MARKET RELEASE
For Immediate Release
27 November 2019

UPDATE OF MINING STUDY AND ORE RESERVE ESTIMATE DFS AND GENERAL UPDATE

Quantum Graphite Limited is pleased to announce the results of the update to the **Uley 2 Mining Study and Ore Reserve Estimate**.

The update, contained in the report attached (**Report**), represents the last of the key studies required for finalisation of the DFS which is now expected to be released next month.

The results confirm the solid economics of Uley 2 and deliver lower quartile operating costs compared with similar/comparable mineral assets.

The company expects further improvement in the overall economics of Uley 2 as part of the optimisation work undertaken within the DFS which will provide the overall Uley 2 base case scope, schedule and budget.

Mining Study Results Highlights

- Total undiscounted operating **cash flow of A$207million at a LOM TGC of 11.89%**
- LOM key economic/financial input parameters and modifying factors:

Crusher feed	500,000 tonnes per annum
Graphitic carbon grade	11.89%
Graphitic carbon recovery	84%
Concentrate purity	94% graphitic carbon

Capital expenditure	**A$79.98 million**

Processing cost (PCAF)	**A$55.3 per tonne**
Mining cost (MCAF)	**A$2.5/t milled at surface plus 5c for every 4m**
Product price (Ex-works)	**US$919 dmt**

- Ore Reserve Estimate

Classification	Tonnes (kt)	Total Graphitic Carbon (%)
Proved	811	11.66
Probable	3,191	11.95
Total	**4,003**	**11.89**

DFS Update

The results of the DFS are expected to be announced next month and will mark the achievement of a major milestone in the Board’s plans to resume production at Uley 2. Chairman, Bruno Ruggiero explained, “the building blocks have now fallen into place. With the completion of the Mining Study, the major technical inputs have now been delivered for finalisation of the DFS. The company is now positioned to move preliminary discussions with prospective funders to meaningful discussions based on solid data”.

The DFS results will also include certain Uley 2 project opportunities beyond the base case with specific recommendations for further work to improve project economics

Sales and Marketing

Following the announcement of the Memorandum of Understanding between the company and Sunlands, the parties have commenced collaboration on three initiatives involving the commercialisation of Sunlands’ thermal battery technology which is expected to utilise Uley 2 concentrate as the battery’s critical heat sink material.

Corporate

The Board is also pleased to announce that the sale of the pilot plant has been completed. The consideration comprises A$150,000 plus the completion of certain remediation works at the process plant site. These works will have a material impact, reducing the rehabilitation liabilities associated with the process plant site by at least 50%.

Competent Person Statement – Mining Update

The information in this report that relates to the Uley 2 Ore Reserve estimate is based on information compiled by Ms Karen Lloyd who is a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM) and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity to which she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Ms Lloyd is an external consultant to QGL and an executive director of Jorvik Resources Pty Ltd and consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to the Uley 2 Mineral Resource estimate is based on information compiled by Ms Vanessa O'Toole who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity to which she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Ms O'Toole is an external consultant to QGL and a full-time employee of Wicklow Resources Pty Ltd and consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

JORC Code (2012) Table 1 Compliance

Appendix B of the Report includes the relevant extracts (i.e., sections 1, 2, 3 and 4) from Table 1 of the JORC Code (2012).

For further information contact:
Company Secretary
Quantum Graphite Limited
e: info@qgraphite.com

Quantum Graphite Limited

Uley 2 Mining Update - November 2019

Uley Graphite Mine, Port Lincoln South Australia

Jorvik Resources Pty Ltd (Jorvik) was engaged by Quantum Graphite Limited (Quantum) to prepare an update to the Uley 2 Mining Study and Ore Reserve Estimate (Report). The Report is based on the Mineral Resource estimate which was reported to the Australian Securities Exchange (ASX) on 15 July 2019 and as set out in the table below. Quantum has engaged Lycopodium to prepare a definitive feasibility level study (Lycopodium Study) in respect of Uley 2 (Project) and Jorvik acknowledges that the Report will be included as an appendix to the Lycopodium Study.

Karen Lloyd
Director and Principal
Jorvik Resources Pty Ltd
www.jorvikresources.com

1. Introduction

Jorvik Resources Pty Ltd (Jorvik) was engaged by Quantum Graphite Limited (Quantum) to prepare an update to the Uley 2 Mining Study and Ore Reserve Estimate (Report). The Report is based on the Mineral Resource estimate which was reported to the Australian Securities Exchange (ASX) on 15 July 2019 and as set out in the table below. Quantum has engaged Lycopodium to prepare a definitive feasibility level study (Lycopodium Study) in respect of Uley 2 (Project) and Jorvik acknowledges that the Report will be included as an appendix to the Lycopodium Study.

June 2019 Mineral Resource Estimate
Reported using a 3.5% Graphitic Carbon cut off for reporting purposes
Graphitic Carbon Grade tonnage distributions subdivided by JORC Code 2012 Resource Categories using ROUNDED figures

Measured			Indicated			Inferred			Total (Measured + Indicated + Inferred)		
Tonnes (Mt)	Graphitic C (%)	Contained Graphite (Kt)	Tonnes (Mt)	Graphitic C (%)	Contained Graphite (Kt)	Tonnes (Mt)	Graphitic C (%)	Contained Graphite (Kt)	Tonnes (Mt)	Graphitic C (%)	Contained Graphite (Mt)
0.8	17.51	125	4.2	10.4	435	1.3	10.5	137	6.3	11.1	697

2. Reliance on other parties

Jorvik has relied on information sourced from the companies presented in Table 1 to determine the modifying factors for use in mine optimisation and Ore Reserve estimation.

Table 1 – Reliance on other parties

Item	Source
Market research and commodity price	Quantum
Mining operating and capital cost	Quantum, based on mining contractor quotations
Metallurgical and processing	Lycopodium
Processing operating and capital costs	Lycopodium
General site operating costs	Quantum
General site infrastructure	Quantum
Geotechnical investigation	Barrett, Fuller and Partners (via Quantum)
Hydro(geo)logical investigation	Quantum
Tailings storage facility	Lycopodium
Social and Environmental	Quantum
Legal tenure	Quantum
Government	Quantum

3. Pit Optimisation

Pit optimisations were carried out on the material classified as Measured and Indicated Mineral Resource using Whittle Four-X pit optimisation software. For a given block model, cost, recovery and slope data, Whittle Four-X software calculates a series of incremental pit shells in which each shell is an optimum for a slightly higher commodity price factor.

The sequence of the pit shell increments is sorted from the economically best (the inner smallest shell viable for the lowest commodity price) to the economically worst (the outer largest pit shell viable for the highest commodity price).

Whittle Four-X provides indicative discounted cashflows for two mining sequences called “best case” and “worst case” scenarios, both using time discounting of cashflows. In the best case, the optimum pit shells are mined bench by bench in increments from inner to the outer shell, resulting in a higher discounted cashflow (DCF) due to lower stripping ratios and/or higher grades in the early years of mine life. The worst-case scenario is based on mining the whole pit outline bench by bench as a single pit, hence resulting in a lower DCF as a result of usually high stripping requirements in the early years of the operation.

Ordinarily, after the selection of the ultimate pit, several practical mining stages are designed and sequenced when developing a final production schedule. This sequence would provide a discounted cashflow somewhere between worst- and best-case scenarios. For this reason, the average discounted cashflows are calculated for each pit shell (mean of the worst and best cases) in order to emulate a practical mining sequence. The cashflows, are exclusive of any capital expenditure or Project start-up costs and should be used for pit optimisation comparison purposes only. No project Net Present Value (NPV) can be derived from these cashflows.

Whittle Four-X requires a regularised block model. As the resource model was a sub-blocked model, containing blocks of varying sizes, regularisation to a uniform block size (12.5 X 12.5 X 4m) was carried out prior to optimisation. The regularised block model file name is 201906uley_2PT5AUD.dm.

Table 2 presents a summary of the economic input parameters used in the pit optimisations.

Table 2 – Summary Whittle Four-X Input Parameters

Item	Unit	Value
Crusher feed	ktpa	500
Graphitic carbon recovery	%	84
Concentrate graphitic carbon grade	%	94
Concentrate moisture content	%	<5%
Product price (Ex-works based on US$919/t at a foreign exchange rate of US$ to A$ of 1.43)	A$/dmt	1,312.86
Cashflow Discount Rate	Real %	10
Government Royalty	%	5.0
Processing cost (PCAF)	$/t milled	55.3
Mining cost (MCAF)	$/t mined	2.5 at surface plus 5c for every 4m vertical advancement

Mining dilution	%	Nil
Mining recovery	%	95
Overall pit wall slope angle	degrees	44

The pit optimisation results are presented in Appendix A. Using a Revenue Factor of 1, Pit Shell 36 provides the best case undiscounted operating cashflow of A$207M. This shell comprises a large single pit (Table 3 and Figure 1).

Pit Shell 36 reaches a depth of 132m (360mRL) and contains approximately 4.0Mt of mill feed at 11.89% TGC (Total Graphitic Carbon).

Table 3 – Selected Pit

Pit	Revenue Factor	Rock (Mt)	Waste (Mt)	Ore (Mt)	Strip Ratio	TGC (kt)	TGC (%)	undiscounted Cash Flow (A$M)
36	1.00	22.55	18.55	4.00	4.63	476	11.89	207

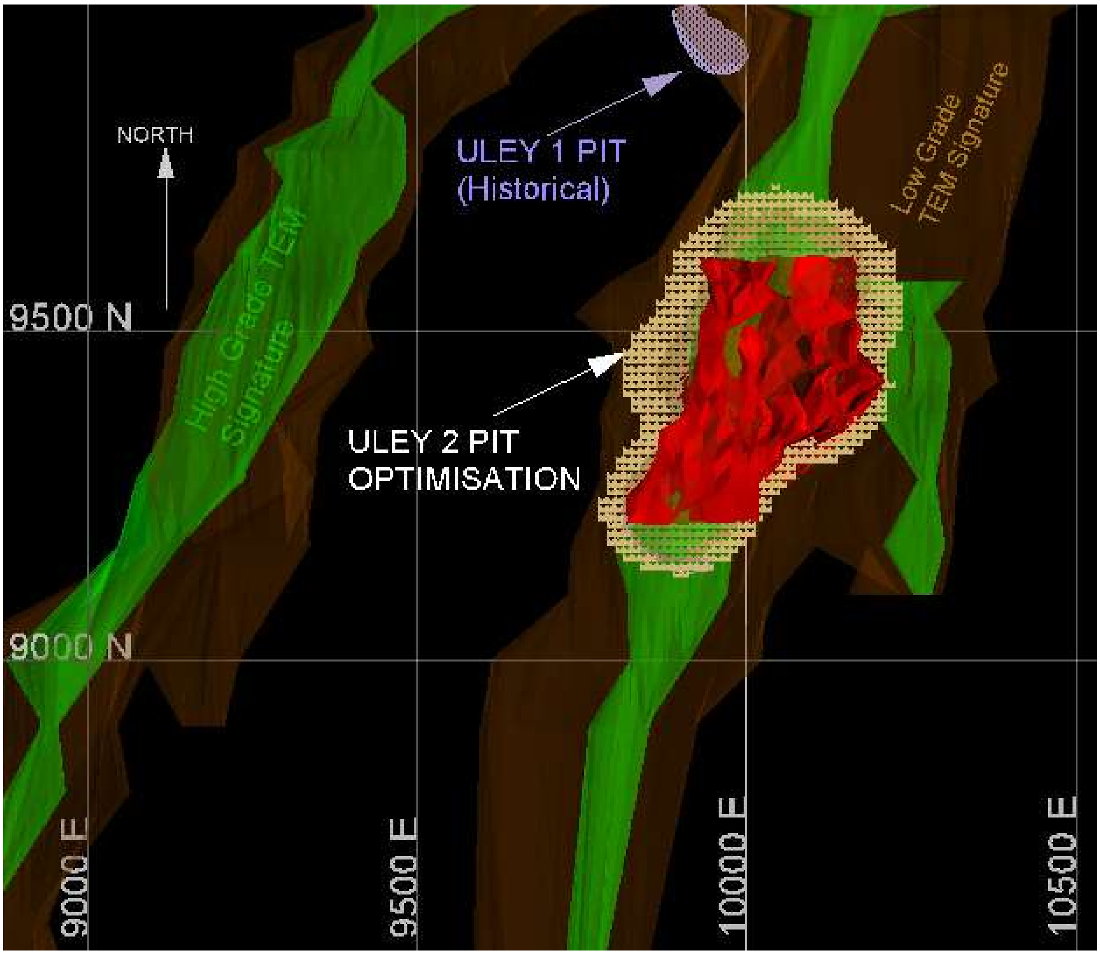


Figure 1: Selected Pit Shell 36

4. Pit design

Pit shell 36 provided guidance for the life of mine (LOM) detailed pit design work. The pit design parameters were informed by the historical mining information taken from the Quantum database and are in keeping with established mining practice (Table 2). The final pit design (Figure 2) reconciles within 5% of the optimisation shell.

Table 2 – Pit Design Criteria

Pit Design Parameter		
Pit Wall Parameters	Batter Face Angle	60º
	Berm Width	5m
	Berm Spacing	12m
Haul Road Design	Width - Dual Lane - Single Lane	21.0m 12.0m
	Gradient	10%

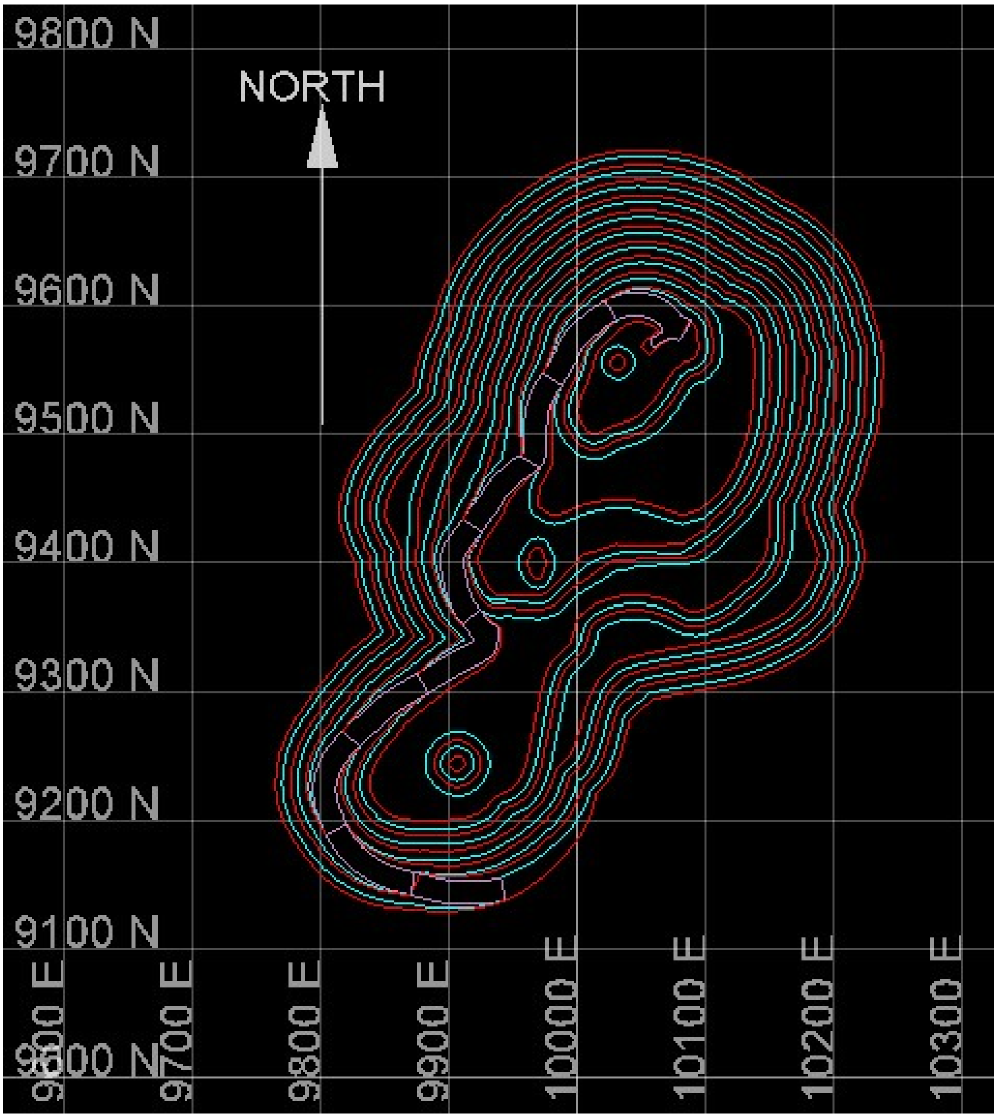


Figure 2: Life of Mine Pit Design

5. Mining Schedule

The mine production schedule was developed in Microsoft Excel. The schedule was based on annual periods targeting an annual mill throughput rate of 500,000 tonnes (Table 3 and Figure 4: Annual Stockpile Balance

). The schedule is based on bench by bench mining of material classified as clay, carbonate, saprolite, saprock and fresh rock Table 4 and Figure 4). Clay mill feed was delayed until year 6 by Quantum. As such, a re-handle stockpiles will be developed. The mining schedule will be refined prior to the commencement of mining once the process flowsheet has been optimised and the target mill specifications by period are finalised.

Table 3 – Summary Mine Production Schedule

Year	Ore Mined (Mt)	Waste Movement (Mt)	Strip Ratio (Waste Mined: Ore Mined)	Ore Processed	
				Tonnes (Mt)	TGC %
1	1.22	10.29	8.43	0.50	10.08
2	0.53	2.08	3.92	0.50	10.48
3	0.75	2.84	3.79	0.50	11.34
4	0.33	0.95	2.88	0.50	11.42
5	0.66	1.51	2.29	0.50	12.84
6	0.41	0.72	1.76	0.50	12.49
7	0.19	0.16	0.84	0.50	12.35
8		0	0	0.50	13.53
TOTAL	**4.00**	**18.55**	**4.64**	**4.00**	**11.89**

Table 4 – Material Mined

Year	Ore Type 500 (Clay) (Mt)	Ore Type 400 (Carbonate) (Mt)	Ore Type 300 (Saprolite) (Mt)	Ore Type 200 (Saprock) (Mt)	Ore Type 100 (Fresh) (Mt)
1	0.63	0.10	0.06	0.43	0.00
2	0.01	0.00	0.01	0.52	0.00
3	0.00	0.00	0.00	0.67	0.08
4	0.00	0.00	0.00	0.20	0.14
5	0.00	0.00	0.00	0.31	0.36
6	0.00	0.00	0.00	0.05	0.36
7	0.00	0.00	0.00	0.00	0.09
8	0.00	0.00	0.00	0.00	0.00
TOTAL	**0.64**	**0.10**	**0.07**	**2.17**	**1.02**

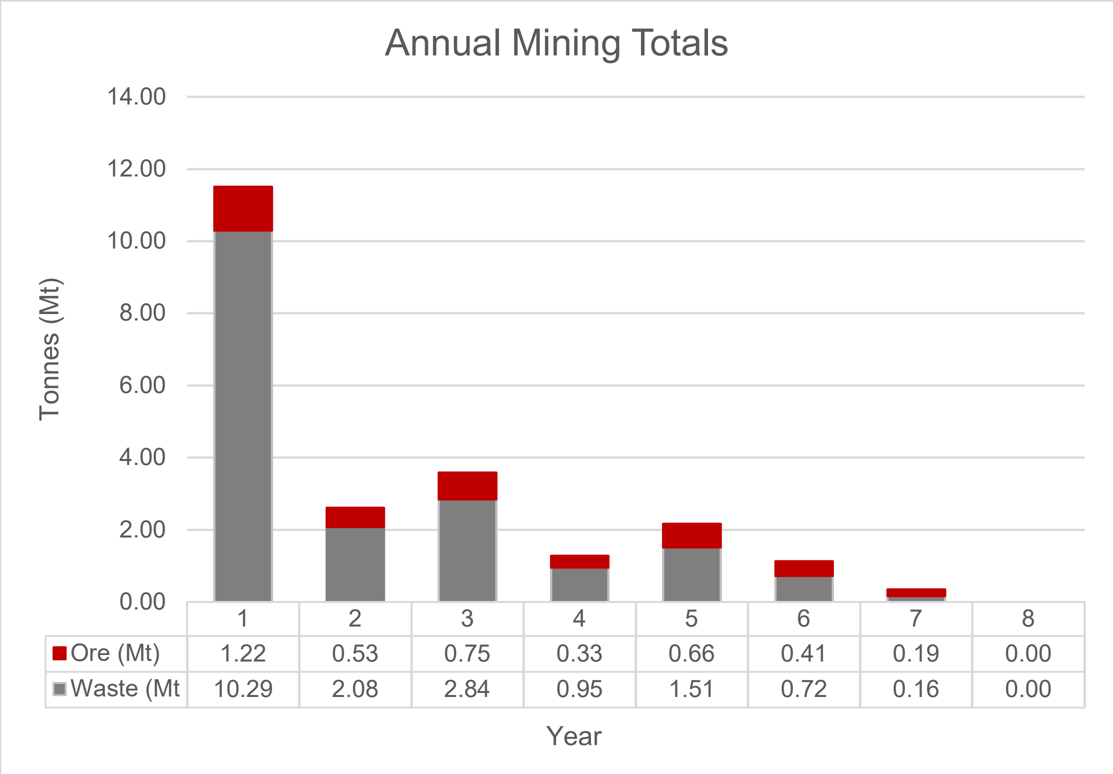


Figure 3: Annual Material Movements

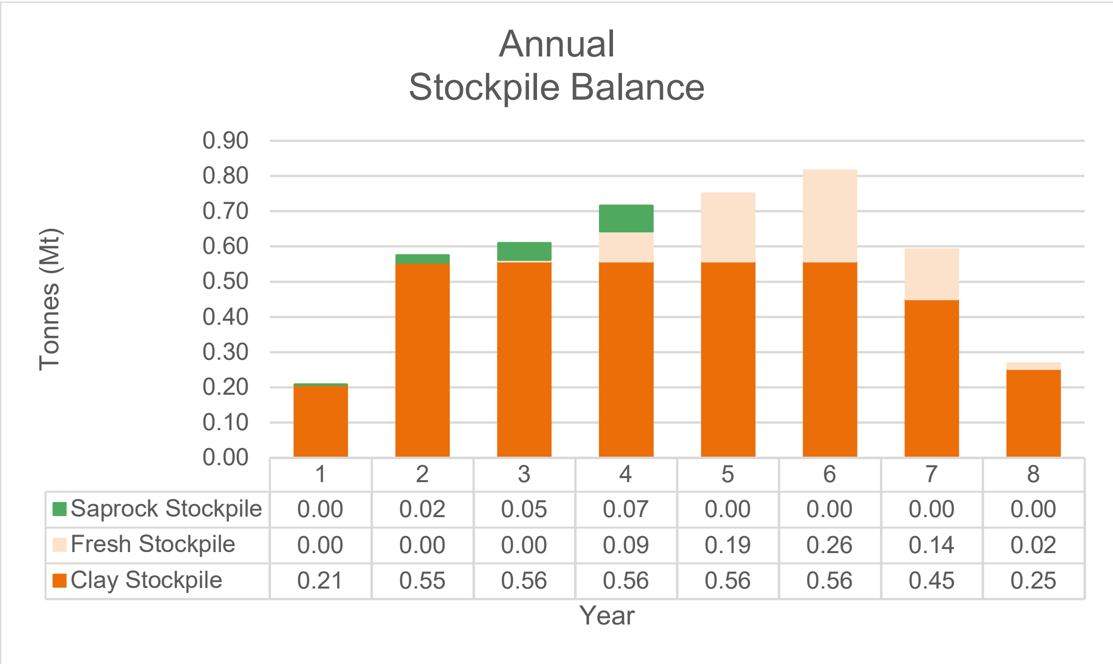


Figure 4: Annual Stockpile Balance

Table 5 – Summary Processing Schedule

Year	Ore Processed		Ore Type 500 (Clay) (Mt)	Ore Type 400 (Carbonate) (Mt)	Ore Type 300 (Saprolite) (Mt)	Ore Type 200 (Saprock) (Mt)	Ore Type 100 (Fresh) (Mt)
	Tonnes (Mt)	TGC %					
1	0.50	10.08	0.00	0.10	0.06	0.34	0.00
2	0.50	10.48	0.00	0.00	0.01	0.49	0.00
3	0.50	11.34	0.00	0.00	0.00	0.50	0.00
4	0.50	11.42	0.00	0.00	0.00	0.48	0.02
5	0.50	12.84	0.00	0.00	0.00	0.31	0.19
6	0.50	12.49	0.10	0.00	0.00	0.05	0.35
7	0.50	12.35	0.24	0.00	0.00	0.00	0.26
8	0.50	13.53	0.28	0.00	0.00	0.00	0.22
TOTAL	**4.00**	**11.89**	**0.62**	**0.10**	**0.07**	**2.17**	**1.04**

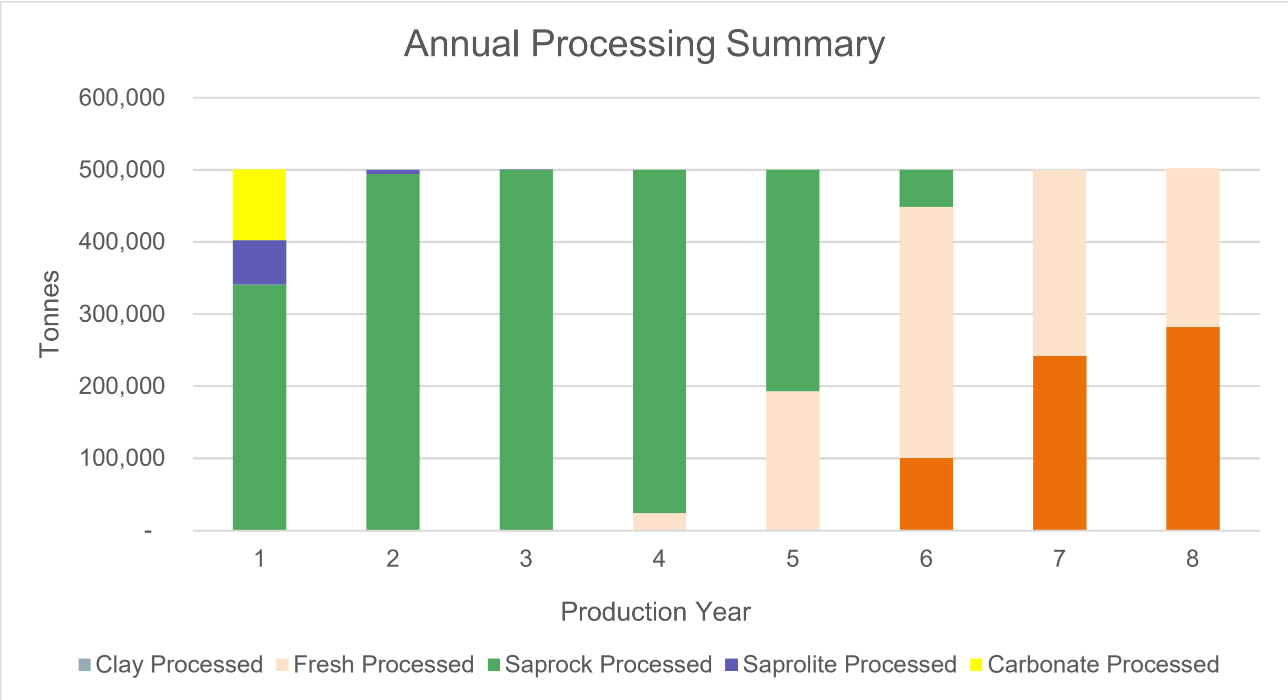


Figure 5: Mine Production Schedule by Material Type

6. Ore Reserve Estimate

The Ore Reserve estimate was based on the modifying factors presented in Table 6.

Table 6 – Summary Modifying Factors used for Ore Reserve estimation

Input	Unit	Value
Mill throughput	Mtpa	0.5
Product Price	A$/t	1,312.86
Royalty	%	5.0
Processing Cost	A$/t milled	55.3
General and Administration	A$/t milled	4.82
Mine supervision, grade control	A$/t milled	0.50
Average Mining Cost	A$/t mined	2.50
Processing recovery (Variable, with average shown)	%	84
Mining recovery	%	95
Mining dilution added	%	Nil
Overall Pit Wall Slope Angle (inclusive of a ramp system)	degrees	44
Initial capital expenditure	A$M	79.98
Sustaining capital	A$/year	4.0
Asset closure and monitoring	A$/year	0.5

A detailed summary of the supporting data and modifying factors is provided in Appendix B (Table 1 of the JORC Code 2012). Table 7 provides a summary of the Ore Reserve estimate as of 19 September 2019. The Ore Reserve estimate is inclusive of the Mineral Resource estimate and is stated in dry metric tonnes.

Table 7 – Ore Reserve – As of 19 September 2019 (inclusive of Mineral Resources)

Classification	**Tonnes[(1)] (kt)**	**Total Graphitic Carbon (%)**
Proved	811	11.66
Probable	3,191	11.95
Total	**4,003**	**11.89**

Notes: 1. Tonnes are expressed in dry metric tonnes

The reported Ore Reserves have been compiled by Ms Karen Lloyd. Ms Lloyd is a Fellow of the Australasian Institute of Mining and Metallurgy and Principal of Jorvik Resources Pty Ltd. Ms Lloyd has sufficient experience, relevant to the style of mineralisation and type of deposit under consideration and to the activity she is undertaking, to qualify as a Competent Person as defined in the 'Australasian Code for Reporting of Mineral Resources and Ore Reserves' of December 2012 ("JORC Code") as prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists and the Minerals Council of Australia.

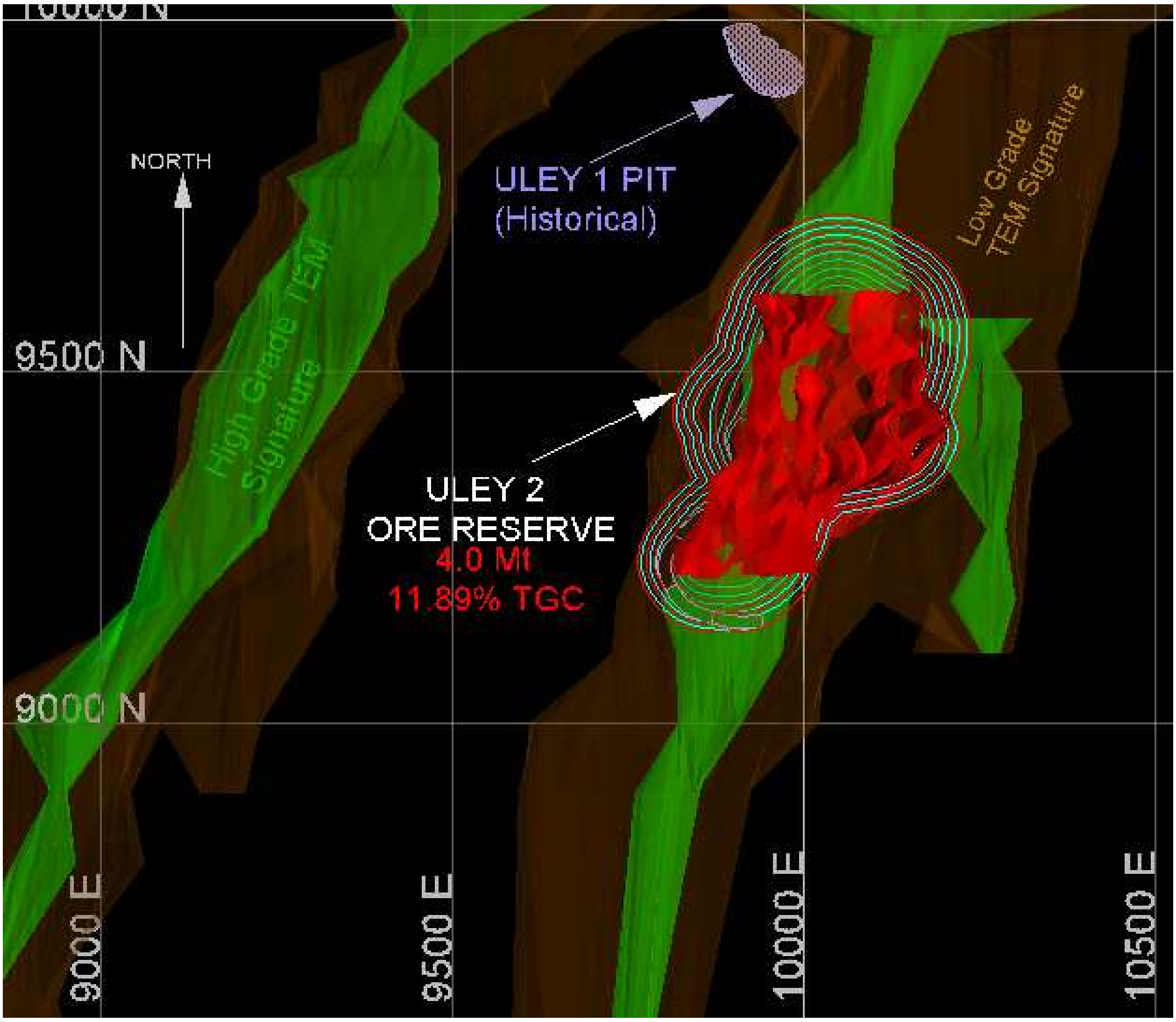


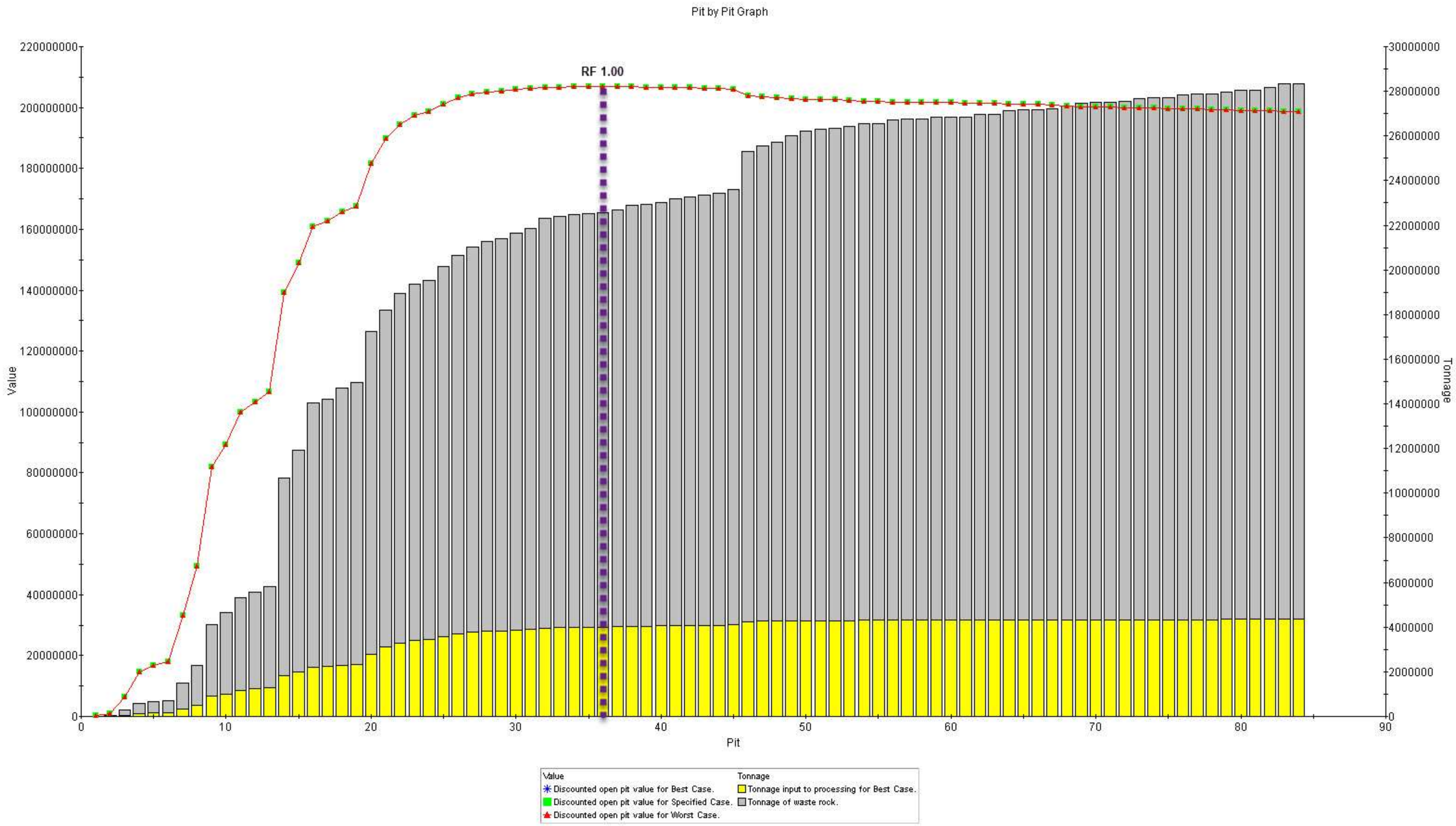
Figure 6: Plan View, Uley 2 Ore Reserve Estimate – September 2019

APPENDIX A - Pit Optimisation Results

Pit	Revenue Factor	Rock (Mt)	Waste (Mt)	Ore (Mt)	Strip Ratio	TGC (kt)	TGC (%)	undiscounted Cash Flow (A$)
1	0.30	0.01	0.01	0.00	6.31	0	30.09	0.23
2	0.32	0.03	0.02	0.00	6.78	1	27.79	0.93
3	0.34	0.27	0.24	0.03	8.35	8	27.04	6.48
4	0.36	0.59	0.52	0.07	7.98	17	25.87	14.72
5	0.38	0.67	0.59	0.08	7.38	20	24.94	16.88
6	0.40	0.71	0.62	0.09	7.03	22	24.29	18.07
7	0.42	1.49	1.31	0.18	7.17	41	22.35	33.15
8	0.44	2.29	1.98	0.31	6.44	63	20.60	49.36
9	0.46	4.12	3.60	0.53	6.81	104	19.76	81.83
10	0.48	4.66	4.04	0.62	6.51	119	19.15	89.22
11	0.50	5.32	4.58	0.74	6.18	137	18.49	99.87
12	0.52	5.55	4.74	0.81	5.84	146	18.01	103.22
13	0.54	5.82	4.94	0.88	5.60	155	17.59	106.75
14	0.56	10.66	9.43	1.24	7.61	217	17.52	139.36
15	0.58	11.92	10.53	1.39	7.58	238	17.14	148.96
16	0.60	14.03	12.43	1.60	7.78	268	16.79	161.01
17	0.62	14.22	12.55	1.67	7.51	276	16.50	162.78
18	0.64	14.73	12.97	1.76	7.38	286	16.26	165.75
19	0.66	14.97	13.15	1.83	7.20	293	16.03	167.55
20	0.68	17.25	15.10	2.14	7.05	329	15.34	181.71
21	0.70	18.22	15.83	2.38	6.65	352	14.78	189.81
22	0.72	18.95	16.37	2.58	6.36	370	14.37	194.45
23	0.74	19.38	16.66	2.72	6.13	383	14.08	197.48
24	0.76	19.54	16.71	2.83	5.91	391	13.83	198.55
25	0.78	20.15	17.14	3.01	5.70	406	13.51	201.20
26	0.80	20.64	17.48	3.17	5.52	419	13.23	203.20
27	0.82	21.02	17.71	3.30	5.37	429	13.00	204.55
28	0.84	21.29	17.89	3.40	5.27	436	12.85	205.14
29	0.86	21.41	17.92	3.49	5.14	443	12.69	205.45
30	0.88	21.66	18.08	3.58	5.05	449	12.54	205.89
31	0.90	21.84	18.17	3.67	4.95	455	12.40	206.22
32	0.92	22.32	18.55	3.77	4.93	462	12.27	206.64
33	0.94	22.39	18.56	3.82	4.86	466	12.18	206.74
34	0.96	22.46	18.57	3.90	4.77	470	12.06	206.79
35	0.98	22.51	18.56	3.95	4.69	473	11.97	206.81
36	**1.00**	**22.55**	**18.55**	**4.00**	**4.63**	**476**	**11.89**	**206.82**
37	1.02	22.68	18.60	4.07	4.57	480	11.79	206.80
38	1.04	22.91	18.78	4.13	4.54	484	11.70	206.76
39	1.06	22.94	18.76	4.18	4.48	486	11.63	206.74
40	1.08	23.04	18.80	4.24	4.43	490	11.54	206.68

Pit	Revenue Factor	Rock (Mt)	Waste (Mt)	Ore (Mt)	Strip Ratio	TGC (kt)	TGC (%)	undiscounted Cash Flow (A$)
41	1.10	23.21	18.90	4.30	4.40	493	11.46	206.57
42	1.12	23.28	18.92	4.36	4.34	496	11.37	206.48
43	1.14	23.34	18.94	4.41	4.30	498	11.31	206.41
44	1.16	23.43	18.98	4.45	4.26	501	11.24	206.31
45	1.18	23.58	19.07	4.51	4.23	503	11.17	206.09
46	1.20	25.29	20.58	4.72	4.36	516	10.95	203.72
47	1.22	25.57	20.80	4.77	4.36	519	10.89	203.43
48	1.24	25.74	20.93	4.80	4.36	521	10.85	203.29
49	1.26	26.01	21.16	4.84	4.37	523	10.81	203.03
50	1.28	26.23	21.33	4.90	4.36	526	10.75	202.68
51	1.30	26.31	21.38	4.93	4.34	528	10.70	202.56
52	1.32	26.34	21.39	4.95	4.32	529	10.67	202.50
53	1.34	26.41	21.42	4.99	4.29	530	10.63	202.35
54	1.36	26.55	21.53	5.02	4.29	532	10.59	202.08
55	1.38	26.56	21.52	5.04	4.27	533	10.57	202.06
56	1.40	26.71	21.65	5.06	4.27	534	10.54	201.82
57	1.42	26.74	21.66	5.08	4.26	534	10.52	201.76
58	1.44	26.78	21.68	5.10	4.25	535	10.50	201.69
59	1.46	26.82	21.71	5.11	4.25	536	10.48	201.63
60	1.48	26.84	21.72	5.12	4.24	536	10.47	201.58
61	1.50	26.86	21.73	5.13	4.23	537	10.45	201.54
62	1.52	26.95	21.81	5.15	4.24	537	10.43	201.37
63	1.54	26.96	21.81	5.16	4.23	537	10.42	201.35
64	1.56	27.15	21.98	5.17	4.25	538	10.40	201.02
65	1.58	27.16	21.98	5.18	4.24	539	10.40	201.01
66	1.60	27.16	21.97	5.19	4.23	539	10.38	200.99
67	1.62	27.20	22.00	5.20	4.23	539	10.37	200.93
68	1.64	27.34	22.12	5.22	4.24	540	10.35	200.61
69	1.66	27.47	22.23	5.24	4.24	541	10.32	200.21
70	1.68	27.49	22.24	5.25	4.24	541	10.31	200.15
71	1.70	27.53	22.27	5.26	4.24	542	10.30	200.08
72	1.72	27.55	22.29	5.26	4.24	542	10.30	200.02
73	1.74	27.68	22.41	5.27	4.26	542	10.30	199.79
74	1.76	27.70	22.43	5.28	4.25	543	10.28	199.74
75	1.78	27.72	22.44	5.28	4.25	543	10.27	199.69
76	1.80	27.85	22.56	5.29	4.26	543	10.26	199.49
77	1.84	27.86	22.56	5.30	4.26	543	10.25	199.46
78	1.88	27.87	22.57	5.31	4.25	544	10.24	199.43
79	1.90	27.96	22.65	5.31	4.26	544	10.24	199.28
80	1.92	28.05	22.74	5.31	4.28	544	10.24	199.12
81	1.94	28.05	22.74	5.32	4.28	544	10.23	199.11
82	1.96	28.15	22.84	5.32	4.29	544	10.24	198.95

Pit	Revenue Factor	Rock (Mt)	Waste (Mt)	Ore (Mt)	Strip Ratio	TGC (kt)	TGC (%)	undiscounted Cash Flow (A$)
83	1.98	28.32	23.00	5.32	4.32	545	10.23	198.56
84	2.00	28.33	23.01	5.32	4.32	545	10.23	198.54



Pit by Pit Graph
RF 1.00
Value
Tonnage
Pit
Value
Discounted open pit value for Best Case.
Discounted open pit value for Specified Case.
Discounted open pit value for Worst Case.
Tonnage
Tonnage input to processing for Best Case.
Tonnage of waste rock.

Appendix B - JORC Code 2012 Table 1

Section 1 Sampling Techniques and Data (Criteria in this section apply to all succeeding sections)

Criteria	JORC Code Explanation	Commentary	Competent Person
Sampling techniques	▪ Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. ▪ Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. ▪ Aspects of the determination of mineralisation that are Material to the Public Report. ▪ In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	▪ All holes used in the Resource Estimate were HQ diamond drillholes, sampling moderately dipping strata bound graphite mineralised zones. ▪ 30 vertical drillholes were used for ore definition together with 114 drillholes drilled at -60° towards 090. ▪ Half cores samples were obtained on geological intervals, typically 1m in length but ranging from 0.3m to 4m. ▪ High grade graphite mineralisation is reasonably visible during geological logging and sampling. ▪ Visibly mineralised intervals were crushed and pulverised to at least 85% passing 75µm, then sent to ALS Brisbane for analysis by LECO method. ▪ The sample preparation and assaying techniques are industry standard and appropriate for this type of mineralisation. ▪ Some core material remains selectively sampled.	KL
Drilling techniques	▪ Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	▪ All holes used in the Resource Estimate were drilled from surface. ▪ 30 vertical drillholes were drilled using HQ standard tube and were not orientated. ▪ 114 angled drillholes were drilled using HQ triple tube. Downhole surveys were obtained using a Ranger SS118 downhole camera. The angled drillholes were orientated using the Reflex ACT II RD core orientation tool.	KL
Drill sample recovery	▪ Method of recording and assessing core and chip sample recoveries and results assessed.	▪ Core recovery was captured by logging "Core Loss" in areas of no or low recovery.	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
	▪ Measures taken to maximise sample recovery and ensure representative nature of the samples. ▪ Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	▪ Industry standard procedures/techniques were employed to ensure maximum downhole recovery. Overall core recovery for all resource drillholes is 87%. ▪ There has been no identified relationship between sample recovery and grade.	
Logging	▪ Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. ▪ Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. ▪ The total length and percentage of the relevant intersections logged.	▪ Geological and geotechnical logging of the drillholes is of an appropriate standard to support a Mineral Resource estimation, mining studies and metallurgical studies. ▪ Geological core logging is qualitative. ▪ Core photography is available. ▪ The total cumulative length of the sample intervals for all holes used for resource definition was 11,270 m (90% of total core length was sampled).	KL
Sub-sampling techniques and sample preparation	▪ If core, whether cut or sawn and whether quarter, half or all core taken. ▪ If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry. ▪ For all sample types, the nature, quality and appropriateness of the sample preparation technique. ▪ Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. ▪ Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling. ▪ Whether sample sizes are appropriate to the grain size of the material being sampled.	▪ Half core samples were taken. In competent core, these were cut by diamond saw. In incompetent material, the sample was collected by manual halving of the material. Half core sampling is an appropriate, industry standard technique. ▪ Bulk reject duplicate samples were taken in the current angled drillholes to ensure sample representivity. These duplicates were typically inserted at a frequency of 1 in 100 samples (1% rate of insertion). Certified reference standards were inserted at a typical rate of 1 in 20 samples (5% rate of insertion) for quality assurance checks of analyses reported by the mineral testing laboratory ALS Global. ▪ There is no record of field duplicate samples or standards having been submitted in the 30 vertical drillholes to test sampling representativity. ▪ Samples from the 18 vertical CRAE drillholes were crushed and sieved on site prior to dispatching the coarse +75µm to ALS-Chemex for assaying. There is no available data on the weights of the sieved fractions. If the fine fraction made up a significant proportion of the total sample, assays from the coarse fractions should be higher	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
		than corresponding whole rock assays. A comparison of grades from the CRAE drilling with the whole rock assays from other drilling programmes shows no difference in grade tenor. Visual comparison of grades in the CRAE drillholes with neighbouring holes from the other programme likewise shows no notable difference in grade tenor. As such, despite the description of assaying of coarse fractions only, the assays from the CRAE drilling are treated in the same manner as whole rock assays with no tonnage correction required. ▪ Some discrepancies were noted in the C values in the CRAE samples, with non-carbonate C occasionally being greater than the Total C value. These are assumed to reflect a lack of complete homogenization in the crushing/sieving process carried out on site. ▪ Sample preparation on the 12 vertical drillholes (2011 campaign) and the 92 angled drillholes (2014 and 2015 campaigns) was undertaken by ALS Adelaide. Samples were crushed and split to >70% passing -6mm and pulverized to >85% passing 75µm prior to assaying by ALS Brisbane. ▪ Sample sizes (half core samples) are deemed appropriate for the material that is being sampled.	
Quality of assay data and laboratory tests	▪ The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. ▪ For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. ▪ Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	Techniques used are: ▪ C-IR18 (Graphitic carbon by LECO analyser). ▪ C-CAL15 (Inorganic carbon by difference). ▪ C-IR17 (Organic carbon by LECO analyser). ▪ C-CON01 (Carbon concentrate by LECO analyser). ▪ C-IR07 Total Carbon by LECO analyser). ▪ C-IR18 was used for the 2014 and 2015 samples, and C-IR17 was used for previous samples. As the rocks are assumed to contain no organic material (supported by petrographic study), the difference between these two techniques is less than the analytical error of the techniques and hence considered negligible. ▪ Bulk reject duplicate samples were taken in the 2014 angled	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
		drillholes at a typical frequency of 1 in 100 samples (1% rate of insertion). Certified reference standards were inserted at a typical rate of 1 in 20 samples (5% rate of insertion). ▪ There is no record of field duplicate samples or standards having been submitted in the 30 vertical drillholes. ▪ Internal laboratory QAQC for all sampling has been reviewed with no problems highlighted with respect to sampling bias or precision.	
Verification of sampling and assaying	▪ The verification of significant intersections by either independent or alternative company personnel. ▪ The use of twinned holes. ▪ Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. ▪ Discuss any adjustment to assay data.	▪ Metallurgical drillholes were designed to allow for twin drilling analysis. Analysis demonstrated acceptable comparative intercepts for tenor and thickness of mineralization. ▪ Assays in the database have been checked against laboratory certificates and original logs which contained assay data. No inconsistencies were identified. ▪ Non-sampled intervals were assumed to be “unmineralised” and given a Graphitic C value of 0.01%, equivalent to half the detection limit of C-IR18. ▪ No adjustments to any assay data were done.	KL
Location of data points	▪ Accuracy and quality of surveys used to locate drillholes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. ▪ Specification of the grid system used. ▪ Quality and adequacy of topographic control.	▪ Drill location co-ordinates are reported in Uley Mine Grid (transformed to truncated AMG). The reported truncation was: Easting = 554,216.866m Northing = 6,139,092.867m ADH = RL + 404.252m ▪ Drillhole collars have been re-surveyed in the field and these grid transformations validated. All drillholes were re-surveyed during 2014 by PA Dansie & Associates Pty Ltd. ▪ A complete site survey was undertaken during 2014 by Maptek Pty Ltd.	KL
Data spacing and distribution	▪ Data spacing for reporting of Exploration Results. ▪ Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	▪ No exploration results are reported or included in this Mineral Resource estimate. ▪ Diamond drilling on an infill spacing of up to 25m X 25m was used to estimate geological and grade continuity at a level deemed appropriate for the classification and reporting of a Mineral	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
	▪ Whether sample compositing has been applied.	Resource estimate (updated estimate). ▪ 1m sample composites were used during the resource estimation process.	
Orientation of data in relation to geological structure	▪ Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. ▪ If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	▪ Drilling orientation is considered appropriate considering the deposit type and orientation of moderately WNW dipping mineralisation. Sampling bias related to the orientation of sampling is considered minimal.	KL
Sample security	▪ The measures taken to ensure sample security.	▪ All reasonable measures were being taken to ensure sample security along the value chain. These measures included the recording of sample dispatch and receipt reports, secure storage of samples, and a locked and gated core shed. ▪ The assay method used is destructive. A representative sample library is maintained on site for reference.	KL
Audits or reviews	▪ The results of any audits or reviews of sampling techniques and data.	▪ No formal third-party audits have been undertaken to date. ▪ Laboratory procedures and manuals are comprehensively documented on-site and both the AMDEL and ALS laboratories are considered to be reputable laboratories for carbon analysis. As the assaying techniques used are broadly destructive techniques, with a limited ash residue, they are not suited for replicate analysis. ▪ The quality control protocols implemented at Uley 2 are considered to represent good industry practice and allow assessment of analytical precision and accuracy to a degree. The assay data is considered to display an acceptable level of precision and accuracy. ▪ Internal laboratory QAQC data (standards, blanks and duplicates) have been reviewed and no significant problems were identified regarding the quality of the chemical assaying.	KL

Section 2 Reporting of Exploration Results (Criteria listed in the preceding section also apply to this section)

Criteria	JORC Code Explanation	Commentary	Competent Person
Mineral tenement and land tenure status	▪ Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. ▪ The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	▪ The Uley Graphite Project consists of five contiguous tenements on the Eyre Peninsula of South Australia, of which two are retention leases, two are mining leases and one is an exploration licence. Tenement identification numbers are: RL66, RL67, ML5561, ML5562 and EL6224. ▪ Mining development is subject to the approved Program for Environmental Protection and Rehabilitation (PEPR) and an Environmental Licence which is mandated under South Australian State legislation. ▪ QGL has a 100% interest in these tenements and no royalty, joint venture or other material agreements are in place other than a royalty of 1.5% with its former parent company, SER. ▪ Tenement ownership is secure with expiration dates varying from 2016 (EL6224) to March 2017 (ML5561 and ML5562). There are no known impediments to obtaining a license to operate in the area.	KL
Exploration done by other parties	▪ Acknowledgment and appraisal of exploration by other parties.	▪ Historically a number of parties have undertaken exploration on the leases. The data set held by QGL, and used in the resource update, includes all available information.	KL
Geology	▪ Deposit type, geological setting and style of mineralisation.	▪ Graphite is developed as a constituent mineral in coarse prograde metamorphic assemblages as well as in the fabric and foliation of micaceous schists. These are interpreted to be the folded, thrusted and metamorphosed equivalents of the Cook Gap Schist. Folding of stratigraphy on various local scales is obvious from the core logging.	KL
Drillhole Information	▪ A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes: ▫ easting and northing of the drillhole collar ▫ elevation or RL (Reduced Level – elevation above sea level in metres) of the drillhole collar	▪ A summary of all drillholes used in the Resource Estimate is provided in Section 8.3 1 of the Mineral Resource estimate report.	VO/KL

Criteria	JORC Code Explanation	Commentary	Competent Person
	▫ dip and azimuth of the hole ▫ down hole length and interception depth ▫ hole length ▪ If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.		
Data aggregation methods	▪ In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated. ▪ Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. ▪ The assumptions used for any reporting of metal equivalent values should be clearly stated.	▪ This Table accompanies a Resource Estimation, and is not reporting Exploration results. ▪ No metal equivalents are used.	KL
Relationship between mineralisation widths and intercept lengths	▪ These relationships are particularly important in the reporting of Exploration Results. ▪ If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported. ▪ If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	▪ As this table accompanies a Resource Estimation, and is not reporting Exploration results, this section is not applicable. ▪ The relationships are captured and defined on a hole-by-hole basis in the resource model and orientations of holes to mineralised zone are appropriately accounted for in the estimate.	KL
Diagrams	▪ Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drillhole collar locations and appropriate sectional views.	▪ Refer to Section 4 of the Mineral Resource estimate report	VO/KL

Criteria	JORC Code Explanation	Commentary	Competent Person
Balanced reporting	▪ Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	▪ QGL carry out balanced reporting of exploration results. ▪ Selective sampling of visible graphitic material only has been carried out on the 2011 and current drill core.	VO/KL
Other substantive exploration data	▪ Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	▪ All available and material exploration information has been considered. This comprised a drilling database, previous estimates and reports, academic literature, petrological reports, metallurgical test work reports, dry rock density determinations, and site visit photography/communication. Historical production records from the original Uley Mine provided assumptions related to future potential economic extraction.	KL
Further work	▪ The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling). ▪ Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	▪ Exploration work to quantify the extent and continuity of mineralisation within the QGL-held tenure is ongoing. This work includes planned additional diamond and reverse circulation drilling, further geophysical surveys and geological mapping. Details of this exploration effort are deemed commercially sensitive.	KL

Section 3 Estimation and Reporting of Mineral Resources (Criteria listed in the preceding sections where relevant, also apply to this section)

Criteria	JORC Code Explanation	Commentary	Competent Person
Database integrity	▪ Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. ▪ Data validation procedures used.	▪ Data has been provided by QGL in the form of an Access database. ▪ A total of 18 1993 era diamond drill holes drilled by Graphite Mines of Australia, 12 SER diamond drillholes drilled in 2011, and 112 Valence angled diamond drillholes in the Uley area have been used in the resource modelling update. The database used for resource estimation consists solely of diamond drilling and has been reviewed and re-validated for obvious errors by Wicklow prior to commencing the resource estimation study. The assay data has been cross-checked against assay certificates provided by ALS Chemex. ▪ The following checks were completed prior to uploading the drilling data into a Surpac database: ▫ Check and correct overlapping intervals. ▫ Ensure downhole surveys existed at a 0m depth. ▫ Ensure consistency of depths between different data tables, for example survey, collar and assays. ▫ Check gaps in the assay data were replaced by -1 as a code for missing data. Non-sampled intervals were assigned a value of 0.01% Graphitic C.	VO
Site visits	▪ Comment on any site visits undertaken by the Competent Person and the outcome of those visits. ▪ If no site visits have been undertaken indicate why this is the case.	▪ Site visits were completed by the competent person in September and December 2018.	VO
Geological interpretation	▪ Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. ▪ Nature of the data used and of any assumptions made. ▪ The effect, if any, of alternative interpretations on Mineral Resource estimation. ▪ The use of geology in guiding and controlling Mineral Resource estimation.	▪ The current geological interpretation is based on a review of previous estimates and reports and has been augmented by the geological and structural information provided by the additional drillholes not available for the May 2015 MRE. ▪ Information from site visits and geological reports suggests the graphite lenses occurs within an anticlinorium i.e. a fold with parasitic folds on its limbs, as occurred in the now depleted Uley mine to the north. The current model is of a recumbent antiform plunging very shallowly to the	VO

Criteria	JORC Code Explanation	Commentary	Competent Person
	▪ The factors affecting continuity both of grade and geology.	ENE, with HW lodes dipping shallowly to the WNW and FW lodes dipping moderately (~33°) to the WNW. ▪ The deposit was previously constrained by Mineral Resource outlines based on mineralisation envelopes prepared using a 3.5 % TGC cut-off. On review the cut-off was adjusted to 2% TGC as the distribution in grade demonstrates a distinct variance at 2%. This likely represents the break between "ore" and waste. The adjusted mineralisation interpretation applied a minimum 2m down hole intercept with a maximum of 2 m internal waste. ▪ Geometallurgical domains were created to allow for the modelling of C as CO_3 cohesively and guide the 2018 metallurgical test work program. The geometallurgical domains (geodomains) are delineated based on lithology, mineralogy, weathering and C as CO3 content. A "carbonate" shell was created to define elevated C as CO3 based on a 1% C as CO3 cut-off.	
Dimensions	▪ The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	▪ The drilling relevant to the Mineral Resource estimate at Uley 2 extends over a distance of 375 m (from 9,225 m grid N to 9,600 m grid N) and includes a 125 m vertical interval from approximately 375 m to 500 m. The graphitic mineralisation is interpreted to extend along the full strike distance. Depth of interpreted mineralisation varies as structural events resulted in the plunge to the north-east of the tight isoclinal folds that host mineralisation. Mineralisation becomes shallower and closer to the surface towards the south-west of Uley 2.	VO
Estimation and modelling techniques	▪ The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. ▪ The availability of check estimates, previous estimates and/or mine production records and whether the Mineral	▪ Based on the dominant sample length, 1 m composites for TGC and C as CO_3 were extracted within the coded mineralisation by geodomains. Variable length compositing was used to ensure that no residuals were created. ▪ An assessment of the Coefficient of Variation (CV – ratio of the standard deviation to the mean) parameter resulted in the decision to top-cut C as CO_3 during grade estimation for some fresh domains. The CV was low for TGC within each mineralisation domain and therefore a top-cut was not required.	VO

Criteria	JORC Code Explanation	Commentary	Competent Person
	Resource estimate takes appropriate account of such data. ▪ The assumptions made regarding recovery of by-products. ▪ Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation). ▪ In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed. ▪ Any assumptions behind modelling of selective mining units. ▪ Any assumptions about correlation between variables. ▪ Description of how the geological interpretation was used to control the resource estimates. ▪ Discussion of basis for using or not using grade cutting or capping. ▪ The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.	▪ TGC (%) and C as CO_3 (%) were estimated into the block model using Ordinary Kriging (OK) utilising the cut 1m composites in Surpac mining software. Grade estimation was constrained to blocks inside individual mineralisation wireframes and geodomains with hard boundaries applied. Results below the detection limit were assigned a value of 0.01 % for both graphitic C and C as CO_3. ▪ Variograms were generated to assess the spatial continuity of TGC and C as CO_3 and as inputs to the kriging algorithm used to interpolate grades. Snowden Supervisor software was used to generate and model the variograms within each geodomain. The major direction (direction of maximum continuity) was oriented along strike with the intermediate (semi-major) direction oriented horizontally and the minor direction oriented orthogonal to the dip plane. ▪ A Surpac block model was used for the estimate with a block size of 12.5 m NS by 12.5 m EW by 4m vertical with sub-cells of 6.275 m by 6.275 m by 1 m. The chosen parent block size is based on the nominal drill hole spacing along with consideration of the geometry of the mineralisation and the results of the grade continuity analysis. ▪ OK grade interpolation used an oriented 'ellipsoid' search to select data for interpolation. Estimation parameters were developed specifically for TGC and C as CO_3 within each mineralised geodomain. Where cohesive variograms could not be achieved due to limited data, parameters were borrowed from other like domains. Search directions were adjusted to allow for variations in orientation as a result of folding. ▪ A three-step qualitative and quantitative process was applied to validate the grade estimate. This included visual comparison of block grades and the input drill hole composites and global comparisons of these grades. The grade trends shown by the composite data are honoured by the block model within each domain. Trend plots comparing the model and composite grades along and across strike and with depth were generated. The plots displayed good correlation between the sample grades and the block model grades in each direction. ▪ No other elements, deleterious or not, were estimated to date. No	

Criteria	JORC Code Explanation	Commentary	Competent Person
		assumptions were made concerning mining selectivity beyond small to medium scale open pit mining.	
Moisture	▪ Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	▪ Tonnes are estimated based on an average dry in-situ bulk density value.	VO
Cut-off parameters	▪ The basis of the adopted cut-off grade(s) or quality parameters applied.	▪ Optimisation studies completed in May 2015 on the previous Uley 2 MRE (Coffey) support the use of a 3.5% cut-off grade for Resource reporting.	VO/KL
Mining factors or assumptions	▪ Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	▪ The Uley graphite deposit has been historically mined by open cut mining methods and it is assumed that this will still be the case for any future mining operation in the area. ▪ No assumptions have been made about mining selectivity for specific material types or quality. ▪ No external mining dilution or other factors have been applied to the resource estimate.	
Metallurgical factors or assumptions	▪ The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	▪ Petrographic studies by Pontifex Pty Ltd demonstrated a range of graphite flake sizes within a gneissic quartz-feldspar matrix. Minor amounts of mafic gangue minerals such as biotite, amphiboles and pyroxenes are also present. Biotite is shown to be intergrown with the graphite in some samples. Graphite liberation test work completed during 2014 and 2015 by QGL delivered promising results. The subsequent 2019 metallurgical campaign was designed to ensure the necessary sample representivity across all geodomains. The 2019 program exceeded the previous test work and was achieved utilising limited crushing and grinding to 0.6 mm followed by conventional froth flotation concentration with multiple stages of polishing. The resultant flake size distribution is.	MG

Criteria	JORC Code Explanation	Commentary	Competent Person
		<table><tr><th>Size fraction µm</th><th>Size fraction (Mesh)</th><th>Approx. weight Distribution %</th><th>Graphitic C Purity %</th><th>LOI %</th></tr><tr><td>+300</td><td>+50</td><td>10.5</td><td>97.8</td><td>0.26</td></tr><tr><td>-300+150</td><td>-50+100</td><td>35.4</td><td>97.2</td><td>0.34</td></tr><tr><td>-150+75</td><td>-100+200</td><td>27.1</td><td>96.6</td><td>0.36</td></tr><tr><td>-75</td><td>-200</td><td>27.0</td><td>90.7</td><td>0.73</td></tr></table>	
Environmental factors or assumptions	▪ Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	▪ Mining development is subject to the approved Program for Environmental Protection and Rehabilitation (PEPR).	KL
Bulk density	▪ Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. ▪ The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. ▪ Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	▪ Bulk density test work was implemented by QGL in February 2019. The analysis was completed externally to Australian Standards by ALS Adelaide and designed to support on-site bulk density measurements completed as part of previous campaigns. Statistical analysis of the bulk density data determined a likely correlation between TGC or C as CO3 content and bulk density, dependent on geodomain. Bulk density was assigned to the model using calculations determined from the analysis.	VO
Classification	▪ The basis for the classification of the Mineral Resources	▪ The Mineral Resource classification criteria were developed based on an	EM

Criteria	JORC Code Explanation	Commentary	Competent Person
	into varying confidence categories. ▪ Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). ▪ Whether the result appropriately reflects the Competent Person's view of the deposit.	assessment of the following items: • Nature and quality of the drilling and sampling including QAQC review. • Drilling density. • Confidence in the understanding of the underlying geological and grade continuity and the structural characteristics. • Confidence in the estimate of the mineralised volume. • Bulk density data. • Model validation results. • The criteria listed in Table 1 Section 1 and Section 3 of the JORC Code. ▪ The resource classification scheme (Measured, Indicated and Inferred) adopted for the Uley 2 MRE was based on the following: • The majority of mineralisation was classified as Indicated Resource where the drilling density was 25 mE x 25 mN. A portion of the Resource where vertical drilling has reduced the drill density and supported the thickness and grade was classified as Measured Resource. • Where mineralisation wireframes were extrapolated to more than half of the drill density (approximately 12.5 m), the Resource was classified as Inferred Resource. There is no extrapolation outside of an appropriate range for Inferred classification. Material outside of the mineralisation envelopes was not classified. • Smaller mineralisation objects derived from minimal informing samples (less than 2 drill holes) were classified as Inferred. • Bulk density data test work completed in 2018 increased confidence in volume to tonnage conversions. ▪ The classification scheme as applied is considered to adequately reflect the sample density and geological interpretation based on all available drillhole data.	
Audits or reviews	▪ The results of any audits or reviews of Mineral Resource estimates.	▪ No third-party reviews have been undertaken on the Mineral Resource estimation process to date, though formal peer review as part of mine	VO

Criteria	JORC Code Explanation	Commentary	Competent Person
		planning processes have been completed.	
Discussion of relative accuracy/ confidence	▪ Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. ▪ The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. ▪ These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	▪ The grade estimate is based on the assumption that open cut mining methods will be applied and that a form of high confidence grade control sampling, for example based on RC grade control drilling or ditch-witch bench top sampling, will be available for final ore/waste demarcation. As such the resource estimate should be considered to represent a global resource estimate.	EM

VO *= Ms Vanessa O'Toole, an employee of Wicklow Resources Pty Ltd.* ***KL*** *= Ms Karen Lloyd, an executive director of Jorvik Resources Pty Ltd.* ***MG*** *= Mr Mark Giddy, an employee of Lycopodium Minerals Pty Ltd.* ***EM*** *= Ms Ellen Maidens, formerly an employee of Coffey.*

‘JORC Code 2012 Table 1’ Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section).

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th><th>Competent Person</th></tr>
<tr><td>Mineral Resource estimate for conversion to Ore Reserves</td><td>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.
Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</td><td>The Uley 2 Mineral Resource estimate described in Section 3 formed the basis for the conversion to Ore Reserves.
The Mineral Resource estimate is inclusive of the Ore Reserve estimate.</td><td>KL</td></tr>
<tr><td>Site visits</td><td>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.
If no site visits have been undertaken indicate why this is the case.</td><td>Ms Karen Lloyd, inspected the Uley site multiple times in the period January 2014 – April 2015. Ms Lloyd has not inspected the site since April 2015 as a further site inspection was not likely to reveal information material to the September 2019 Mining Study Update or Ore Reserve estimate</td><td>KL</td></tr>
<tr><td>Study status</td><td>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.
The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</td><td>A feasibility study is being completed by Lycopodium Ltd using reliance on the following parties:
<table>
<tr><td>Market research and commodity price</td><td>Quantum</td></tr>
<tr><td>Mining operating and capital cost</td><td>Lycopodium</td></tr>
<tr><td>Mine planning</td><td>Jorvik</td></tr>
<tr><td>Metallurgical and processing</td><td>Lycopodium</td></tr>
<tr><td>Processing costs</td><td>Lycopodium</td></tr>
<tr><td>General site operating costs</td><td>Quantum</td></tr>
<tr><td>General site infrastructure</td><td>Quantum</td></tr>
<tr><td>Geotechnical investigation</td><td>Quantum</td></tr>
<tr><td>Hydro(geo)logical investigation</td><td>Quantum</td></tr>
<tr><td>Tailings storage facility</td><td>Lycopodium</td></tr>
<tr><td>Social and Environmental</td><td>Quantum</td></tr>
<tr><td>Legal tenure</td><td>Quantum</td></tr>
<tr><td>Government</td><td>Quantum</td></tr>
</table></td><td>KL</td></tr>
<tr><td>Cut-off parameters</td><td>The basis of the cut-off grade(s) or quality parameters applied.</td><td>A 3.5% graphitic carbon lower cut-off was used. This was based on an assessment of the grade tonnage curve and the operating cost profile.</td><td>KL</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary	Competent Person
Mining factors or assumptions	The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design). The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc. The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc), grade control and pre-production drilling. The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate). The mining dilution factors used. The mining recovery factors used. Any minimum mining widths used. The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion. The infrastructure requirements of the selected mining methods.	• Mining will be undertaken by conventional open pit methods of load and haul, utilising small mining equipment comprising 100t diesel hydraulic excavators and 60t off-highway dump trucks. • Detailed pit design work was completed based on pit optimisations using Whittle Four-X optimisation software. Only Measured and Indicated Resources were used in the pit optimisation. • The life of mine waste to ore strip ratio is approximately 4.6:1. • Pit slope parameters were based on the slope parameters and conditions the historical Uley 1 pit and the supporting geotechnical investigations undertaken by Barrett and Fuller. • Grade control is expected to be undertaken using surface trenching using Ditch Witch equipment. • No mining dilution was included in the optimisation work given the expected strong visual mining control. A mining recovery of 95% was assumed. • A minimum cutback mining width of 25m was adopted. • The mine plan was based on Measured and Indicated Resources. • The primary infrastructure required for the development of the Project includes the refurbishment of the existing Tailings Storage facility, the construction of a new processing plant and the establishment of a water borefield. The site has an existing power supply and access is possible via the existing road infrastructure	KL
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralisation. Whether the metallurgical process is well-tested technology or novel in nature. The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	• The proposed metallurgical flowsheet includes conventional primary crushing and milling, followed by flotation with polishing regrinding to achieve clean graphite. Graphite concentrate drying, sizing and bagging of screened products to meet industry standard size ranges will be performed. Tailings will be thickened to recover water and disposed of to a lined storage facility. The proposed metallurgical process follows well accepted industry standard processing approaches and uses established, proven technologies.	MG

Criteria	JORC Code Explanation	Commentary	Competent Person
	Any assumptions or allowances made for deleterious elements. The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole. For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	• A testwork programme was conducted at the ALS Metallurgical laboratory in Perth. Five composite samples were made up representing the various geodomains identified. Graphite mineralisation appears to be similar across the geodomains with all samples upgrading to over 95% purity (total graphitic carbon (TGC) grade) in 3 cleaning stages, but the differences in gangue mineralisation impacted on the flotation reagent regime required. For the master composite representing the life of mine geodomain blend, the recommended TGC recovery for economic evaluation was 85%. Variabilities in feed blending in the mine schedule will take account of the individual geodomain recoveries. The graphite product has a large coarse flake fraction of typically 45-50% >150 µm. • Testwork is on-going for the tails settling and geo chemistry. Further work is also planned for regrinding mill optimisation and flotation scale-up to pilot scale cells.	
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	• Quantum has obtained approval under the Mining Act (1971) which includes a comprehensive Program for Environment Protection and Rehabilitation (PEPR) and an environmental licence. • Detailed impact assessments are on-going in areas including air quality, groundwater, surface water, flora, fauna, noise, social, visual, and heritage • It is expected that all predicted impacts may be adequately mitigated and/or managed and that the site will be approved for re-establishment by the South Australian government.	KL
Infrastructure	The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.	• A new process plant and supporting infrastructure will be constructed on site to process 0.5 Mtpa new feed and generate 55-60,000 tpa graphite product. • Personnel will be accommodated in Port Lincoln which is 23km by sealed road from the Uley mine site.	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
		• Roads and power supply infrastructure in place to service the construction and subsequent plant operations phases. • A water borefield will be established by Quantum prior to the commencement of construction activities • A transport and logistics study has been completed for supply of operating consumables and transport of the containerised product to offshore customers. .	

Costs	The derivation of, or assumptions made, regarding projected capital costs in the study.
	The methodology used to estimate operating costs.
	Allowances made for the content of deleterious elements.
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.
	The source of exchange rates used in the study.
	Derivation of transportation charges.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.
	The allowances made for royalties payable, both Government and private.
		• The capital cost and operating cost estimates are commensurate with a feasibility level study and were estimated by the Study contributors as listed under the Study Status criterion discussed above. The capital cost estimate has been developed through the collation of a number of first principle estimates completed by the various Lycopodium Study contributors on completion of sufficient design works to provide bills of materials to the estimators, quotations from equipment providers and contracting companies and estimates carried out directly by the owner's team. The operational cost estimate was developed on a 'first principle basis:
		• Forecast operational manning levels
		• Proposed organisation charts
		• Reagent & consumables usage forecast by system modelling and based on testwork usage rates
		• Fuel utilisation estimates
		• Calculated power consumption from the electrical load list
		• Operational readiness costs
		• Estimated mining costs
		  o The estimated capital costs for the Project are $79.98M.
		  o The mining costs were estimated at $2.50/t mined.
		  o The estimated process operating costs, including drying and bagging, for the Project are $439/dmt of concentrate.
		• Royalties of 5% of were included in the operating estimates.
			KL

Criteria	JORC Code Explanation	Commentary	Competent Person
Revenue factors	The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc. The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	• Assumptions made regarding revenue factors including head grade, commodity price, exchange rates, transportation and treatment charges have been derived by Quantum and relied upon by Ms Lloyd. An average LOM concentrate price of US$919/dmt was used to inform the pit shell optimisation work. • A long-term AUD:USD foreign exchange rate of 1.43 was adopted	KL
Market assessment	The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future. A customer and competitor analysis along with the identification of likely market windows for the product. Price and volume forecasts and the basis for these forecasts. For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	• Quantum has completed a detailed analysis covering the forward supply and demand outlook and long-term pricing forecasts including a technical marketing and specification study for the Uley graphite basket prices. • Quantum has represented this information in writing to Ms Lloyd for use in mine optimisation, mine planning and Ore Reserve estimation. Ms Lloyd is satisfied that Quantum have established a likely market window for the Uley products. • The testing and acceptance of Uley graphite products has been made by several offtake parties. • The likely product specifications and possible product marketability and overall potential for economic extraction are considered by Ms Lloyd to support the Ore Reserve estimate.	KL
Economic	The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. NPV ranges and sensitivity to variations in the significant assumptions and inputs.	• The financial evaluation undertaken as part of the Study indicated a positive net present value (NPV) at a 10% discount rate. • Sensitivity analysis indicated that a negative 20% change in product price, foreign exchange rate, operating cost or capital cost results in a positive NPV.	KL
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	• A social impacts and benefits study has been completed as part of the requirements of the PEPR	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
Other	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves: Any identified material naturally occurring risks. The status of material legal agreements and marketing arrangements. The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.	• No significant (high) naturally occurring risks were identified during a whole of project risk assessment. • All Quantum tenure is in good standing with all legal obligations met. Regular meetings with state and federal Government agencies occur for the purposes of discussing required approvals and facilitating meetings with other stakeholders. • The PEPR currently imposes a depth restriction on mining at Uley within ML5561 and ML5562. Life of Mine production will be reliant upon mining beyond this depth restriction and also relies upon the conversion of a part of the EL4778 into a Mining Lease. Quantum are currently undertaking relevant studies and are in consultation with the South Australian government on these matters.	KL
Classification	The basis for the classification of the Ore Reserves into varying confidence categories. Whether the result appropriately reflects the Competent Person's view of the deposit. The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	• Proved and Probable Ore Reserves were based on the Measured and Indicated Mineral Resources contained within the pit design. The financial analysis showed that the economics of the project were positive and the risk analysis did not identify any material risks • All Measured Resources that were contained within the pit design were converted to Proved Ore Reserves.	KL
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	• No external audits or reviews of the Ore Reserve estimates have been undertaken.	KL
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an	• The relative accuracy and confidence of the Ore Reserve estimate is inherent in the Ore Reserve Classification. No mine production data is available for reconciliation and/or comparative purposes. • Factors that may affect the global tonnages and the associated grades include: Mining dilution, mining recovery and mass yield	KL

Criteria	JORC Code Explanation	Commentary	Competent Person
	approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.		