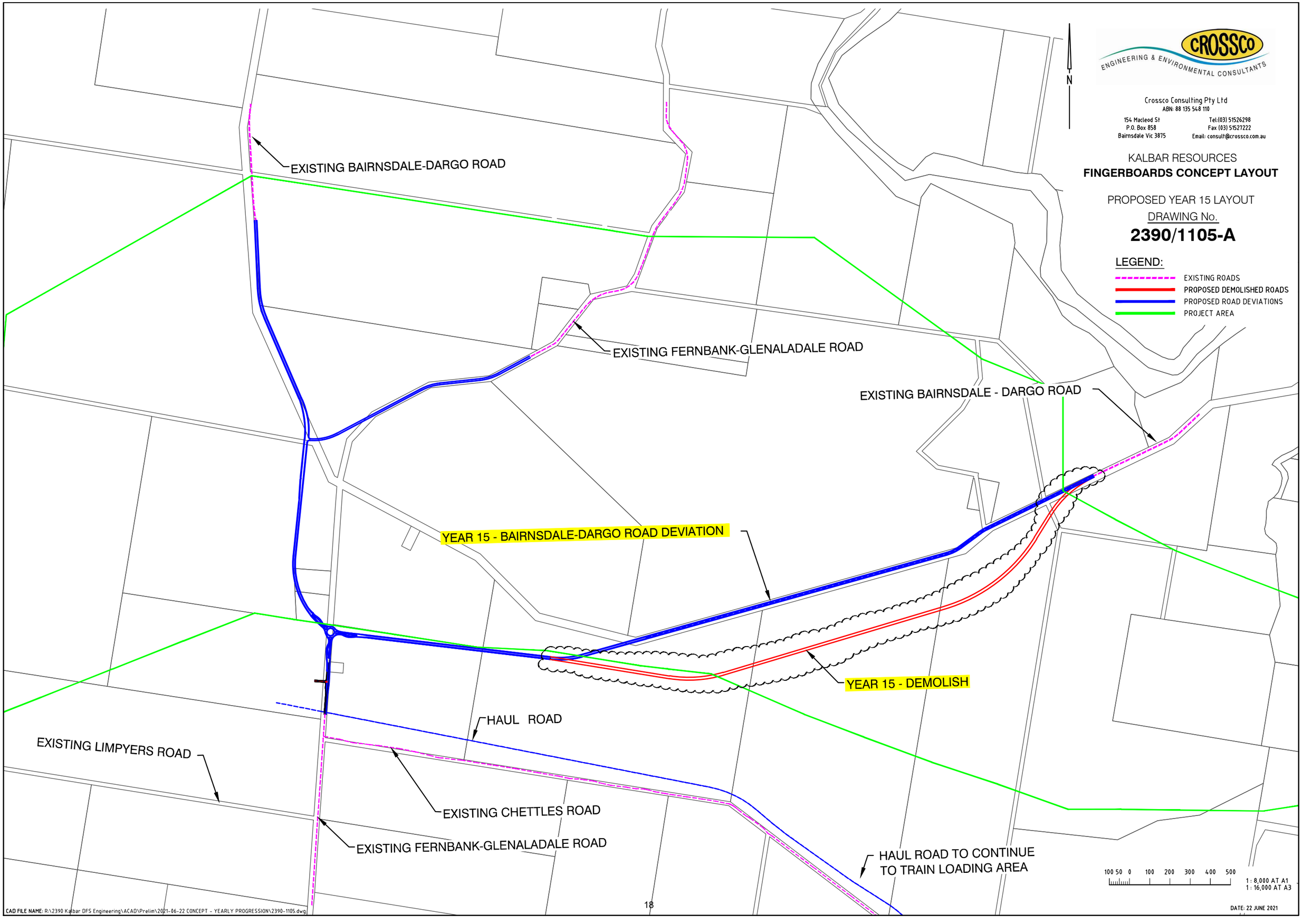
HAUL ROAD TO CONTINUE TO TRAIN LOADING AREA

100 50 0 100 200 300 400 500

1 : 8,000 AT A1
1 : 16,000 AT A3

DATE: 22 JUNE 2021

CAD FILE NAME: R:\2390 Kalbar DFS Engineering\ACAD\Prelim\2021-06-22 CONCEPT - YEARLY PROGRESSION\2390-1104.dwg



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KALBAR RESOURCES

FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 15 LAYOUT

DRAWING No.

2390/1105-A

LEGEND:

- EXISTING ROADS
- PROPOSED DEMOLISHED ROADS
- PROPOSED ROAD DEVIATIONS
- PROJECT AREA

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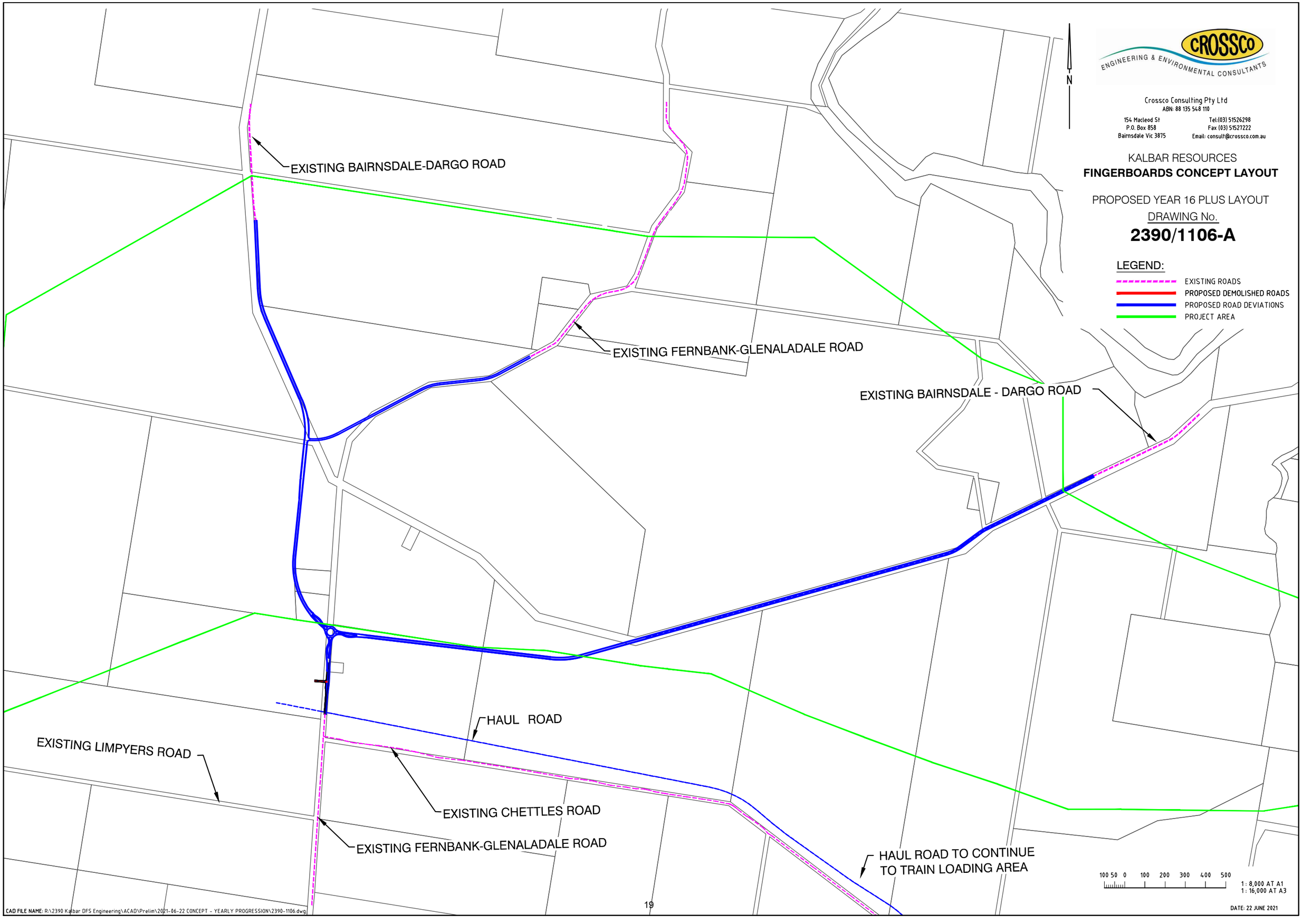
DATE: 22 JUNE 2021



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KALBAR RESOURCES

FINGERBOARDS CONCEPT LAYOUT

PROPOSED YEAR 16 PLUS LAYOUT

DRAWING No.

2390/1106-A

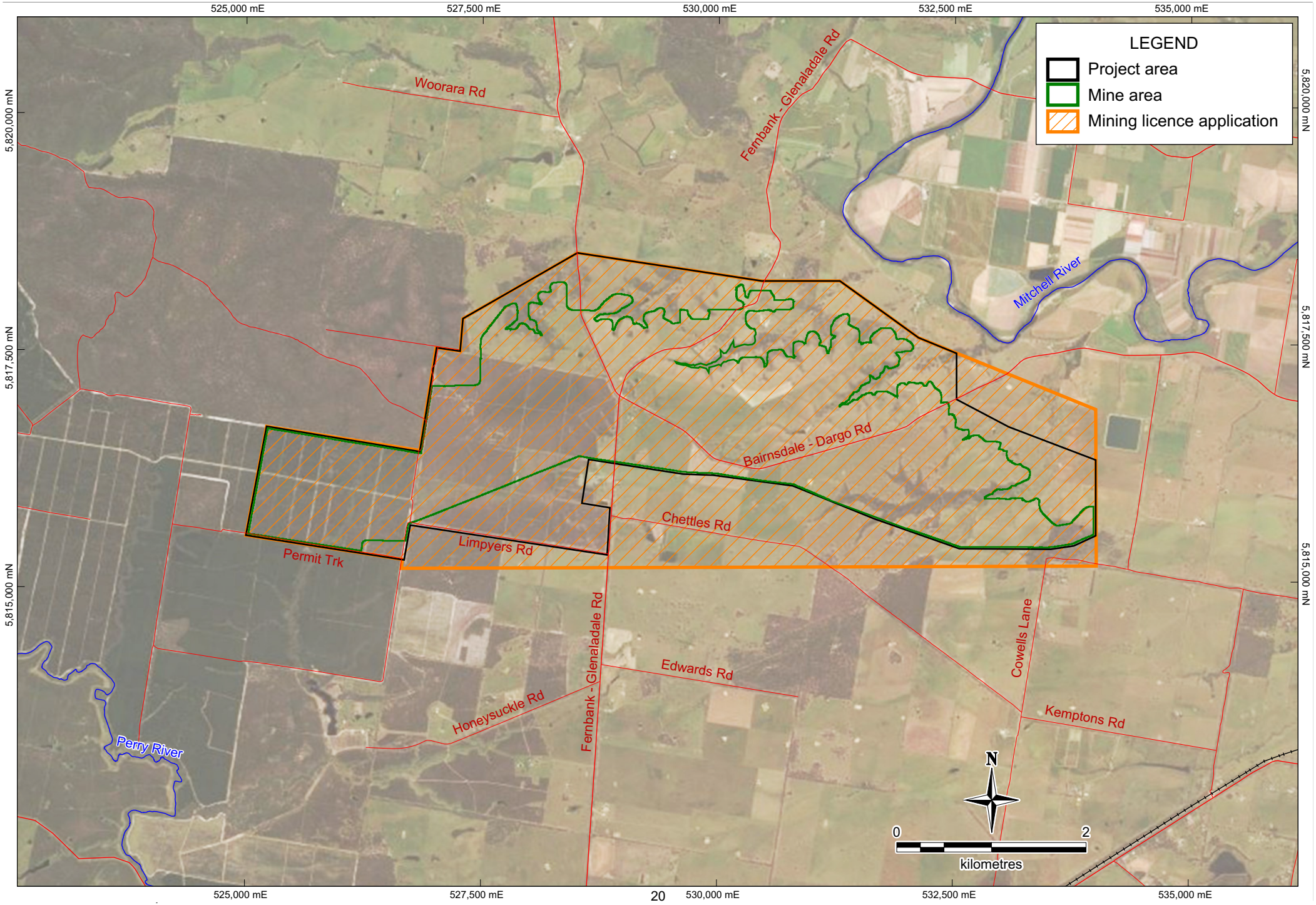
LEGEND:

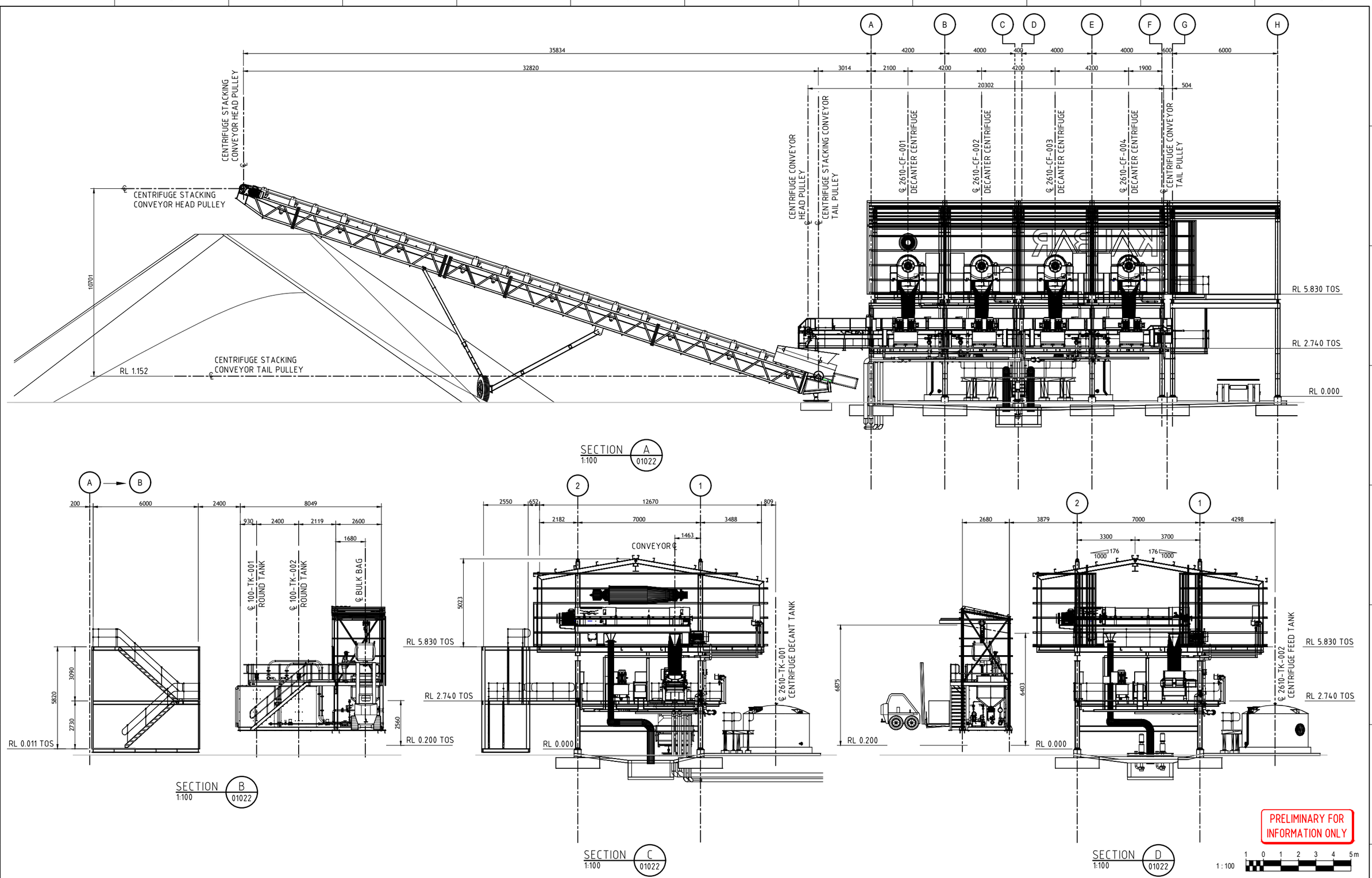
- EXISTING ROADS
- PROPOSED DEMOLISHED ROADS
- PROPOSED ROAD DEVIATIONS
- PROJECT AREA

CAD FILE NAME: R:\2390 Kalbar DFS Engineering\ACAD\Prelim\2021-06-22 CONCEPT - YEARLY PROGRESSION\2390-1106.dwg

DATE: 22 JUNE 2021

Attachment 2 - Mining Licence Application Area





DRAWING NUMBER	DESCRIPTION
DRAWING REFERENCE	

KALBAR

REV	DATE	REVISION DESCRIPTION	DRAWN	CHECKED	ENGINEER	APPROVED
A	29.03.2021	ISSUED FOR INFORMATION	HG			

IN THE ABSENCE OF THE APPROVED SIGNATURE, THIS DRAWING SHALL BE TREATED AS PRELIMINARY

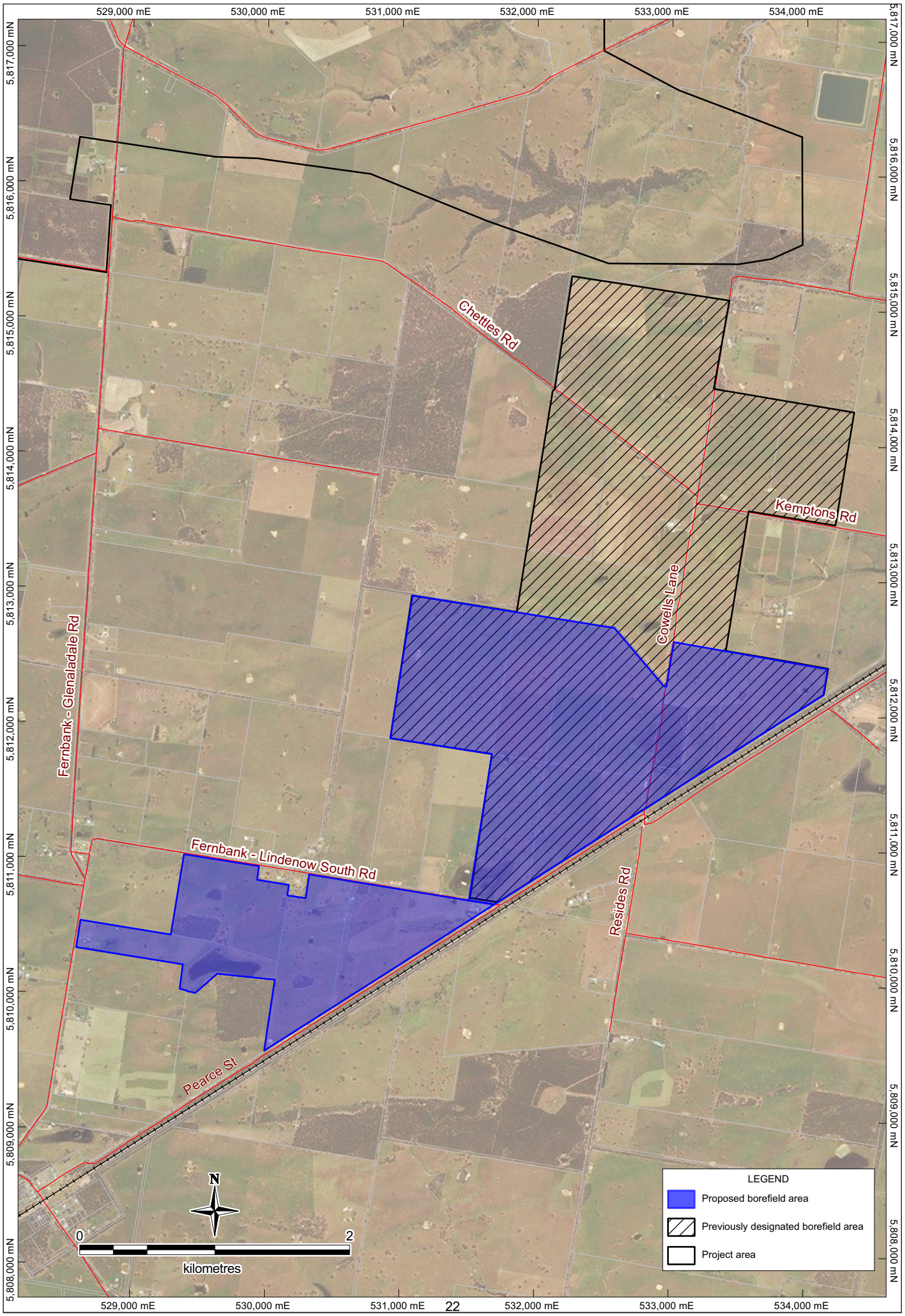
		DATE
DRAWN	HG	19.03.2021
DESIGNED		DATE
CHECKED		DATE
ENGINEER		DATE
APPROVED		DATE

wave international
DETERMINE • DESIGN • DELIVER

CLIENT: KALBAR OPERATIONS PTY LTD
PROJECT: FINGERBOARDS MINERAL SANDS DFS
TITLE: CENTRIFUGE PLANT ELEVATIONS

DRAWING STATUS: FOR INFORMATION ONLY
CLIENT DWG NO
AS1100-1992 ALL DIMENSIONS IN mm
SCALE | GRID | DATUM | SIZE: A1
DWG NO: 5253-40-DWG-GE-01023 | REV: A

Attachment 4 - Potential revised borefield location plan



Attachment 5 - receptor correlation

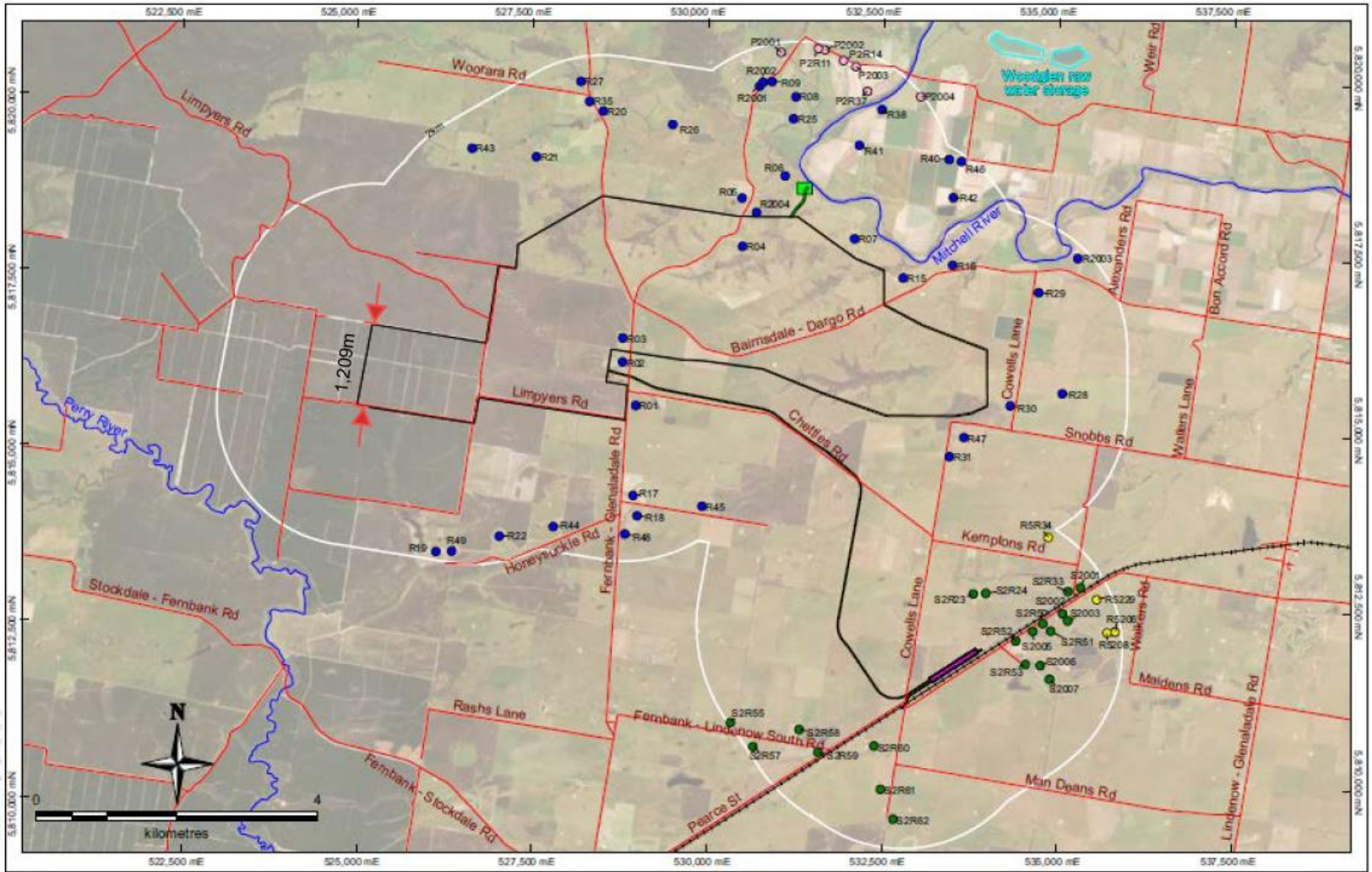
Submitter 813, map on p 478 no.	Kalbar comment	Corresponding receptor no. in TN004
1		R48
2	there are two structures on this property (within a single parcel) in close proximity, treated as a single receptor – R18	R18
3		R18
4		R5217
5	there are two structures on this property (within a single parcel) in close proximity, treated as a single receptor – R5219	R5219
6		R5219
7		R17
8		R01
9		R02
10		R03
11		R04
12		R2004
13		R05
14		R06
15		R25
16		R08
17		R09
18		R2001
19		R5R13
20		R5R10
21	paddock	
22		P2002
23	paddock (appears to be a landlocked vacant parcel (Lot/Plan 1\TP543181)	
24		P2R14
25		P2003
26	paddock	
27		R5020
28		R38
29		R5051
30		R5048
31		R5059
32		R5058
33		R2003
34		R16
35		R15
36		R21
37		R26
38		R20
39		R35
40		R27
41		R5011

42		R5010
43	no structure in this location	
44		R07
45		R43
46	no structure in this location, although the submitter's dot may be intended to represent Kalbar's R5004 located further west on Woorara Rd	
47	Woodglen school	R46
48		R40
49		R41
50		R5032
51		R5R39
52		R42
53		R5028
54		R5033
55		R5035
56		R5025
57		R5026
58		R29
59		R28
60		R30
61		R47
62		R5123
63		R5R34
64		S2R33
65	No corresponding receptor	
66		S2R23
67		R5R32
68		R31
69		R44
70	farm dam	
71		R22
72		R49
73		R45
	a no. 74 cannot be located on the map	
75		R5224
76		R5225
77		R5109
78	shearing shed	
79		R5226
	a no. 80 cannot be located on the map	
81	farm dam	
82	This location is a paddock, however the submitter may be referring to which is located slightly to the north-east	R5018

Relevant maps

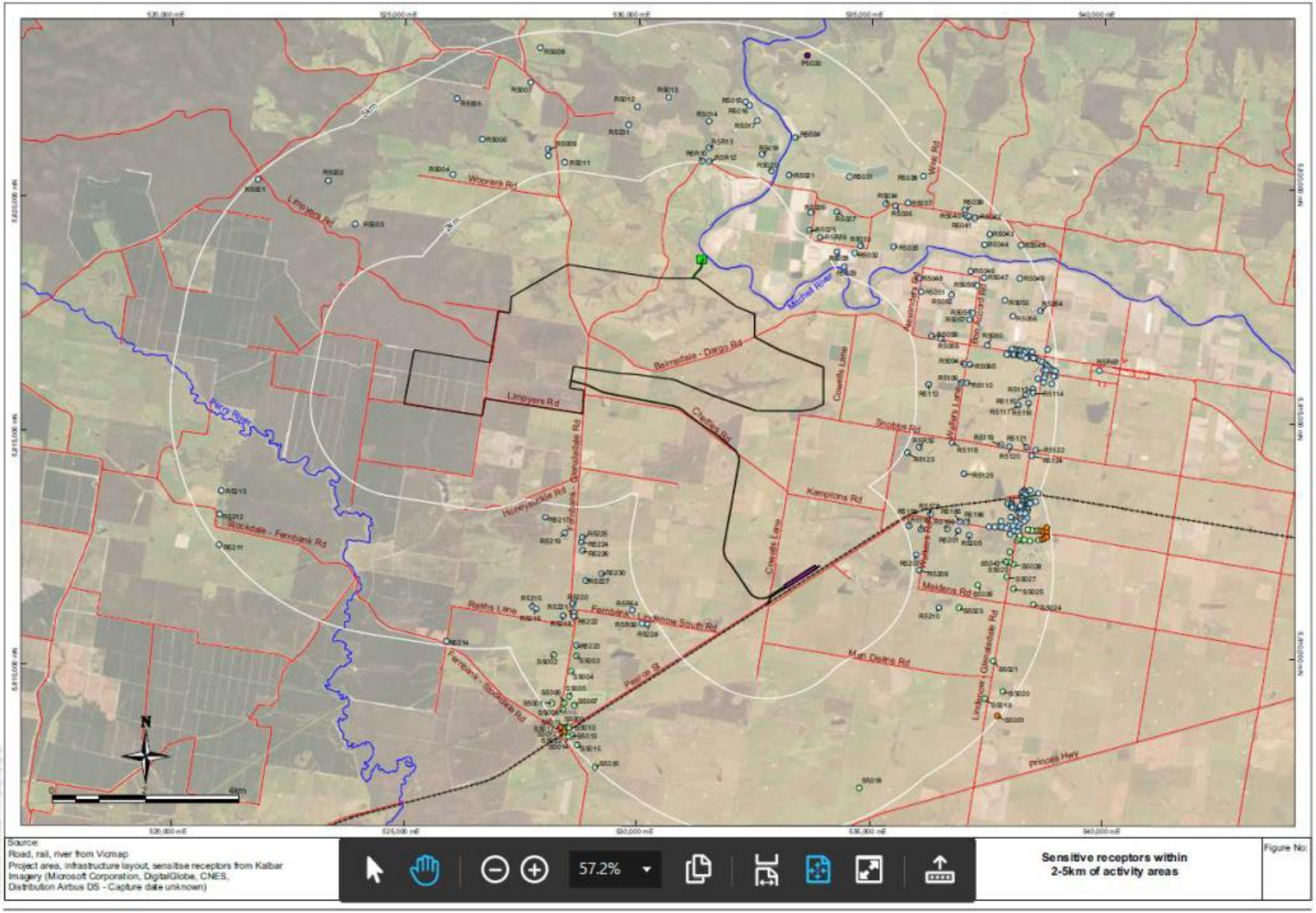
Technical Note: TN 004

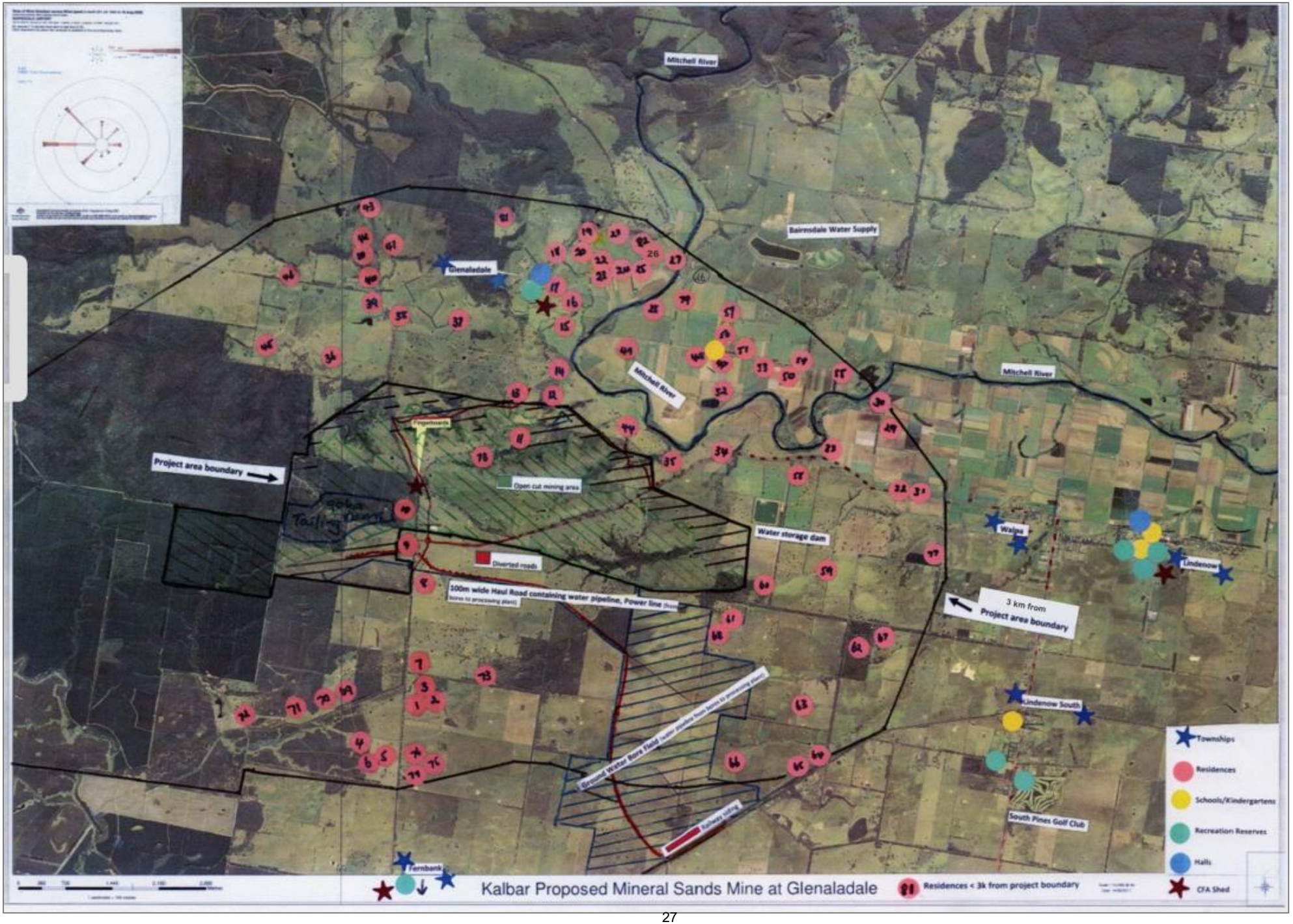
Figure 1: Sensitive receptors within 2km of the Project



Technical Note: TN 004

Figure 2: Sensitive receptors between 2km and 5km of the Project




Mitchell River
Bairnsdale Water Supply
Glenaladale
Mitchell River
Mitchell River
Project area boundary
Open cut mining area
Water storage dam
Diverted roads
100m wide Haul Road containing water pipeline, Power line
3 km from
Project area boundary
Ground Water Bore Field
Railway siding
Walpa
Lindenow
Lindenow South
South Pines Golf Club
Fernbank
Townships
Residences
Schools/Kindergartens
Recreation Reserves
Halls
CFA Shed
Kalbar Proposed Mineral Sands Mine at Glenaladale
Residences < 3k from project boundary

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