

EPC 1233

Vulcan South: Initial Development Plan

May 2022

Prepared by: Vitrinite Resource Team

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1 DOCUMENT DESCRIPTION

Report to:		Vitrinite Pty Ltd
Report on:		VULCAN SOUTH PROJECT
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Table of Contents

1	DOCUMENT DESCRIPTION	2
2	LEGISLATION CHECKLIST	6
3	INTRODUCTION.....	8
4	DESCRIPTION OF PROPOSED ACTIVITIES.....	10
5	RESOURCES AND RESERVES	15
6	RESOURCE RECOVERY	19
7	APPENDIX A – YEARLY STAGE PLANS.....	20
8	APPENDIX B – VULCAN GEOLOGY	25
9	APPENDIX C LAND SURVEY	26



List of Figures

Figure 1. Vulcan Mine Extension ML Application	9
Figure 2. Vulcan Water Management.....	11
Figure 3. Yearly opencut mining targets	13
Figure 4 Vulcan Mine Extension Annualized Mine Plan	18
Figure 5 VME Construction Year 1.....	20
Figure 6 VME Construction Year 2.....	21
Figure 7 VME Mining Year 1	22
Figure 8 VME Mining Year 2	23
Figure 9 VME Mining Year 1	24
Figure 10 Vulcan General Geology	25
Figure 11 Land Survey	26



List of Tables

Table 1 Summary of Activities	14
Table 2 JORC Resource Vulcan Mine Complex	16
Table 3 Vulcan Drilling Program	18



2 Legislation checklist

<i>Document</i>	<i>Section (MR Act)</i>	<i>Requirement</i>	<i>Section</i>
Initial Development Plan	s.318DT(1)(a)	An overview if the activities proposed to be carried out under the proposed mining lease during all of its proposed term.	4
	s.318DT(1)(b)	For each year of the plan period – all the information relating to (1)(b) must be shown on a year-by-year basis.	Appendix A
	s.318DT(1)(b)(i)	The nature and extent of activities proposed to be carried out under the proposed mining lease during the year	4
	s.318DT(1)(b)(ii)	Where activities are proposed to be carried out.	4
	sS.318DT(1)(c)	For each mineral the applicant proposes to mine under the proposed mining lease – the mineral to be “mined” may include both coal and coal seam gas.	5
	s.318DT(1)(c)(i)	The location and an estimate of the resources of the mineral in all of the area, or proposed area, of the proposed mining lease.	5 and Appendix B
	s.318DT(1)(c)(ii)	The standards and procedures used to make the estimate.	4.
	s.318DT(1)(c)(iii)	The rate and amount of the proposed mining.	4
	s.318DT(1)(c)(iv)	Approximately when the proposed mining is to start	4
	s.318DT(1)(c)(v)	A schedule for the proposed mining during the plan period.	Figure 4
	s.318DT(d)	Maps that show the matters mentioned in paragraphs 318DT(b) and (c)(i), (iii) and (iv)	
	s.318DT(1)(e)	Any other information relevant to the criteria mentioned in section 318EF: Whether the mining of minerals that, under section 234, are sought to be specified in the lease will be optimised in the best interests of the State, having regard to the public interest the CSG assessment criteria (see section 318AP(2)).	
	s.318DT(1)(f)	Reasons why the plan is considered appropriate.	4
	s.318DT(1)(g)	Another matter prescribed under a regulation.	
	318DU	The proposed plan must state its period. The period must not be longer than	3



		<p>if the term sought for the mining lease is less than 5 years from the granting of the mining lease—the term of the mining lease; or</p> <p>if the term sought for the mining lease is 5 years or more—5 years from the start of the term</p>	
	s.318DV	<p>The proposed plan must include a statement of how the effects on, and the interests of, any relevant overlapping or adjacent petroleum tenure holder have, or have not, been considered having regard to – the main purposes of chapter 8.</p> <p>The CSG assessment criteria, other than the initial development plan requirements.</p>	
	s.318DW	<p>The activities provided for under the proposed plan must seek to optimise the use of incidental coal seam gas in a safe and efficient way if it is commercially and technically feasible to do so.</p>	
	s.318DW	<p>If all or part of the land in the area of the proposed mining lease is in the area of a petroleum lease (the relevant land), the proposed plan must, to the extent it applies to the relevant land, be consistent with –</p> <p>The development plan for the petroleum lease; and</p> <p>Any coordination arrangement relating to the relevant land.</p>	



3 Introduction

The Vulcan mine complex (Vulcan South) consists of Exploration Permits for Coal (EPCs) 1732, 1234, 1233 and Prospecting Permits (PPs) 100714, 100715, 100718 and 100719 which adjoins Vitrinite's ML 700060 in Queensland's Bowen Basin. These tenements are located in central Queensland on the western side of BMA Saraji mine and BMA Peak Downs mine, approximately 45km from Dysart. Mining at Vulcan South will commence following exhaustion of reserves in ML 700060 when the excavator fleet will transition to the Vulcan pits, however construction for MIA and mining infrastructure will commence prior to mining activities. Vulcan South will utilise two primary excavator fleets (400t class which will relocate from ML 700060 and the introduction of a 600t fleet) for waste mining and a dedicated coaling fleet. In addition to conventional open cut methods, highwall mining will occur in the north of the Vulcan South project on outcropped seams in the Mesa Hilltops.

Exploration and mining assessment work has been ongoing since Vitrinite acquired the EPCs and mining in the open pits will commence from outcrop in the west to the Saraji road and rail corridor for Aurizon in the east. Whilst numerous coal seams have been identified in the exploration drilling, the primary target seams are the sub cropped Alex, Dysart Lower seams and the Matilda Seam. These seams, in the Moranbah Coal Measures, are primarily a premium-hard coking coal with a secondary thermal product. The Alex seam is contained only within one of the proposed open pits.

The mine plan focuses on conventional open-cut mining with truck and shovel targeting the basal seam of Dysart Lower. There are three (3) pits which are constrained by geology (faulting) or physical barriers (Saraji Road and Aurizon rail easement). The pits are mined from north to south and named Vulcan North, Vulcan Main and Vulcan South. The lowwall will be defined through line of oxidisation (LOX) drilling to determine the western extent and will follow down dip to a 35m offset from the Aurizon rail corridor. This is not the economic cut-off but a boundary limit due to interaction with key stakeholders. The mineable reserves equate to 13.3 MT of ROM coal over 8 years. Additionally, highwall mining consisting of 750 kT of Dysart Lower and Matilda seam coal will be conducted in the Mesa Hilltops.

Further project development is now contingent on acquiring a mining lease over the Vulcan South Project area. This Proposed Initial Development Plan (IDP) describes the development of the Vulcan South for the first 5 years of mining (plan period) including the Vulcan mining industrial area (MIA) and commencement of mining in Vulcan North and Vulcan Main pits) and contains all relevant information to support the mining lease application. The ML application area can be seen in the below Figure 1. The mining lease duration applied for is for 15 years, of which 8 years will consist of production mining activities. The remaining term of the lease is for construction, rehabilitation, monitoring and mine closure.

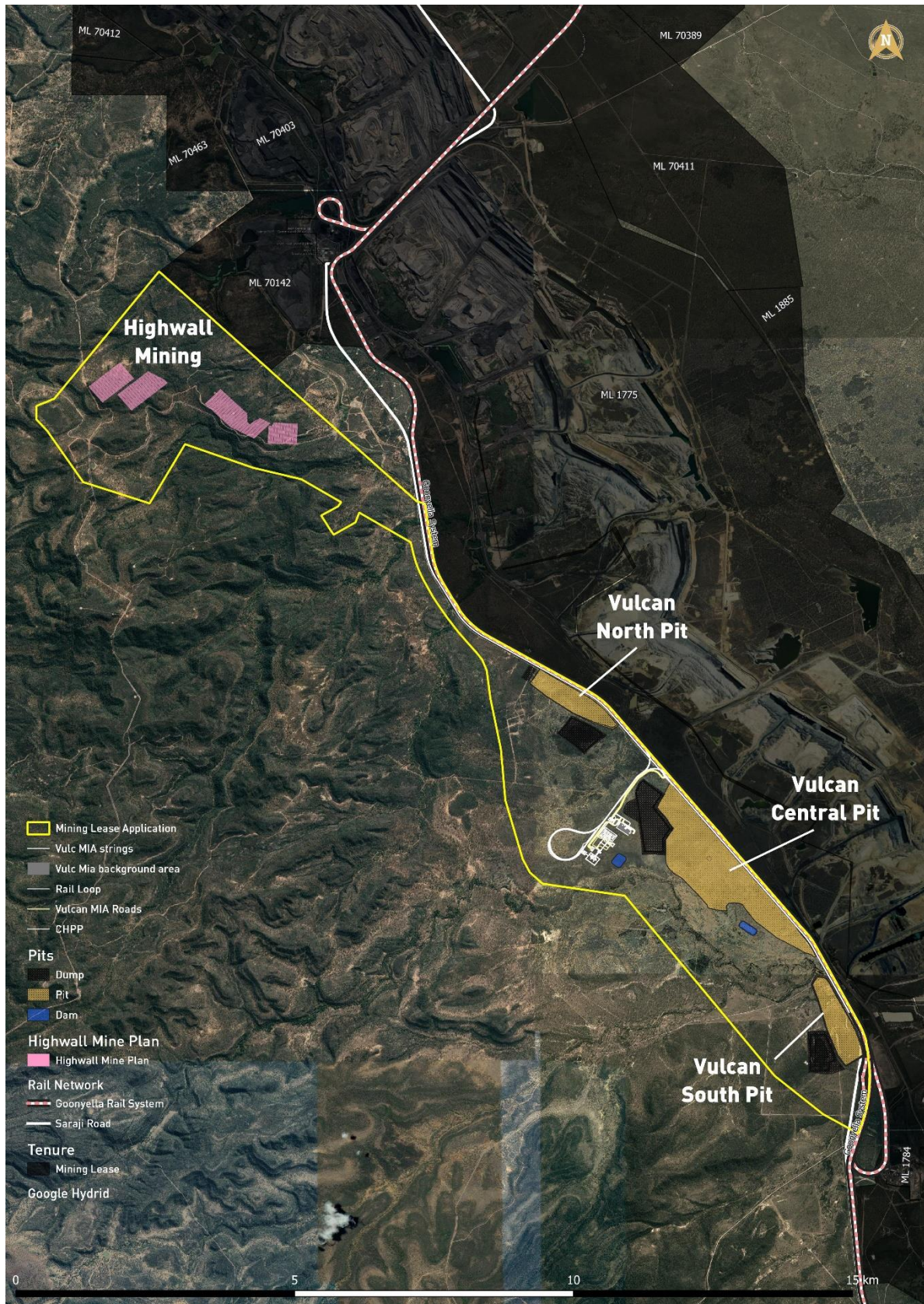


Figure 1. Vulcan Mine Extension ML Application



4 Description of proposed activities

Prior to full scale operations, construction of key infrastructure will take place. The intent of the Vulcan South Project is to provide the necessary cash flow required to fund the construction of permanent infrastructure consisting of a rail loop and wash plant for the MIA. For the first two years, activities will be focused on the establishment of site facilities and infrastructure which include:

- Construction of the MIA inclusive of site facilities;
- Construction and connection of Vulcan stub line power infrastructure to Ergon network;
- Construction of surface water management infrastructure;
- Construction of the Vulcan Coal Handling Preparation Plant (CHPP); and
- Construction of the Vulcan rail loop and train load out (TLO) facility

During operations, Vulcan South coal will be processed on site with reject co-disposal hauled backed in pit.

Highwall mining of outcropped Dysart Lower and Matilda Seams in the north of the project area will be conducted. This utilises a side cut to create a stable entry and pad for the highwall mining machine which will then extract resources through the exposed seams.

The proposed fleet comprises:

- 1x 400t class excavator
- 1x 600t class excavator
- 2x small coal clean-up excavators
- 4 x 90t mine trucks
- 5 x 180t mine trucks;
- 4 x 200-220t mine trucks
- 2 x D10 dozers;
- 2x D11 dozers
- 3 x grader;
- 3 x water truck;
- 2 x drill rigs;
- 2 x service truck;
- 1x Highwall mining unit and ancillary support equipment.

Following completion of construction of the MIA and site facilities, mining will then commence in the northern Vulcan pit. The pit will comprise of one expit dump with the remaining dumping to be in pit. The internal haul road network will link up to the MIA and wash plant facilities. A levee for flood mitigation will be created on the southern end of the pit. This will occur during the initial two years of construction as well as initial topsoil clearing and stacking for the commencement of operations in the pit. Full locations of levees, can be seen in Figure 2.

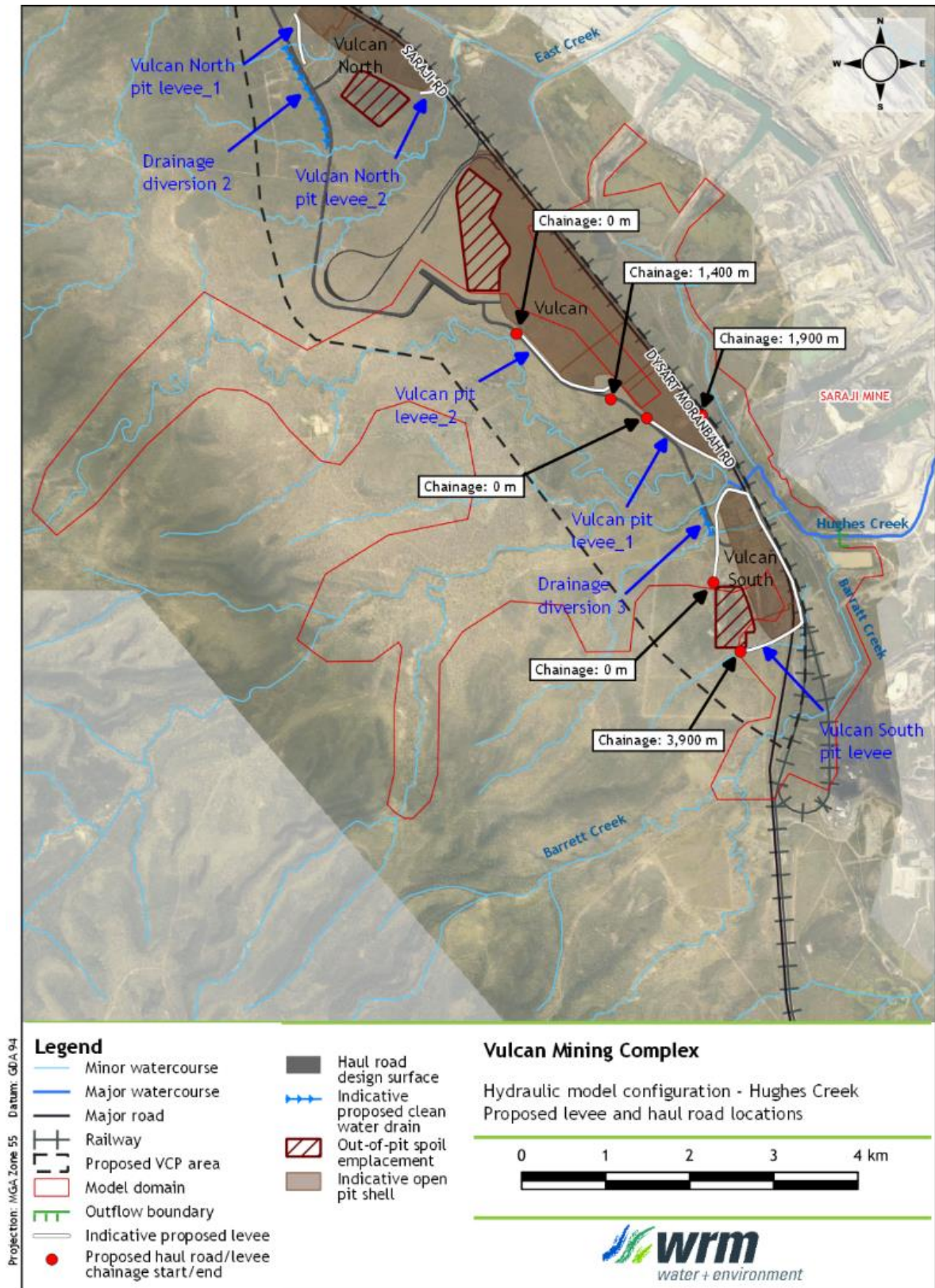


Figure 2. Vulcan Water Management

During year two, as per these images in Appendix A, mining will commence at Vulcan North pit at the completion of the construction phase. Year two will largely encompass the creation of the expit dump and commencement of mining in a northerly direction, limited on the west by the barrier limit of Saraji road and the Aurizon rail corridor. Mining will be a combination of truck and shovel and blasting. Operations will also continue to clear and grub and



topsoil strip the remaining pit limits to the north. Vitrinite will progressively backfill the pit void once the external dump is exhausted and where possible, ensure external dump batters are re-contoured ready for rehabilitation for seasonal efficiency. Dump lifts will be compliant with the final landform requirements under the PRCP. Topsoil stripping for the commencement of Vulcan main pit will start in year two.

Highwall mining will commence in the Mesa Hilltops. The maximum production for this unit is 750 kT per annum, however it is expected this production rate may not be reached during the term of this plan.

In year three, Vulcan North pit will continue with cross dip mining of the Dysart Lower seams through to completion of the available reserves constrained by the pit limits. The mine does not reach an economic cut-off for the open-cut under current financial conditions as it will be constrained by the lease and physical barriers of the road and rail corridor. Rehabilitation will continue on the external dump batters as the dump progresses following the pit void. Year three introduces a second fleet which will commence mining in the Vulcan Main pit. The Alex seam and Dysart Lower seams are targeted in Vulcan Main pit. Topsoil clearing will continue in Vulcan main as this pit progresses south.

Year four will predominantly contain on-site activities of rehabilitation for mine closure in the Vulcan North pit. This will entail completion of the backfilling of the remaining void, recontouring of dumps and establishment of final drainage profiles as required in the surface water impact assessment. Temporary infrastructure will be removed. Vulcan Main pit is continued to the south with the excavator fleet from Vulcan North pit operating in the Vulcan Main pit acting as a prestrip fleet. Progressive rehabilitation on the external dump of Vulcan Main pit will commence once this is fill to completion.

Mining will continue in Vulcan Main pit progressing south to the final pit in Vulcan South. This is outside of the IDP and is incorporated in a later development plan. The target mining areas for the operational opencut are denoted in Figure 3.

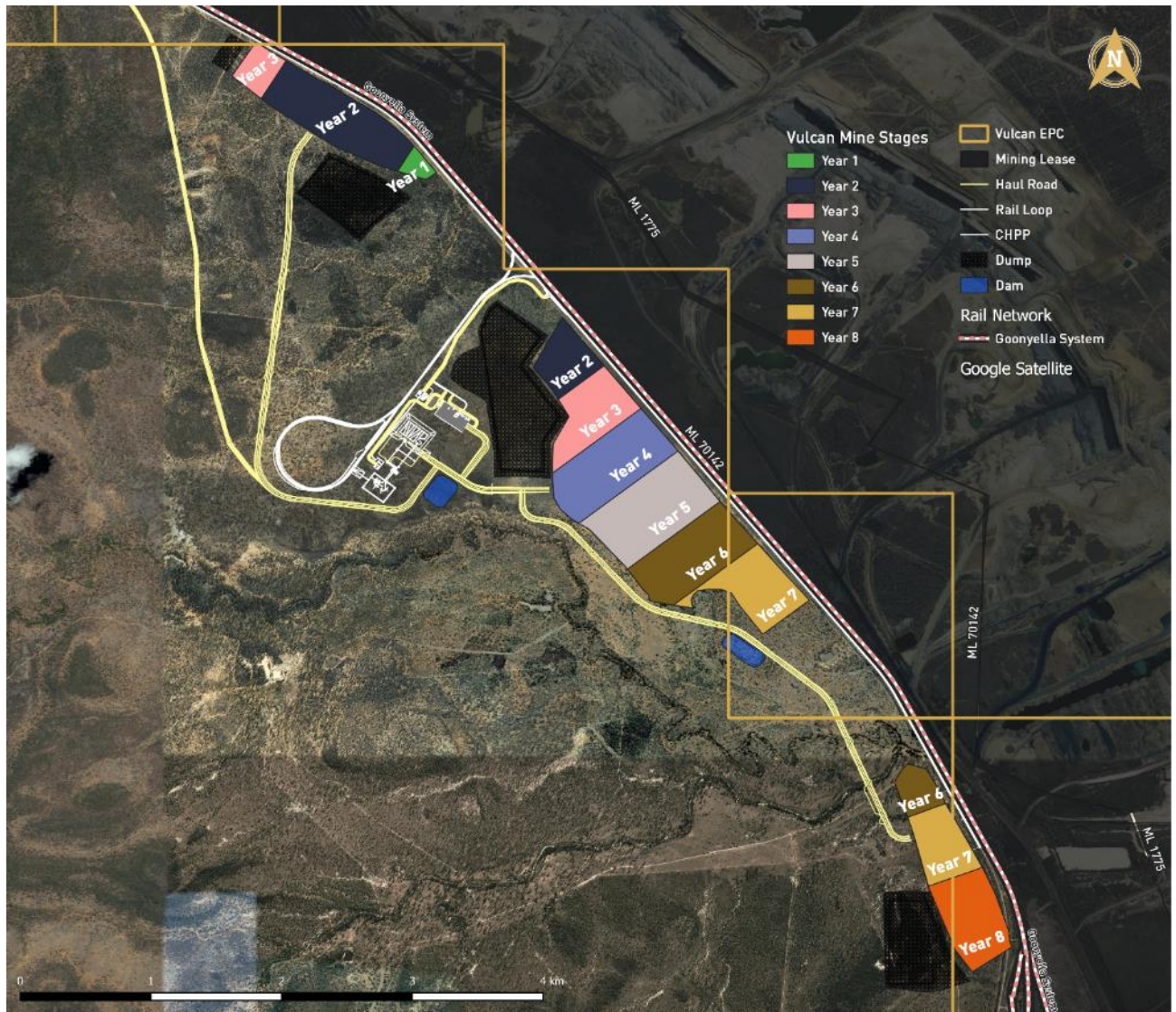


Figure 3. Yearly opencut mining targets

Justification for Term of Proposed Lease

The term for which the Mining Lease will be applied for is fifteen (15) years. This will encompass the mine plans of a maximum of approximately 1.95 MT per year over 8 years. The additional time external to the years directly associated with winning of coal will be utilised for rehabilitation and closure monitoring. The information in this IDP contains the onsite activities for five years with the remaining term for ongoing mining out of resource, rehabilitation and monitoring post closure of the mine to be covered under a Later Development Plan. The duration of the ML also allows for flexibility of the mine plan should unforeseen circumstances delay production while still committing to the required closure plan for the mine.

Planned Activities during the IDP Period

A summary of the activities for duration of the IDP is summarized in the following table (Table 1).



Table 1 Summary of Activities

Year	Activities
0	Construction of VS CHPP Construction of VS rail loop and train load out facility Construction and setup of initial site facilities and MIA
1	Construction of VS CHPP Construction of VS rail loop and train load out facility Construction and setup of initial site facilities and MIA Clearing and establishing life of mine water infrastructure within Vulcan Main pit Construction of levee for Vulcan North pit Clearing and stockpiling of topsoil of external dump extension in Vulcan North pit Clearing and stockpiling of topsoil of required area for pit advance Vulcan North pit
2	Clearing and stockpiling of topsoil of required area for pit advance in Vulcan North pit Commencement mining of waste and Dysart Lower seam with conventional truck and shovel operation in Vulcan North pit Clearing and stockpiling of topsoil of external dump extension in Vulcan Main pit Clearing and stockpiling of topsoil of required area for pit advance Vulcan Main pit Commence trial of highwall mining,
3	Clearing and stockpiling of topsoil of required area for pit advance in Vulcan North pit Continue mining of waste and Dysart Lower seam with conventional truck and shovel operation in Vulcan North pit Commence recontouring of available dump area in Vulcan North pit for progressive rehabilitation Commencement mining of waste, Alex and Dysart Lower seam with conventional truck and shovel operation in Vulcan Main pit Clearing and stockpiling of topsoil of required area for pit advance Vulcan Main pit Commencement of construction of main haul road from MIA to Vulcan South pit
4	Continue mining of waste and Dysart Lower seam with conventional truck and shovel operation in Vulcan North pit Continue recontouring of available dump area in Vulcan North pit for progressive rehabilitation Rehabilitation of the expit dump for Vulcan North pit Continue mining of waste, Alex and Dysart Lower seam with conventional truck and shovel operation in Vulcan Main pit Commence recontouring of available external dump area in Vulcan Main pit for progressive rehabilitation Clearing and stockpiling of topsoil of required area for pit advance Vulcan Main pit Continue construction of main haul road from MIA to Vulcan South pit



5 Resources and Reserves

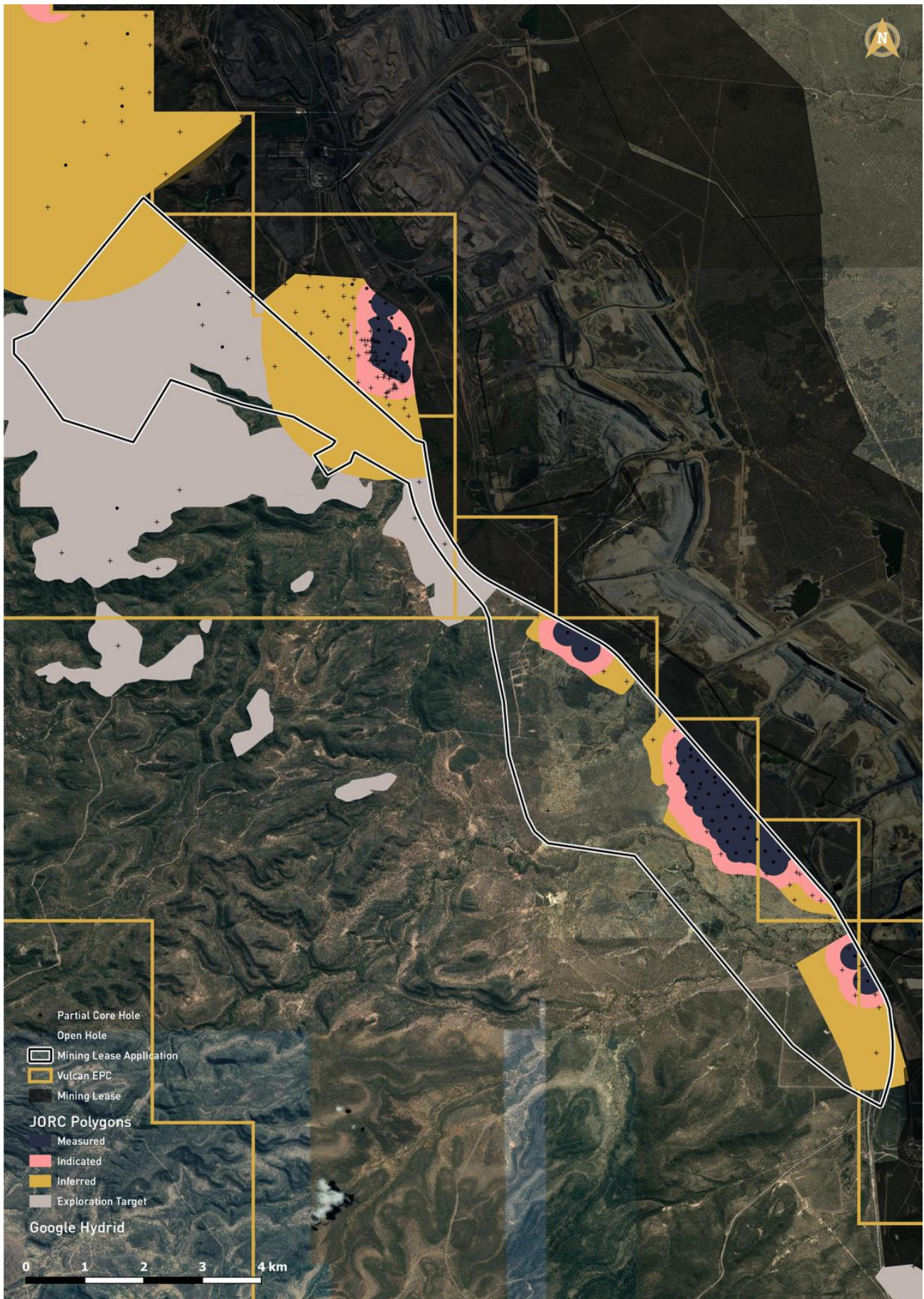
A JORC resource report resource estimation over the Vulcan mine complex was updated in January 2021. Exploration program is still ongoing over the applicants EPCs within the Vulcan complex. With the current JORC resource report as of January 2021, a **Total JORC²⁰¹² Code Resource of 20 Mt** was estimated for the Vulcan Mine Extension, this consisted of **3Mt *Inferred*** , **6Mt *Indicated*** and **11Mt *Measured***. The seams that are included in the resource calculation are the ALEX and DL seams of the Permian MCM in the Blackwater Group. In addition within the Jupiter target area for the Highwall Mining there is a **Total JORC²⁰¹² Code Resource of 27 Mt** was estimated for Jupiter area, this consisted of **12Mt *Inferred*** , **6Mt *Indicated*** and **9Mt *Measured*** of the seams that are included in the resource calculation are the ALEX, DL, DLLL seams of the Permian MCM in the Blackwater Group and Matilda seam from the Back Creek Group.

Further detail of the Vulcan South resource can be seen below in Table 2 and in Appendix B.



Table 2 JORC Resource Vulcan Mine Complex

Modelled Sub Area	Area (Ha)	Thickness (m)	ISRDR[1] (/t)	ISM (%)	In situ Basis				Horizon Depth (m)	Tonnes 10x6 (Mt)			Total (Mt)
					Ash (%)	VM (%)	TS (%)	CV (/t)		Measured	Indicated	Inferred	
Jupiter	105	0.95	1.68	4.8	42.2	16.6	1.27	4315	Oxidised	-	-	2	27
Jupiter	36	1.24	1.64	4.9	38.3	16.9	0.79	4645	Oxidised	-	1	-	
Jupiter	57	1.32	1.57	5.6	31.9	18.2	0.67	5121	Oxidised	1	-	-	
Jupiter	597	0.97	1.7	4.9	43.4	16.3	1.49	4197	<100	-	-	10	
Jupiter	312	1.05	1.72	5	44.8	15.7	1.49	4063	<100	-	5	-	
Jupiter	189	2.48	1.66	4.7	39.4	16.5	0.93	4565	<100	8	-	-	
Vul_Nth	27	1.47	1.57	5.7	31.8	18	0.62	5141	Oxidised	-	-	1	3*
Vul_Nth	34	2.09	1.56	6.1	31.6	17.7	0.62	5123	Oxidised	-	1	-	
Vul_Nth	11	2.33	1.56	6.1	31.6	17.7	0.62	5121	Oxidised	0.5*	-	-	
Vul_Nth	23	2.17	1.52	6	31.2	17.8	0.63	5168	<100	1	-	-	
Vulcan	70	0.9	1.59	6.7	34.2	15.6	0.48	4832	Oxidised	-	-	1	13
Vulcan	107	1.51	1.57	7.4	32.2	15.8	0.48	4928	Oxidised	-	3	-	
Vulcan	62	2.24	1.57	6.9	32.5	15.8	0.51	4967	Oxidised	2	-	-	
Vulcan	40	1.25	1.63	6	38.2	15.3	0.5	4599	<100	-	1	-	
Vulcan	135	2.6	1.57	6.7	32.4	15.9	0.5	4991	<100	6	-	-	
Vul_Sth	38	0.69	1.55	4.1	39.3	14.4	0.6	4690	Oxidised	-	-	0.5*	3*
Vul_Sth	24	1.15	1.56	4.5	39.2	14.6	0.5	4589	Oxidised	-	0.5*	-	
Vul_Sth	15	0.9	1.59	3.5	51.5	12.7	0.42	3448	Oxidised	0.5*	-	-	
Vul_Sth	34	0.82	1.51	4.8	28.9	16	0.55	5667	<100	-	-	0.5*	
Vul_Sth	13	1.88	1.54	4.7	37.4	14.8	0.55	4724	<100	-	0.5*	-	
Vul_Sth	27	1.79	1.52	5	32.3	15.6	0.59	5184	<100	1	-	-	
TOTAL			1.69	4.8	42.1	18.7	0.85	4163		20*	12*	15*	47*





The exploration drilling for the Vulcan South comprised of the following drilling program detailed in Table 3.

Table 3 Vulcan Drilling Program

Sub Area	Chip Holes	Core Holes	Geotech Holes	Total
Jupiter	51	18 (incl. 2 redrills)	2	71
Vulcan	49	46 (incl. 10 redrills and 1 twinned borehole)	4	99

The mineable reserves for Vulcan South open cut pit totals 12.5 Mt over eight years. Highwall mining 750 kt is proposed with a total ROM of 13.3 Mt. This targets the Alex seam and the Dysart Lower seam. The mine plan targets the sub cropped areas for the Dysart Lower(s) through to the barrier constraint of the rail corridor which is continuous with the neighbouring ML for BMA’s Peak Downs and Saraji. The mine plan recovers a maximum of 1.9 Mt per annum over the duration years with the outputs evident in the subsequent Figure 4. Due to the size of available reserve area, truck and shovel operations consisting of a 600t class excavator, a 400t class excavator and appropriately match trucks are planned. Exact equipment specifications are contingent with tender award for the contract mining company.

Period	Years	1	2	3	4	5
ROM Coal O/C	T	26,137	1,890,350	1,809,366	1,841,120	1,728,933
ROM Coal HWM	T	750,000	-	-	-	-
ROM Coal Total	T	776,137	1,890,350	1,809,366	1,841,120	1,728,933
Overburden	BCM	2,164,367	16,900,801	16,711,478	16,676,993	16,825,260
Strip Ratio	T W/C	82.81	8.94	9.24	9.06	9.73
Total Move Material	BCM	2,180,703	18,082,270	17,842,332	17,827,694	17,905,843
Period	Years	6	7	8	Total	
ROM Coal O/C	T	1,810,451	1,951,667	1,478,437	12,536,462	
ROM Coal HWM	T	-	-	-	750,000	
ROM Coal Total	T	1,810,451	1,951,667	1,478,437	13,286,462	
Overburden	BCM	16,938,659	16,831,282	10,492,536	113,541,376	
Strip Ratio	T W/C	9.36	8.62	7.10	8.55	
Total Move Material	BCM	18,070,191	18,051,073	11,416,559	121,845,415	

Figure 4 Vulcan Mine Extension Annualized Mine Plan

Project Commencement

Vitrinite will commence mining in the Vulcan South project following completion of ML 700060, as such the first year of mining in the schedule demonstrates the transition. During the mining of ML 700060, the MIA, CHPP and rail loop for Vulcan South will be constructed. There are no significant delays other than those identified and operations will progress into the mining leases immediately upon approval.



6 Resource Recovery

Vitrinite have identified the target seams of the Alex and Dysart Lower for open-cut reserves. The Matilda and May seams were identified in drilling; however they are not included in the mineable opencut reserves as these are too thin and at a depth that is un-economic for open cut extraction methods. The mine plan recovers the maximum resource available as the pits are constrained by physical barriers or geologically constrained. The stripping ratio of the project is 9:1 which is under economic constraints highlighting that if the lease was not constrained by adjacent tenures but more importantly road and rail infrastructure, mining would be able to continue down dip until economic cutoff. There are no indications that the target seams contain gas compositions or concentrations that would be considered a viable gas resource. Due to open-cut extraction the low volume of gas would be unable to be captured.

With identified resources in the Mesa hills, the applicants propose to utilize Vitrinite's highwall miner to recover these resources. This will maximise the recovery of premium coking coal over the Vitrinite assets.

Suitability of plan

The proposed mine plan is considered the most suitable as it maximises the recovery of the available economic resource in the Vulcan domain. With interaction of stakeholders (Isaac Regional Council and Aurizon) for sensitive infrastructure, a combination of cross-dip and terrace formation is utilised. Although this will increase mining cost as compared to traditional down-dip strip mining, this style / sequence of mining minimises the risk to these stakeholders. Smaller constrained blasts can be implemented in identified critical infrastructure zone to reduce the risk from vibration. Additionally, the plan backfills the pit void at a steady rate allowing for the reduction in duration of exposed highwall as well as fulfilling PRCP (Progressive rehabilitation closure plan) requirements allowing Vitrinite to ensure the land is rehabilitated to the approved landform designs.

Overlapping and Adjacent Tenures

There is overlying exploration gas tenure over the Vulcan Main pit and Vulcan south pit as seen in Figure 1. This tenure is PCA199 and ATP 814 which is held by Eureka Petroleum Pty Ltd. Vitrinite has consulted the holders of this tenure and have opened discussion around the exchange of required information and a Joint Interaction Management Plan. Adjacent mining leases to the ML application are ML 70142 and ML 1775. These are namely BHP's Peak Downs and Saraji leases. BHP have been consulted regarding the operation of a neighboring mine and aware of the proposed Vulcan South Project. Vitrinite intends to source mine affected water from surrounding mines.



7 Appendix A – Yearly Stage Plans

Year 1 Construction

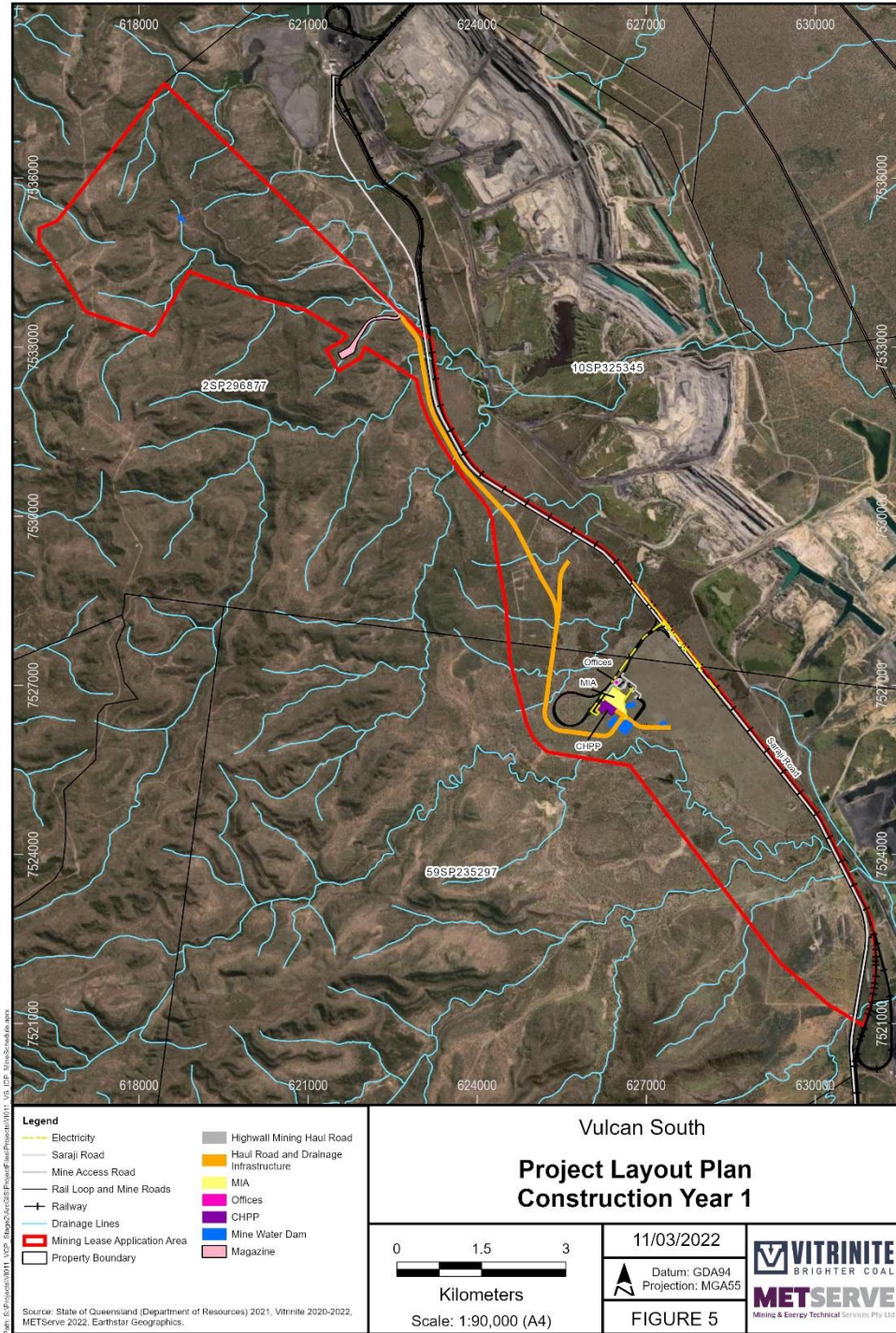


Figure 5 Vulcan South Construction Year 1



Year 2 Construction

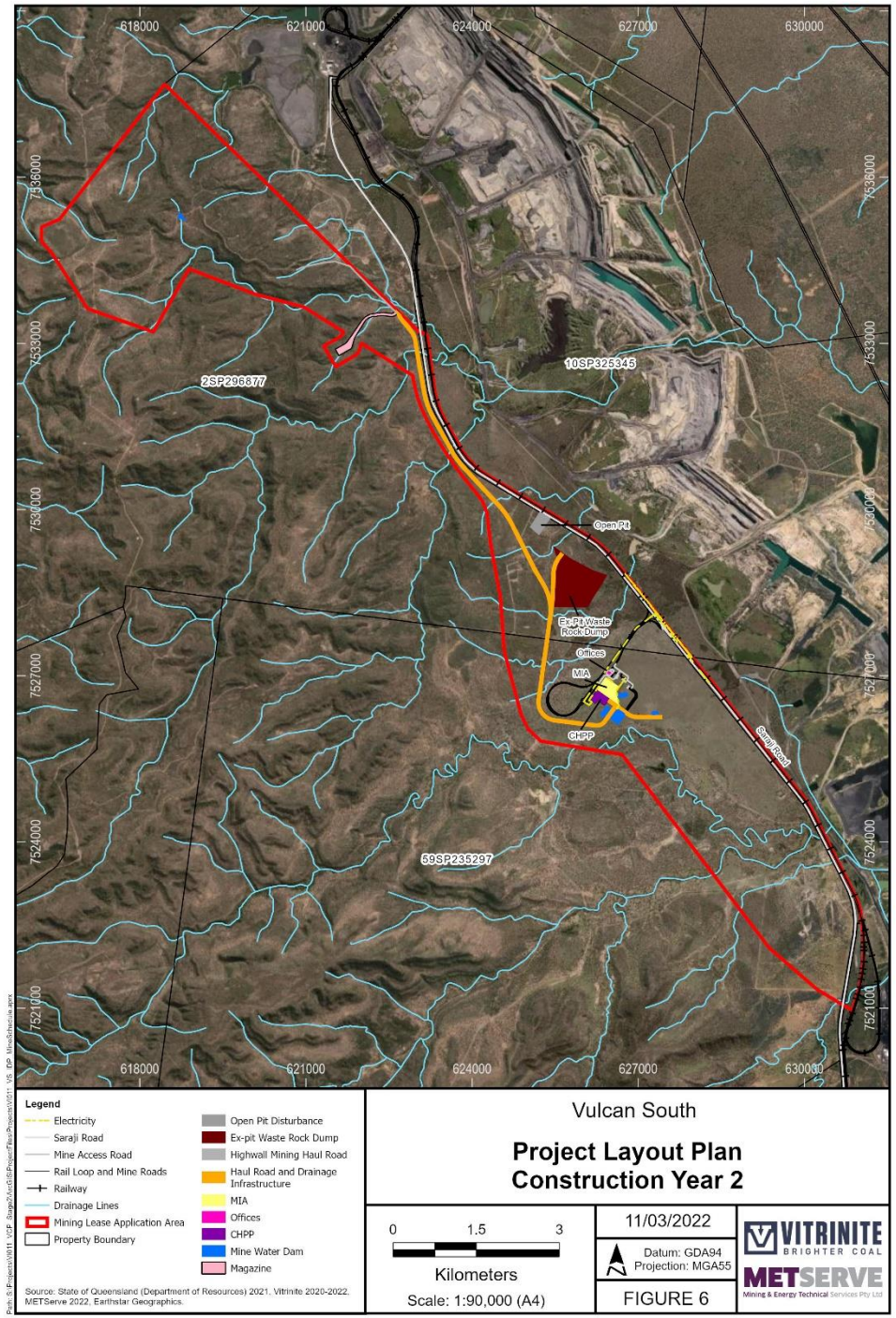


Figure 6 Vulcan South Construction Year 2



Year 1 Mining

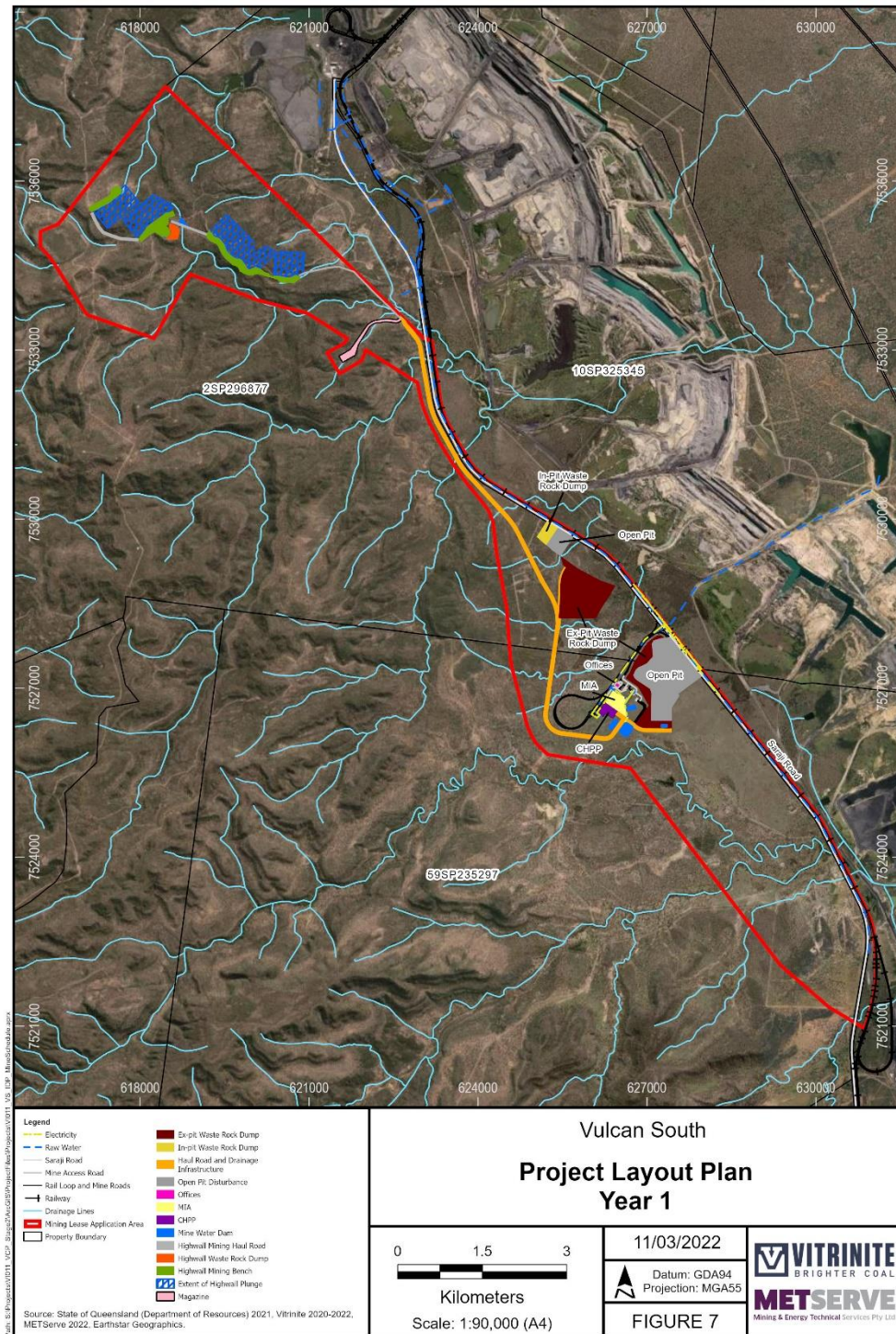


Figure 7 Vulcan South Mining Year 1



Year 2 Mining

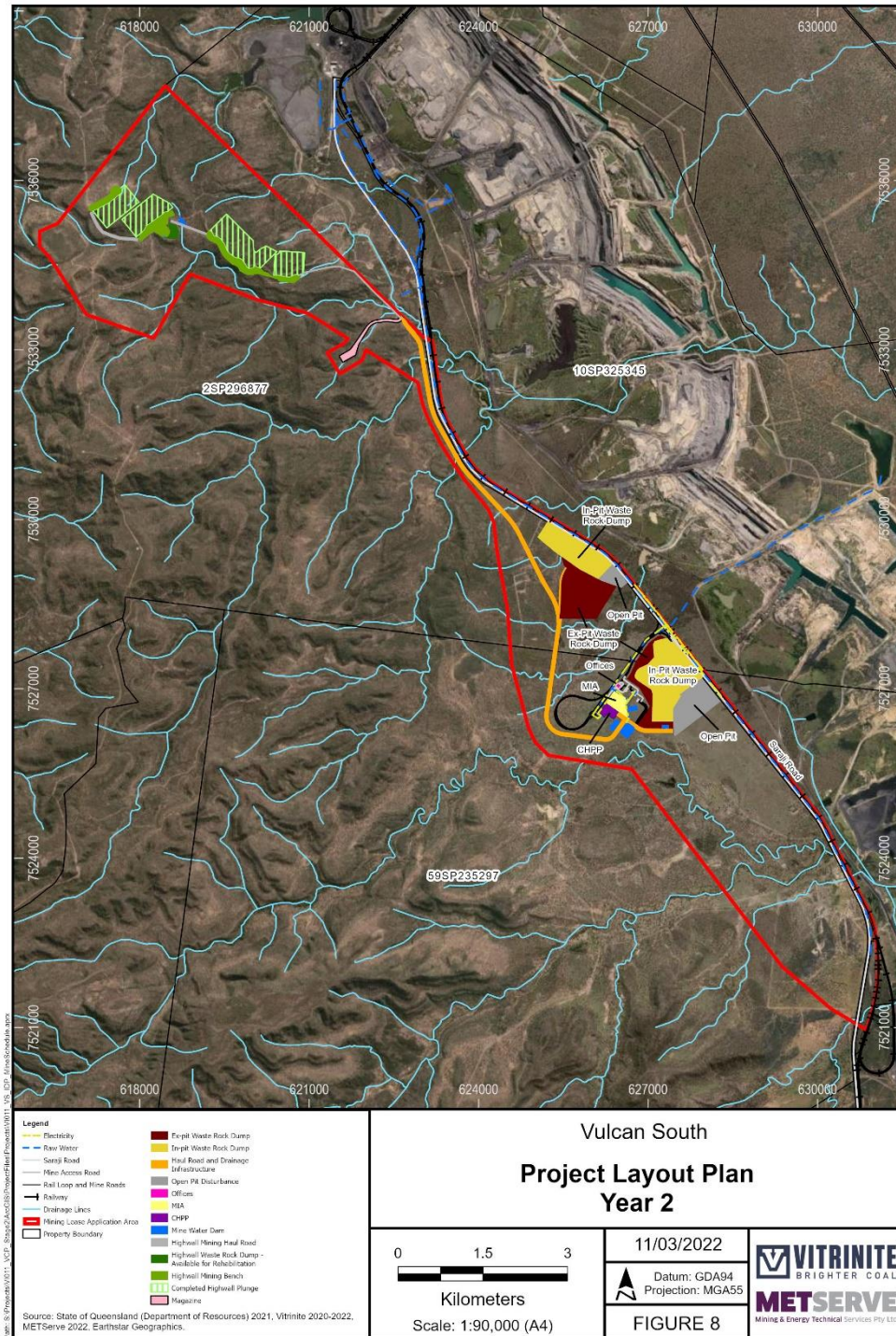


Figure 8 Vulcan South Mining Year 2



Year 3 Mining

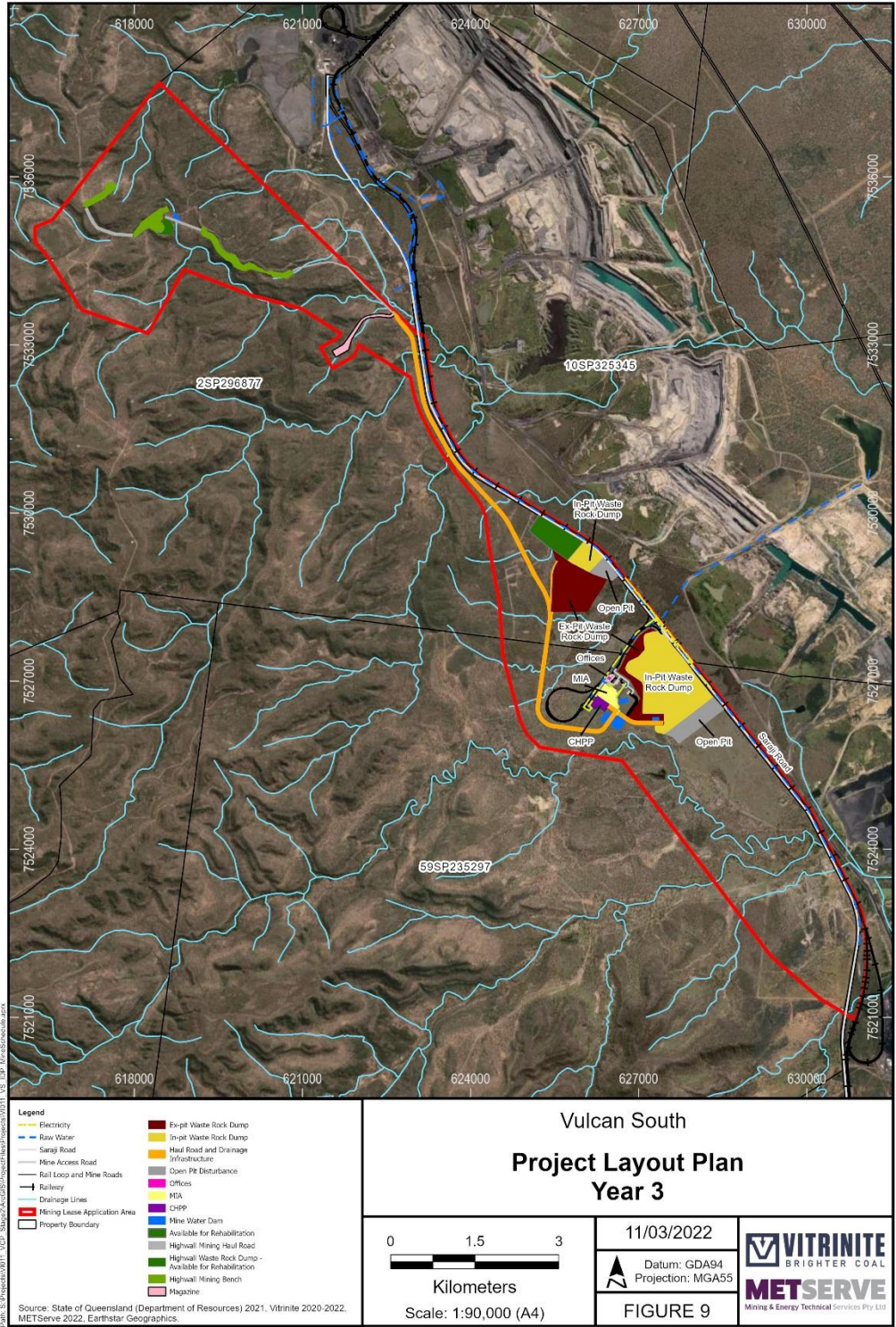


Figure 9 Vulcan South Mining Year 1

9 Appendix C Land Survey

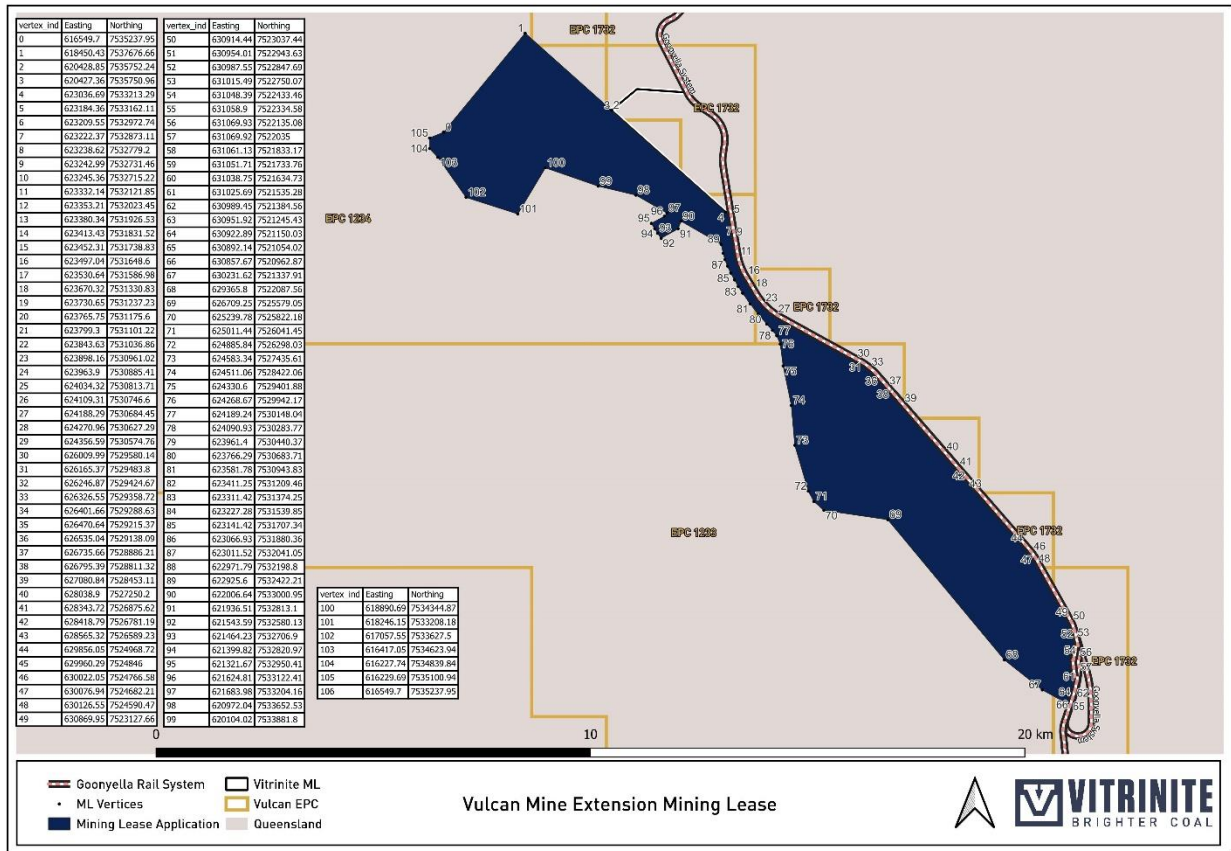


Figure 11 Land Survey