KALBAR DEMONSTRATION PIT

Exploration work plan

RL2026

Kalbar Operations Pty Ltd

November 2020

QUALITY INFORMATION

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Acronym / abbreviation	Meaning
AHD	Australian Height Datum
AS	Australian Standard
ASLP	Australian Standard Leaching Procedure
CHMP	Cultural Heritage Management Plan
DJPR	Department of Jobs, Precincts and Regions
DPI	Department of Primary Industries
DELWP	Department of Environment Land, Water and Planning
EES	Environment Effects Statement
EGCMA	East Gippsland Catchment Management Authority
EGSC	East Gippsland Shire Council
EPA	Environment Protection Authority
EP Act	*Environment Protection Act 1970*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (C'wlth)
ERR	Earth Resources Regulation
FFG	*Flora and Fauna Guarantee Act 1988*
GLaWAC	Gunaikurnai Land and Waters Aboriginal Corporation
GRZ	Geotechnical risk zone
ha	Hectare
HHF	Haunted Hill Formation
mg/L	Milligrams per litre
MRSD Act	*Mineral Resources (Sustainable Development) Act 1990* (Vic)
ppm	Parts per million
SRW	Southern Rural Water
t	Tonne(s)
VAHR	Victorian Aboriginal Heritage Register

1 INTRODUCTION

1.1 About this Work Plan

Kalbar Operations Pty Ltd (Kalbar) has identified a significant mineral sands deposit (the Glenaladale deposit) at a location approximately 20 km northwest of Bairnsdale, Victoria. Kalbar is planning to develop a mining operation - the Fingerboards Mineral Sands Project – which focuses on a high-grade area of the Glenaladale ore body in the eastern part of the deposit. A definitive feasibility study (DFS) for the project is underway and is scheduled for completion by the end of March 2021. The planned works will provide essential information to support the DFS detailed designs.

The planned Fingerboards process plant design creates both magnetic and non-magnetic concentrate products. The two separate concentrates are planned to be shipped internationally for further upgrading into their final products. To better understand the potential downstream processing method and subsequent marketing of the concentrates, a bulk sample of ore is required for offsite processing.

To obtain a representative bulk sample, a small open pit is required to get access to the ore grade sands. By default, the works provide an opportunity to obtain additional information to support the detailed design of the proposed Fingerboards Project, in particular, geotechnical and geological properties of the deposit and the mining methods best suited to accessing and recovering ore.

This exploration work plan outlines proposed work to establish an excavation approximately 90 m long x 40 m wide x 12 m deep. The demonstration pit plan is to remove approximately 1,948 bank cubic metres (BCM) of ore, 12,813 BCM of overburden and 1,140 BCM of topsoil.

The open pit would be backfilled within a relatively short timeframe following the completion of mining and would be immediately followed by rehabilitation with pasture. As such, this “demonstration pit” provides an opportunity for the community and stakeholders to see mining, processing and rehabilitation all within a short time frame.

All activities for the proposed demonstration pit addressed in this work plan lie within the boundary of RL2026. Kalbar is the licence holder for this tenement, which forms part of the Gippsland Heavy Mineral Sands Project.

This work plan addresses regulatory requirements set out in the Mineral Resources (Sustainable Development) (Mineral Industries) Regulations 2019 (‘MRSD Regulations’) and has been prepared in accordance with the Department of Jobs, Precincts and Regions’ (DJPR’s) *Guideline for Exploration Projects: Preparation of Work Plans and Work Plan Variations* (Version 1.2, September 2019). A checklist of compliance against requirements of the MRSD Regulations is provided in Appendix A.

Preparation of a work plan is a requirement of the *Mineral Resources (Sustainable Development) Act 1990* (Vic) (MRSDA). The work plan and associated rehabilitation plan and risk management plan:

- describe the exploration activities proposed to be carried by Kalbar Operations Pty Ltd in implementing the proposed demonstration project;
- summarise the key technical, public safety, environmental and social risks of implementing the project;
- identify potential social and environmental impacts of the project and how these impacts would be avoided or managed; and
- describe how areas disturbed by exploration works will be rehabilitated.

1.2 Work plan objectives and scope

Key work plan objectives are summarised in Table 1-1.

Table 1-1: Work plan objectives

Aspect	Objectives
Geological / geotechnical	• Confirm in situ bulk densities. • Confirm block bulk grade against geological model. • Validate down hole Haunted Hill contact methodology.
Mining / materials handling	• Evaluate trafficability characteristics of the pit floor and identify any future operation considerations. • Measure bearing capacities of pit floor and backfill material. • Develop methodology for mining the haunted hills/marker contact. • Evaluate centrifuge cake handling • Demonstrate the placement of sand and fine residue-via co disposal. • Confirm water recovery from the residue placement. • Evaluate screening of the Haunted Hills marker contact. • Evaluate the mechanism of placement of modified co-disposal ('Mod Cod') tailings as constructed subsoil layer. • Get an understanding of the drying / consolidation time period required to enable access onto the constructed subsoil layer
Metallurgy	• To obtain a bulk ore sample for offsite processing and subsequent market analysis of valuable mineral concentrates. • Assess the effectiveness of a centrifuge for sand slimes dewatering. • Confirm the operating setpoints for sand stacking via cyclone classification.
Environmental management / rehabilitation	• Evaluate effectiveness of proposed noise and dust emission controls to limit impacts of demonstration pit activities. • Evaluate the suitability of Mod CoD for subsoil. • Evaluate the performance of constructed/modified subsoils and topsoils as plant growth medium over 12 month period.
Stakeholder engagement	• Demonstrate to stakeholders the key operating phases of ore recovery, void backfilling and rehabilitation. • Demonstrate the effectiveness of Kalbar's systems for receiving and responding to complaints or other feedback. • Demonstrate and evaluate rehabilitation success on mined land.

The work plan is for exploration activities conducted under the *Mineral Resources (Sustainable Development) Act 1990* (Vic) (MRSD Act) only. The prime purpose of the planned program of works is for the taking of samples for chemical or other analysis.

Under the MRSD Act, **low impact exploration** means exploration that does not involve any of the following:

a) the use of explosives;

b) the taking of flora listed under section 10 or Schedule 2 of the *Flora and Fauna Guarantee Act 1988*, unless that flora is taken from private land that is not owned by a public authority;

c) the taking of flora from a community listed under section 10 or Schedule 2 of the *Flora and Fauna Guarantee Act 1988*, unless that community is found on private land that is not owned by a public authority;

d) the taking of fauna listed under section 10 or Schedule 2 of the *Flora and Fauna Guarantee Act 1988*;

e) the taking of any taxon or community of flora or fauna from any habitat or parts of habitat under section 20 of the *Flora and Fauna Guarantee Act 1988*;

f) the removal or damaging of more than 1 hectare of native vegetation if that area does not contain any native trees during either the term of the licence or a period of 5 years from the grant of the licence, whichever ends first;

g) the removal or damaging of more than 15 native trees that have a trunk diameter of less than 40 cm at a height of 1.3 metres above ground level during either the term of the licence or a period of 5 years from the grant of the licence, whichever ends first;

h) the removal or damaging of more than 5 native trees that have a trunk diameter of 40 cm or more at a height of 1.3 metres above ground level during either the term of the licence or a period of 5 years from the grant of the licence, whichever ends first;

i) the creation of any road, structure or hardstand area without the consent of the owner or occupier of the land on which it is created;

j) the use of any closed road without the consent of the owner or occupier of the land on which the road is located or undertaking works on any road without the consent of the owner or occupier of the land on which the road is located;

k) ground intrusive work that:

   i. is within 200 metres of a waterway; or

   ii. is on a slope steeper than 1 vertical: 3 horizontal; or

   iii. is of greater than 2 hectares in an area of cultural heritage sensitivity during either the term of the licence or a period of 5 years from the grant of the licence, whichever ends first; or

   iv. involves taking water from an aquifer, hydraulic fracturing, or excavation using heavy earth moving equipment.

Due to the proximity of the planned works to a waterway (Perry Gully) and the intent to use heavy machinery, the planned program of works is classed as **high impact exploration** and as such a workplan is required.

The plan and works do not include commercial scale mining activities and no mineral sands concentrate or other mineral product would be produced directly as a result of the activities proposed under this work plan.

The activities proposed under this work plan are of short duration. An indicative timetable for project implementation is provided in Figure 1-1.

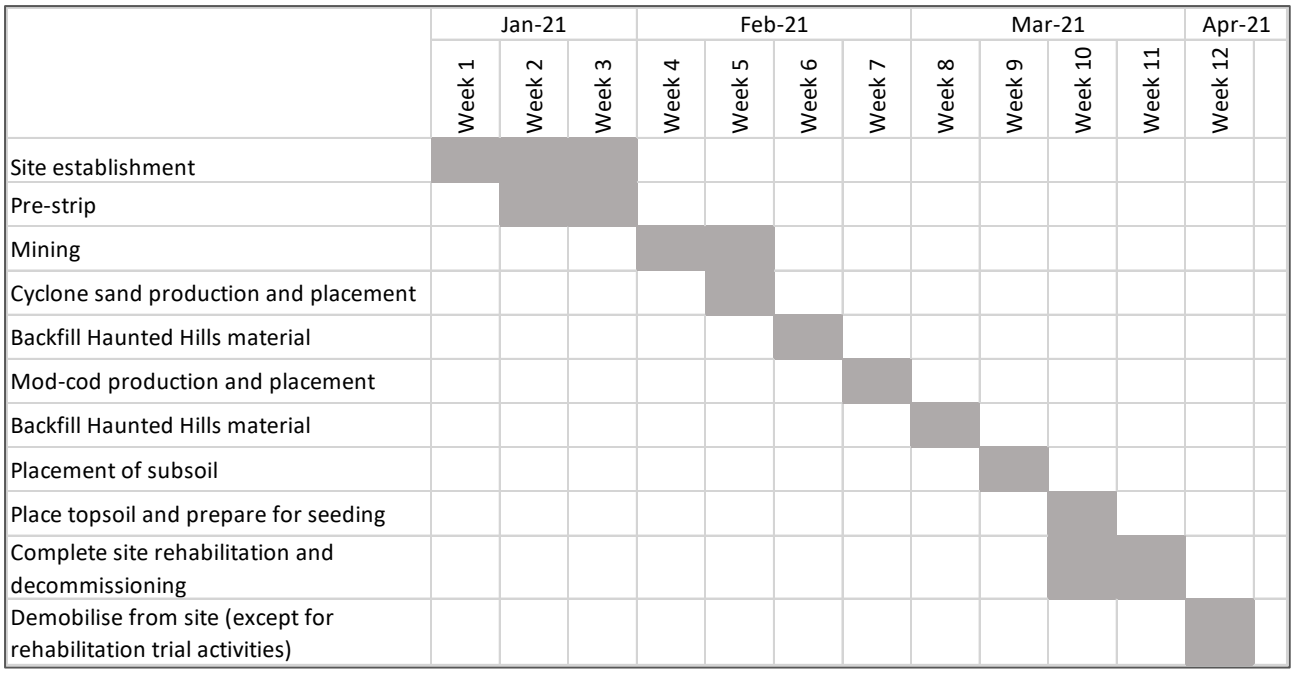


Figure 1-1: Project implementation schedule (indicative and subject to approvals)

1.3 Planning Consent

Exploration activities are exempt from the requirement for a planning permit under s.43(3) of the MRSD Act and clauses 52.08-1 and 62.01 of the East Gippsland planning scheme. The project activities and planning exemption is consistent with the approach taken for test pits at other mine sites in Victoria in recent years. The planning permit exception for exploration activities was confirmed in writing by the East Gippsland Shire Council (EGSC) (Email J.Pitkin to J.Chandler(ERR), CC M.Binks, 13th Oct 2020).

1.4 Considerations for the Environmental Effects Act

The Fingerboards Project is currently undergoing an EES assessment for works associated with the construction and operation of a mine for the purpose of commercial production of mineral sands concentrates. The Demonstration Pit planned works are independent to that defined for the Fingerboards Project and differ significantly in both purpose and scale.

The prime purpose of the demonstration pit is to obtain a bulk sample for further analysis, for which under the MRSD Act, the works are clearly defined as exploration. Exploration Works are considered exempt from the EES process and as such, this workplan does not contravene any sections of the Environmental Effects Act and therefore there are no statutory bars preventing this workplan from being approved.

1.5 EPA Consultation

The EPA were consulted in the preparation of this plan and provided the following summarised correspondence (Email L. Snelling (EPA) to M.Binks, CC J.Chandler (ERR), 24th September 2020). EPA provided the following summarised key points in regards to the demonstration pit:

- EPA does not believe that the approval for the Demonstration Pit requires a referral to EPA. However, we have provided comments below on the environmental and human health risks of the proposed activity in the absence of a referral.

Water

- EPA would expect that the final Work Plan will include an assessment of impacts on underlying aquifer/s and that the operation will include testing associated with the leachate from tailings to validate the modelling and assessment. Accordingly EPA considers it an excellent opportunity to obtain data on the leachability of potential contaminants into the aquifers for ground truthing the model assumptions.

Air quality

- The proponent has indicated that the Demonstration Pit operations will mitigate the generation of offsite dust on roadways, ore and overburden stockpiles through the use of a water cart. A dust suppression coating will be used for subsoil and topsoil stockpiles.

- EPA recommends that a reactive dust management plan forms part of the Work Plan so that dust is mitigated in the event that elevated levels are monitored or observed. Portable monitoring stations should be considered as part of the monitoring program to ensure that the impacts are better understood. EPA also recommends that Kalbar utilise this opportunity to optimise and improve the techniques used to suppress dust. EPA understands that dust management options have been considered and recommends that Kalbar include a section outlining how controls, monitoring and management complies with best practice to reduce air emissions and potential impacts on human health and the environment from the operation of the Demonstration Pit.

- The separation distance from the activity boundary of the Pit to the nearest sensitive receptor is approximately 650m. EPA considers this distance is adequate should the mitigation measures detailed above be implemented.

Noise

- EPA understands that works will be conducted during daytime hours. Mining machinery including vehicles and the centrifuge may generate noise impacts.

- The proponent has indicated that noise monitoring using a handheld device will be conducted on a daily basis, both prior to activities and during operations. Operations should be conducted to meet relevant noise limits including Noise from Industry in Regional Victoria (NIRV) (EPA Publication 1411).

- In addition to the above measures, EPA recommends that noise monitoring is undertaken both at sensitive receptors and proximate to the noise generating source.

- EPA is comfortable that the mitigation measures detailed above will provide a sound operational framework to reduce potential noise impacts on sensitive uses.

Additional comments

- In addition to the above comments on the environmental and human health risks, EPA encourages Kalbar to utilise the opportunity of the Demonstration Pit to engage with the community. Whilst the Pit may be used to inform the detailed design of the Fingerboards Project, allowing the community to visit the site may be beneficial in alleviating potential community concerns.

2 PROJECT DESCRIPTION

2.1 Project location and site description

The activity area consists of a small, irregularly shaped parcel located on private property at 2250 Bairnsdale-Dargo Road, Walpa, within the Shire of East Gippsland (Lot 2, Plan PS420109). The activity area is located approximately 100 m southeast of the Fernbank-Glenaladale Road (Figure 1-1). The project area measures approximately 220 m in length and 190 m in width at its widest point. The overall working area occupies approximately 1.8 ha. The proposed demonstration activities will be located in an open paddock within an area currently zoned as Farming Zone – Schedule 1 (Figure 2-2).

The proposed trial pit site was previously used as a gravel pit by the local council (Figure 2-3). It is estimated that in the order of 1.5 to 3 m of surface soils and gravel were removed from the site during past quarrying operations. The current surface of the proposed pit area has undergone some level of natural revegetation and a small amount of naturally generated topsoil through organic decomposition and stock fertilisation, now exists across the majority of the disturbed area.

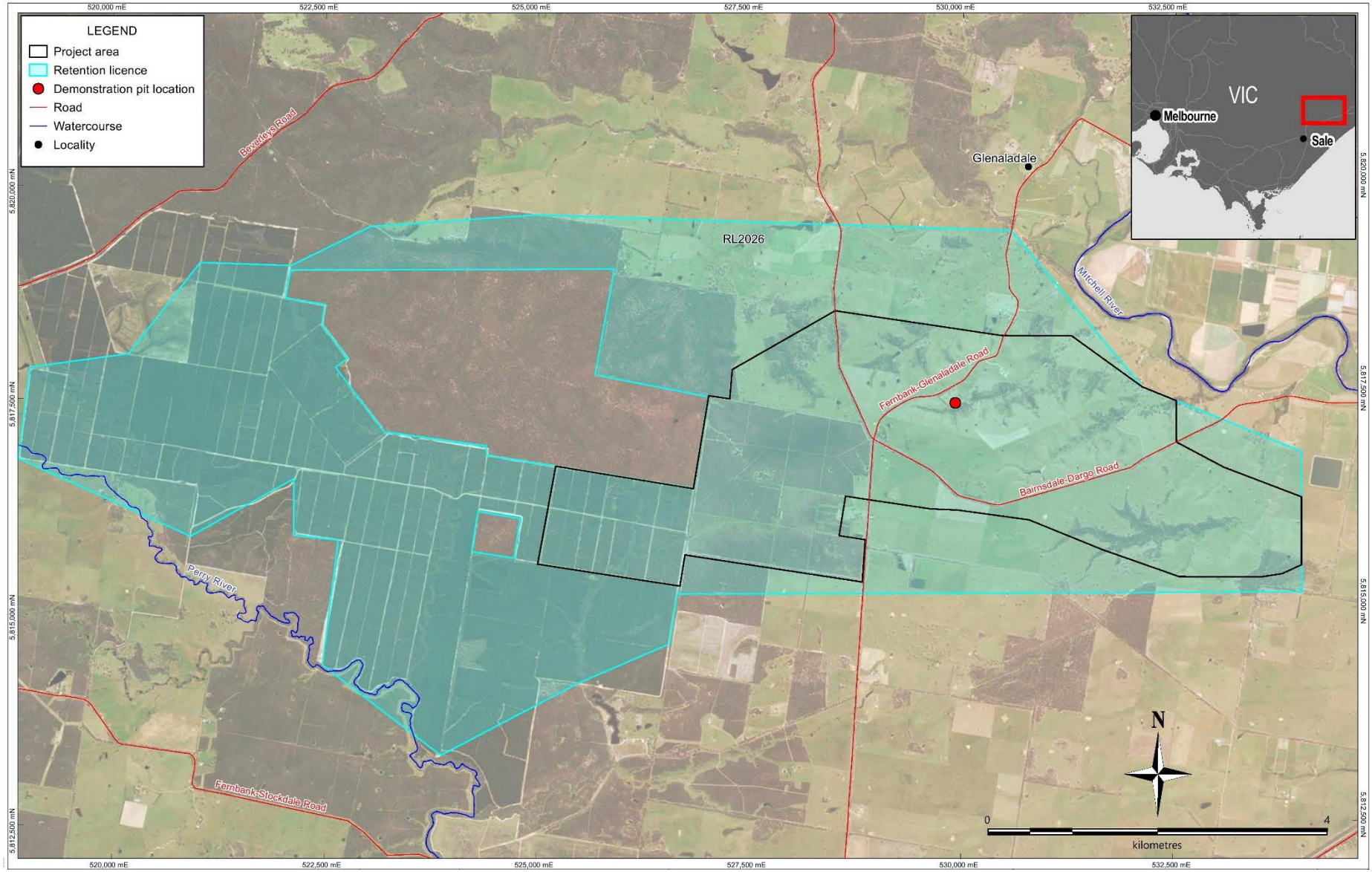


Figure 2-1: Project location

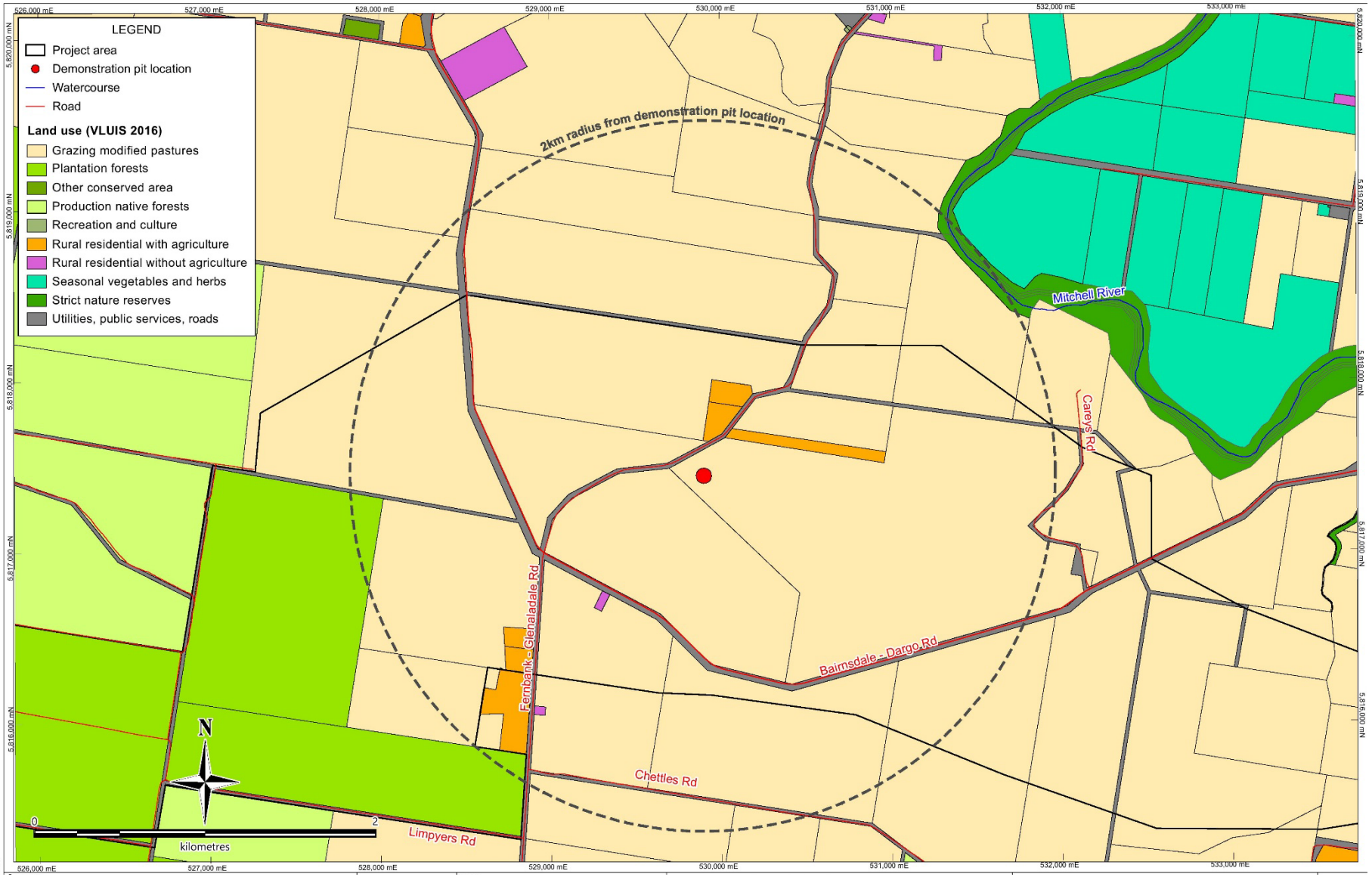


Figure 2-2: Land uses in project locality

Figure 2-3: Aerial view of site in 1972

Figure 2-4: Proposed demonstration pit area

2.2 Environmental and social context

2.2.1 Vegetation and habitats

The demonstration project area and adjoining parts of the retention licence area are typical of much of the East Gippsland region, comprising large areas of improved pasture with scattered patches of remnant native vegetation (mainly Plains Grassy Forest (EVC 151) and Valley Grassy Forest (EVC 47)) and regrowth from past clearing (Figure 2-5). Most of the land within the proposed demonstration project area has been cleared and heavily modified.

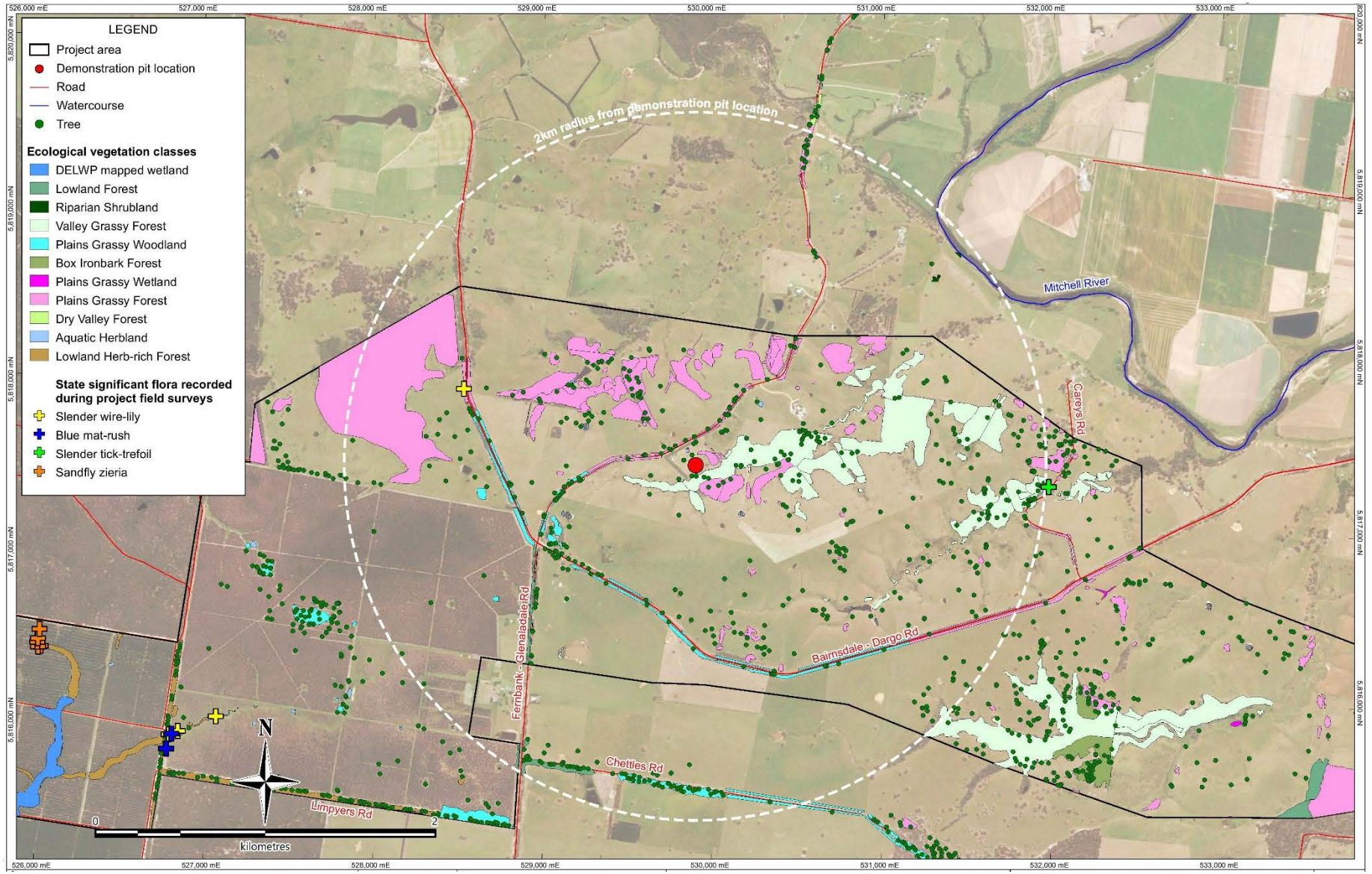
Small patches of Aquatic Herbland (EVC 653) have been recorded within some permanent waterbodies (farm dams) in the Retention Licence 2026 (EHP, 2020), with most patches dominated by one of, or a combination of, the species Tall Spike-sedge (*Eleocharis sphacelata),* Common Reed (*Phragmites australis*) or Rush (Juncus spp). Aquatic Herbland is typically a species-poor herbland occurring in permanent to semi-permanent wetlands dominated by sedges and/or aquatic herbs (DELWP 2020c). The Aquatic Herbland vegetation is classified as an 'endangered' Ecological Vegetation Class.

Two habitat zones of differing quality (AH1 and AH2) were identified during baseline studies covering the Retention Licence. AH1 is described as 'moderate quality' and supports a higher diversity of native species compared to AH2 which is described as 'low quality'. Both patches of Aquatic Herbland vegetation in proximity to the demonstration trial works area were described as AH2 – low quality. One small patch of low quality Herbland of 100m^2 lies within the pit shell and would have to be cleared.

The nearest remnant vegetation representing a 'threatened ecological community' protected under the *Environment Protection and Biodiversity Conservation Act* is a patch of Plains Grassy Woodland (inferred to correspond to the EPBC-listed 'Gippsland Red Gum Grassy Woodland), lying approximately 660 m west-southwest of the proposed demonstration pit site (Figure 2-7).

A single 'scattered small tree', a White Stringybark (*Eucalyptus globoidea*) with a trunk diameter at breast height of 44 cm, would be impacted by the proposed demonstration pit activities, as the tree lies within the proposed trial pit shell and would have to be cleared. The White Stringybark is not classified as a rare or threatened species.

Figure 2-5: Vegetation units within 2 km of wo



rk area

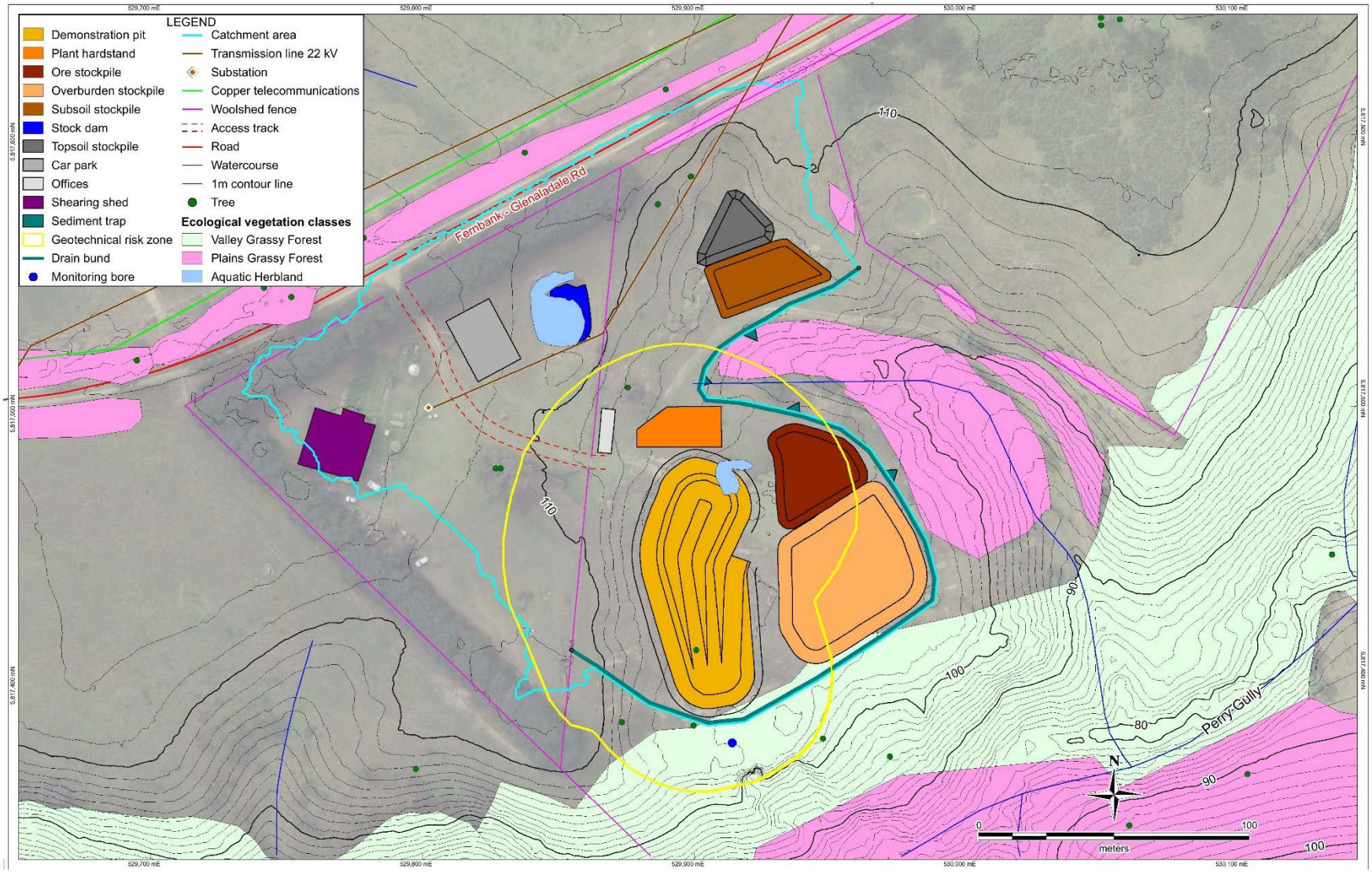


Figure 2-6: Vegetation in close proximity to works

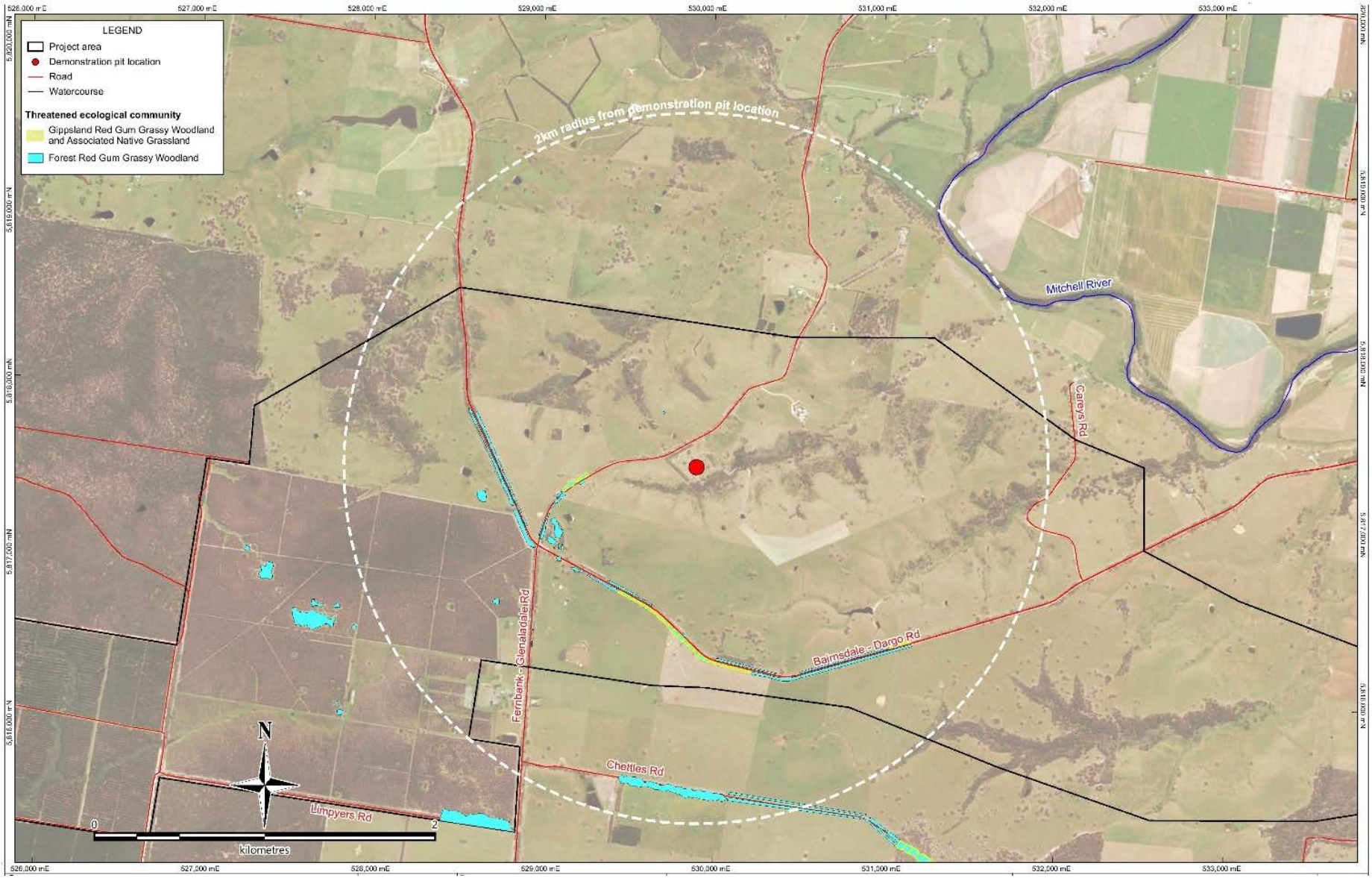


Figure 2-7: Proximity of proposed demonstration pit to threatened ecological communities

2.2.2 Soils and landforms

The broader Fingerboards project area lies in the northern margin of the Munro Plain, which is truncated to the east by the Mitchell River. The landform is distinguished by parallel and sub-parallel sand ridges oriented southwest to northeast, interspersed with broad level flats and occasional damp depressions. The modern terrain is characterised by sub-radial drainage of multiple small stream catchments producing a low broad dome with dissected margins of ridges and close-spaced spurs and narrow deep valleys (Figure 2-8). All tributaries in the activity area have very small surface catchments and are ephemeral streams.

Land within the proposed demonstration pit works area generally slopes to the east and south. A drainage line oriented approximately north-south passes to the east of the proposed overburden stockpile, conveying surface runoff towards Perry Gully (Figure 2-9). Slope gradients at the project site are generally in the order of 5% or less.

The dominant soil unit in the project area is the Fernbank soil type, an acidic texture contrast soil, with sandy surface horizons overlying clay or sandy clay, often containing gravel or stones. Subsoils are commonly sodic (Landloch, 2020). Stockdale or Munro soil types (the latter of which has a deeper thickness of sand in the uppermost soil horizons) occur along drainage lines (Figure 2-10). Both soil types are moderately to strongly acidic, with generally low nutrient content and low water holding capacity. The typical appearance of soils in the demonstration project area is shown in Figure 2-11 and Figure 2-12. The chemical properties of the soils are presented in Table 2-1.

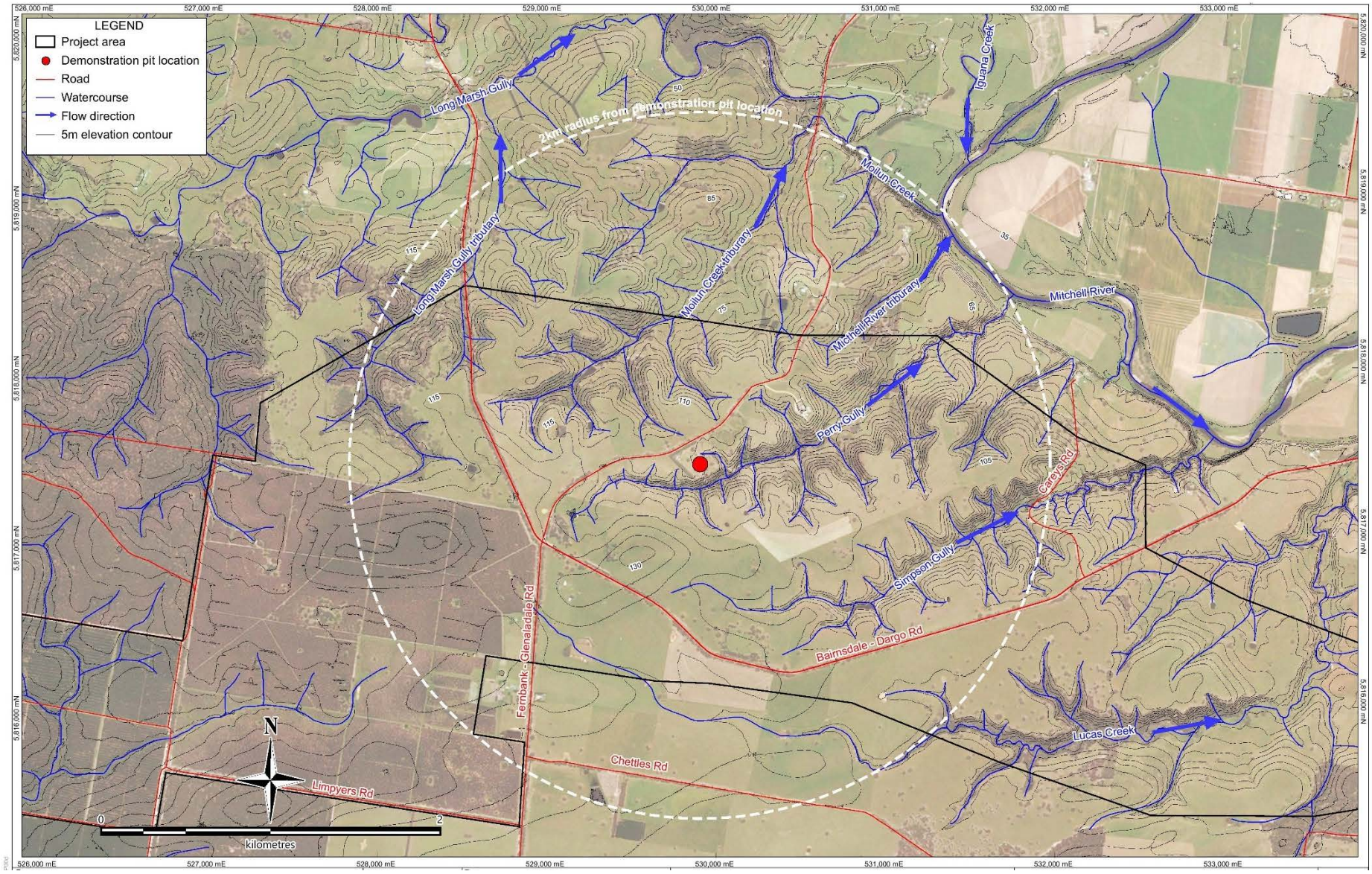


Figure 2-8: Topography in project locality

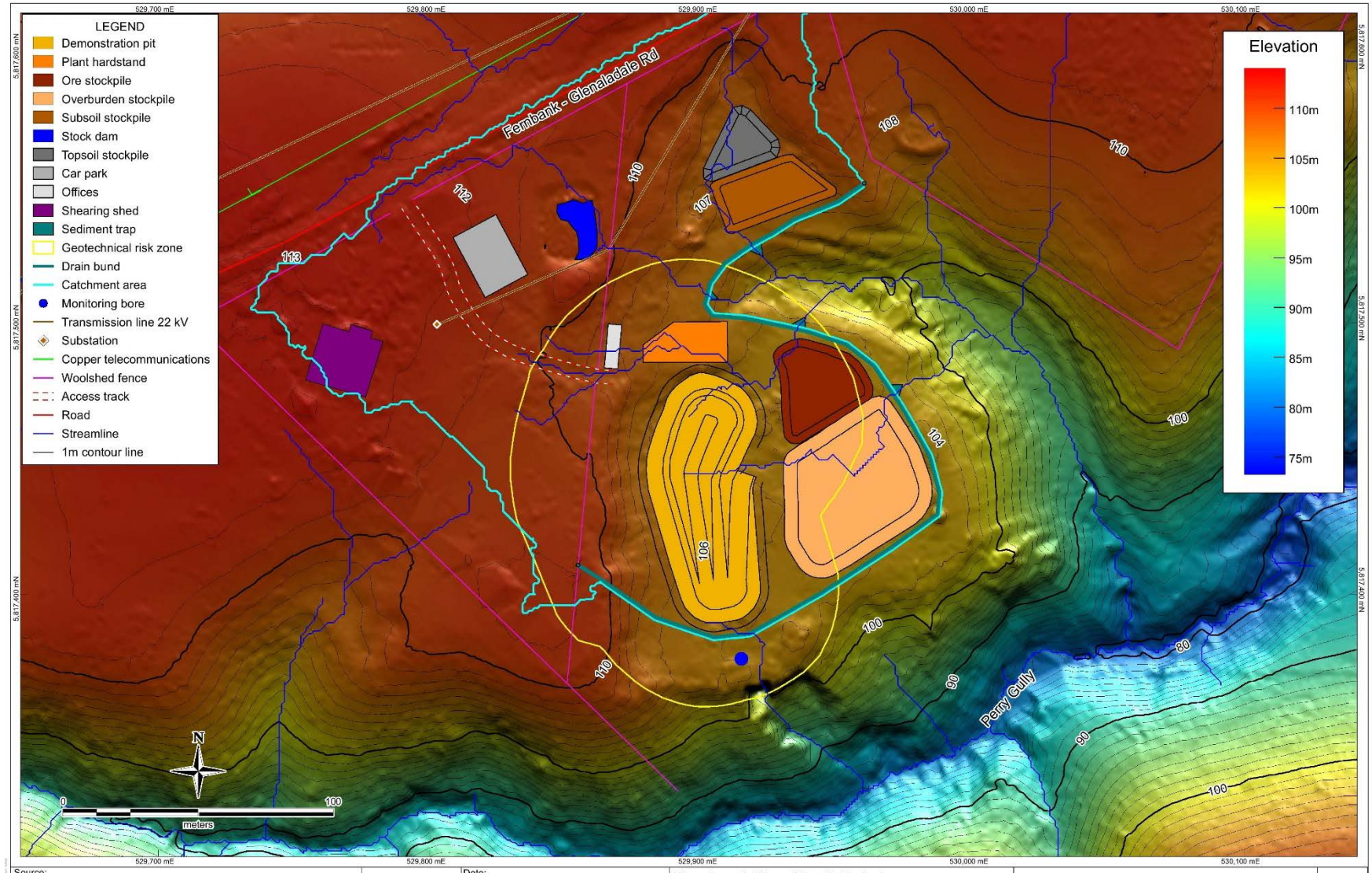


Figure 2-9: Existing topography – proposed demonstration pit site

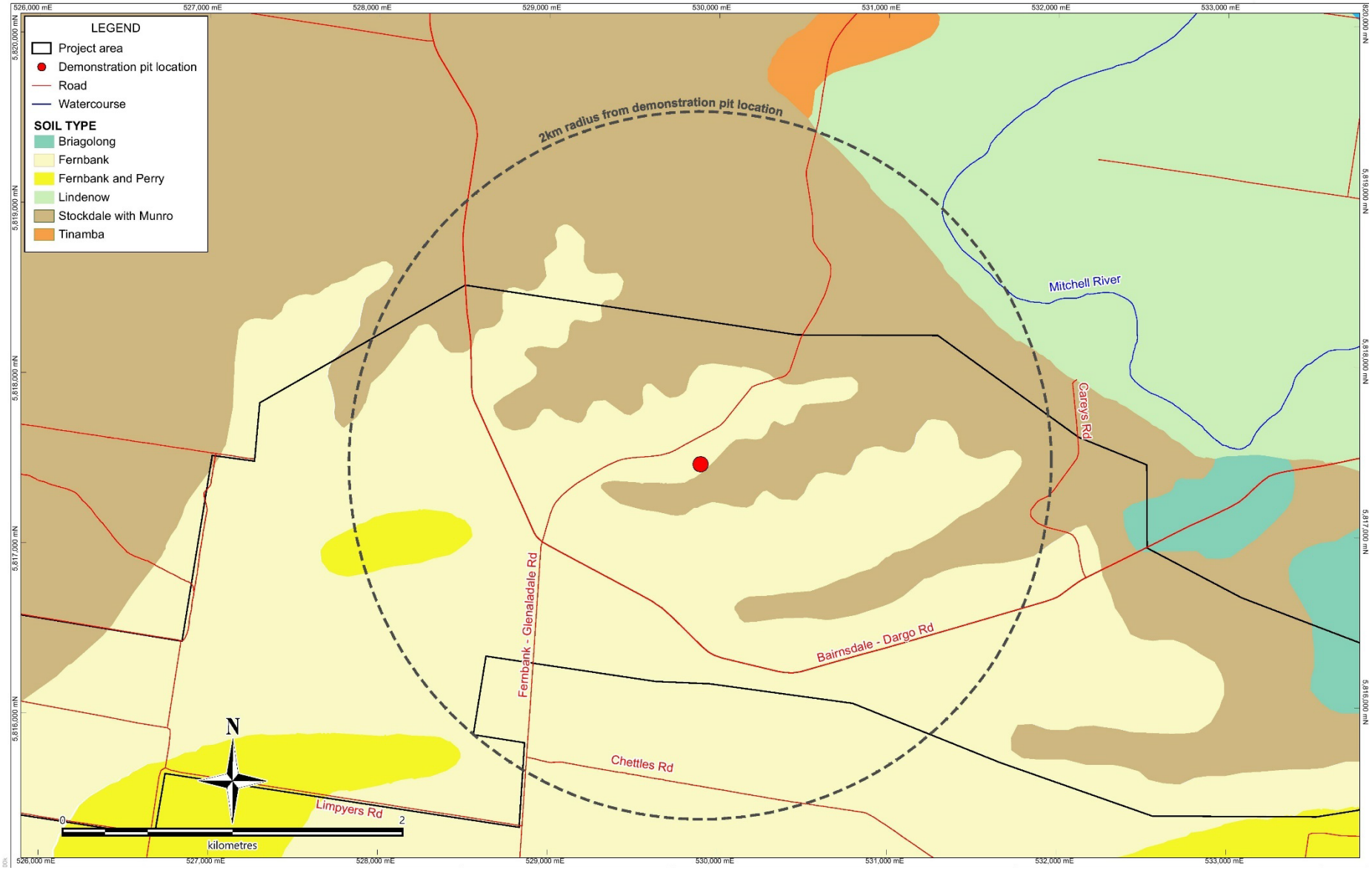


Figure 2-10: Soils in project locality

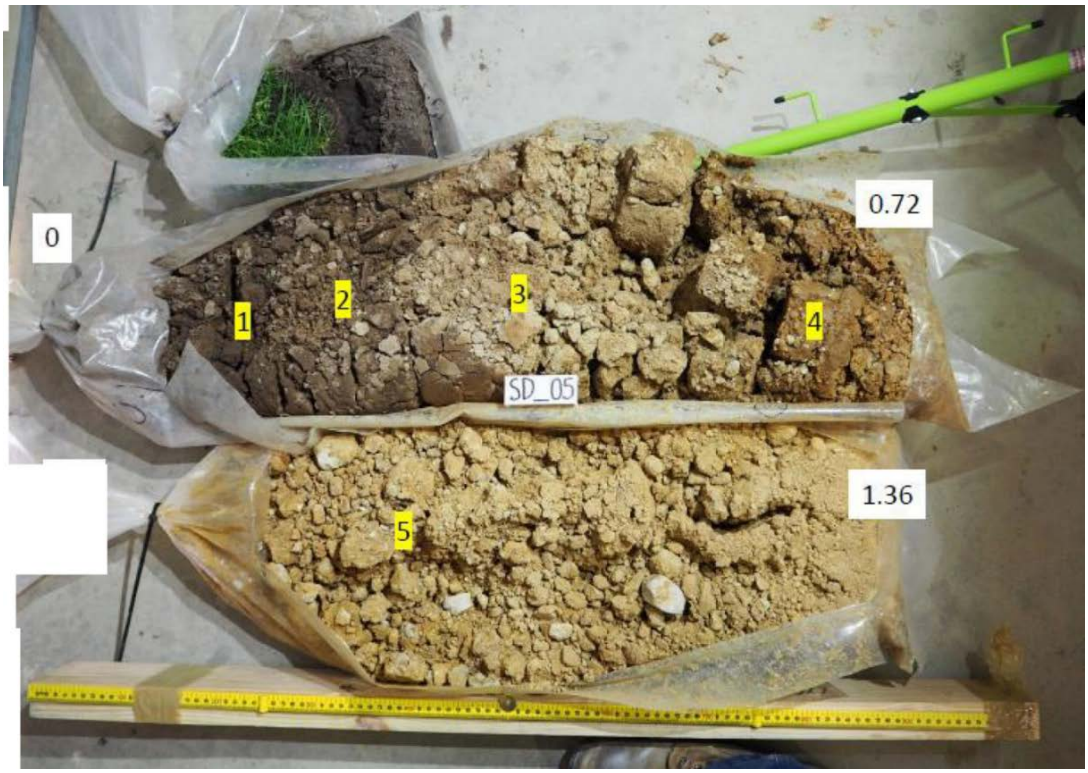


Figure 2-11: Ferndale type duplex soil from sampling location SD05 (529758.7mE; 5817506.6mN)

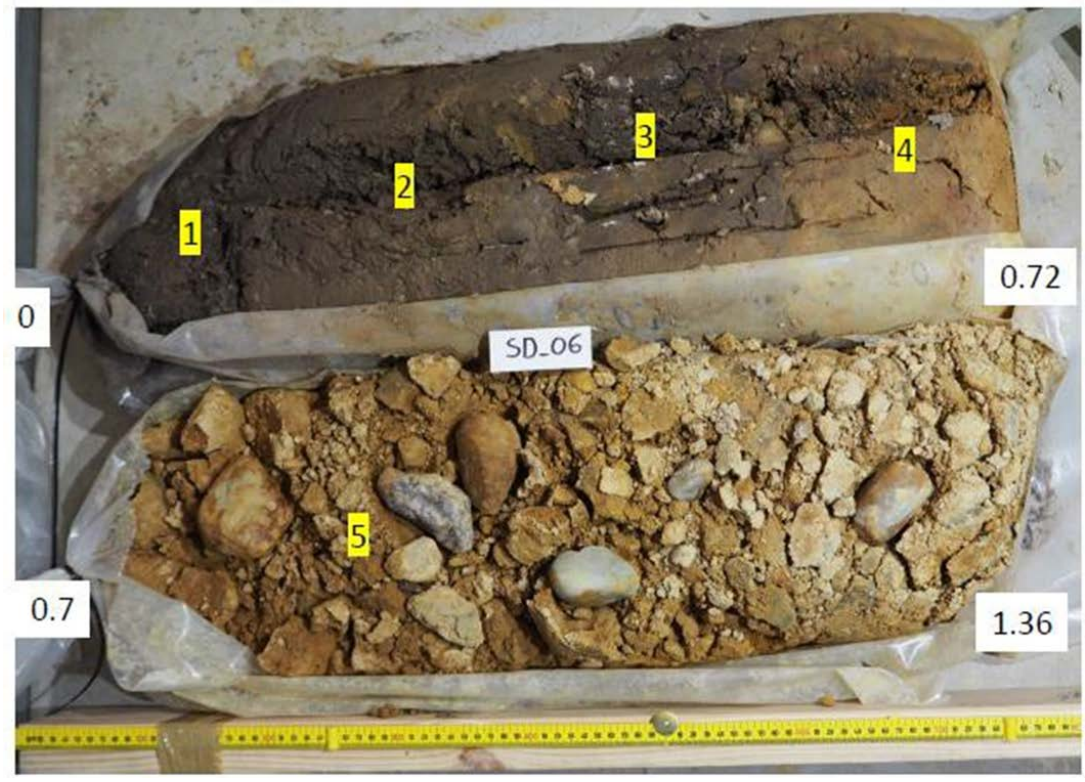


Figure 2-12: Stockdale/Munro sandy soil over clayey gravel at SD06 (529855.5mE; 5817527.8mN)

Table 2-1: Typical soil composition – demonstration pit site

Analyses	Unit	SD05-1	SD05-2	SD05-3	SD05-4	SD06-1	SD06-2	SD06-3	SD06-4
pH - Water	pH units	5.67	6.42	5.89	5.94	5.66	5.51	5.54	6.04
Electrical Conductivity	dS/m	0.05	0.04	0.25	0.32	0.06	0.04	0.02	0.03
Chloride	mg/kg	9.1	11.5	28.6	34.8	29.1	17.1	6.4	8.4
Total Nitrogen - Kjeldahl	mg/kg	463	*	*	*	1367	*	*	*
Total Phosphorus - Nitric/Perchloric	mg/kg	66.2	*	*	*	119	*	*	*
Phosphorus - Colwell extr	mg/kg	57.4	*	*	*	17.5	*	*	*
Potassium - Colwell ext	mg/kg	350	*	*	*	246	*	*	*
Sulphur - KCl	mg/kg	9.7	*	*	*	9.6	*	*	*
Organic Carbon	%	0.34	*	*	*	0.58	*	*	*
Copper	mg/kg	<0.2	*	*	*	0.44	*	*	*
Iron	mg/kg	57.7	*	*	*	442	*	*	*
Manganese	mg/kg	5.73	*	*	*	44.7	*	*	*
Zinc	mg/kg	3.85	*	*	*	2.71	*	*	*
Boron	mg/kg	0.2	*	*	*	0.42	*	*	*
Cation Extraction Method	Rayment& Lyons	15A1	15A1	15A1	15A1	15A1	15A1	15A1	15A1
Cation Exchange Capacity	meq/100g	3.5	2.3	15.1	16.7	4.3	5.2	3.6	4.9
Exch Calcium Percent	%	72.22	58.68	18.52	17.81	54.29	51.36	56.79	55.37
Exch Magnesium Percent	%	15.67	22.37	63.78	65.46	32.3	35.89	34.08	37.66
Exch Potassium Percent	%	6.26	11.33	6.7	5.3	7.48	7.18	3.93	3.21
Exch Sodium Percent	%	5.4	7.4	10.8	11.3	5.7	4.4	4.7	3.5
Exch Aluminium Percent	%	0.51	0.24	0.21	0.09	0.2	1.11	0.47	0.23
Exchangeable Calcium	mg/kg	507	271	560	594	465	539	411	544
Exchangeable Magnesium	mg/kg	66	62	1157	1310	166	226	148	222
Exchangeable Potassium	mg/kg	85.7	102	395	345	125	147	55.4	61.5
Exchangeable Sodium	mg/kg	43.2	39.2	375	435	56.3	53.7	39.4	39.9
Exchangeable Aluminium	mg/kg	1.6	0.5	2.82	1.39	0.78	5.26	1.52	1.01
Exchangeable Calcium	meq/100g	2.54	1.36	2.8	2.97	2.33	2.7	2.06	2.72
Exchangeable Magnesium	meq/100g	0.55	0.52	9.64	10.92	1.38	1.88	1.23	1.85
Exchangeable Potassium	meq/100g	0.22	0.26	1.01	0.88	0.32	0.38	0.14	0.16
Exchangeable Sodium	meq/100g	0.19	0.17	1.63	1.89	0.24	0.23	0.17	0.17
Exchangeable Aluminium	meq/100g	0.02	0.01	0.03	0.02	0.01	0.06	0.02	0.01
Calcium/Magnesium Ratio	-	4.6	2.6	0.3	0.3	1.7	1.4	1.7	1.5
Gravel >2.0mm	%	2.4	8.5	6.3	21	3	11.4	6.3	16.7
Coarse Sand 0.2-2.0mm	%	33.1	32	13.2	14.9	42.6	34	43.1	36.9
Fine Sand 0.02-0.2mm	%	38	40.4	21.1	25.5	33.1	33.2	31.7	25.6
Silt 0.002-0.02mm	%	12.7	8.5	11.5	5.3	10.6	4.7	8.2	9.3
Clay <0.002mm	%	13.7	10.6	47.8	33.3	10.7	16.6	10.6	11.6
Moisture content	%	3.42	1.73	12.65	12.21	20.9	14.89	6.32	6.95
Electrochemical Stability Index	ratio	0.009	0.005	0.023	0.028	0.010	0.009	0.004	0.008

Note: an asterisk (*) means the test was not performed.

2.2.3 Climate

The lowlands of East Gippsland are within a temperate climate zone, and experience warm summers and cool winters. The mean daily maximum temperature in the project locality ranges from about 12°C to 25.7°C. Mean daily minimum temperatures range from 5.3°C to 13.5°C. Mean maximum temperatures are greatest during the summer months (i.e., December to February). Mean minimum temperatures are lowest during winter (i.e., June to August)

Average monthly rainfall in the project locality has historically been highest in spring or early summer and lowest in winter, but with a relatively even distribution of rainfall throughout the year (Figure 2-13). Year to year rainfall can show large deviations from the long term median value of approximately 650 mm/year (Table 2-2; Figure 2-14). Annual average potential evaporation is approximately 1350 mm. On average, potential evaporation exceeds rainfall in all months except June (Figure 2-13).

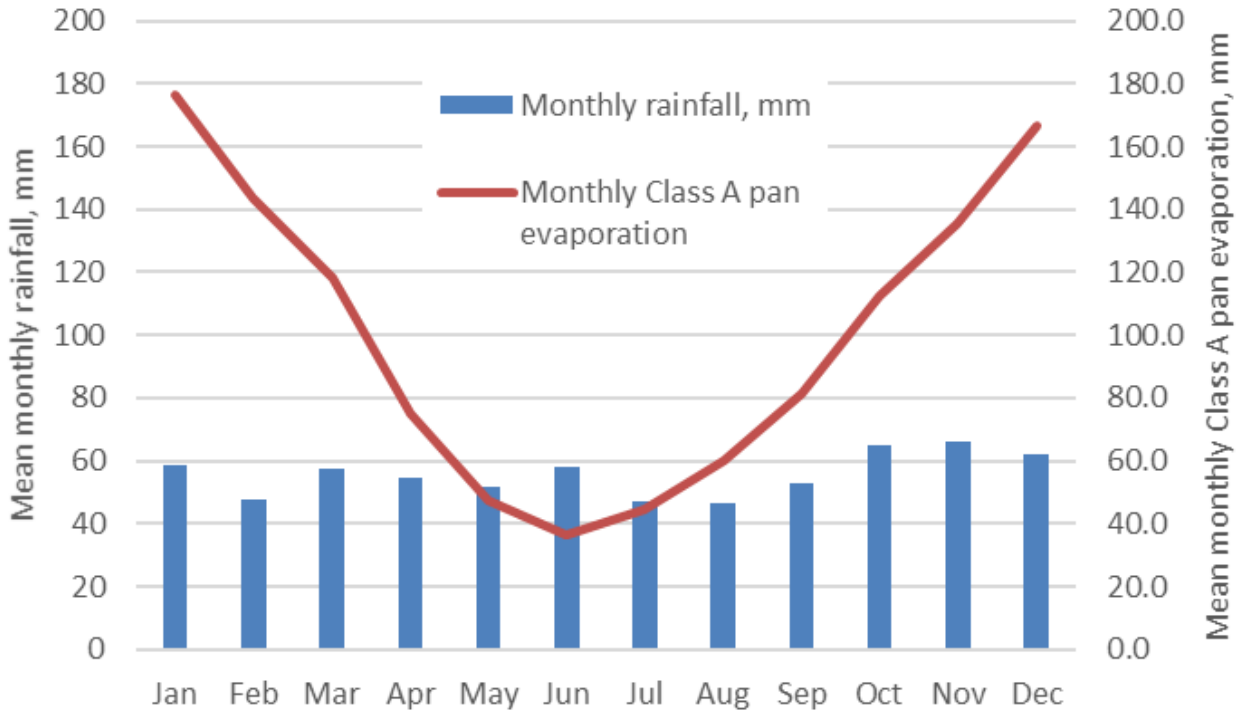


Figure 2-13: Mean monthly rainfall and potential evaporation (Lindenow, Stn no 085050)

Table 2-2: Annual rainfall statistics, Lindenow (Station No. 085050)

Annual rainfall statistic	Annual rainfall, mm
Minimum	379
10th percentile	486
50th percentile	650
90th percentile	880
Maximum	1,118

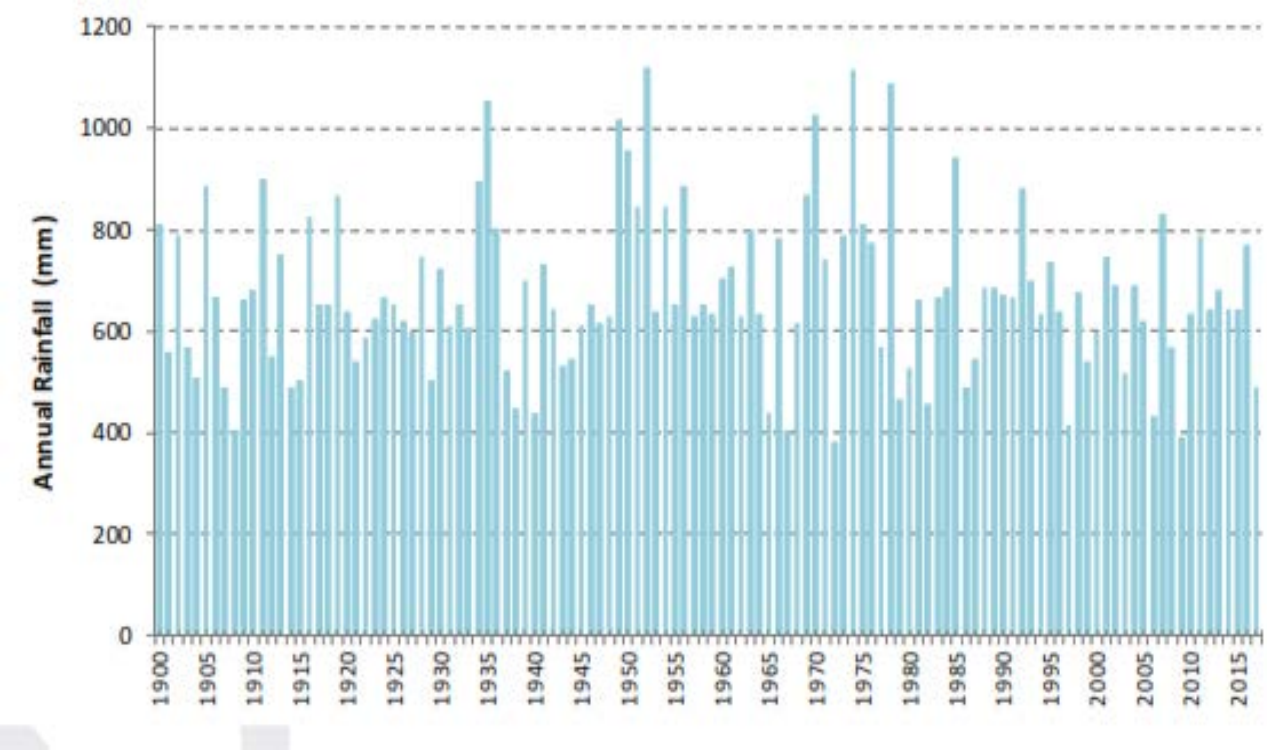


Figure 2-14: Annual rainfall, 1901 – 2017 (Lindenow meteorological station, Stn no 085050)

Significant long duration storm events for the Gippsland region are typically caused by intense low pressure systems forming off the east coast of Australia, commonly referred to an "east coast low". These weather systems can cause intense rainfall over a period of 1 to 3 days. The critical storm intensities for the site are associated with 'east coast low' weather events. A summary of rainfall amounts and probabilities for various storm durations is provided in Table 2-3.

Table 2-3:Design rainfall depths (mm) – various storm durations and exceedance probabilities

Duration (hrs)	Annual exceedance probability (AEP), %						
	63.2%	50%	20%	10%	5%	2%	1%
1	16.5	18.7	26.2	31.8	37.6	46	52.9
2	21.4	24.2	33.6	40.5	47.8	58.2	66.9
3	25.1	28.4	39.3	47.4	55.8	68	78
6	33.4	37.8	52.8	63.7	75.1	91.2	104
12	44.7	51	72	87.2	103	124	142
24	58.6	67.5	96.4	117	138	165	186
48	73.3	84.8	121	146	171	201	224
72	80.9	93.6	133	159	184	215	238
96	85.6	98.8	139	165	190	221	243
120	88.7	102	143	168	192	223	246
144	90.9	105	145	170	194	224	247
168	92.7	106	146	171	194	225	248

Note: Data sourced from Australian Rainfall Runoff Data Portal April 2018

2.2.4 Surface water

The activity area is situated within 200 m of Perry Gully, a registered watercourse under the *Geographic Place Names Act 1998*. Perry Gully is an ephemeral drainage line that discharges to the Mitchell River, approximately 2 km to the east/northeast (Figure 2-15).

Flows along Perry Gully are infrequent, however an opportunistic sample of surface water was recovered from the gulley following an 80 mm rainfall event in January 2020. Water quality results are summarised in Table 2-4. The water sample recovered in January 2020 was very turbid, with high concentrations of nitrogen and phosphorus (relative to water quality objectives set out in the State Environment Protection Policy (Waters)).

Table 2-4: Surface water quality – Perry Gully (20 January 2020)

Analyte	Units	LoR	Result	ANZECC ecosystem protection guideline (SEPP)[1]
Alkalinity (Hydroxide) as $CaCO_3$	µg/L	1000	<1	--
Alkalinity (total) as $CaCO_3$	mg/L	1	3	--
Alkalinity (Bicarbonate as $CaCO_3$)	mg/L	1	3	--
Alkalinity (Carbonate as $CaCO_3$)	mg/L	1	<1	--
Ammonia as N	mg/L	0.010	0.21	0.90
Total Dissolved Solids	mg/L	1	544	--
Electrical conductivity (field)	µS/cm	1	62.8	250
pH (field)	mg/L	0.01	6.78	6.7 – 7.7
pH (lab)	pH units	0.01	5.78	--
Suspended solids	mg/L	5	906	
Turbidity	NTU	0.1	**2000**	(25)
Dissolved oxygen (field)	mg/L	0.1	7.95	
Chloride	mg/L	1	9	--
Sulphate (turbidimetric)	mg/L	1	<1	--
Total nitrogen	mg/L	100	**4.6**	(1.1)
Total phosphorus	mg/L	0.01	**0.48**	(0.055)
Mercury (filtered)	mg/L	0.0001	<0.0001	0.0006
Aluminium (filtered)	mg/L	0.01	**2.30**	0.055 (pH >6.5)
Antimony (filtered)	mg/L	0.001	<0.001	0.009
Arsenic (filtered)	mg/L	0.001	0.006	0.013 (As V)
Barium (filtered)	mg/L	0.001	0.014	--
Cadmium (filtered)	mg/L	0.0001	<0.0001	0.0002
Chromium (filtered)	mg/L	0.001	0.008	0.0004 (Cr VI)
Copper (filtered)	mg/L	0.001	**0.002**	0.0014
Iron (filtered)	mg/L	0.05	1.56	--
Lead (filtered)	mg/L	0.001	0.001	0.0034
Manganese (filtered)	mg/L	0.001	0.027	1.90
Molybdenum (filtered)	mg/L	0.001	<0.001	0.034
Nickel (filtered)	mg/L	0.001	0.002	0.011
Selenium (filtered)	mg/L	0.01	<0.01	0.011
Zinc (filtered)	mg/L	0.005	0.006	0.008
Strontium (filtered)	mg/L	0.001	0.006	--

Note 1: ANZECC values are for 95th percentile ecosystem protection. Values in parentheses are environmental quality indicators specified in the State Environment Protection Policy (Waters) for the Central Foothills and Central Plains segment of the Mitchell River system. Values shown in bold font exceed ANZECC guideline values or SEPP water quality objectives.

2.2.5 Groundwater

The project area is located within the northern margin of the Central Gippsland groundwater basin. This basin is managed jointly by Southern Rural Water and DELWP. The main hydrostratigraphic units within the project area are the Haunted Hills Formation and Coongulmerang Formation (Water Technology, 2020).

The Haunted Hills Formation overlies the Coongulmerang Formation. The Haunted Hills Formation comprises sand, clay and gravel and is typically about 40 m thick within the project area. The Haunted Hills Formation is unsaturated and does not represent an aquifer in the demonstration pit area.

The watertable lies within the lower sequence of the Coongulmerang Formation, which underlies the Haunted Hills Formation. The depth to groundwater in the proposed demonstration pit area is approximately 68 m below ground surface, corresponding to an elevation of about RL38m AHD. The groundwater table therefore lies about 56 m below the proposed depth of the demonstration pit floor. No mine dewatering is expected to be required during mining of the trial pit, other than to remove seepage into the sump from wet backfill or collected via surface runoff.

There are no registered groundwater bores in close proximity to the proposed demonstration pit. The nearest registered groundwater bores are shown in Figure 2-16. The majority of bores in the general project locality are registered for stock and domestic use or for irrigation. Many stock and domestic bores, and the majority of registered irrigation bores, are concentrated within the Wy Yung Water Supply Protection Area (WSPA). The nearest registered groundwater bore (ID. 85910) lies approximately 1 km to the southwest and is upgradient of the proposed demonstration pit. This stock and domestic bore is 107 m deep and is likely to be sourcing groundwater from the Latrobe Valley Group aquifer. The nearest downgradient bore is a stock and domestic water bore located approximately 1.7 km northeast of the proposed demonstration pit. It is thought to be screened in the shallow Coongulmerang Formation at a depth between 8 m and 11 m below ground level.

Groundwater within the Coongulmerang Formation aquifer underlying the project area ranges from fresh (125 mg/L total dissolved solids) to brackish (2,666 mg/L total dissolved solids). Field measurements of the pH at groundwater monitoring locations within the project area and surrounds ranged between 4.55 and 7.42. Most monitoring rounds returned a pH of between 5 and 6, indicating slightly acidic groundwater conditions. Groundwater was generally found to be oxidised, with dissolved oxygen concentrations generally above 1.0 mg/L. Groundwater near the Mitchell River typically contained less dissolved oxygen than at other monitoring locations. Concentrations of dissolved metals (aluminium, arsenic, nickel, iron, cadmium, copper, strontium and zinc) were higher than commonly encountered in groundwater found in formations that are not influenced by minerals.

Major ion chemistry in groundwater underlying the proposed demonstration pit area is dominated by sodium and chloride, with lesser amounts of sulphate (SO4), magnesium (Mg) and bicarbonate (HCO3) ions. Nitrogen has been detected, primarily in the form of nitrate, at all groundwater monitoring locations. Concentrations ranged from below detection up to 2.82 mg/L. Phosphorus is also present at elevated concentrations (<0.01 to 3.54 mg/L). Both phosphorus and nitrate are common groundwater contaminants associated with the agricultural industry

No pesticides or herbicides have been detected in baseline groundwater monitoring conducted across the Retention Licence area to date.

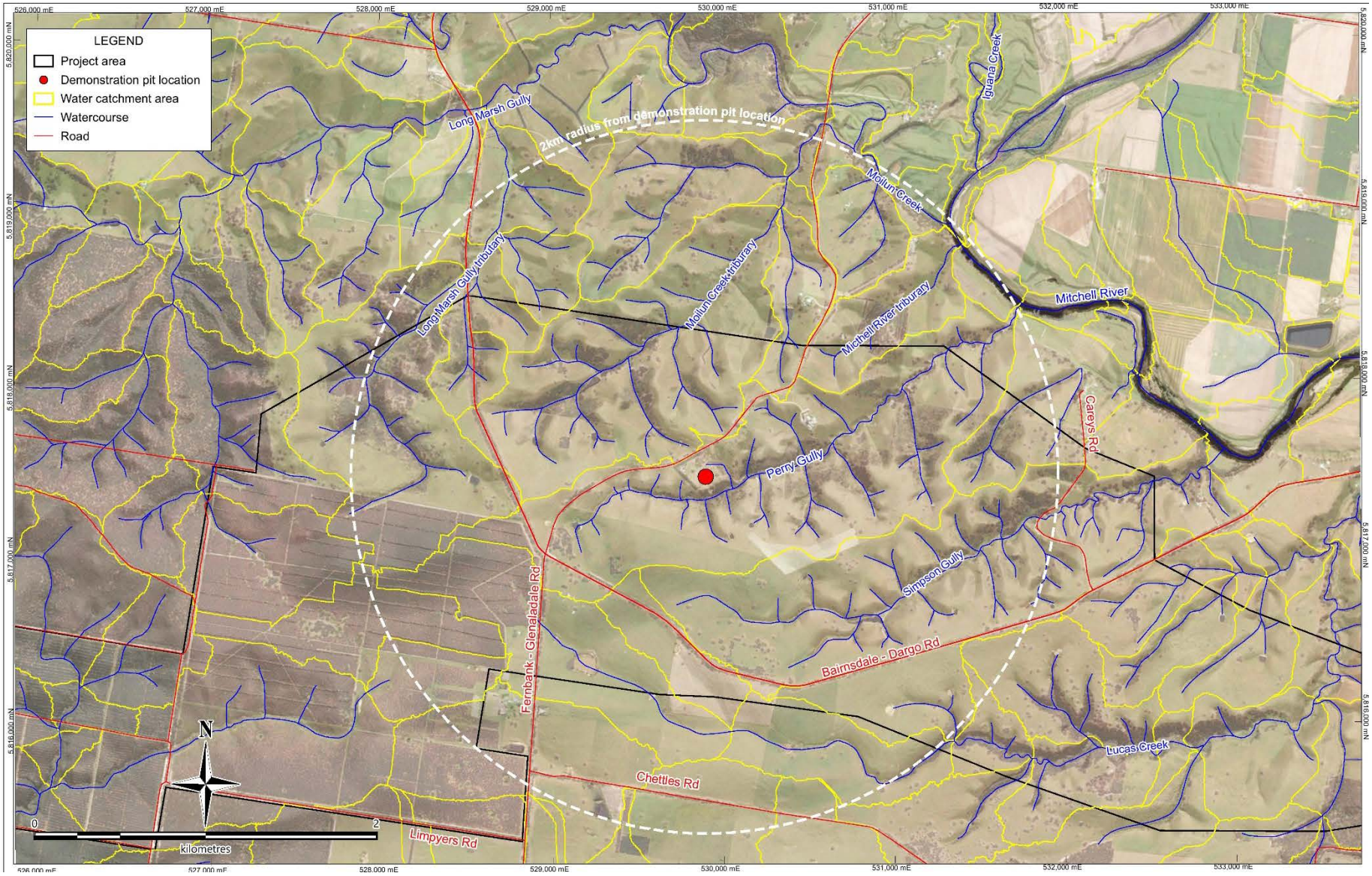


Figure 2-15: Surface water catchments in project locality

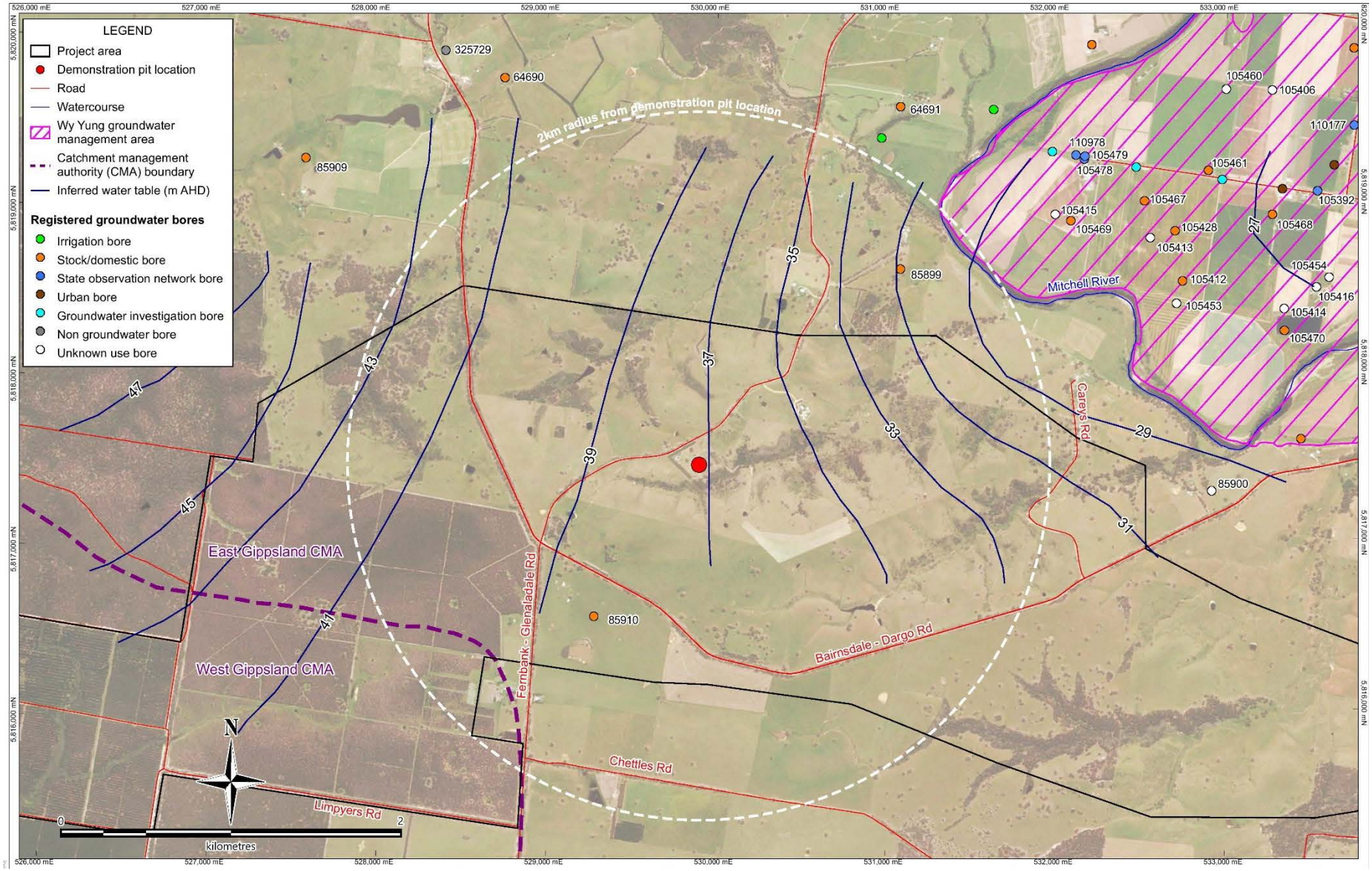


Figure 2-16: Registered groundwater bores in project locality

Table 2-5: Metals in groundwater within Retention Licence 2026

Parameter		Coongulmerang Formation Groundwater			ANZECC (2000) ecosystem protection guideline (mg/L)[1]	ANZECC (2000) Long term irrigation (mg/L)	ANZECC (2000) Livestock water (mg/L)
	LoR, mg/L	Min, mg/L)	Max (mg/L)	Median			
Aluminium	0.01	0.01	**2.09**	**0.215**	0.0008 (pH <6.5)	5	5
Arsenic	0.001	0.001	**0.014**	0.0025	0.013	0.1	0.5 to 5
Barium	0.001	0.004	0.573	0.044	--	--	--
Boron	0.05	0.07	0.08	0.075	0.37	--	5
Copper	0.001	0.001	**0.029**	0.001	0.0014	0.2	1 (cattle)
Iron	0.05	0.06	111	1.53	--	0.2	--
Manganese	0.001	0.001	**4.06**	0.199	1.9	0.2	--
Molybdenum	0.001	0.001	0.004	0.0025	0.034	0.01	0.15
Nickel	0.001	0.001	**0.587**	**0.0265**	0.011	0.2	1
Strontium	0.001	0.003	0.328	0.043	--	--	--
Zinc	0.005	0.006	**0.814**	**0.056**	0.008	2	20

[1] Note: ANZECC values shown in the table are for 95th percentile ecosystem protection where available; if no 95th percentile values have been defined the default freshwater ecosystem guideline is shown.

2.2.6 Cultural values

The planned activity area is located within 200 metres of Perry Gully. As such, it is considered to be within an area of cultural heritage sensitivity, except for those parts of the area which have been subject to significant ground disturbance (Regulation 26 of Aboriginal Heritage Regulations 2018 S.R. No. 59/2018). All new ground disturbance proposed for the demonstration project has either been positioned in areas previously subject to significant ground disturbance or has been located outside the 200 m zone classified as culturally sensitive (Figure 2-17). Notwithstanding these precautionary measures, Kalbar has implemented a 'chance finds procedure' to guide operational decisions in the unlikely event that Aboriginal heritage artefacts or materials are encountered during project implementation. A copy of the procedure is provided in Appendix E.

In September 2020, Andrew Long and Associates completed a desktop review of the demonstration pit area and reported no previously registered Aboriginal cultural heritage places within the activity area, nor were there any listings on the Register of the National Estate or the Victorian Aboriginal Places Register (A Long & Associates, 2020). However, an updated review of the site, indicates that a potential scar tree has been registered with the reported coordinates positioning within the demonstration pit works area.

Historic and current photos of the site clearly show the absence of the tree at the location indicated in the Aboriginal Places Register and it has since been confirmed that the potential scar tree actually lies some 1.35 km to the west north-west of the project site. A Long and Associates are working with Aboriginal Victoria to update the register with the correct coordinates.

2.2.7 Land tenure and social context

The proposed demonstration area is located on private property in a predominantly rural, agricultural landscape, intersected by roads. No schools, hospitals, churches or other non-residential sensitive receptors are located within a 5 km radius of the project boundary.

Figure 2-18 shows the locations of residential properties identified within and around the proposed mining licence area. The residence shown as 'R4' on Figure 2-18 is Kalbar's site office. The residences labelled 'R2' and 'R3' are owned by Kalbar.

Figure 2-19 shows public infrastructure (including roads and powerlines) in the project locality.

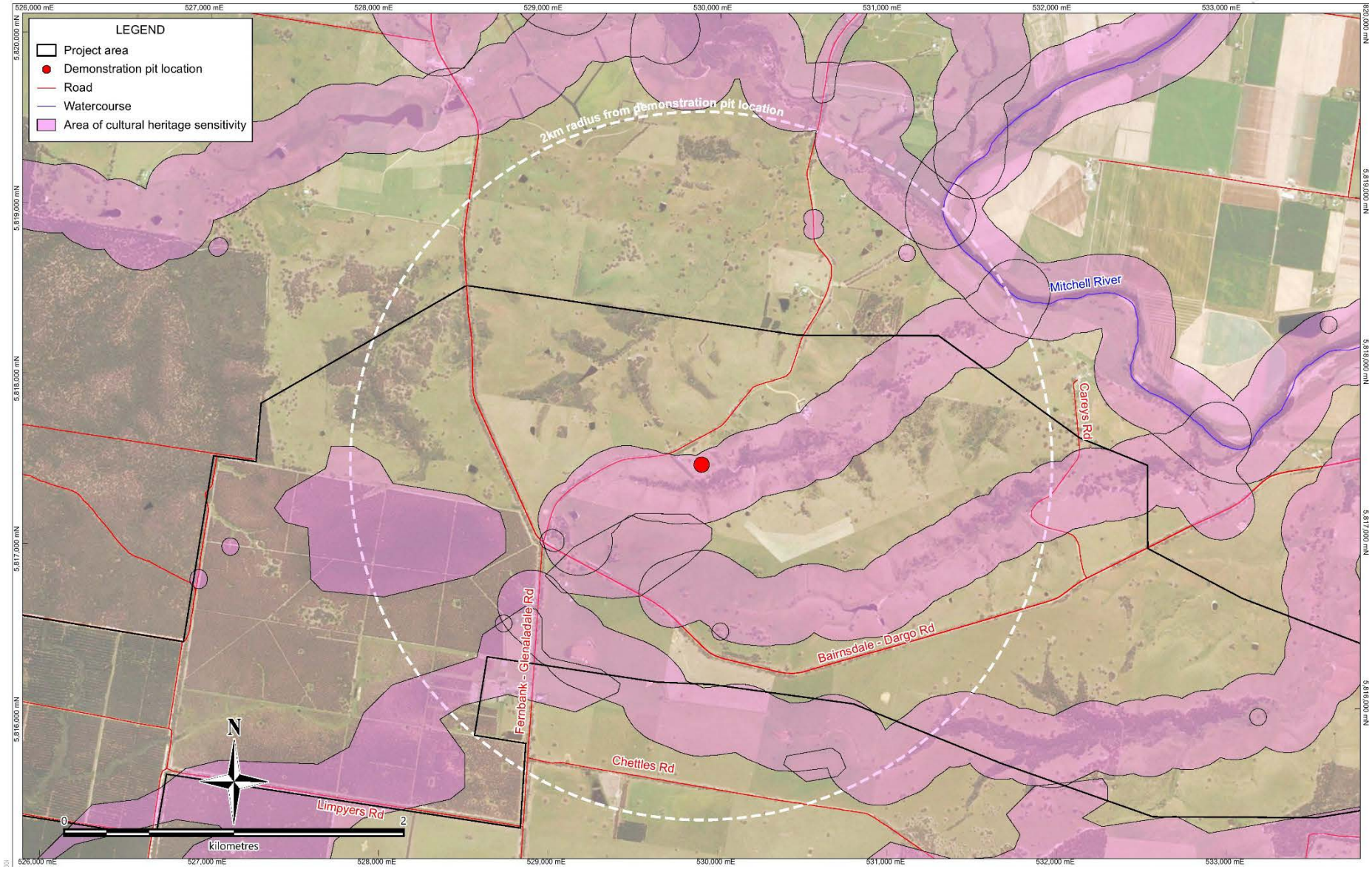


Figure 2-17: Areas of cultural sensitivity near demonstration pit

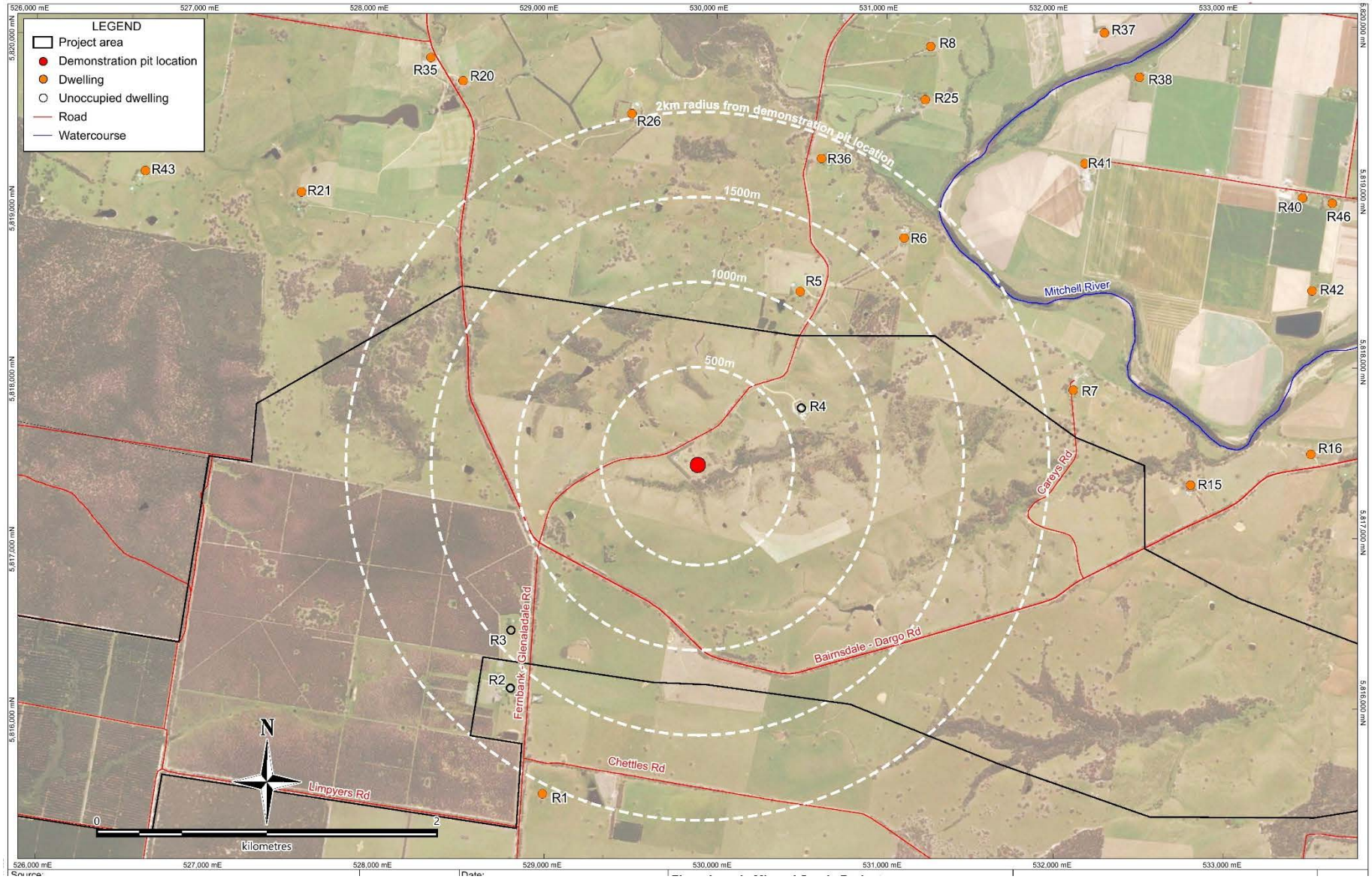


Figure 2-18: Residential properties near proposed demonstration pit

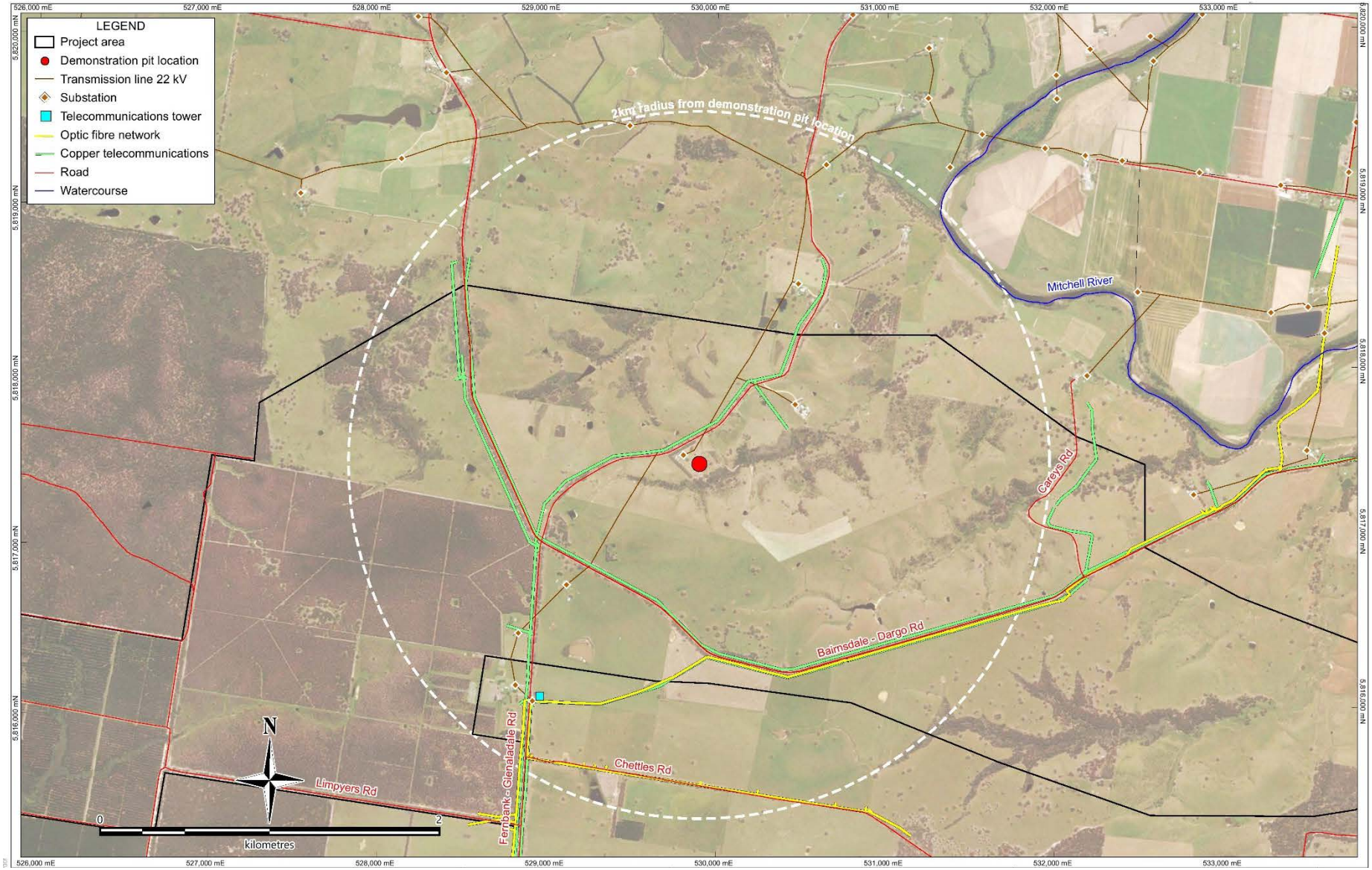


Figure 2-19: Public infrastructure near proposed demonstration pit

2.3 Nature of proposed exploration works

The proposed demonstration pit has the primary purpose of obtaining a bulk sample of ore, however it creates other opportunities in the process which will help support the detailed design and definitive feasibility study for the Fingerboards project. The following activities are proposed under this work plan:

1. Excavation of a pit for the purpose of:
    - Providing access to a ~200 tonne bulk sample or sand ore.
    - Validating geological block model and grade assumptions;
    - In situ bulk density test work for overburden, mineralisation and within the floor of the pit;
    - Performing permeability testing of various lithologies.
    - Evaluate the trafficability of the various lithologies using the mining fleet.
2. Testing of ore handling and separation processes at a small scale (demountable) processing facility;
3. Evaluation of placement methods for in-pit storage of process residues;
4. Collection of ambient noise and air quality (particulate) data to allow further calibration of noise and air quality modelling completed as part of the Fingerboards EES;
5. Implementation of remedial works to reduce the rate of tunnel erosion in the nearby drainage line, which has result from poor rehabilitation of the former gravel quarry;
6. Trialling of revegetation procedures for land proposed to be used for grazing purposes.

The mining and processing described in this work plan will occur during daylight hours only, nominally between 7am and 6pm Monday to Saturday. The proposed layout of the demonstration trial is shown in Figure 2-20. Cross sections of the demonstration pit are shown in Figure 2-21 and Figure 2-22. The general sequence for the demonstration works will be as follows:

1. **Site establishment / preparatory works** - delineation and fencing of the works area; setup of temporary site office and ablution facilities; establishment of drainage works and sediment traps conditioning; stripping and stockpiling of topsoil;; construction of a heavy vehicle hard stand;; clean out existing stock dam and; preparation of a pad for process plant placement.
2. **Mining** Using mobile earthmoving equipment, the overburden within the pit confines will be progressively stripped off and stockpiled. Following overburden removal, the ore (sand) parcel will be recovered from the pit base and stockpiled separately. The Haunted Hills contact will be screened with the oversize stockpiled for rehabilitation works.
3. **Pit Underdrainage**. On completion of mining, geological and geotechnical sampling and testwork, an underdrainage system will be installed within the base of the pit for the recovery of water during the wet backfill process.
4. **Processing Plant** – A modular skid mounted process plant will be setup on site to simulate slimes classification, sand stacking and slimes dewatering using a centrifuge
5. **Backfilling –** Backfilling of the pit void will be achieved through a combination of wet backfill of sand and slimes, centrifuge cake and haunted hills overburden material.
6. **Subsoil Placement** – Several sections of the pit area will undergo the placement of constructed topsoil which is a mix of fine and coarse sand.
7. **Rehabilitation –** Will involve the replacement of recovered subsoil and topsoil onto stockpile pads and across dedicated areas of the backfilled pit area. Additional topsoil and amendments will be trucked in and used within various zones for comparison. All disturbed areas will be seeded with pasture.

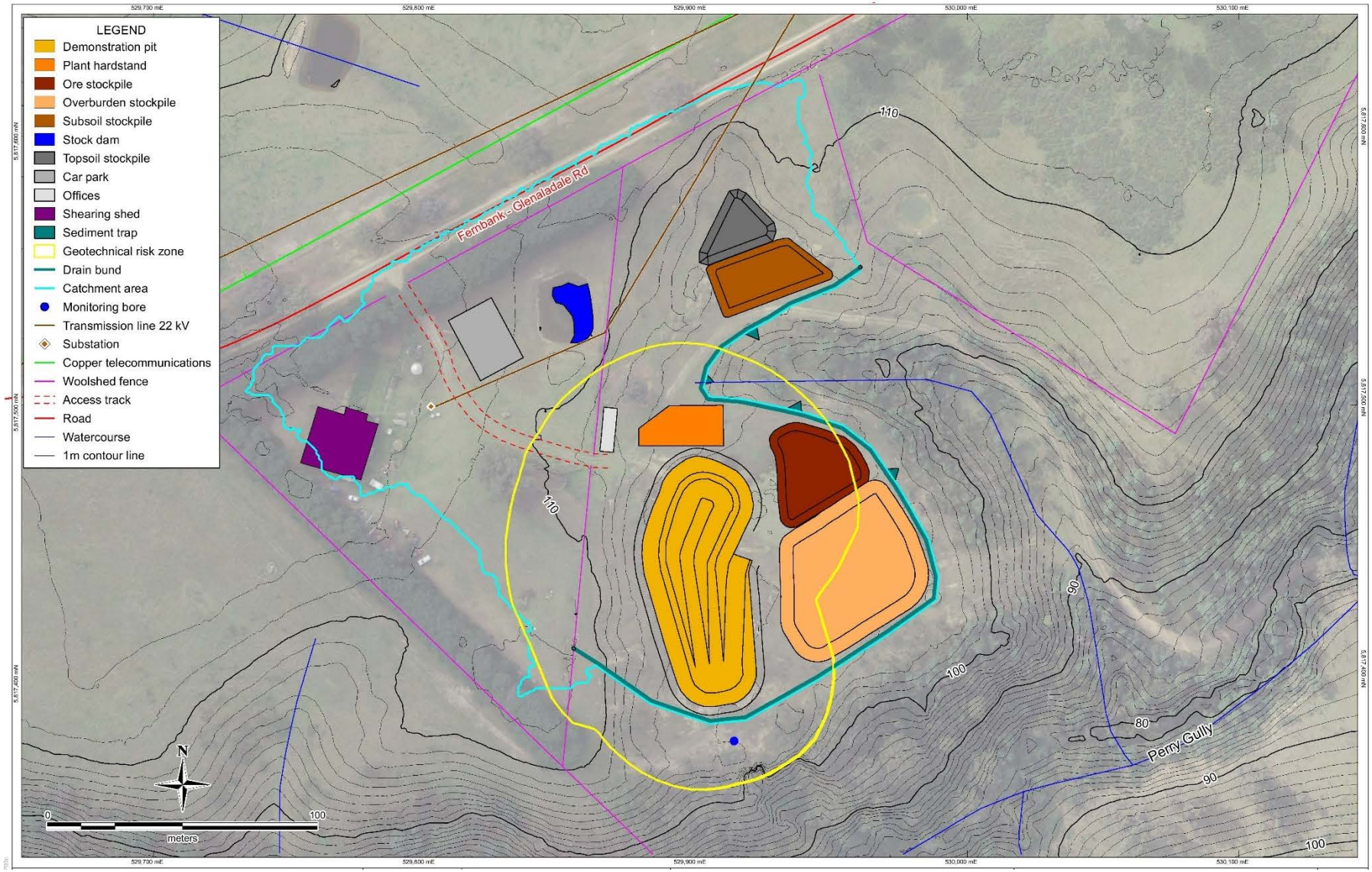


Figure 2-20: Site plan showing trial pit, stockpiles stockpile pit and ore processing areas

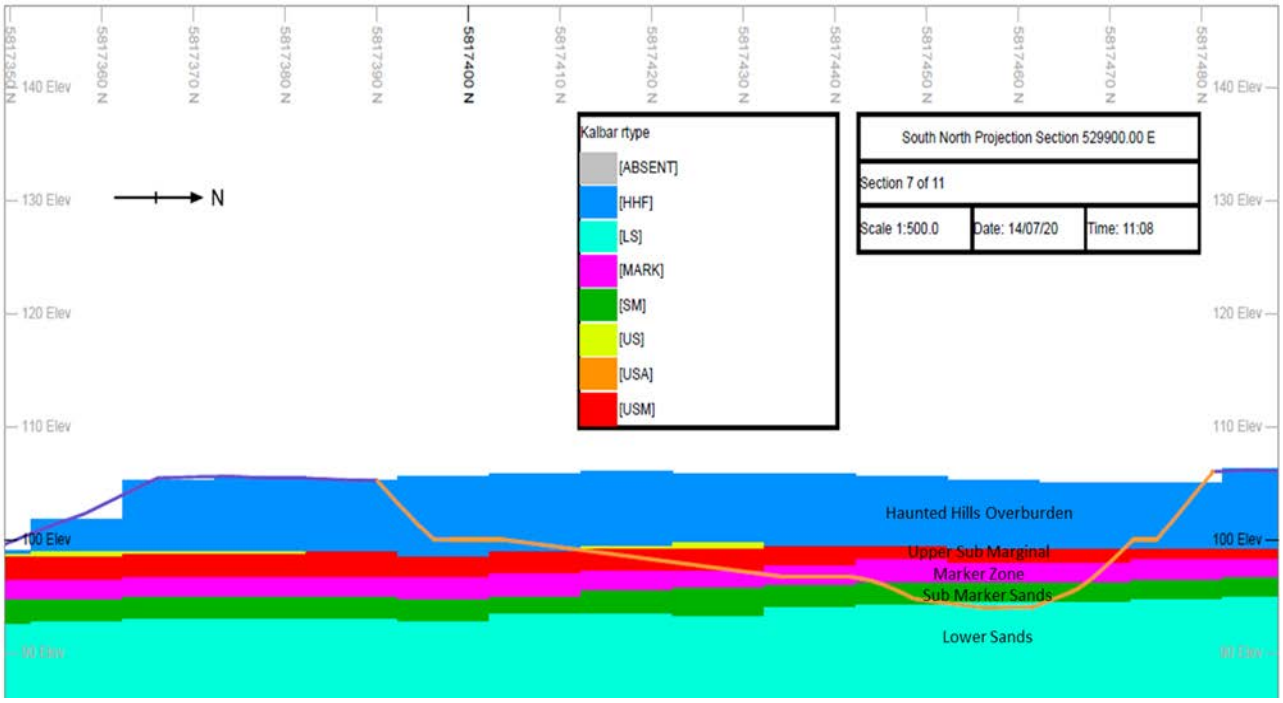


Figure 2-21: North-south cross section of trial pit

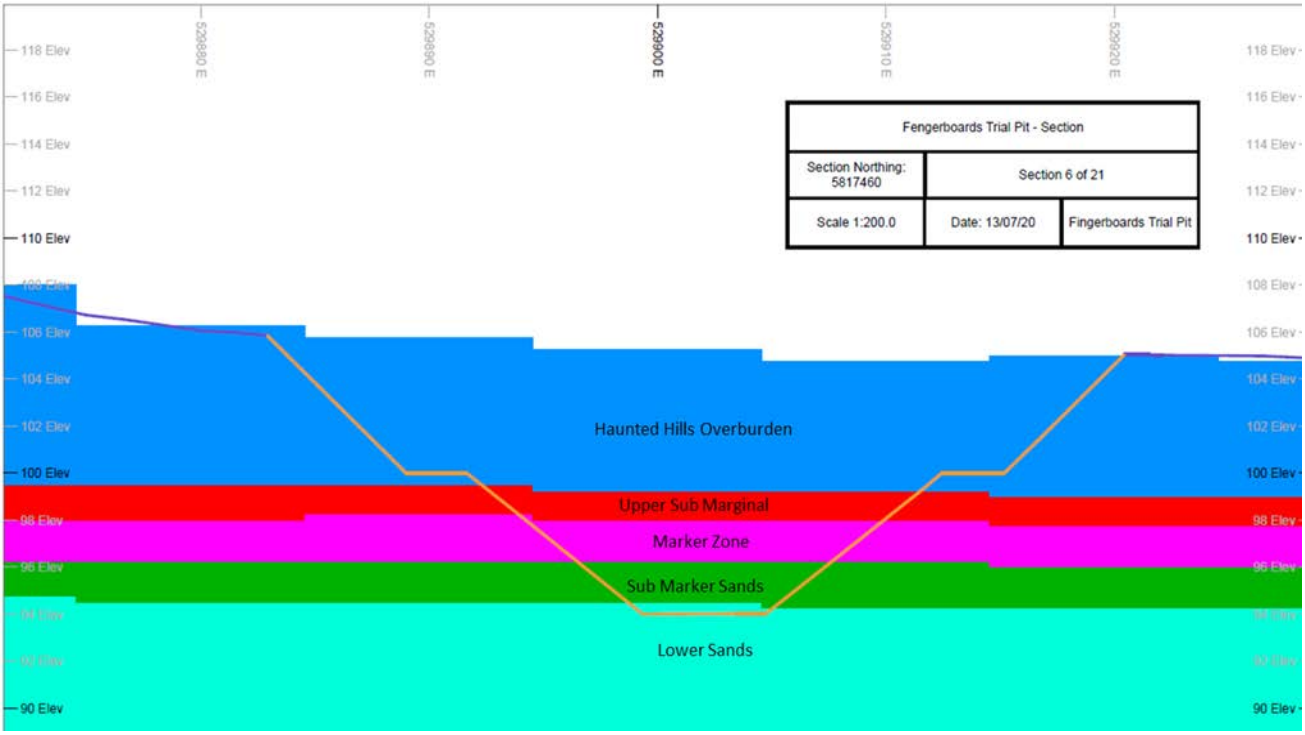


Figure 2-22: East-west cross section of trial pit

2.3.2 Site Preparation and Establishment

Weed Control

There are a number of weeds within the planned working area, including blackberries, Kikuyu Grass, African Love Grass and Bent Grass (Figure 2-23). A spraying program will be implemented to reduce, if not eliminate, the grassy weeds. The spraying of the Love Grass will occur as soon as practicable at project commencement, with a two-stage follow-up approximately 4-6 weeks ahead of topsoil removal. Spray treatments of other grassy weeds will be applied prior to topsoil removal to reduce the risk of weed establishment / spread during site rehabilitation. The blackberries are better suited to mechanical removal during the planned works.

Figure 2-23: Weeds observed in proposed demonstration project area

Fencing and land access

Kalbar proposes to retain, and where required to improve, existing fencing at the site to control access and ensure public and worker safety. The existing rural fencing is generally considered adequate for these purposes. Appropriate warning signs and coloured barricading will be attached to the fence line. Temporary fencing will be installed around the pit void following subsoil stripping.

Site Security

Contracted security staff will be employed to provide on site security outside the hours of general operation. Security services will be engaged to a point where the site rehabilitation is complete and the area considered low risk to public safety and unlikely to be vandalized.

Crib/Ablution Facilities

Temporary skid mounted crib/meeting room and ablution facilities will be established for use by the contractors and supervision staff. The buildings will be located along the woolshed paddock fence on the pit side. Crib and ablutions facilities will not generally be available to the public, except during site visits organised by Kalbar. An additional hut may be required for security and to control site access.

Water for the ablutions will be sourced from a rain water tank which is located alongside the existing shearing shed.

Power supply

Power to the temporary facilities will be via a diesel-powered generator. Fuel for the generator will be sourced from a mobile service truck, or transportable fuel pod. There will be no on-site bulk fuel storage.

Figure 2-24: Planned location for temporary crib and ablution facilities

2.3.3 **Mining**

General Pit Design

AMC Consultants, in consultation with Kalbar, completed a mine design for the demonstration pit to meet target volumes and ability to test mining equipment operating on the various stratigraphy surfaces. The pit designs have taken into account geotechnical recommendations by GHD (2020).

The pit design parameters include:

- 45 degree batter angles in overburden (Haunted Hills Formation)
- 40 degree batter angles in ore (Coongulmerang Formation)
- 2.5 m berm at the contact of ore and overburden
- Ramp gradient of 12.5 percent (1:8)
- Maximum pit depth of 12 m
- Ramp width is 5 m without safety bund (7 m width with safety bund).
- Base of pit to reach and expose the lower sands unit (base at RL 94 m AHD).

The design also includes construction of a nominal 232 m long pit perimeter bund, a 344 m long drainage bund, roads, topsoil stockpiles, subsoil stockpiles, overburden waste dump, and ore stockpiles. A summary of disturbance associated with project implementation is provided in Table 2-6. An inventory of the estimated quantities of materials to be moved during mining is provided in Table 2-7. Stockpile capacities are summarized in Table 2-8.

Table 2-6: Disturbance estimates; topsoil and subsoil volumes

	Area for Topsoil Stripping (m2)	Area for Subsoil Stripping (m2)	Topsoil Volume (m3)	Subsoil Volume (m3)
Pit, pit bund, ore stockpile and overburden waste dump	9,300	9,300	930	930
ROM and Subsoil Stockpile	2,100	1,280	210	128
Roads and Bund	797	797	80	160
Total	11,400	10,580	1,140	1,058

Table 2-7: Pit inventories

Material	Volume (m3)	Tonnes (t)
Ore	1,948	3,316
Overburden	12,813	28,701
Total	14,761	32,017

Table 2-8: Stockpile capacities

Stockpile Capacities	Capacity (m^3)
Overburden waste dump	14,200
Ore stockpile	1,427
ROM stockpile	1,493
Subsoil stockpile	1,072
Topsoil stockpile	1,171

Topsoil Stripping

The uppermost 75-100 mm of topsoil will be stripped from the main pit area, ore, and overburden stockpiling locations. Prior to stripping, the topsoil will be conditioned with gypsum. The topsoil will be stockpiled for use in rehabilitation trials (Figure 2-25). Topsoil stockpile heights will be no greater than 2.5 meters.

Sub Soil Stripping

Nominally 50-100 mm of sub soil will be stripped from the main pit area, ore, and overburden stockpiling locations. The subsoil will be stockpiled for used in rehabilitation trials. Subsoil stockpile heights will be no greater than 4 meters.

Surface Water Management

Following removal of topsoil and subsoil from the stockpile areas, the operations area will be graded/profiled to direct any surface water and stockpile runoff back into the pit. Any water collected as runoff from the disturbed areas will be recovered via submersible pump back into either a water cart for dust suppression or pumped to the stock dam located on site for use within the process.

Sediment Traps

Temporary sediment traps will be installed at the boundary of the project area at four key drainage points (Figure 2-20). The traps will consist of either straw bales and/or sediment fencing.

Figure 2-25: Planned topsoil and subsoil stockpile location

Ground Water Management

A ground water monitoring bore to a depth of approximately 14 meters will be installed between the pit crest and the edge of Perry Gully. The bore will be screened through the entire sand zone to intercept any horizontal water movement from the pit.

Overburden Stripping

The overburden consists of predominantly Haunted Hills Formation, which is a combination of transported gravel and sand. The overburden can be somewhat cemented in parts, but is mostly free-digging. No blasting or rock breakers will be required. The recovery of the overburden will be via excavator and truck.

Initially, the recovered overburden will be used to create windrows and safety berms around the edge of the pit. The remaining overburden will then be stockpiled, for eventual use in backfilling the pit void upon completion of the trial.

A portion of the overburden and the marker contact zone will be screened to evaluate the efficiency of the process and to create clean cobble for rehabilitation purposes.

Ore/Sand Recovery

Geological investigation will be undertaken during and following the earthmoving exercise. Geologists will visually confirm that the mineral sand marker horizon is evident at the modelled RL. No one (apart from equipment operators) will be allowed in the pit while heavy mobile equipment is in operation. Earthmoving will cease while project personnel undertake periodic inspections of the pit's progress. Earthmoving activities will be limited to daylight hours only, 7am to 6pm.

During mining, an assessment will be made of the efficiency of overburden stripping (ease of stripping, ore dilution / loss). The ore will be mined and stockpiled in a way to provide an even distribution of the various lithologies for the bulk sample and the plant feed

For all lithologies, the following testing will be undertaken:

Trafficability – The trafficability of each of the lithologies will be evaluated by driving/turning the mobile fleet over the top of the exposed in-situ material. Tyre impressions will be measured and the general disturbance by the traffic monitored and assessed.

Bearing capacity - Plate bearing tests will be conducted to establish the baseline bearing capacity of the various materials. This will be repeated at several points across the surface of each lithology.

In-situ density measurement - Troxler density testing will be undertaken to measure the in-situ bulk densities.

In-situ permeability measurement – Falling head permeability testing of the various lithologies.

Moisture content – Moisture measurements will be undertaken on several samples of each lithology to establish the nominal moisture contents of the in-situ materials.

Volumes – Surveying will be conducted pre and post each stage of the stripping process to understand swell factors of the recovered materials.

All monitoring and measurements will be supported by photographs.

Overburden and Haunted Hills Contact Screening

A mobile screening plant will be used to screen a small portion of the haunted hills overburden to produce coarse cobble for potential drain lining and to be used to stabilize the existing Perry Gully erosion area as far as practical.

The marker contact will also undergo screening to evaluate the effectiveness of separating ore grade sands from the haunted hills overburden.

Screened fines will be progressively recovered and will form part of the plant feed or returned to the pit as part of the backfill process.

2.3.4 **Ore Processing**

The processing plant will comprise multiple pieces of equipment including a feed hopper, conveyor, slurry pumps, cyclones, agitated tank and a centrifuge. All equipment will be skid mounted and/or installed on temporary foundations. The foundations will be hardstand created from recovered overburden and potentially capped with a thin layer off fine gravel to improve trafficability and operator comfort and safety.

Ore processing will create four different material streams:

- a sand product
- a slimes cake generated by a centrifuge
- a re-pulped straight ore mix which is simply wetted, flocculated and placed back within the pit.
- a ‘mod cod’ blend, which is a higher slimes/sand ratio than straight mined ore.

The different materials will be placed within the pit void to evaluate ease of placement, consolidation, trafficability and dewatering behaviours.

Water recovered from plant and from the in-pit seepage and surface water collection systems will be recycled back to the process water system via the process water dam (Figure 2-26).

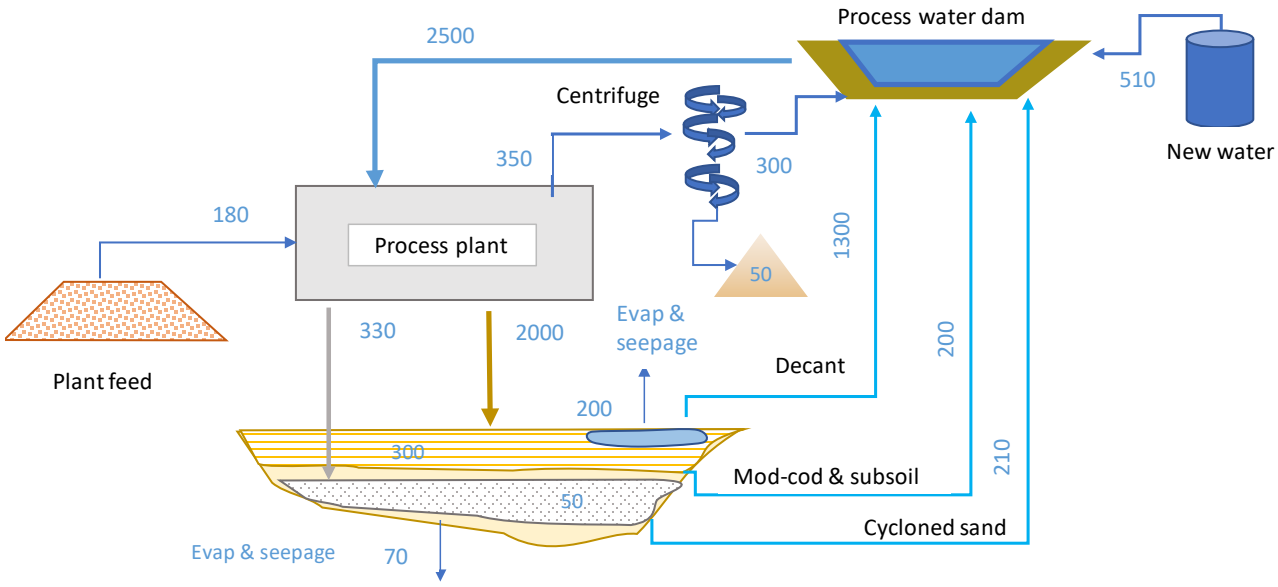


Figure 2-26: Process water balance

Plant Flowsheet – Sand Generation

Mined ore will be fed into a variable speed feeder hopper using a front end loader. The feed rate will be controlled by a variable speed belt which will deliver ore onto a transfer conveyor. The transfer conveyor will feed the sand onto a scalping screen which is used to remove +2mm material. Water is added at this point to wash the sand through the screen and form a slurry with a set density of nominally 40% solids.

The +2mm material will report to a bunker and will be collected using a loader and combined with overburden backfill. The -2mm material gravitates into a pump hopper where it is pumped to a desliming cyclone. The sand slimes are classified to the cyclone overflow and will flow into a slimes surge tank. The sandier underflow gravitates into a second pump hopper and is pumped to a dewatering cyclone located within the pit (Figure 2-27).

The underflow of the dewatering cyclone is the coarser sand and should be at a density that enables it to stack into conical piles. The dewatering cyclone overflow is recycled to the desliming cyclone feed hopper for re-use in the plant.

Plant Flowsheet – Slimes Dewatering

Accumulated slimes which are stored within a surge tank will be pumped periodically into a trailer mounted centrifuge. The centrifuge will recover water from the slimes fraction and in doing so will produce a fine clay product which will be stockpiled next to the process plant. The clay stockpile will be recovered using a loader and recombined with Haunted Hills during the pit backfill process.

The water recovered from the slimes ('centrate') via the centrifuge will be pumped back to the water storage dam for re-use in the plant or for dust suppression.

Plant Flowsheet – Modified Co Disposal (Mod Cod)

Modified co-disposal ('ModCod') is the combination of coarse sand with finer 'slime' sand in a slurry form that then undergoes flocculation near its discharge point to the pit. The sand slurry will be pumped to the pit void using a centrifugal pump. Liquid flocculant will be dosed into the slurry pipeline prior to entry into the pit (Figure 2-28).

A Nalco 83384 anionic flocculent will be used for the process. The flocculant is not classified as hazardous according to the Australian Safety & Compensation Council (ASCC), and is not classified as a dangerous good according to national or international regulations.

The flocculant will be sourced in 25kg bags and will be brought to site as required for mixing with water ahead of dosing into the circuit. It is estimated that 10 bags (250kg) will be required through the duration of the works.

The flocculant combines with the mineral particles within the slurry and promotes their settlement on discharge into the pit void. Water is expressed to the surface as the sands beach out. This water is recovered via a decant and returned to the surface water dam for re-use.

The natural sand:slime ratio is approximately 3.5:1. As part of the rehabilitation trials, various sand to slime ratios down to 1:1 will be tested by combining accumulated slimes from the slime surge tank with raw ore feed.

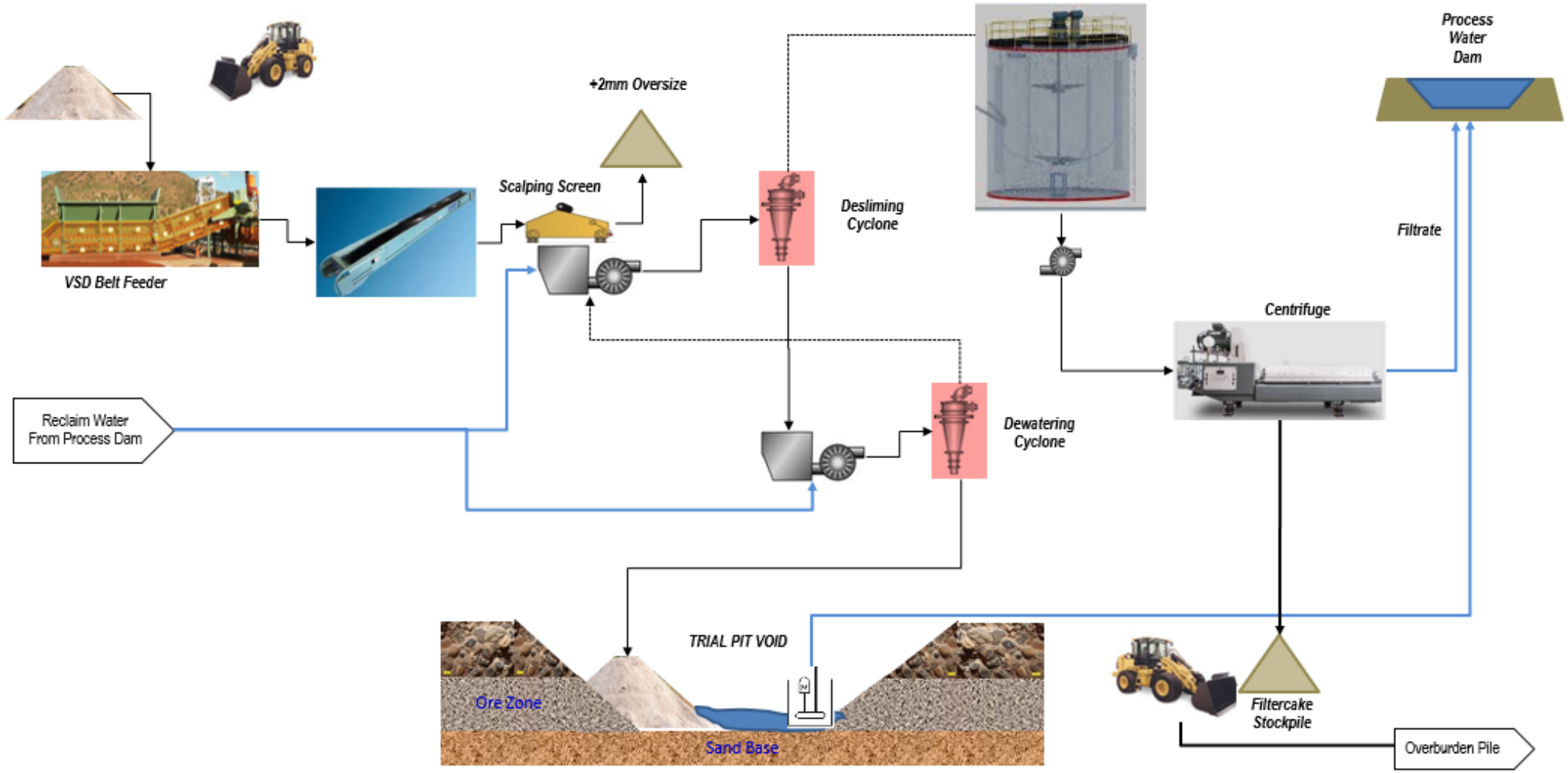


Figure 2-27: Plant Flowsheet – Sand generation and centrifuge operation

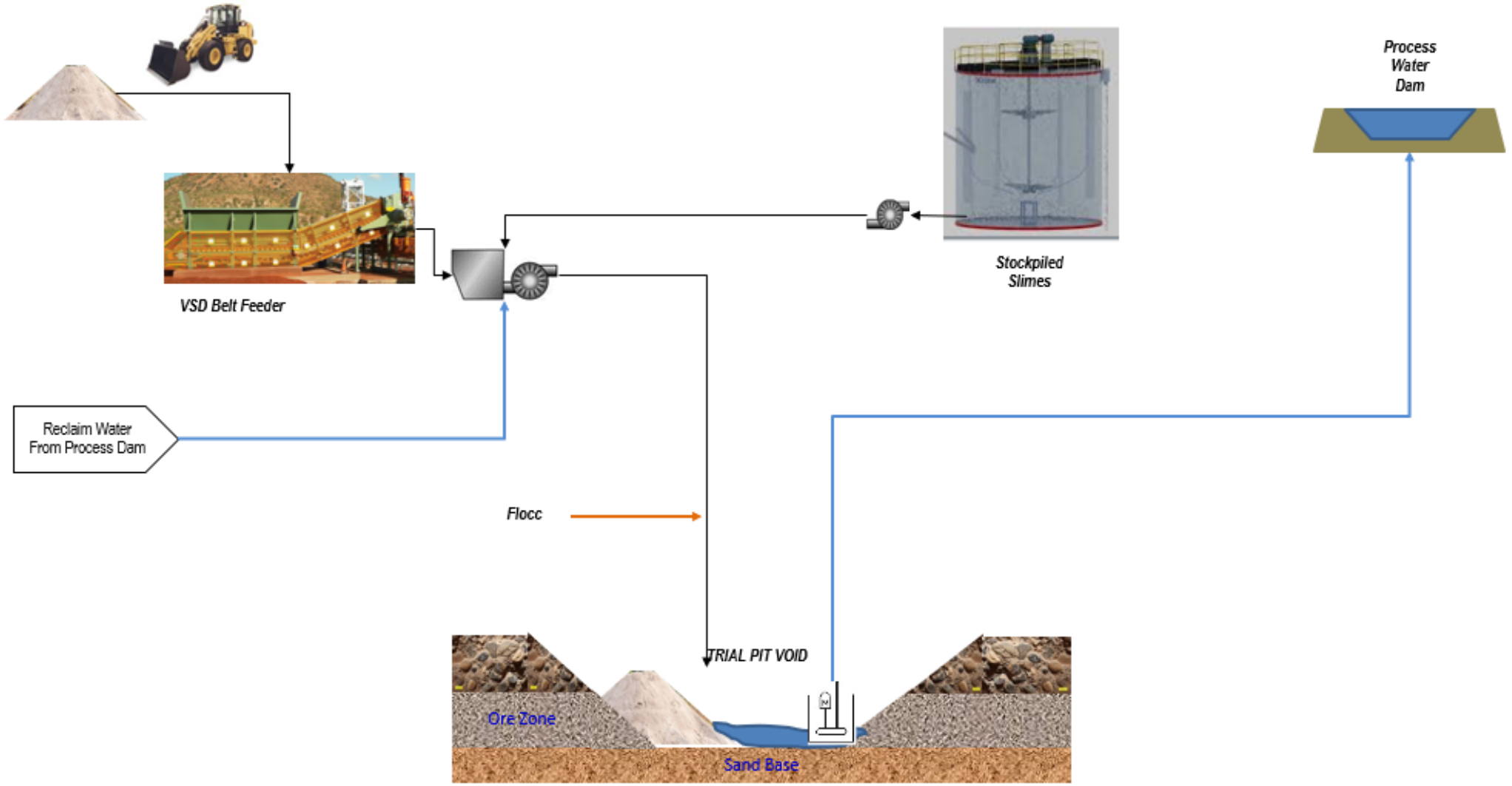


Figure 2-28: Plant Flowsheet – Modified Co-disposal for general backfill and sub soil creation

2.3.5 Mine Backfilling

Underdrainage

Prior to the pit backfill process commencing, an underdrainage system will be installed to capture water that percolates through the backfill towards the base of the pit. The recovery of water via this method maximises the ability to recycle process water and accelerates the consolidation of any sand or wet backfill.

The northern end of the pit will be the lowest point of the pit void. A small box cut will be made and a rock-based underdrainage collection sump will be installed at the northern end of the pit. The collection sump will be encased in geofabric and filled with a fine clean gravel pack. A single drainage line running along the length of the floor of the pit and linked to the collection sump, will aid in water recovery from the wet backfill material (Figure 2-29).

A slotted PVC or poly pipe will intercept the collection sump and be used to house a bore pump for the recovery of water. The bore pump discharge will be fitted with a flow meter to facilitate monitoring the water extraction rate and volume, and to confirm when the sump is running empty. The standing water levels within the riser pipe will be measured on a daily basis using a manual dipper. Any water recovered will be pumped to the site stock dam for re-use within the process.

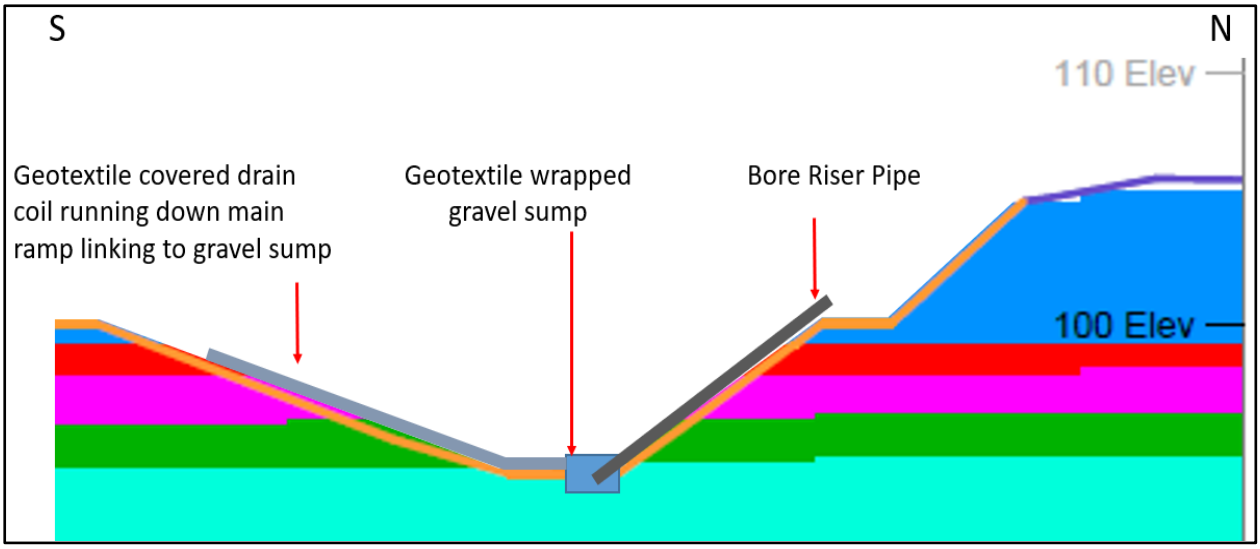


Figure 2-29: Pit void underdrainage - general arrangement

Backfill Sequence

The backfill process will be sequenced such to enable various compaction and trafficability tests to be completed. The sequencing also attempts to maximise the ability of the backfill to drain. The general backfill sequence (Figure 2-30) will be:

- Cyclone sand – levelled off after placement.
- Haunted Hills overburden combined with centrifuged slimes.
- Co disposal of sand and slimes (Mod Cod) at a ratio of 3.5:1 (natural values)
- Co disposal of sand and slimes (Mod Cod) at a ratio of 2.5:1
- Haunted Hills overburden
- Natural sand (any spare ore)
- Manufactured subsoil placement (mod cod at various ratios)
- Placement of recovered subsoil and topsoil is described in Section 5 (Rehabilitation).

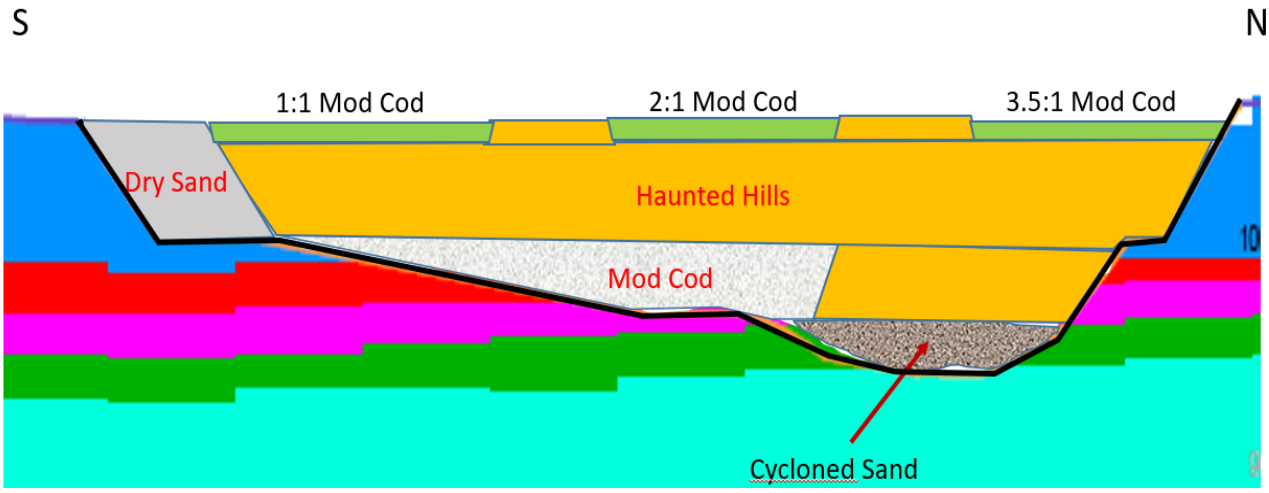


Figure 2-30: General backfill cross section within the pit void.

2.3.6 **Auxiliary Works**

Water - Process

A ~0.6 ML stock dam located within the adjacent Woolshed paddock of the landowner, will be used for the storage of plant water. The dam currently contains a level of reedy vegetation (Figure 2-31). The reeds will be removed and the base of the dam will be cleaned. If necessary, the base and sides of the dam will be sheeted with clay-based material. Makeup water for the dam will initially be trucked into site. Water will be recovered from the wet backfill process and returned to the dam for re-use.

Figure 2-31: Existing stock water dam

Water – Reclaim

Water will be recovered from the wet backfill process in two ways (Figure 2-26):

1. Recovered as decant water of the surface of the wet backfill.
2. Recovered from the underdrainage sump located at the base of the pit.

The water flow rates and totals will be measured for both of these sources using rotameter style meters. Water samples will be taken weekly during the works and then move to monthly sampling from the pit underdrainage until water extraction is no longer being achieved. Solution assaying will include turbidity, EC (salinity), pH, N, K, P and hardness (CaCO3).

Power

Power for the plant operation and supporting facilities will be supplied by diesel generators. The generator's will be fueled via a mobile fuel pod. It will be fitted with a sound attenuation canopy to limit noise generation. One or two generators will be located along side of the plant while another unit will be dedicated to the crib room and ablution facilities.

Non-process waste

Septic waste collected as part of the transportable ablution facilities will be collected by an appropriate contractor for disposal off site.

Any clean rubbish and general waste from plant establishment and operation will be stored and relocated to an approved refuse facility.

A hydrocarbon spill kit will be maintained on site to deal with any hydrocarbon spills. Any contaminated material will be relocated to an approved refuse facility at the completion of the works

2.4 Sensitive receptors

2.4.1 Occupied dwellings

Three residential receptors (excluding residences owned by Kalbar) are located within 2 km of the works. These include residential dwellings and include workshop shedding located between 1.2 km and 1.9 km northeast of the proposed demonstration pit site (Figure 2-18).

2.4.2 Noise Management

To limit the risk of noise impacts on the local receptors, works will be conducted during daytime hours only. In addition to this, any generators used will be fitted with appropriate sound attenuation canopies.

The operation of the mining fleet will be the predominant noise from the operation. The centrifuge associated with the plant operation will create similar noise levels to the mobile fleet. The remaining processing plant equipment has a relatively quiet operation.

2.4.3 Noise Monitoring

Noise monitoring using a hand held device will be conducted on a daily basis, two weeks prior activities commencing to establish a general baseline. Further noise monitoring will be conducted during general operation to confirm compliance within standard regulated noise limits.

2.4.4 Dust Management

The control of dust on roadways, ore and overburden stockpiles will be predominantly achieved through the use of a water cart.

For the subsoil and topsoil stockpiles, half of each of them will be coated with Enviroshield as a demonstration of the effectiveness of the product for dust suppression. The use of a thin coating of fine sand slimes recovered through processing has proven effective at other sites for the management of dust. This method will be tested on a portion of the subsoil and topsoil stockpiles. A water cart and process water hoses will be available for use to control dust in the event that any of these methods prove ineffective.

2.4.5 Dust Measurement

Two continuous optical dust monitors are being considered for installation 1 month ahead of planning mining works to establish general baseline information. One is planned to be located at the nearest receptor, while the second unit will be installed at the existing Kalbar weather station. The current Kalbar Partisol™ measurement device will be re-commissioned and operated in parallel the weather station dust monitor.
The measurement of dust will continue at least 1 month past the works completion.

2.4.6 Heritage places

Andrew Long and Associates (ALA) has performed a Cultural Heritage Assessment of the area proposed for the demonstration pit and has assessed the proposed demonstration pit site as part of the EES for the Fingerboards Project. As the areas required for mining activities have been subjected to significant ground disturbance during the areas previous use as a council gravel pit ALA's assessment is that a CHMP is not required. Aboriginal Victoria representatives have reviewed the assessment and accepted ALA's assessment of the area. A chance finds procedure (Appendix E) will be implemented during the project to guide operational activities in the unlikely event that heritage materials are encountered.

2.4.7 Flora and fauna

The site layout has been designed to avoid, to the extent practicable, clearing of native vegetation, in particular the large patch of Valley Grassy Woodland (EVC 47) that lies to the south and east of the proposed works area, which has been classified as 'high quality habitat' and the patch of Plains Grassy Forest to the east/ northeast of the proposed demonstration pit, which has been classified as 'low quality habitat' (EHP, 2020).

Implementation of the demonstration pit would impact on one 'scattered small tree' (Tree number 343, a White Stringybark (*Eucalyptus globoidea*) with a diameter at breast height of approximately 44 cm and one patch of poor quality aquatic herbland with an extent of approximately 100 m2 (Figure 2-6). *E globoidea* (Figure 2-32) is not listed as a threatened species under the *Flora and Fauna Guarantee Act 1988* and does not appear in the *Advisory List of Rare or Threatened Plants in Victoria* (DSE, 2014).

The tree has a circumference (DBH) of ~44cm and using the NVIM tool equates to a general offset of 0.029 habitat units. The aquatic herd land occupies an area of 0.01 Ha and equates to a general offset of 0.004 habitat units. An offset of equivalent value is readily available on the market if required.

Figure 2-32: Tree number 343

Targeted surveys for nationally significant flora species (i.e. Swamp Everlasting, *Xerochrysum palustre* and Dwarf Kerrawang, *Commersonia prostrata*) were undertaken across the Retention Licence in all potentially suitable habitat, including the small modified areas of Aquatic Herbland. Qualified botanists undertook targeted surveys (at five metre intervals) in areas of potentially suitable habitat at a time when detection was the highest (i.e. during the species' flowering period). Neither species was detected.

No significant fauna have been observed within the proposed demonstration pit works area. The nearest observation of significant fauna was a recording of a Yellow- bellied Sheathtail Bat, *Saccolaimus flaviventris*, at an Anabat monitoring site positioned in a patch of good quality Valley Grassy Forest in Perry Gully, approximately 250 m east of the proposed demonstration pit (**Error! Reference source not found.**). The Yellow-bellied Sheathtail Bat is a hollow-roosting species listed under the FFG Act and classified as 'Near Threatened' on the Victorian Advisory List. The species is a rare visitor to Victoria and those recorded in the Fingerboards area were considered to be migrant – or possibly vagrant – individuals (EHP, 2020).

2.4.8 Surface Water

No registered waterways will be directly impacted by project implementation. A drainage bund will be established along the downstream perimeter of the proposed demonstration pit works area (Figure 2-20) to control surface water runoff from stockpiles and disturbed areas. The amount of water to be intercepted by the perimeter drainage bund will be small, as the project site is near a minor catchment divide and there is very little catchment area upstream of the site. Any surface water runoff intercepted by perimeter drainage bund will either be:

- directed to the pit void, where it will report to the in-pit sumps and then be recovered via the proposed underdrainage system, or

- directed to sediment traps where water will be temporarily retained, allowing sediment to drop out before the runoff flows into the natural drainage system.

The drainage system has been designed to prevent surface flow draining towards the existing tunnel erosion feature along Perry Gully.

The planned works was provided to the East Gippsland Catchment Authority (EGCA). On review, and coupled with the fact that there is no planned surface discharge, EGCA concluded that their involvement was not required and the assessment falls to ERR.

2.4.9 Ground Water

To minimise the impacts of the planned works on the ground water levels and/or quality, the following design and operating features have been adopted:

1. An underdrainage system will be installed within the base of the pit to maximise the recovery of water that drains from the wet backfill process.
2. Surface water pumps will be used to recover any water that presents to the surface of the wet backfill.
3. Fresh water will be used within the process plant.
4. Small volumes of process residue backfill will be placed.

The ground water levels in the area of the proposed pit is nominally 40mRL. The base of the pit will finish at 94 mRL, therefore there is a 54m separation of the two.

Taking into account the planned design and operating features coupled with the high separation from the standing ground water, no measurable or material impact on the ground water is expected through the planned works.

To ensure that there is no lateral movement of water from the wet backfill process impacting on the eroded area, a monitoring bore will be installed between the pit wall and the erosion area.

The planned works were presented to Southern Rural Water (SRW). No concerns with respect to the planned project works were raised.

2.4.10 Municipal infrastructure and other public assets

The location of public infrastructure relative to the proposed demonstration pit is shown in Figure 2-19. No municipal infrastructure or other public assets lie within the geotechnical risk zone (Figure 2-20).

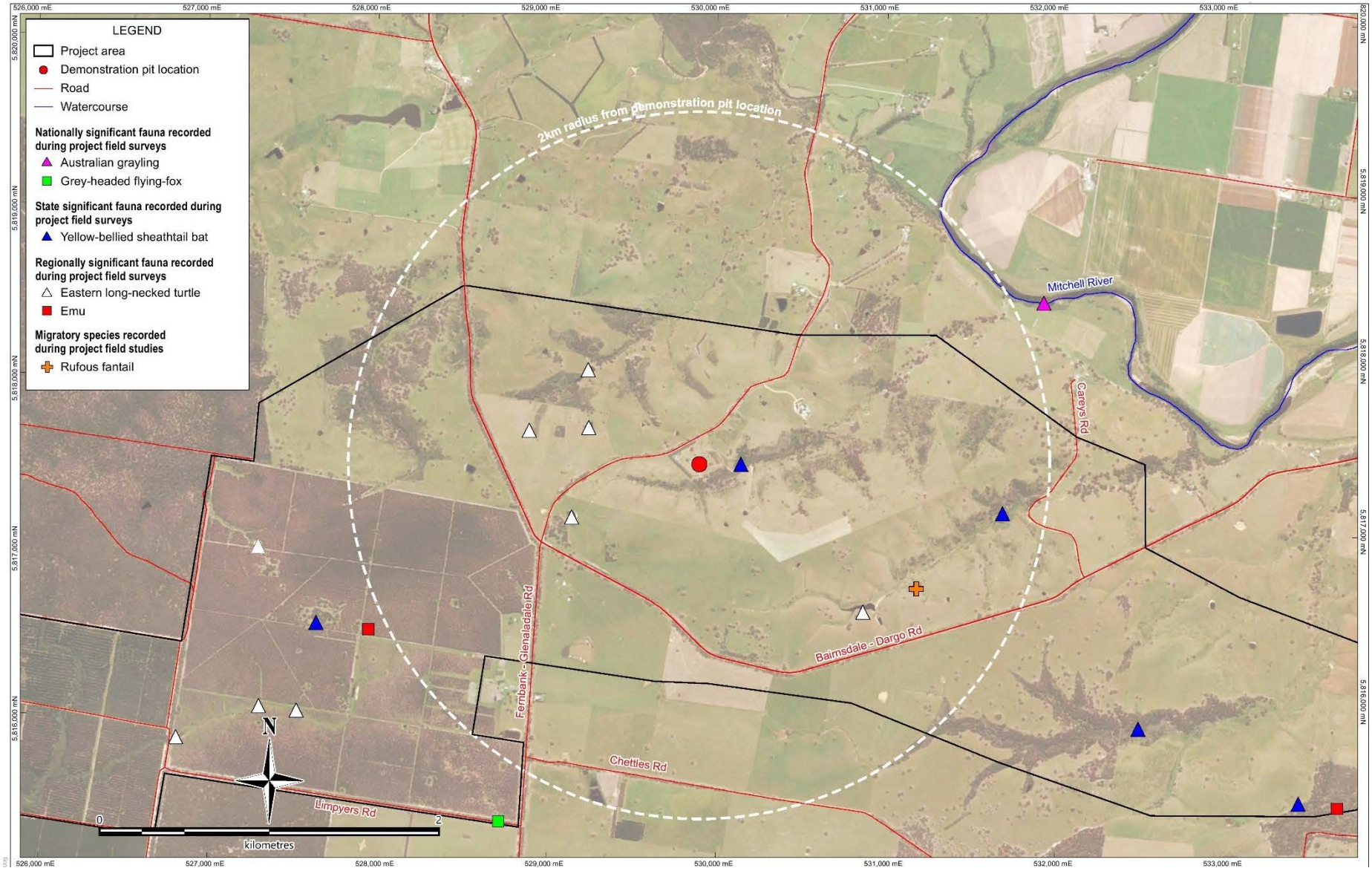


Figure 2-33: Significant fauna recorded in project locality

3 EXPLORATION HAZARDS AND RISK ASSESSMENT

3.1 Risk identification

A systematic listing of risks identified during the preparation of the Demonstration Pit was reviewed by the Kalbar development team, in consultation with technical specialists advising on the design of the mining and rehabilitation trial. The consequence definitions, likelihood definitions and risk matrix adopted for the risk assessment were consistent with those recommended in ERR's *Guideline for Mineral Exploration Projects: Preparation of Work Plans and Work Plan Variations*, Version 1.2,

Forty-five risk elements were identified as relevant to the trial. Each risk event was considered in the context of the trial project setting, taking into consideration the proposed scale and duration of trial activities. After initially rating inherent likelihoods and consequences of each risk event, given the proposed 'standard' mitigation measures, each risk element was reconsidered to see if additional mitigation actions were warranted or possible. Results of the risk assessment are presented in Appendix C.

3.2 Assessment of inherent and residual risks

The assessment of inherent risk identified 10 risk events with 'medium' risk ratings. Application of further mitigation measures reduced this number to 3 residual risk events with a rating of medium (Figure 3-1). The were no inherently 'high' or 'very high' risk events. Details are provided in Table 3-1 and in Appendix C.

The three medium residual risk events are:

- Community anxiety occasioned by mistaken view that trial pit activities represent the commencement of the full scale Fingerboards project;
- Injury to member of public or project personnel as a result of unauthorised entry to works area; and
- Disturbance of previously unidentified Aboriginal cultural heritage artefact or site.

Kalbar has identified mitigation actions to reduce these and other risks to as low as practicable.

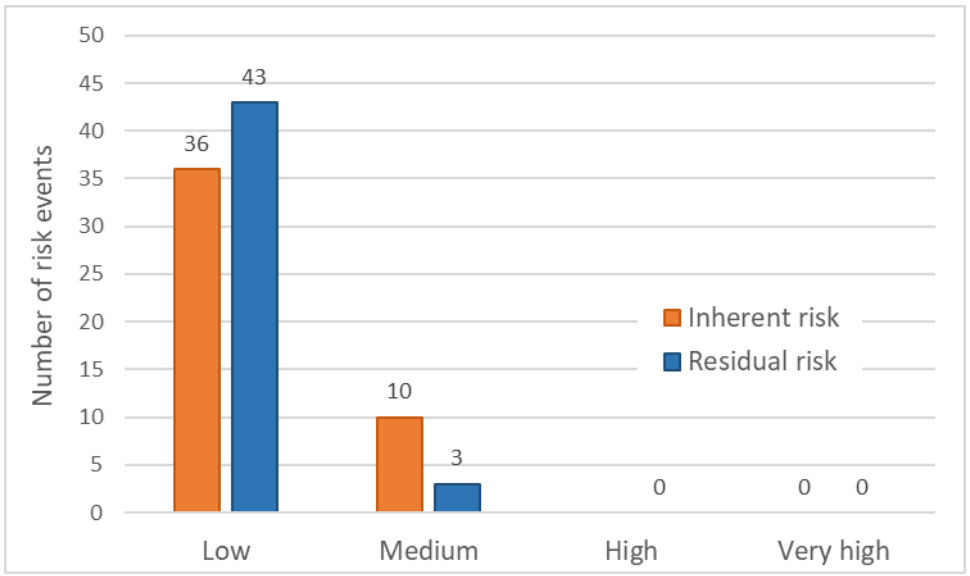


Figure 3-1: Inherent and residual risks – demonstration project

Table 3-1: Summary of inherent and residual risk ratings

Hazard	Inherent risk rating			Residual		
	Low	Medium	High	Low	Medium	High
Disturbed air quality	4	1	0	5	0	0
Noise pollution	2	0	0	2	0	0
Biodiversity disturbance	7	1	0	8	0	0
Erosion and sedimentation	5	1	0	6	0	0
Hazardous materials and wastes	4	0	0	4	0	0
Non-process wastes	1	0	0	1	0	0
Altered visual amenity	2	0	0	2	0	0
Rehabilitation failure	5	2	0	7	0	0
Geotechnical	4	1	0	5	0	0
Heritage	0	2	0	1	1	0
Land access	2	2	0	2	2	0

3.3 Risk avoidance, minimisation and management

Proposed measures to avoid, minimise and manage risks during the implementation of the demonstration pit project are described in the Risk Management Plan (Appendix C). The Risk Management Plan is supported by the following risk treatment plans, copies of which are provided in Appendix C:

- Land access risk treatment plan
- Noise risk treatment plan
- Air quality risk treatment plan
- Tailings management plan
- Ground control management plan
- Fire risk treatment plan

Rehabilitation risks are addressed in the Rehabilitation Plan (Appendix D). Risks related to community perception are addressed in the Community Engagement Plan (Appendix B). A chance finds procedure addressing the actions to be taken in the event that cultural heritage material is encountered in the course of implementing the demonstration project is provided in Appendix E.

4 COMMUNITY ENGAGEMENT

A key aspect of the project is demonstrating Kalbar's ability to manage project impacts on the environment and to protect the amenity on neighbouring properties. The demonstration project also provides an opportunity to test the effectiveness of Kalbar's stakeholder communications systems. A Community Engagement Plan has been developed for the demonstration pit project and is attached as Appendix B of this work plan.

4.1 Stakeholder identification

The key stakeholders with potential interests in the demonstration pit project are listed in Table 4-1.

Table 4-1: Stakeholder identification and level of engagement

Identified Community	Stakeholders	Level of Engagement
Community of Place		
Community Member(s)	▪ Landholder where exploration activities are proposed to be undertaken.	Inform/Consult/Involve
	▪ Landholders in close proximity to the proposed exploration activities.	Inform/Consult
	▪ Residents of communities in surrounding area.	Inform
Groundwater and Surface Water Management	▪ Southern Rural Water ▪ EGCA	Inform/Consult/Involve
Community of Interest		
Local business/ industry	▪ Horticultural Growers ▪ Suppliers ▪ Service Providers	Inform
Local media	▪ Print and Social media	Inform
Community and Interest Groups	▪ MFG ▪ Local Schools ▪ Community groups	Inform/Involve
Community of Standing		
Victorian State Government	▪ Earth Resources Regulation ▪ Environmental Protection Authority ▪ Department of Environment, Land, Water and Planning (DELWP) ▪ State Ministers	Inform/Consult/Involve/ Collaborate
Water Catchment Authorities	▪ EGCA	Inform/Consult/Involve/ Collaborate
Special Interest Groups	▪ Environmental Group	Inform/Consult/Involve/ Collaborate
Emergency Services	▪ Victoria police ▪ Country Fire Authority Victoria ▪ Ambulance	Inform/ Consult
Local Government	▪ EGSC	Inform/ Consult/ Involve Collaborate
Local Indigenous Groups	▪ GlaWac	Inform/Consult/Involve/ Collaborate

4.2 Stakeholder expectations and concerns

Engagement undertaken for the Fingerboards Environment Effects Statement (EES) has given Kalbar insight into potential stakeholder issues or concerns that will be associated with the demonstration pit. Table 4-2 provides a list of key issues and potential concerns identified through initial consultation with stakeholders.

Table 4-2: Summary of stakeholder concerns

Issue	Description
Air quality	Issues and risks associated with dust emissions, including the potential for impacts on surrounding agriculture and human health.
Flora & fauna	Issues associated with loss of vegetation, and potential impacts on rare and threatened flora and fauna species.
Hazardous wastes	Issues associated with the potential for impacts on surface and ground water in the area.
Rehabilitation	Issues associated with the return of the land to agricultural use and the potential risks of rehabilitation not being completed or carried out to acceptable standards.
Noise	Issues associated with the emission of noise from the project site and the potential impacts on local residents.
Visual amenity	Potential visual landscape impacts of the project. Light noise from the works.
Indigenous culture & heritage	Cultural awareness, artefacts and opportunities for Indigenous people.

4.3 Potential impacts

Potential impacts of implementing the demonstration project and likely stakeholder concerns about impacts are summarised in Table 4-3.

4.4 Managing complaints and other feedback

Complaints are managed according to the procedure described in the Community Engagement Plan (Appendix B). Feedback from the community in relation to the exploration activities is collected and documented via many mechanisms, including, but not limited to:

- Direct contact with Community at meetings or events.
- Provision of phone number – for business hours contact
- Provision of community email for direct contact
- Contact via the social media Facebook page.
- Via community information meetings feedback forms.
- Personal visits to local residents

A project update will be provided to ERR at the close of each month during the period of the works. The report will detail the progress of the works and report on community complaints or issues raised and any mitigation steps that were required.

4.5 Engagement processes and timeline

Table 4-3 summarises the potential impacts of implementing the demonstration project on a range of stakeholders. The table describes for each of the identified stakeholders how and when Kalbar would communicate on matters of concern to the stakeholder. Additional information on Kalbar's proposed stakeholder engagement activities for the demonstration project is presented in the Community Engagement Plan (Appendix B of this work plan).

Table 4-3: Timeline for stakeholder engagement – demonstration project

Identified Community	Issues / potential impacts	Engagement Strategy	Method	Timing
Community of Place				
Landholder affected by proposed exploration activities (landowner).	▪ Access ▪ Biosecurity ▪ Groundwater contamination ▪ Surface water contamination ▪ Security ▪ Livestock interactions ▪ Noise ▪ Dust ▪ Rehabilitation	▪ Ensure landholder is aware of proposed plans and consent is obtained for access. ▪ Ensure landholder is aware of any impacts associated with the works. ▪ Provide opportunity for views and develop change plans based on their input.	One on one Meetings Direct communication	▪ Access agreement established as part of workplan submission ▪ Planning phase prior to workplan submission. ▪ Ongoing throughout program
Community members Landholders in close proximity to the works	▪ Noise ▪ Dust ▪ Light impacts ▪ Traffic	▪ Ensure landholders are aware of proposed plans. ▪ Ensure landholders are aware of any environmental/social impacts.	Meetings Information papers Direct Communication Advertising Letter drops	▪ Planning phase prior to program commencement ▪ Ongoing throughout program via updates or specific event notification.
Community members Residents of communities in surrounding area	▪ General interest	▪ Ensure community members are aware of proposed plans.	Information Sessions Advertising Media Website	▪ Planning phase prior to program commencement ▪ Ongoing throughout program
Groundwater and surface water management groups	▪ Groundwater contamination ▪ Surface water contamination	▪ Ensure groups are aware of proposed plans and any environment/social impacts.	Meetings Presentations. Site review.	▪ Workplan submission phase. ▪ Invitational site inspections. ▪ At project completion.
Community of Interest				
Local public service providers and voluntary services (CFA, SES, Police, Ambulance)	▪ Emergency service provision	▪ Ensure stakeholders are provided with general information on proposed project.	Direct communication Publicly Available Information Advertising	▪ Planning phase prior to program commencement. ▪ Notification of intended start date.
Local business/ industry	▪ General interest	▪ Ensure stakeholders are provided with general information on proposed project.	Information Sessions Advertising Media Website	▪ Planning phase prior to program commencement.

Identified Community	Issues / potential impacts	Engagement Strategy	Method	Timing
Local media	• Community attitude ▪ Environmental & social impacts	▪ Ensure stakeholders are provided with general information on proposed project.	Direct communication	▪ Planning phase prior to program commencement.
Community and Interest Groups	▪ Native Vegetation ▪ Threatened species ▪ Jobs ▪ General Interest ▪ Education	▪ Ensure stakeholders are provided with general information on proposed project, including environmental and social impacts.	Information Sessions Advertising Media Website	▪ Planning phase prior to program commencement.
Community of Standing				
Victorian State Government ▪ Earth Resources Regulation ▪ Environmental Protection Authority ▪ Department of Environment, Land, Water and Planning (DELWP) Local Council	▪ Approvals and associated risk management of project. ▪ Environmental performance – air, water, waste etc. ▪ Project progress and rehabilitation performance.	▪ Ensure key regulators are aware of risk assessment and risk management for proposed exploration. ▪ Ensure key stakeholders are aware of proposed plan, approval processes and areas for involvement. ▪ Provide a monthly update on project progress through the period of activities.	Group meetings Direct communication Invitation sessions Monthly summary report. Project close out report.	▪ Workplan submission phase. ▪ Ongoing throughout program. ▪ At month end during completion of the works.
Water Catchment Authorities SRW, EGCA	▪ Groundwater contamination ▪ Groundwater level alteration ▪ Surface water Contamination	▪ Ensure key stakeholders are aware of proposed plan, approval processes and areas for involvement.	Group meetings Collaborative engagement sessions Direct communication	▪ Workplan submission phase. ▪ Ongoing throughout program.
Indigenous Groups GlaWac	▪ Impacts to land and areas of high cultural sensitivity	▪ Ensure all indigenous groups are aware of proposed program. ▪ Ensure Traditional Owners are provided with opportunity to be involved in cultural heritage sensitivity analysis, site surveys and CH protection plans.	One on one meetings Group meetings Direct communication Invitational sessions	▪ Workplan submission phase. ▪ Ongoing throughout program.
Special Interest Groups Environmental Groups	▪ Environmental impacts ▪ Vegetation Clearance ▪ Threatened species & habitat ▪ Education	▪ Ensure key stakeholders are aware of proposed plans for exploration, timelines and approval processes.	Information sessions	▪ During program of works and at the completion of the program.

Identified Community	Issues / potential impacts	Engagement Strategy	Method	Timing
Local Shire Council	▪ Planning & land manager approvals.	▪ Ensure key stakeholders are aware of proposed plans for exploration, timelines and approval processes where input may be required.	Group meetings One on One meetings Direct communication Invitational sessions	▪ Workplan submission phase. ▪ Ongoing throughout program. ▪ Project close out report.

5 REHABILITATION

This section provides a high-level overview of the rehabilitation activities proposed in connection with the Fingerboards demonstration project. More information is provided in the Rehabilitation Plan (Appendix D of this work plan).

5.1 Pit Void

The rehabilitation process of the pit void will occur as soon as practicable following the placement of the various types of backfill. At the surface, cells will be created in the HHF backfill to accommodate three distinct manufactured subsoils with sand to slimes ratios of 3.5:1, 2:1 and 1:1. There will also be local Haunted Hill Formation subsoil zones within the pit void area (Figure 5-1)

Each of the subsoil profiles will undergo different combinations of amendments and fertilisation. Half of each subsoil treatment zone will be capped with the native topsoil recovered from the area (and potentially supplemented with topsoil recovered from an external source), while the remaining half will be topped with constructed topsoil (refer Section 5.2). Specific zones will then undergo +/- fertilization as another point of comparison. The following figures 5-1, 5-2 and 5-3, graphically illustrate the general plan.

In essence, 40 different plots will be created with varying subsoil, top soil and fertiliser regimes. The performance of each plot can then be monitored and evaluated to support and optimise future rehabilitation methods.

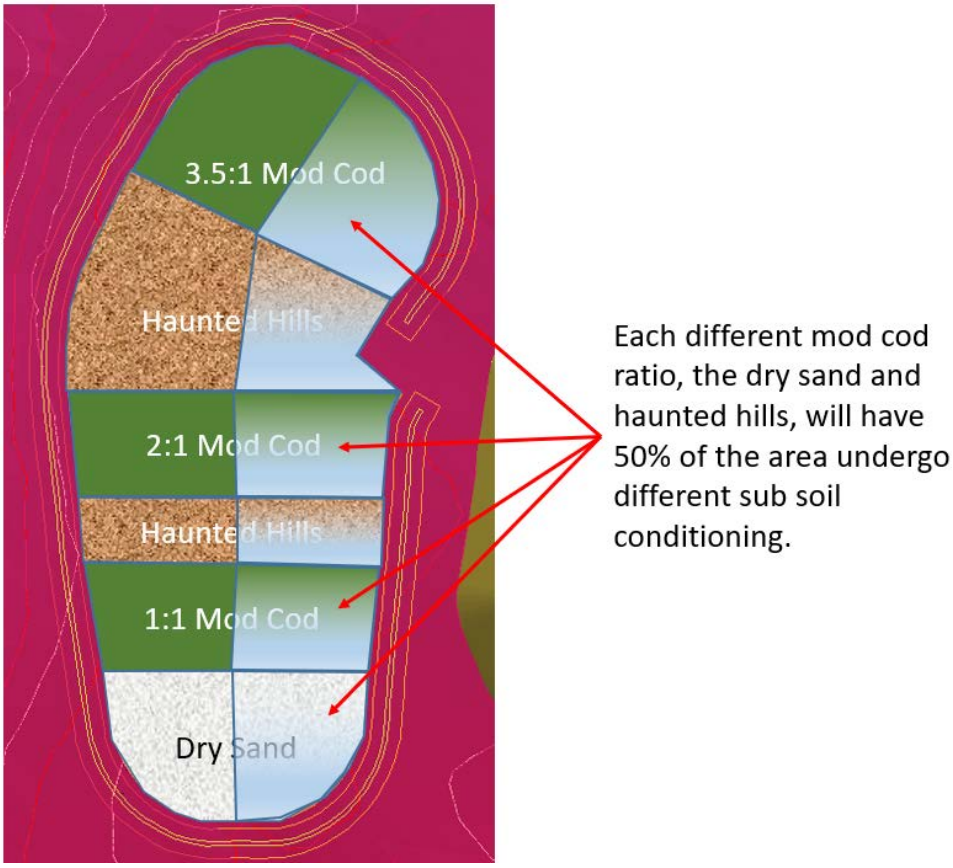


Figure 5-1: Pit void plan view showing the various manufactured subsoil zones.

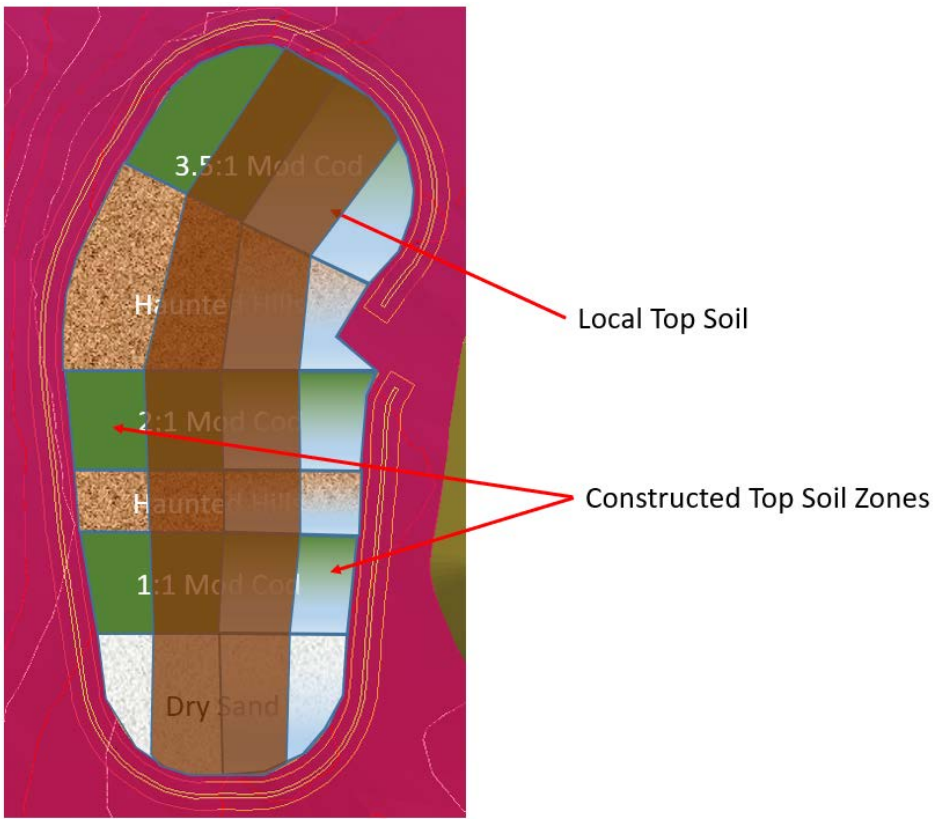


Figure 5-2: Top soil application to the pit void area

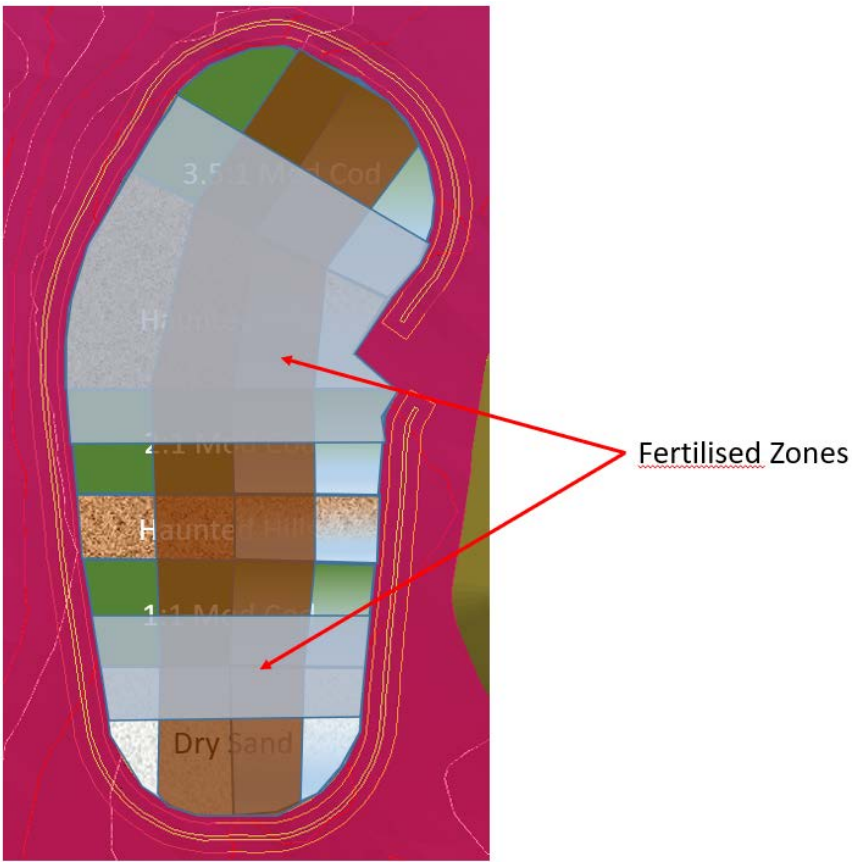


Figure 5-3: Fertilised zones of the pit void area.

5.2 Sub Soil Creation

Preliminary rehabilitation trials have shown that sub soils created from mined materials are potentially superior (in terms of physical properties, such as retention of plant available water) to existing natural substrates. Additionally (or alternatively), it may be possible to mix process plant residues with Haunted Hills Formation material to improve its physical properties and lessen its susceptibility to erosion.

5.3 Topsoil Stockpile Footprint

Following the removal of the stockpiled topsoil, the existing topsoil base will be conditioned with gypsum then shallow ripped, harrowed and seeded with pasture mixes.

5.4 Subsoil Stockpile Footprint

Following the removal of the stockpiled subsoil, the strip surface will be conditioned with gypsum then capped with a nominal 100 layer of topsoil. The topsoil will be further conditioned with gypsum and fertilizer. It will then undergo shallow ripping, harrowing and seeded with pasture mixes.

5.5 Overburden Stockpile Footprint

Following the removal of all the overburden, existing subsoil base will be conditioned with gypsum and then capped with a nominal 100 layer of subsoil and then a 100mm layer of topsoil. The topsoil will be further conditioned with gypsum and fertilizer. It will then undergo shallow ripping, harrowing and seeded with pasture mixes.

5.6 Post-rehabilitation monitoring and maintenance

Once topsoil surfaces are laid and climatic conditions are suitable, all treatment zones will be seeded with a blended pasture mix (consisting of rye grass, cocksfoot and legumes). If required, supplementary watering of the rehabilitated areas will be undertaken (water cart or similar).

Plant growth dynamics and erosion characteristics on rehabilitation treatments will be monitored for up to 18 months. Flora focused monitoring (e.g. seedling emergence, seedling/plant number, biomass, cover, species identity) will be used to determine if vegetation establishment has been successful.

Soil moisture monitoring will be conducted to aid in correlating subsoil moisture contents with plant growth and external environmental factors.

Weed control, stock abatement, regrowth monitoring and assessment will be implemented after vegetation has been established.

Ultimately the demonstration area resides within the planned mining footprint and will be re-mined with 12-24 months of the completion of the exploration works. Notwithstanding the planned remining of the area, Kalbar proposes to re-establish pasture on the disturbed land to satisfy land owner requirements and to inform its rehabilitation planning for the full-scale Fingerboards project.

6 REFERENCES

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