ASX Announcement

27 August 2024

Julia Creek Project – Scoping Study Completed

Critical minerals explorer and developer QEM Limited (ASX: QEM) (QEM or Company) is pleased to announce the completion of a positive Scoping Study ("Study") in its flagship Julia Creek Project located in Queensland's North West Minerals Province.

Scoping Study Cautionary Statement

The Scoping Study referred to in this ASX release has been undertaken for the purpose of initial evaluation of the potential for development of a series of an open pit and processing facilities at the Julia Creek Project ("JCP"). It is a preliminary technical and economic study of the potential viability of the Julia Creek Project. The Scoping Study is based on low level technical and economic assessments (+/- 40% accuracy) that are not sufficient to support the estimation of Ore Reserves or to provide assurance of an economic development case at this stage or to provide certainty that the conclusions of the Scoping Study will be realised. Further exploration and evaluation work and appropriate studies are required before QEM will be able to estimate any Ore Reserves or to provide any assurance of an economic development case.

The Scoping Study is based on the material assumptions outlined below. These include assumptions about the availability of funding. While QEM considers all the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Scoping Study will be achieved.

To achieve the range of outcomes indicated in the Scoping Study, funding of in the order of $744 million excluding contingency costs and indirect costs such as owner's costs and EPCM (inclusive of these elements, the pre-production capital expenditure is $1,095 million) will likely be required. Investors should note that there is no certainty that the Company will be able to raise that amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of QEM's existing shares. Given the scale of the pre-production capital expenditure required, it is likely that QEM will need to access multiple streams of funding opportunities and/or partnering opportunities in order to support the pre-production capital expenditure, which may include a combination of project debt, equity capital, offtake prepayment, farm-in, joint venture and other appropriate initiatives.

It is also possible that QEM could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the project. If it does, this could materially reduce the Company's proportionate ownership of the project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study

Production Target Cautionary Statement

The Company has concluded that it has reasonable grounds for disclosing a production target which includes a proportion of Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. Indicated Mineral Resources comprise approximately 100% of the processing feed tonnage for vanadium and oil shale Resource in the first seventeen years of the Project's operating life. Inferred Mineral Resources comprise approximately 14%, 79% and 43% of processing feed tonnage for vanadium and oil shale Resource in years eighteen, twenty-three, and twenty-seven of the Project's operating life respectively. Finally, the processing feed tonnage for the last two years of LOM (years 29 and 30) is approximately 100% Indicated Mineral Resource and overall, 80% if the processing feed tonnage is Indicated Mineral Resources. The viability of the development scenario envisaged in the Scoping Study does not depend on the inclusion of Inferred Mineral Resources, and accordingly, Inferred Mineral Resources are not a determining factor of the Project's economic viability.

The Mineral Resources Estimate underpinning the production target in the Study has been prepared by a Competent Person and Qualified Estimator in accordance with the requirements of Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves JORC Code (2012) and the Petroleum Resource Management System SPE guidelines (2018).

For full details of the Mineral Resource Estimates for the Julia Creek Project, including JORC Table 1, please refer to "ASX Announcement – *QEM Upgrades Julia Creek Resource Base (Updated)",* released to the ASX on 05 March 2024. QEM confirms that it is not aware of any new information or data that materially affects the information included in those releases. All material assumptions and technical parameters underpinning the Estimates in the announcement continues to apply and have not materially changed.

ASX Announcement

27 August 2024

Julia Creek Project – Scoping Study Completed

Highlights:

- → **The Scoping Study has demonstrated that the Project has robust economic outcomes and no significant issues to prevent it from progressing to a pre-feasibility stage.**
- → **Post-tax NPV(8%) of approximately AUD 1,106M and 16.3% IRR[1].**
- → **Projected revenue over the life of mine from V_2O_5 sales is approximately 11.5Bn AUD and approximately 10.1Bn AUD from sale of transport fuel (Total revenue 21.7Bn)[2].**
- → **Pre-production capital expenditure is estimated at approximately AUD 791M excluding contingency costs and indirect costs such as owner's costs and EPCM[3].**
- → **Payback period of approximately 5 years from the start of mining.**
- → **30-year mine schedule with a production target of approximately 10,571 tonnes (23.3Mlbs) of vanadium pentoxide (99.5% pure) and 313 million litres of transport fuel per annum over the life of mine.**
- → **Mineralisation likely to be sourced from one shallow open-cut pit with an average steady state annual mining schedule target of approximately 5.1Mt (dry basis) at 0.27% V_2O_5 and 54.1 litres/tonne in-situ of oil equivalent.**

[1] Based on a projected vanadium pentoxide (V_2O_5) selling price of approximately USD11.56/lb and an exchange rate of AUD:USD 0.68. The projected selling price has been selected on the assumption that a premium is to be applied on the basis of the 99.5% grade of the V2O5 and with reference to the Vanitec Forecast and Vanadium Market Overview presented in July 2024 which projects the long-term average price of V2O5 to be USD12.26/lb. Refer to page 19 'Project Economic Modelling' of the Appendix A Executive Summary for further information.

[2] Refer to Footnote 1 in respect of the V_2O_5 selling price. The transport fuel selling price of AUD 1.202/L (AUD 191.18/bbl) has been selected based on the 3-year average wholesale at the gate price for diesel ex. Brisbane (excluding excise and GST).

[3] Inclusive of contingency costs and indirect costs, pre-production capital expenditure is estimated at AUD 1,096M.

SUMMARY – JULIA CREEK PROJECT

The Julia Creek Project comprises four granted Exploration Permits for Minerals (EPMs) covering a total area of approximately 250km^2. The tenements form part of the vast Toolebuc Formation, which is recognised as one of the largest deposits of vanadium and oil shale in the world.

The Julia Creek project is a unique world class resource with the potential to produce vanadium pentoxide and transport fuel. QEM strives to become a global supplier of high-purity vanadium pentoxide for the emerging energy storage sector.

This globally significant JORC (2012) Mineral Resource of 2,870 Mt @ 0.31% V2O5 is one of the single largest ASX listed vanadium resources and represents a significant opportunity for development. The resource is comprised of 461Mt @ 0.28% V2O5 in the Indicated category and 2,406Mt @ 0.31% V2O5 in the Inferred category, with the added benefit of a contingent (SPE-PRMS 2018) in-situ oil resource of 6.3 MMBBls of Oil equivalent in the 1C category, 94MMBBls in the 2C category, and 654MMBBLs in the 3C category, contained within the same ore body.

The Project is significant at regional, national and international scales, as supported by the Critical Minerals Strategies published by both Queensland and Federal Governments. These strategies target the accelerated development of critical minerals projects to produce minerals such as vanadium that are required for sustainable supply chains and in addressing the energy transition.

The Julia Creek Project is located approximately 16 km southeast of the Julia Creek township. Julia Creek is approximately 650 km west of Townsville and 250 km east of Mount Isa. Julia Creek falls within the McKinlay Shire Council local government area. The town of Julia Creek serves as a hub for the surrounding agricultural and mining activities and also provides essential amenities and services for residents and workers in the area.

With its strategic location near Julia Creek and convenient access via the Flinders Highway and Julia Creek Airport, QEM's Julia Creek project enjoys a favourable position within the region's mining and resource industry.

QEM Managing Director, Gavin Loyden, commented:

“This study represents a significant milestone for the Company and the Julia Creek Project. For the first time, we have detailed initial financial analysis to complement the technical and exploration achievements we've made to date.

We are seeking to develop a major, long-term project at Julia Creek and this study clearly articulates the potential that exists at our flagship project and reaffirms our ambition to become a key player in the long-duration vanadium battery storage market.

The study highlights the culmination of a lot of hard work and our dedicated team continues to work diligently toward the delivery of that goal. We are excited to share this detailed technical and financial information with our shareholders and potential investors."

QEM Chair, Tim Wall, commented:

"I wish to congratulate the QEM team for developing a distinctive and commercially attractive project for on-site critical minerals refining in Qld. The multi-commodity nature of QEM's Julia Creek Project demonstrates strong revenue potential and the technical solutions presented enable capital efficient mining, on-site processing and refining to produce high purity Vanadium with a compelling investment proposition.

"I thank the team for their diligent and comprehensive work to demonstrate the technical and financial viability of QEM's ambitions in the long-duration Vanadium battery market and look forward to the achievement of future key milestones as we continue to progress the project."

FORWARD LOOKING STATEMENTS

The Scoping Study referred to in this ASX release contains 'forward-looking information' that is based on the Company's expectations, estimates and projections as of the date on which the statements were made.

QEM has concluded that it has a reasonable basis for providing these forward-looking statements and believes it has a reasonable basis to expect it will be able to fund development of the Julia Creek Project. However, several factors could cause actual results or expectations to differ materially from the results expressed or implied in the forward-looking statements. Given the uncertainties involved, investors should not make any investment decisions based solely of the results of this Study.

This forward-looking information includes, among other things, statements with respect to the Company's business strategy, plans, development, objectives, performance, outlook, growth, cash flow, projections, targets and expectations, mineral reserves and resources, results of exploration and related expenses.

Generally, this forward-looking information can be identified by the use of forward-looking terminology such as 'outlook', 'anticipate', 'project', 'target', 'potential', 'likely', 'believe', 'estimate', 'expect', 'intend', 'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve' and similar expressions.

The Study has been completed to a level of accuracy of +/-40% in line with industry standard accuracy for this stage of development. All dollar figures are presented in Australian dollars (AUD) except where specifically otherwise indicated.

Persons reading this announcement are cautioned that such statements are only predictions, and that the Company's actual future results or performance may be materially different.
Forward-looking information is subject to known and unknown risks, uncertainties and other factors that may cause the Company's actual results, level of activity, performance, or achievements to be materially different from those expressed or implied by such forward-looking information.

STUDY TERMINOLOGY

For the avoidance of doubt, any reference to mining quantities in this report is solely to support the description of the mine plan and is not an estimate per international reporting codes. The following terms have been adopted for referring to the estimation of mineable quantities:

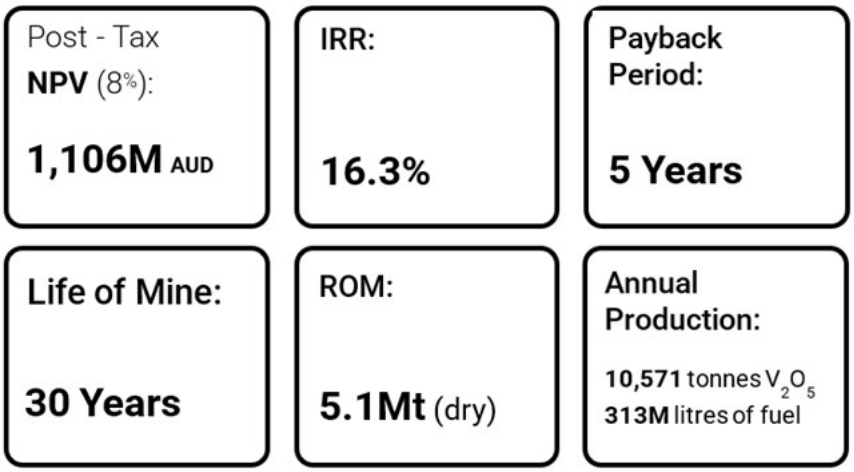
In situ mineable quantity (non-JORC terminology) is used in this report to refer to in situ mineralised rock within the ultimate pit design that has not had loss and dilution applied, and

Mineable ore (non-JORC terminology) is used in this report to refer to the mineable in situ mineralisation within the ultimate pit design that has had ore loss and waste rock dilution applied and is above the cut-off grade.

For the avoidance of doubt, no Ore Reserves have been reported and this terminology is only used to refer to the estimation of mineable quantities.

KEY STUDY FINDINGS

All financial outcomes reflect an approximate or estimated value.
Key physical metrics for the Project, key financial outcomes and key assumptions used in the Scoping Study are summarised below (the below graphic should be read with the detailed notes that follow).



Key Outcomes of the Scoping Study:

- Post-tax NPV of AUD 1,106 M (8% discount rate), DCF-IRR of 16.3%, and a payback period of 5 years from the start of mining [4].
- Pre-production capital expenditure is estimated at approximately AUD 791M [5]
- Projected revenue over the life of mine from V_2O_5 sales is approximately 11.5Bn AUD and approximately 10.1Bn AUD from sale of transport fuel (Total revenue 21.7Bn) [6].
- 30-year mine schedule with over 80% of the process plant feed is Indicated Resources;
- Scheduled plant feed quantities of approximately 148.4M dmt (154.7 M wmt @ ~4% moisture) at an average of 0.27% V_2O_5 and 54.1 litres per tonne (L/t) (PRMS), and strip ratio of 5:1;
- Pit limit sensitivity analysis indicated the majority of the lease has economic ore and, therefore, the Project has significant potential to increase production or the life of the operation;
- Mine life of 30 years, assuming an ore production rate of 5.1 Mt (dry) (5.3 Mt wet) per year;
- Over the LOM, an average production of 10,571 tpa (23.3Mlbs) V_2O_5 (99.5% grade) and 5,960 bbl/day (313 million litres per annum) of transport fuel;
- Approximately 7% of the produced transport fuel is to be provided free-issue to the mining contractor to undertake the mining work. Therefore, the average transport fuel sold is 5,500 bbl/day (874,500 L/day) totalling 291 million litres per annum;

[4] Based on a projected V2O5 selling price of approximately USD11.56/lb and exchange rate of AUD:USD 0.68. The projected selling price has been selected on the assumption that a premium is to be applied on the basis of the 99.5% grade of the V2O5 and with reference to the Vanitec Forecast and Vanadium Market Overview presented in July 2024 which projects the long-term average price of V2O5 to be USD12.26/lb. Refer to page 19 'Project Economic Modelling' of the Appendix A Executive Summary for further information.

[5] Excluding contingency costs and indirect costs such as owner's costs and EPCM. Inclusive of contingency costs and indirect costs, pre-production capital expenditure is estimated at AUD 1,096M.

[6] Refer to Footnote 1 in respect of the V_2O_5 selling price. The transport fuel selling price of AUD 1.202/L (AUD 191.18/bbl) has been selected based on the 3-year average wholesale at the gate price for diesel ex. Brisbane (excluding excise and GST).

- Ongoing replacement and sustaining capital of AUD 598 M (over 30-year mine life ~AUD 20 M per annum), resulting in a total capital expenditure of AUD 1,694 M (including contingency costs and indirect costs);
- Mine cash operating costs average AUD 83.36/dmt plant feed (including royalties, transport costs and contingency); and
- Projected vanadium pentoxide (V_2O_5) selling price of approximately USD11.56/lb and transport fuel at AUD 1.20/L (AUD 191.18/bbl) excluding excise and GST.
- A sensitivity analysis[7] across a range of +/-15% undertaken on product selling price, capital and operating costs, and product output indicates that the NPV remains positive for each analysis. The Project is most sensitive to the selling price and operating costs as outlined on the table below:

Project Economic Sensitivities

Variable	Lower %	Upper %	Lower NPV (AUD million)	Upper NPV (AUD million)
Sale Price	85%	115%	343	1,847
Opex	115%	85%	462	1,732
Plant Recovery	95%	105%	837	1,356
Capital	115%	85%	909	1,285
Diesel for Mining Operations[a]	125%	75%	1,097	1,097

a Approximately 7% of the transport fuel produced by QEM is to be provided free-issue to the mining contractor to undertake the mining work. Fuel is provided free of charge to the mining Contractor, therefore, a change in the price of diesel (as a cost) is immaterial to the estimated NPV.

Please refer to Appendix A (Scoping Study Summary), Appendix B (Risks and Opportunities), and Appendix C (JORC Table 1), which each contain important information in relation to this announcement.

MARKET OUTLOOK

Vanadium

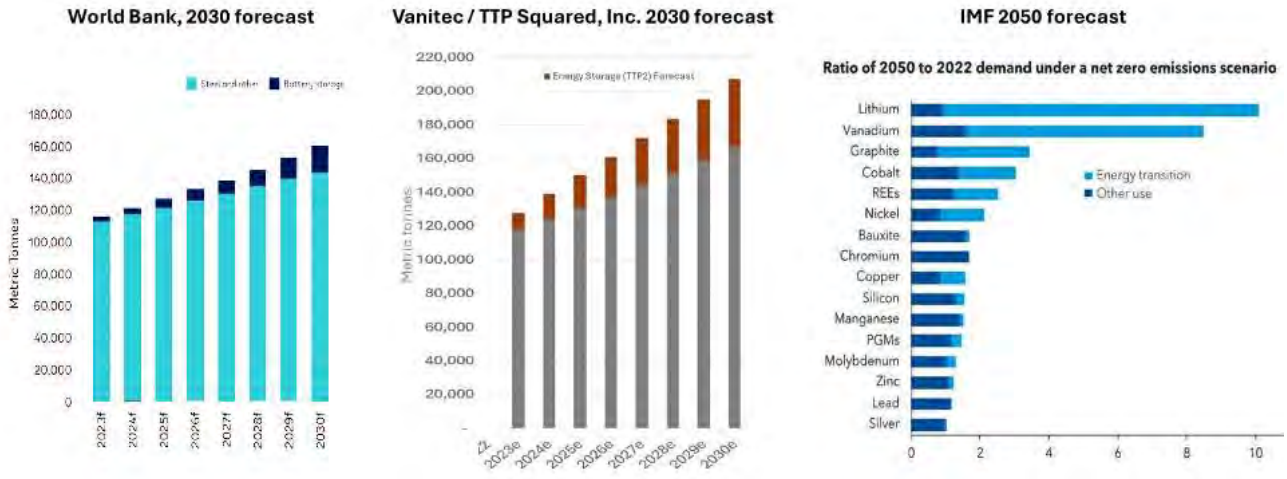
In 2022, the Australian Government designated vanadium as a Critical Mineral. According to the Australian Government's Critical Minerals Strategy 2023-2030[8], a Critical Mineral is a mineral essential to modern technologies, economies, and national security, with supply chains that are vulnerable to disruption.

According to United States Geological Survey, in 2023, 70% of the global vanadium supply comes from China and Russia, and the balance from South Africa, Brazil, United States, India, and Vietnam.

Approximately 90% of global vanadium consumption is in the making of steel for products in the industrial and automobile sectors. In 2023, only 4% of demand came from Vanadium Flow Battery electrolyte[9]. However, as power grids around the world continue to replace fossil fuel power plants with large-scale renewable energy assets, long-duration energy storage (such as vanadium batteries) is critical to ensuring reliable grid operation.

[7] For further information on the results of sensitivity analysis on product selling price, capital and operating costs, and product recovery refer to Appendix A – Julia Creek Scoping Study, pages xxiv – xxvi.
[8] Critical Minerals Strategy 2023–2030, Australian Government Department of Industry, Science and Resources.
[9] Vanadium Battery Storage Report, Circular Business Model for Vanadium Use in Energy Storage, World Bank, 2024.

Demand projections have been recently published by a variety of institutions such as Vanitec, the World Bank, International Monetary Fund:



QEM's objective of producing high purity vanadium pentoxide (99.5% pure) to address the demand in battery electrolyte for Vanadium Flow Batteries (VFB), responds to the market opportunity presented by the forecast demand growth in VFB. In their 2022 report, Guidehouse Insights forecasted the global annual deployments of VFBs to reach approximately 32.8 GWh in 2031, with Asia Pacific leading in deployments. This presents significant growth with a CAGR of 41% across the forecast period [10]. As power grids around the world continue to replace fossil fuel power plants with large-scale solar PV arrays and wind farms, long-duration energy storage (LDES) is critical to ensuring reliable grid operation.

Vanadium electrolyte is one of the critical components of vanadium flow batteries for LDES complementing renewable electricity generation. The purity of the electrolyte has an impact on the electrochemical performance and cost of the battery. Using high-purity vanadium is key to increasing battery performance, capacity and efficiency. High-purity means free from byproducts and chemical residue that can often be left behind and negatively impacts the electrochemical stability, charging and discharging, and ultimately battery life.

QEM favours a long-term average price of USD11.56/lb in line with its objective of producing high-purity vanadium pentoxide (99.5% pure) to address the demand in battery electrolyte for VFB, assuming ongoing market growth and limited increased capacity globally. Increased vanadium use in energy storage is likely to impact long term pricing with a premium being received for high purity V2O5 needed for use in batteries. This pricing is based on 2030 forecasts from the World Bank, Vanitec and Project Blue.

Transport Fuel

QEM's value proposition is to domestically produce transport fuel (such as diesel) in North West Queensland to address the demand and contribute towards Australia's liquid fuel security.

Australia almost entirely relies on refined product and crude imports to meet domestic consumption. Over the last decade, five Australian refineries have closed leaving only two Australian refineries in operation. In FY 2021, 91% of all liquid fuel consumed in Australia was imported [11]. This poses a significant fuel security risk due to the reliance on foreign countries, maritime transit and lack of sovereign supply. This was also identified in the Australian Government's National Defence Strategic Review in 2023, stating that fuel distribution in the north and northwest must be more effective and less vulnerable by introducing a more productive and predictable supply approach.

Over the last decade, the demand for diesel in Queensland has grown 180%. In 2023, 32.8 billion litres of diesel were consumed in Australia with Queensland consuming 25% (8.3 billion litres), making it highest consumption state in the country [12]. QEM's expected transport fuel production of approximately 313 million litres per annum represent a modest 4% of the annual demand in Queensland.

The Scoping Study assumes a transport fuel price of 120.24 cents per litre (AUD, excl. GST and excise). This price is based on the 2022 to 2024 daily average wholesale at the gate price from Brisbane (diesel product)[13].

[10] Vanadium Redox Flow Batteries, Identifying Market Opportunities and Enablers, Guidehouse Insights , 2022.
[11] Addressing Australia's Liquid Fuel Security, The Australia Institute, 2022.
[12] Australian Petroleum Statistics, Commonwealth of Australia 2023.
[13] Terminal wholesale gate prices, daily prices ex. Brisbane, Australian Institute of Petroleum.

PROJECT FUNDING

QEM will further progress project funding options during the pre-feasibility study stage.

To achieve the range of outcomes indicated in the Scoping Study, the Project is expected to require approximately $20 million for studies and evaluation and further funding in the order of $744 million excluding contingency costs and indirect costs such as owner's costs and EPCM will likely be required. Inclusive of these elements, the pre-production capital expenditure is $1,095 million.

QEM believes that to progress its project to the next stage it will be necessary to seek to access multiple funding streams and QEM is actively exploring other additional initiatives so as to proportionately contribute in this regard.

QEM has a supportive shareholder base and has successfully raised capital to progress development in the past. QEM has also actively taken steps to open up additional potential sources of revenue or saleable assets (refer for example to the Julia Creek Renewables Project) to assist in funding the continued development of the project.

Accordingly, QEM is confident in its ability to attract appropriate funding to progress this project to the next stage and believes that it has reasonable grounds for its assumptions in respect of funding sources.

Renewables project – potential future revenue streams / saleable asset

QEM refers to the Company's ASX announcement dated 15 January 2024 in respect of the Julia Creek Renewables Project.

In summary, this transaction involved QEM selling certain meteorological data, engineering design and equipment to EGPA (a renewable energy project developer) in relation to a potential large-scale renewables project proposed to be developed adjacent to QEM's project at Julia Creek. The transaction involved an upfront payment. The transaction also involves the potential for future staged payments to be made subject to the satisfaction of various conditions and a deferred payment on Final Investment Decision (FID) (which depends on the mix of renewable technologies selected and is not currently able to be ascertained). Additionally, on and from the commercial operation of the renewables project, QEM has secured a revenue-based royalty of between 1% - 2%, as well as energy offtake rights to supply its mine operations.

This potential revenue-based royalty stream may represent a possible saleable asset to assist in funding the continued development of the project.

Supportive Shareholder base

QEM has a supportive shareholder base and has successfully raised capital to progress its development in the past. The last two capital raising programs undertaken by the Company (2022 and 2023) were oversubscribed. Similarly, in 2023, major shareholder and non-executive director, David Fitch, made available to QEM an unsecured loan facility (which has since been repaid in full, such that QEM currently has zero debt).

Market outlook and demand / supply metrics are supportive of investment

QEM's proposed production mix of vanadium pentoxide and transport fuel aims to address market opportunities presented by forecasted global demand growth and the current lack of domestic supply in these respective resources.

Vanadium is recognised as a Critical Mineral by the Australian Government, largely due to its use in Vanadium Flow Batteries (VFB) which are critical to ensuring the reliable operation of renewable energy grids. QEM aims to produce high-purity vanadium pentoxide (99.5%) to meet the rising demand for VFBs, driven by a projected 41% CAGR in global VFB deployments, especially in the Asia Pacific region. High-purity vanadium is vital for enhancing battery performance, and increased demand in energy storage is expected to boost long-term pricing for high-purity vanadium.

In addition, Australia almost entirely relies on imports to meet domestic consumption of liquid fuel, with five Australian refineries closing over the last decade and 91% of fuel being imported. Simultaneously, the demand for diesel in Queensland has risen by 180% over the last decade. QEM's value proposition is to domestically produce transport fuel to address the demand and contribute towards Australia's fuel security.

QEM's proposed project timeline aligns significantly with these wider market trends. Refer to the Market Outlook section above for further information.

Incremental scale-up

QEM has a long-term outlook for this project and intends to scale as it further develops the Project. The key point at this stage of the process is to progress to the next stage which, with the completion of the Scoping Study, is to progress a detailed pre-feasibility study.

Other funding initiatives

There are various potential funding streams that may be available to QEM to finance further studies and the future development of the Project and the Company is committed to pursuing a funding mix that de-risks project development. In this regard, QEM has held preliminary discussions with two ASX200 companies, two investment funds (one Australia-based) and two non ASX listed overseas companies in the energy and heavy industry sector.

Board and management experience

The QEM Board draws upon decades of experience in the resources sector ensuring that the Company is well placed to progress the project through the next phases. QEM's Board of Directors and Management are experienced and have a successful track record in Finance and Equity Markets, Exploration, Development and Operation in the mining industry.

KEY CONSULTANTS

Please see the full text of the public Scoping Study Summary release below.

ENDS

This announcement was authorised for release on the ASX by the Board of QEM Limited.

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ABOUT QEM

QEM Limited (ASX: QEM) is a publicly listed company which is focused on the exploration and development of its flagship Julia Creek Project, covering 250km² in the Julia Creek area of North Western Queensland.

The Julia Creek vanadium and oil shale project is a unique world class resource with the potential to produce vanadium pentoxide and transport fuel. QEM strives to become a global supplier of high-purity vanadium pentoxide for the emerging energy storage sector.

This globally significant JORC (2012) Mineral Resource of 2,870 Mt @ 0.31% V2O5 is one of the single largest ASX listed vanadium resources and represents a significant opportunity for development. The resource is comprised of 461Mt @ 0.28% V2O5 in the Indicated category and 2,406Mt @ 0.31% V2O5 in the Inferred category, with the added benefit of a contingent (SPE-PRMS 2018) in-situ oil resource of 6.3 MMBBls of Oil equivalent in the 1C category, 94MMBBls in the 2C category, and 654MMBBLs in the 3C category, contained within the same ore body.

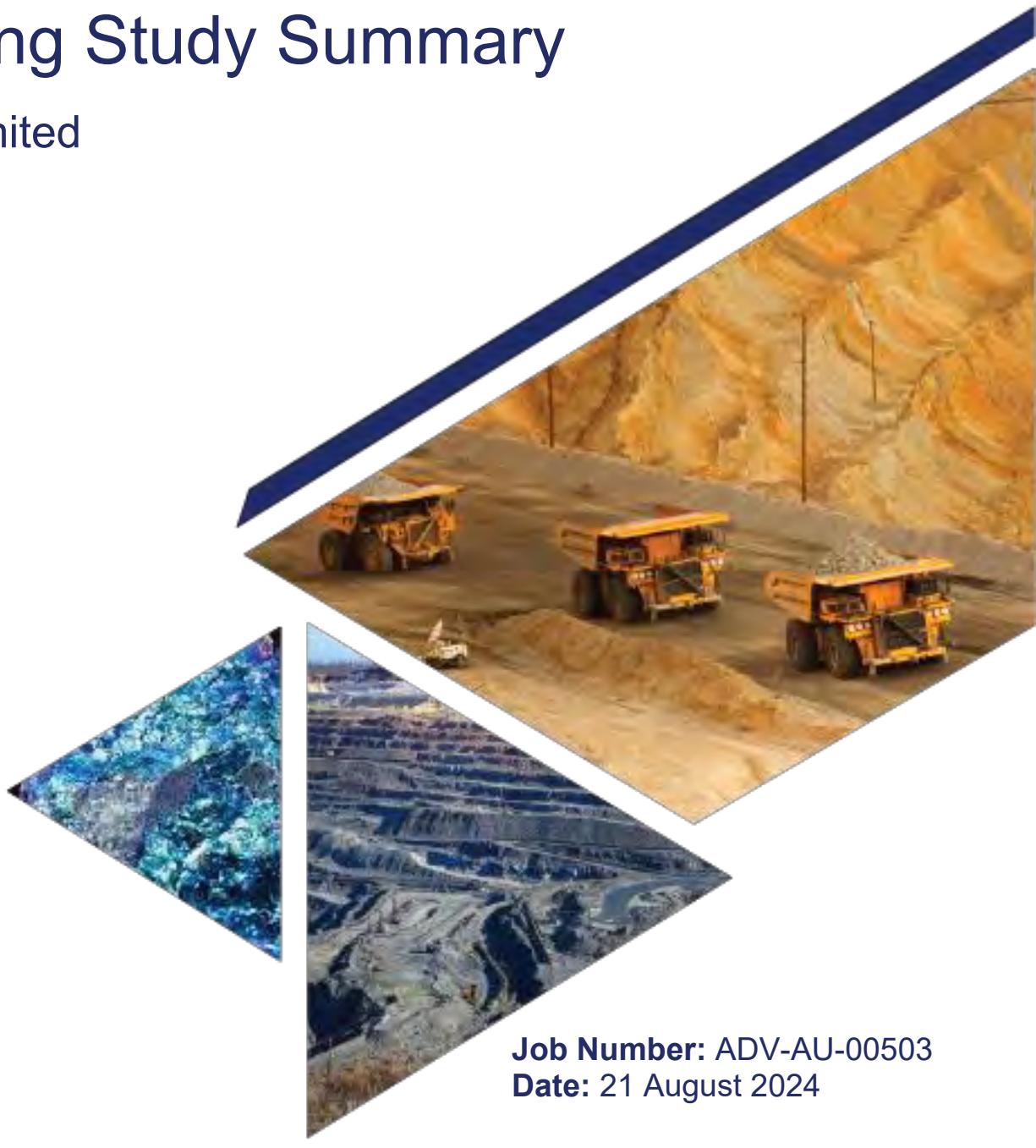
The tenements form part of the vast Toolebuc Formation, which is recognised as one of the largest deposits of vanadium and oil shale in the world and located 16km east of the township of Julia Creek. In close proximity to all major infrastructure and services, the project is intersected by the main infrastructure corridor of the Flinders Highway and Great Northern Railway, connecting Mt Isa to Townsville.

**The information in this announcement that relates to the mineral resource and contingent resource estimates for the Company's Julia Creek Project was first reported by the Company in its IPO prospectus dated 20 August 2018 and supplementary prospectus dated 12 September 2018 (together, the "Prospectus") and the subsequent resource upgrade announcements ("Resource Upgrade") dated 14 October 2019, 7 April 2022 and 5 March 2024. The Company confirms that it is not aware of any new information or data that materially affects the information included in the Prospectus and Resource Upgrade, and in the case of estimates of Mineral Resources and Contingent Resources, that all material assumptions and technical parameters underpinning the estimates in the Prospectus and Resource Upgrade continue to apply and have not materially changed.*

RPMGLOBAL

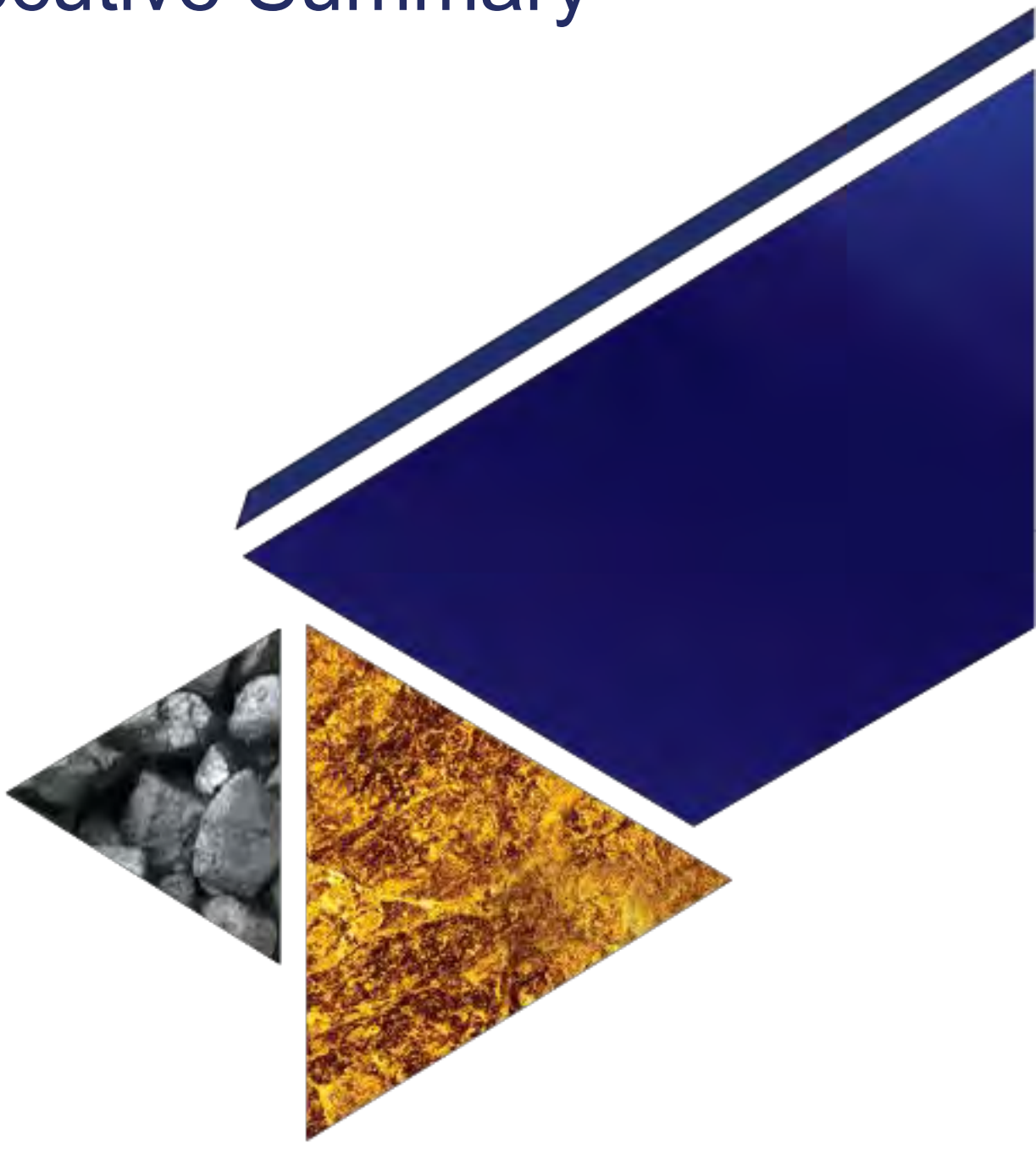
Julia Creek Project Scoping Study Summary

QEM Limited



Job Number: ADV-AU-00503
Date: 21 August 2024

Appendix A.
Executive Summary



APPENDIX A: Executive Summary

Introduction

RPM Advisory Services Pty Ltd ("RPM") was engaged by QEM Limited ("QEM" or the "Client") to complete a Scoping Study (hereafter referred to as the "Study") for its Julia Creek Project (the "Project") located in Queensland's North-West Minerals Province. This Executive Summary is extracted from the main Scoping Study prepared by RPM and represents a summary of the main Study and should not be relied upon as a standalone document.

The proposed development is an open cut mining operation with on-site processing facilities to produce high-purity vanadium pentoxide and transport fuel products. The Project is significant at regional and national scales, as supported by the Critical Minerals Strategies published by both Queensland and Federal Governments. These strategies target the accelerated development of critical minerals projects to produce the required minerals, such as vanadium, for sustainable supply chains to support the energy transition challenge.

Key Outcomes

The key outcomes of the Scoping Study include:

- Post-Tax NPV of approximately AUD1,106 M (8% discount rate), DCF-IRR of 16.3%, and a payback period of 5 years from the start of mining.
- Projected revenue over the life of mine from vanadium pentoxide (V_2O_5) sales is approximately AUD 11.5Bn, and approximately AUD 10.1Bn from the sale of transport fuel (Total revenue AUD 21.7Bn).
- Pre-production capital expenditure is estimated at approximately AUD 791M (CAPEX) and AUD 305M (7% owner's cost, 15% EPCM and 20% contingency) for a total of AUD 1,096M.
- Ongoing replacement and sustaining capital of approximately AUD 598M (over 30-year mine life ~AUD 20M per annum), resulting in a total capital expenditure of AUD 1,694M.
- 30-year mine schedule with over 80% of the process plant feed is Indicated Resources.
- Scheduled plant feed quantities of approximately 148.4M dmt (154.7 M wmt @ ~4% moisture) at an average of 0.27% V_2O_5 and 54.1 litres per tonne (L/t) (PRMS) and strip ratio of 5:1.
- Pit limit sensitivity analysis indicated the majority of the lease has economic ore and, therefore, the Project has significant potential to increase production or the life of the operation.
- Mine life of 30 years, assuming an ore production rate of approximately 5.1 Mt (dry) (5.3 Mt wet) per year.
- Over the LOM, an average production of approximately 10,571 tpa (23.3 Mlbs) V_2O_5 (99.5% grade) and 5,960 bbl/day (313 million litres per annum) of transport fuel.
- Approximately 7% of the produced transport fuel is to be provided free-issue to the mining contractor to undertake the mining work. Therefore, the average transport fuel sold is 5,500 bbl/day (874,500 L/day), totalling 291 million litres per annum.
- Mine cash operating costs average AUD 83.36/dmt plant feed (including royalties, transport costs and 5% contingency).
- Projected vanadium pentoxide selling price of approximately USD11.56/lb and transport fuel at AUD 1.20/L (AUD 191.18/bbl), excluding excise and GST.
- A sensitivity analysis across a range of +/-15% undertaken on product selling price, capital and operating costs, and product output indicates that the NPV remains positive for each analysis. The Project is most sensitive to the selling price and operating costs, refer **Table ES 1**.

Table ES 1 Project Economic Sensitivities

Variable	Lower %	Upper %	Lower NPV (AUD million)	Upper NPV (AUD million)
Sale Price	85%	115%	343	1,847
Opex	115%	85%	462	1,732
Plant Recovery	95%	105%	837	1,356
Capital	115%	85%	909	1,285
Diesel for Mining Operations[a]	125%	75%	1,097	1,097

a Approximately 7% of the transport fuel produced by QEM is to be provided free-issue to the mining contractor to undertake the mining work. Fuel is provided free of charge to the mining Contractor, therefore, a change in the price of diesel (as a cost) is immaterial to the estimated NPV.

Background

The 2024 Scoping Study focuses on a new processing flow sheet to reduce the feed tonnage into the oil facility and vanadium treatment plant, thereby reducing capital and operating costs.

This Study follows on from earlier studies into the Project. In 2016, a scoping study was completed on a vanadium-only development. The 2016 study identified substantial economic upside if the oil shale could also be successfully processed. QEM commenced the development of a processing technique to process oil shale, including trialling the process using a bench-scale pilot plant. Between 2020 and 2022, QEM conducted oil extraction tests based on the hydrogenation process (initially on a laboratory scale and subsequently with a bench-scale pilot plant), successfully proving the oil extraction process from the ore feed.

The Scoping Study commenced in 2023 by RPM, focusing on vanadium and transport fuel products. During the development of the Scoping Study, value engineering opportunities were identified that pre-treating the feed ore to remove calcite substantially reduced the tonnage directed to the vanadium refining and oil recovery facilities, which resulted in significant economic improvements for the Project. QEM subsequently undertook additional metallurgical investigations in late 2023 and early 2024. The outcome of these additional metallurgical investigations is an updated metallurgical flowsheet where a Feed Preparation Facility (FPF) removes significant quantities of calcite and a series of float cells that direct feed to either the Oil Recovery Facility (ORF) or Vanadium Refining Facility (VRF).

The Study outcomes are to guide future work with the intent of fast-tracking to a pre-feasibility study later this year.

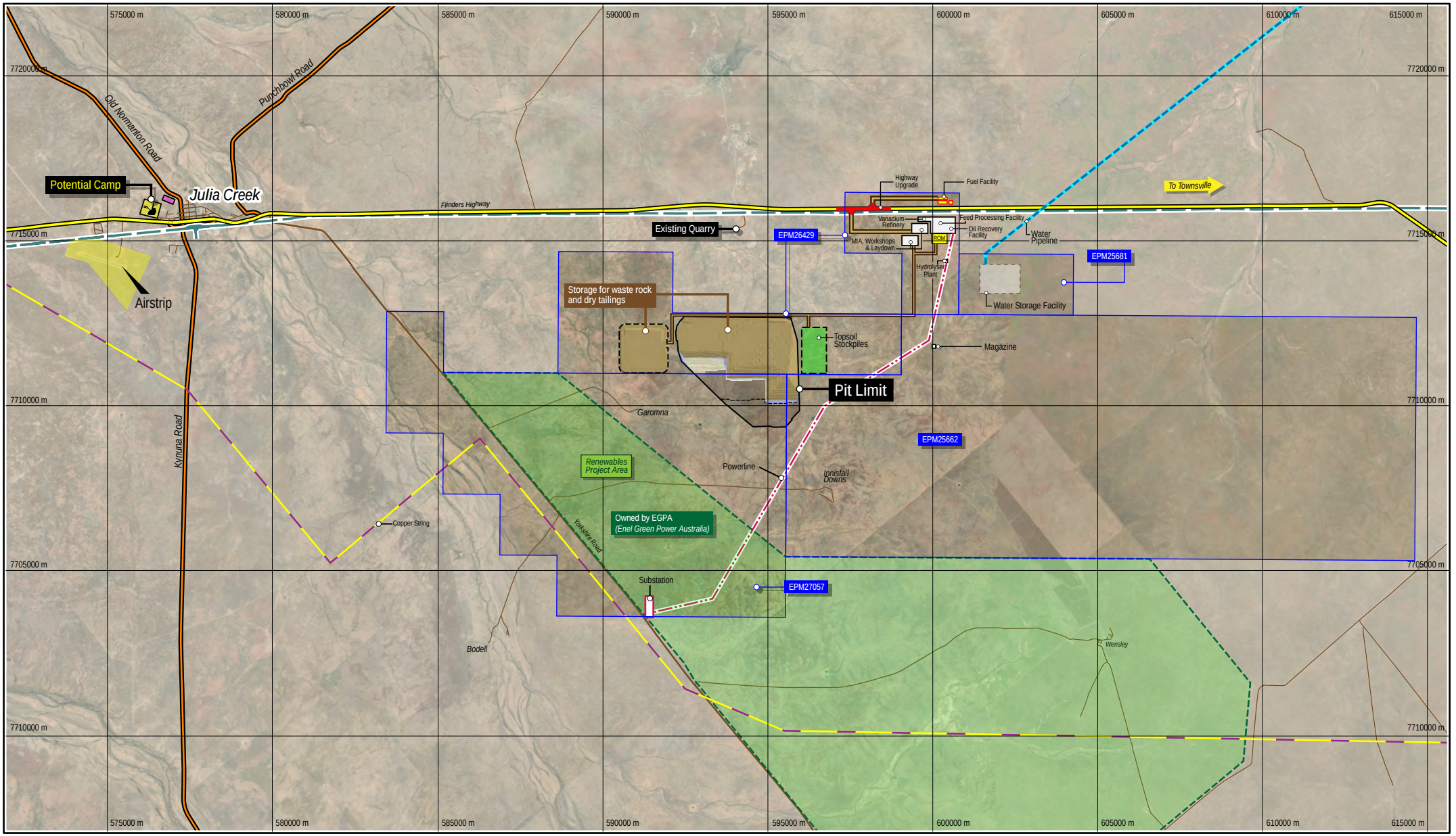
RPM classifies this study as a Scoping Study with an accuracy of ±40% and aligns with industry understanding. More detailed technical studies are required to increase the accuracy and confidence in the project costs and the reporting of Ore Reserves. This would include further design and engineering, supported by budget quotations directly from equipment suppliers. A 20% contingency has been applied to the capital costs in the financial modelling to reflect the unknowns.

The Julia Creek Project is about 16 kilometres (km) southeast of the Julia Creek township and 130 km east of Cloncurry in northwest Queensland. Julia Creek serves as a central point for nearby agricultural and mining activities and is accessible via the Flinders Highway, a crucial segment of the major east-west highway connecting Mt Isa to Townsville.

The Project enjoys close proximity to significant infrastructure and services, including the Great Northern Railway, a vital link in the MITEZ corridor, and the proposed CopperString 2032 transmission project being developed by Powerlink.

In addition to road access via the Flinders Highway, the site is also accessible by air, with Julia Creek Airport located approximately 19 km west of the project site. The site location is illustrated below in **Figure ES 1**.

In June 2023, the Queensland Department of Resources released the Queensland Critical Minerals Strategy. The Julia Creek/Richmond area has been identified as a Critical Minerals Zone in the Queensland Critical Minerals Strategy. According to the Queensland Government, “The Julia Creek/Richmond area has significant vanadium resources with the potential to develop an important critical minerals industry for Queensland (Julia Creek/Richmond Critical Minerals Zone Water Delivery Options, Queensland Government, 2023)



LEGEND

- EPM Boundary
- Rail
- Highway
- Secondary Highway
- Road
- Haul Road
- Copper String

N

0 2 4km

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CLIENT

QEM

PROJECT

NAME

JULIA CREEK SCOPING STUDY

DRAWING

PROJECT LOCATION

FIGURE No.	PROJECT No.	Date
ES1	ADV-AU-00503	August 2024

Project Description

The Project involves the development of a truck-and-shovel, open-pit mine using conventional strip-mining techniques. The total project life is 32 years, comprising a 24-month construction phase followed by a 30-year mining period and site rehabilitation the following year. The initial phase involves site preparation, infrastructure construction, waste pre-striping, and ore stockpiling. Major infrastructure to be constructed on-site includes a process plant (capacity of 5.1Mtpa (dry) ROM feed), ore stockpiles and handling equipment, mine offices, equipment workshops and an access road.

The Project proposes to produce a combination of high-purity vanadium pentoxide and transport fuel. The ore is selectively mined from an open cut pit and separated into vanadium-bearing and kerogen-rich feeds. The vanadium-bearing feed is processed to produce high-purity vanadium pentoxide (99.5% V_2O_5) at an estimated rate of 10,571 tonnes per year. QEM's value proposition is to produce high-purity vanadium pentoxide (99.5% pure) to address the demand for battery electrolyte to use in Vanadium Flow Batteries. The high-purity vanadium pentoxide is transported via road to Townsville for potentially future processing into vanadium electrolyte.

Processing the kerogen-rich feed involves the hydrogenation process followed by hydrotreating to produce transport fuel at a rate of 313 ML/a or 5,960 bbl/day. Approximately 7% of this transport fuel is provided to the mining contractor for all the mining work. The remainder is proposed to be sold at the gate to a distributor. The development proposes using some renewable energy to support ore processing into products. QEM's access to renewable energy depends on the successful completion of the State-owned CopperString 2032 transmission line, which started early construction works in July 2024.

Mining Titles and Property Ownership

The Julia Creek Project tenements include EPM 25662, EPM 25681, EPM 26429 and EPM 27057. Details relating to the status of the Julia Creek Project tenements have been obtained from the QDEX website (maintained by the Queensland Department of Natural Resources, Mines and Energy), and are shown below in **Table ES 2**.

Table ES 2 Julia Creek Project Tenement Details

Tenement	Concession Type	Area (km^2)	Status	Expiry
EPM 25662	Exploration Permit Minerals other than Coal	134.54	Granted	23/01/2025
EPM 25681	Exploration Permit Minerals other than Coal	6.41	Granted	06/03/2025
EPM 26429	Exploration Permit Minerals other than Coal	35.24	Granted	16/03/2027
EPM 27057	Exploration Permit Minerals other than Coal	73.63	Granted	02/05/2029

Geology and Mineral Resources

MGPL completed an updated JORC Mineral Resource estimate for the vanadium resource as of February 2024, as set out in **Table ES 3**. MPGL also completed a Mineral Resource estimate for the oil shale in accordance with the Petroleum Resources Management System (PRMS), as set out in **Table ES 4**. The quantities set out in each of the tables are independent estimates and are not additive.

The geological model area is approximately 1,000 km^2. It was constructed from 91 drill holes with modelling supported by seismic surveys demonstrating seam continuity. The location of drill holes and 2D seismic exploration work is illustrated below in **Figure ES 2**.

Table ES 3 Mineral Resource Estimate as of February 2024

Resource Class	Strata Unit	Mass (Mt)	Average Thickness (m)	In situ Density (gm/cc)	V2O5 (wt %)
Indicated	CQLA	167	3.17	2.4	0.24
	CQLB	128	2.58	2.28	0.3
	OSU	81	1.92	1.95	0.31
	OSL	84	2.02	1.93	0.32
	Total	**461**		**2.20**	**0.28**
Inferred	CQLA	697	2.46	2.42	0.23
	CQLB	826	3.13	2.23	0.39
	OSU	432	1.84	1.97	0.31
	OSL	451	1.95	1.95	0.29
	Total	**2,406**		**2.18**	**0.31**
	Total	**2,870**		**2.19**	**0.31**

Source: Mineral Resource Estimate Report, Julia Ck, 2024
The Mineral Resources Estimate has been prepared by a Competent Person in accordance with the requirements of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves JORC Code (2012).

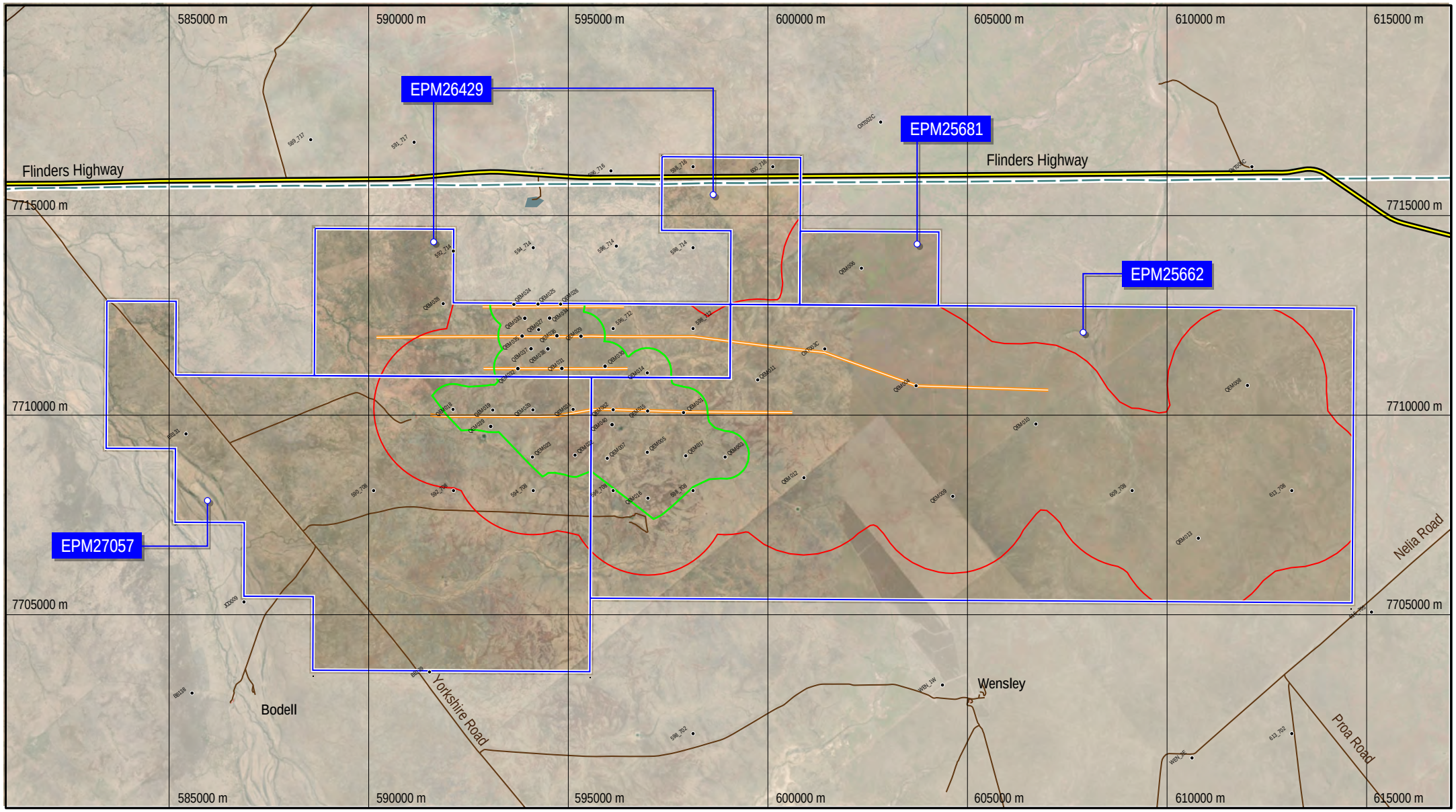
While **Table ES 3** refers to the Mineral Resource Estimate 2024 for the entire tenement, the proposed location of the mine pit is primarily within the Indicated category. For further reference, Figure ES 3 of the Ultimate Pit Design, shows the location of the proposed open pit relative to the location of the Indicated Resource. The production target comprises of approximately 80% Indicated Resource and the remainder Inferred Resource (refer to Production Schedule section below).

The oil shale resource has been estimated according to the PRMS 2018 code. 654 MMbbls have been classified as 3C, 94 MMbbls have been classified as 2C and 6.3 MMbbls have been classified as 1C.

Table ES 4 Julia Creek Summary of Oil Shale Estimate as of February 2024

Resource	Strata Unit	Mass (Mt)	Average Thickness (m)	Total Moisture (wt%)	Oil Yield (L/t)	Oil Yield (LTOM)	MMbbls (in situ PIIP)	MMbbls Recoverable
3C Contingent	CQLB	903	2.5	6.8	53.1	55	254	228
	OSU	621	1.8	6.8	75.9	79	248	223
	OSL	609	1.9	6.8	70.7	76.7	224	202
2C Contingent	CQLB	107	2.1	2.8	50.9	52.3	33	29
	OSU	76	1.9	13.3	78.7	81.4	36	32
	OSL	81	2	11.8	74.8	76.7	36	33
1C Contingent	CQLB	7	1.9	2.8	49.0	49.6	1.9	1.8
	OSU	5	1.9	13.3	77.2	78.7	2.5	2.2
	OSL	6	2.1	11.8	74.6	76.2	2.6	2.3

Source: Mineral Resource Estimate Report, Julia Ck, 2024
The Mineral Resources Estimate has been prepared by a Competent Person in accordance with the requirements of the Petroleum Resource Management System SPE guidelines (2018).
The 1C volume is included as part of the 2C volume, which is included as part of the 3C volume. That is, the volumes are not incremental, they are cumulative.



LEGEND

- EPM Boundary
- Rail
- Highway
- Road
- Drillhole
- 2d Seismic Survey Line
- Indicated Resource
- Inferred Resource

N

0 5 10km

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PROJECT

NAME: JULIA CREEK SCOPING STUDY

DRAWING: TENEMENT AND DRILLING LOCATIONS

FIGURE No.	PROJECT No.	Date
ES2	ADV-AU-00503	August 2024

Pit Limits and Potential Mineable Ore Quantities

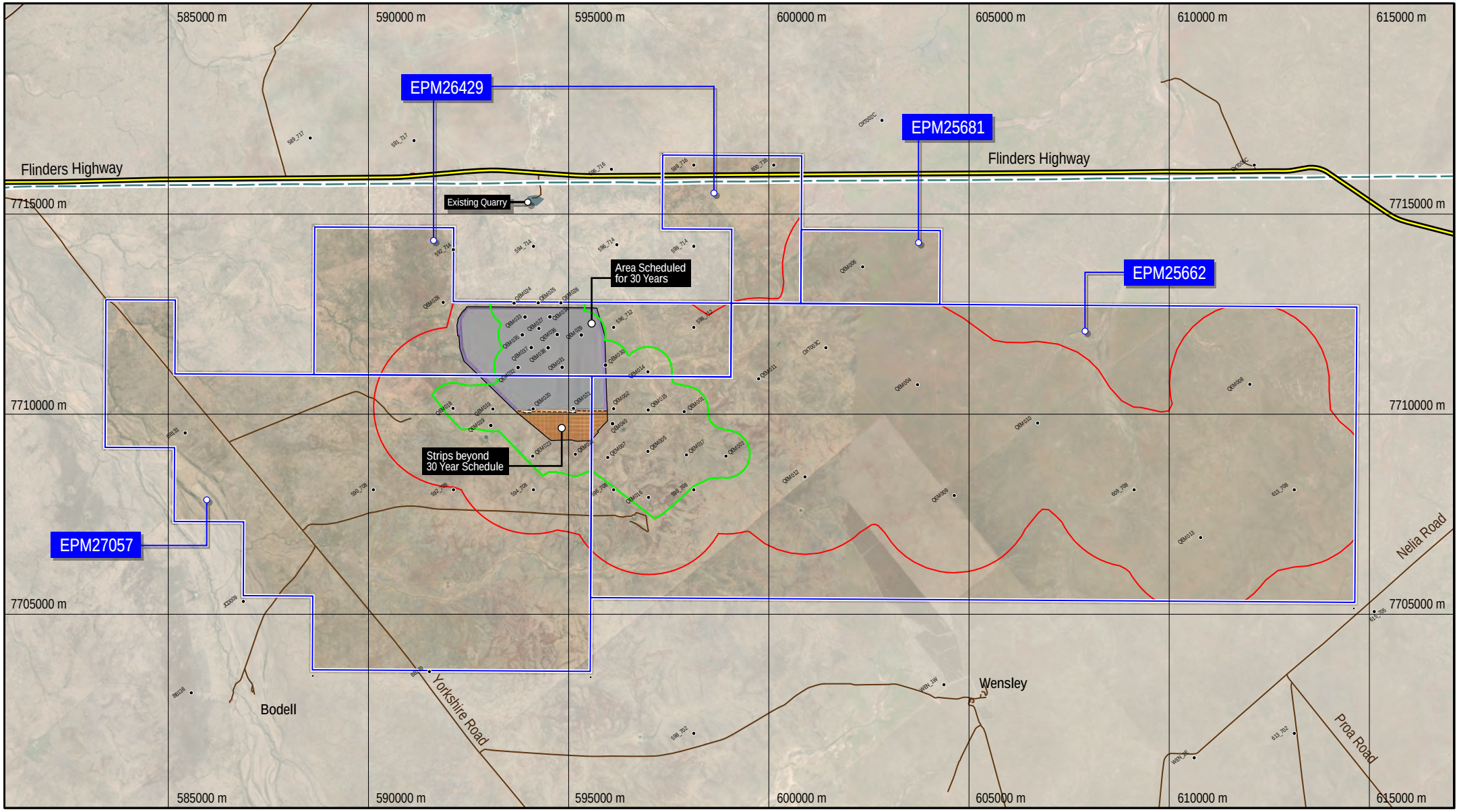
RPM completed a Whittle pit limit optimisation analysis in 2023 based on the 2022 Resource Model. The 2023 pit limit analysis results were checked against the 2024 geological model, and as there was no significant change to the structure and grades, they were considered valid. The pit limit optimisation results indicated

- The highest margin areas are located in the lease's central-north and east.
- The highest density of drilling has been concentrated in the central-north area. This region of Indicated Resources is where the proposed open pit is located.
- The potential open pit area, as defined in the central-north area, has sufficient ore for a 30-year mine life at a production rate of 5.3 Mtpa (wet).
- There is potential to develop significant quantities of high-margin ore in satellite pits located on the eastern side of the lease; however, additional drilling is required to convert this resource from Inferred to Indicated/Measured.

A detailed pit design was prepared based on the Whittle 79% revenue factor pit shell, as shown in **Figure ES 3**. The pit design has the following characteristics:

- 3.0 km (east-west) x 2.6 km (north-south);
- CQLA horizon - 68.7 Mt / 0.22% V_2O_5 Grade/ 32.5 L/t (MFA Oil Yield @ 0% Moisture);
- CQLB horizon – 42.9 Mt / 0.32% V_2O_5 Grade/ 52.8 L/t (MFA Oil Yield @ 0% Moisture);
- OS horizon – 72.5 Mt / 0.30% V_2O_5 Grade/ 75.0 L/t (MFA Oil Yield @ 0% Moisture);
- Total of 184.1 Mt of ore at grades of 0.27% V_2O_5 and 54.0 L/t (MFA Oil Yield @ 0% Moisture);
- Total Waste of 1,062 Mt @ strip ratio of 5.8:1 (Waste t : Ore t); and
- Pit depth ranges between 50 to 65 m.

Of the 184 Mt (wet) of ore, 154.7 Mt (wet) was directed to the processing facilities within the 30-year schedule period.



LEGEND

- EPM Boundary
- Rail
- Highway
- Road
- Drillhole
- Indicated Resource
- Inferred Resource

N

0 5 10km

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QEM

PROJECT

NAME

JULIA CREEK SCOPING STUDY

DRAWING

MINE DESIGN

FIGURE No.	PROJECT No.	Date
ES3	ADV-AU-00503	August 2024

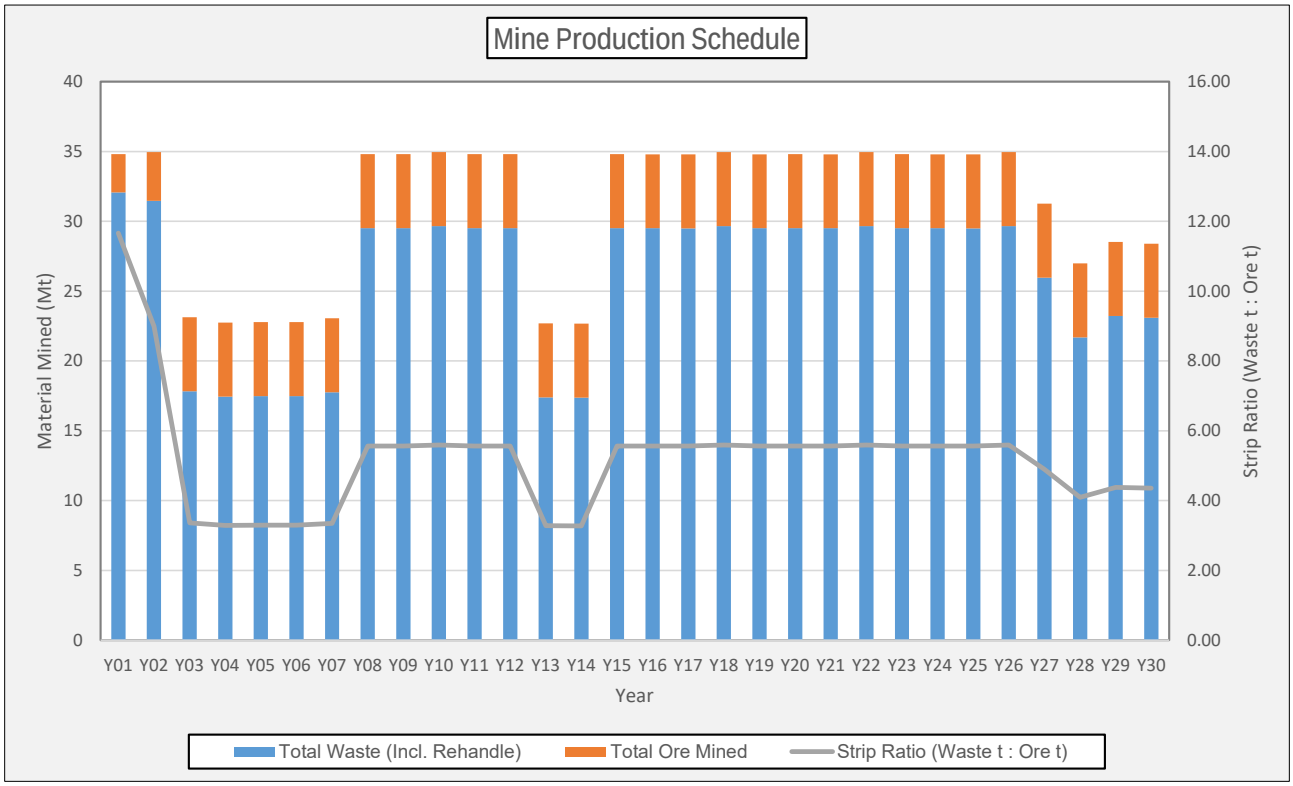
Production Schedule

The Study mining schedule is for a 30-year operating period. A production rate target of 5.1 Mt (dry) per year was set to achieve over 10,500 t per year of vanadium pentoxide. The total quantity of material scheduled for 30 years is 154.7 Mt (wet) or ore and 755.4 Mt of prime waste at a strip ratio of 5:1 (waste t : ore t). A significant upside exists for the operation to continue beyond the study period. **Figure ES 4** illustrates the ore and waste quantity mined over the 30-year schedule.

The key production schedule outcomes include:

- Ramp-up of ore production to 2.75 Mt in Year 1, 3.5 Mt in Year 2, and 5.3 Mt (wet) from Year 3 onwards.
- Waste mining ~32 Mtpa (Year 1 and 2) at a high strip ratio of over 10.2:1 (waste t: ore t) for open cut establishment. From Year 3, waste mining varies from 17 to 30 Mtpa as mining progresses from north (low strip ratio) to south.
  - As a large open cut void is established, waste is directed to an in-pit dump.
- Average feed grade of 0.27% V_2O_5 and 54.0 L/t oil yield (MFA).
- Product made during the steady state operational period (Y3-Y30):
  - 313 M litres of transport fuel produced per annum (947,600 ltr/day or 5,960 bbl per day).
  - 10,571 tpa of vanadium pentoxide.

Figure ES 4 Scheduled Ore and Waste



A key strategic requirement was for the early years of mining to be in areas of higher geological confidence. The schedule has mining commencing in the northeast of the pit, as this is within the Indicated Resource boundary and has a lower strip ratio. It has, however, slightly lower ore grades than the western pit area with Inferred Resources. **Figure ES 5** illustrates that the average plant feed grade generally increases over the scheduled period as mining progresses from east to west.

Figure ES 5 Feed Grades

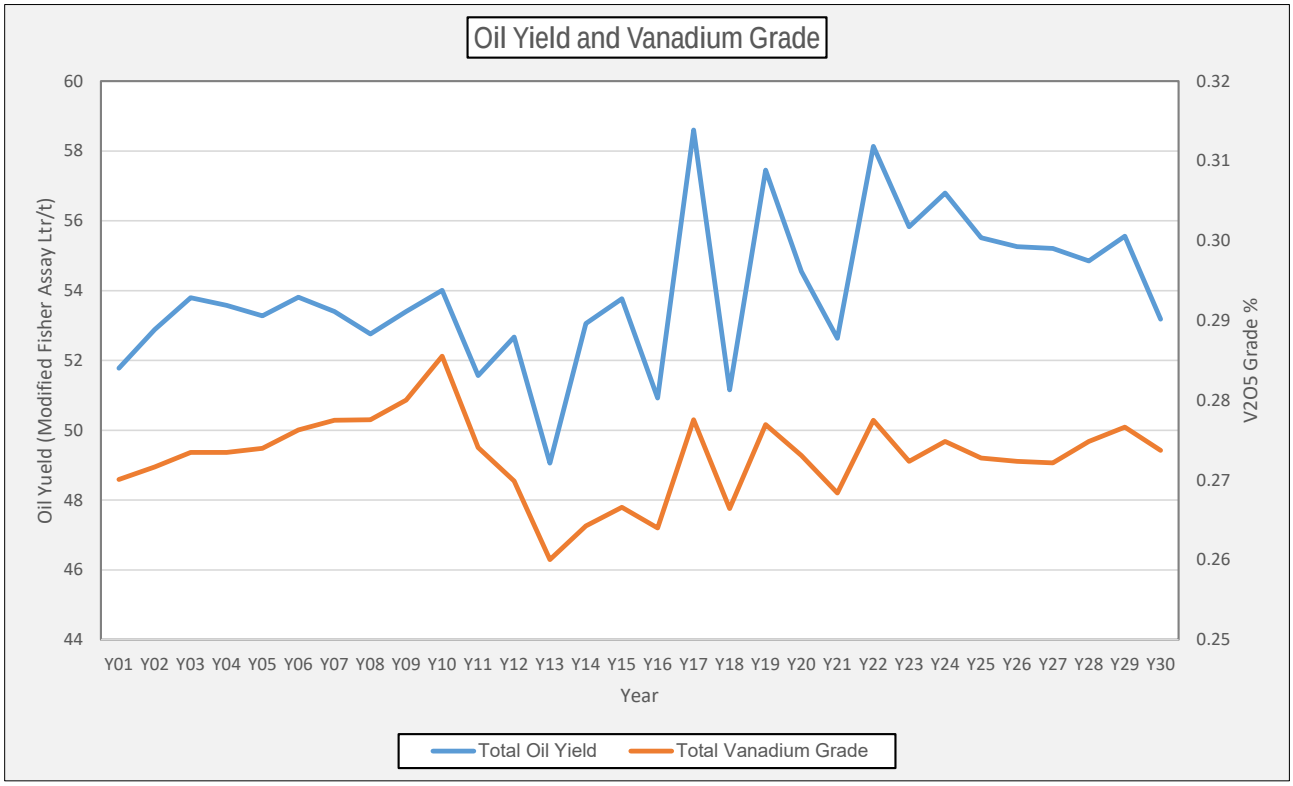
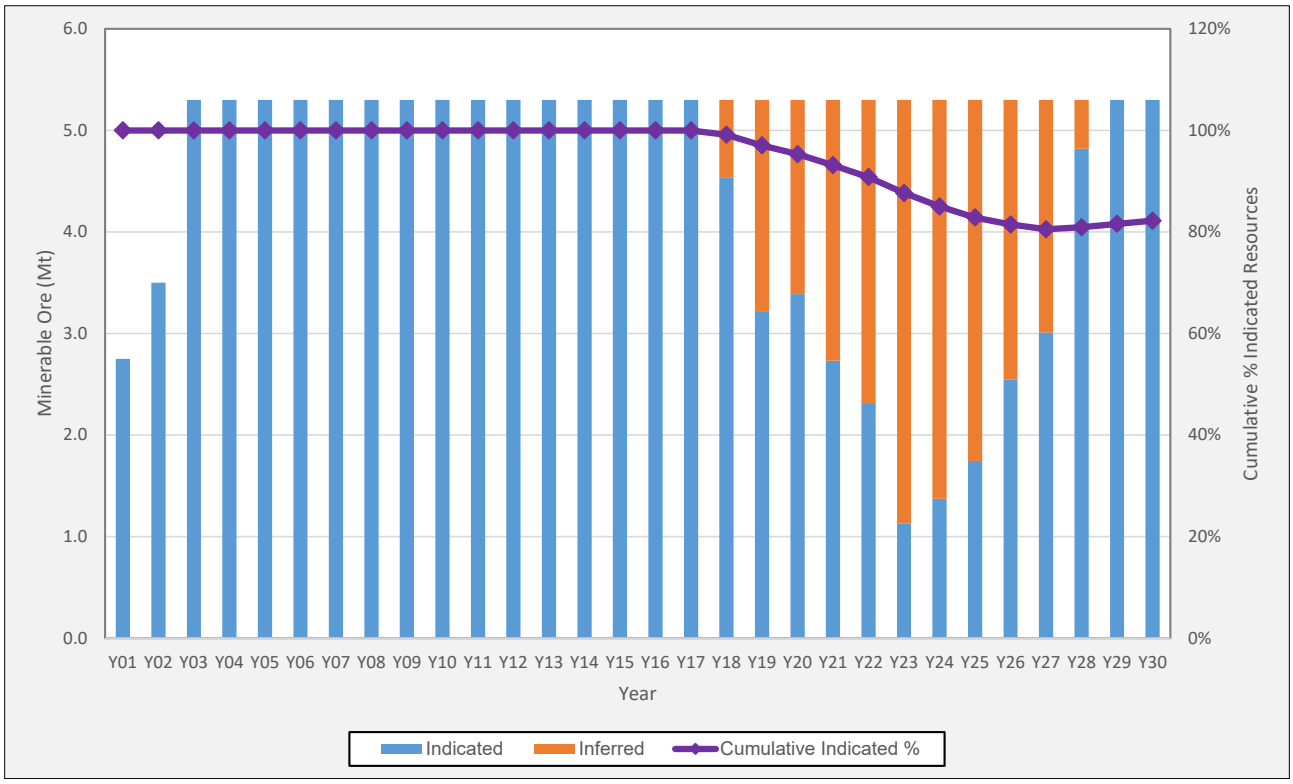


Figure ES 6 illustrates the average plant feed production of the Indicated and Inferred Mineral Resources mined per year.

For the first 17 years of the schedule, 100% of the feed is Indicated Resources. Between Years 18 and 28, some Inferred material is also fed to the plant, peaking in Year 23 when approximately 79% of plant feed is of the Inferred classification for that particular year. Over the life of the schedule, approximately 82% of the total plant feed is of the Indicated classification, and therefore, the inclusion of Inferred resources into the production profile is not considered by QEM to be a determining factor of the project's economic viability.

Figure ES 6 Scheduled Indicated and Inferred Resources Classification Material



Mining Equipment

The mining fleet requirements were estimated from the outcomes of the production schedule and material characteristics. The analysis concluded that up to 4 x 250 t class hydraulic excavators loading 140 t class rear dump trucks could service the operation. The estimated truck fleet requirements range between 19 to 21 units.

Over the first four years, waste haulage gradually migrated from ex-pit dumps to in-pit dumping with one-way haulage distances of around 2 km. Ore hauls generally ranged from 8 km to over 10 km one-way.

Support equipment was selected to match the requirements for grading, dust suppression, dozing, rehandling and other support activities. Caterpillar D10 dozers were also included for ripping the CQLA and CQLB seams, while the remainder was fragmented using drill and blast methods.

The fleet for the co-disposal of tailings in the waste dumps was estimated to be up to 8 x 90 t class rear dump trucks loaded by front-end loaders.

Processing

Sufficient metallurgical development has been conducted to support a Scoping Study, with bench scale test work identifying a vanadium extraction methodology and a hydrocarbon extraction technology (Hydrogenation process) demonstrated at the pilot plant scale.

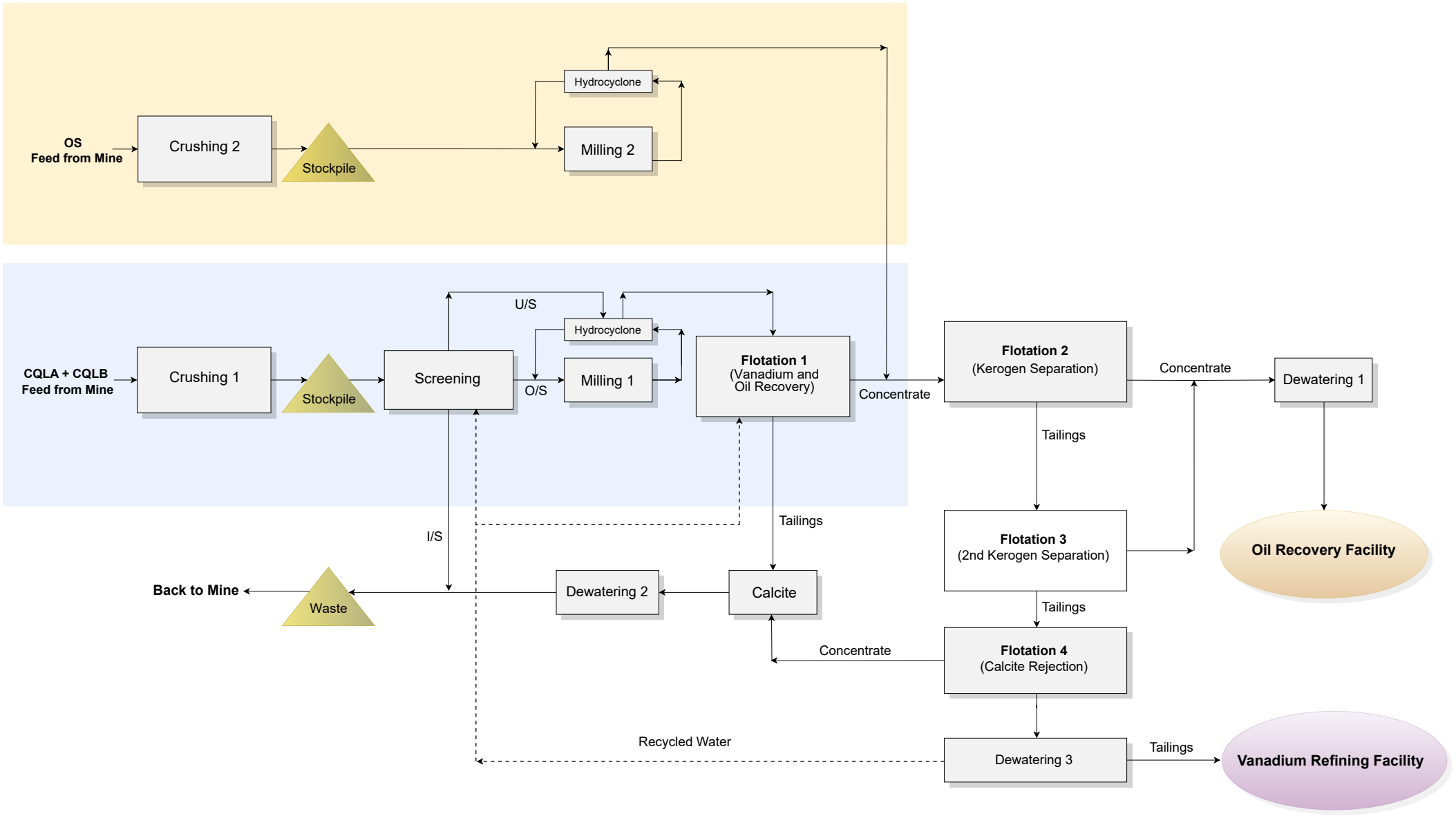
Based on test work and research, a flowsheet has been developed to extract vanadium as a high-purity vanadium pentoxide (V_2O_5) and produce transport fuel as marketable products from the CQL and OS ores.

The flowsheet consists of three processing stages where the ores would be initially concentrated into two separate streams, namely kerogen-rich and vanadium-rich products in the Feed Preparation Facility (FPF). The FPF would employ conventional mineral processing techniques, such as flotation, for dedicated downstream treatment. A calcite-rich product would be made for disposal.

The kerogen-rich product would be converted into hydrocarbons and treated in the Oil Recovery Facility (ORF) to produce transport fuel, employing hydrogenation and conventional oil refinery processes.

The vanadium-rich product would report to the Vanadium Refining Facility (VRF), where vanadium would be extracted with sulphuric acid and purified through precipitation and re-leaching stages before calcination to produce high-purity vanadium pentoxide (V_2O_5). The leach tailings, as well as impurity precipitants, are dewatered for disposal.

The flow sheets for the FPF, ORF and VRF are provided in **Figures ES 7** to **ES 9**.



LEGEND

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QEM

PROJECT

NAME

JULIA CREEK SCOPING STUDY

DRAWING

FEED PREPARATION FACILITY FLOWSHEET

FIGURE No.	PROJECT No.	Date
ES7	ADV-AU-00503	August 2024

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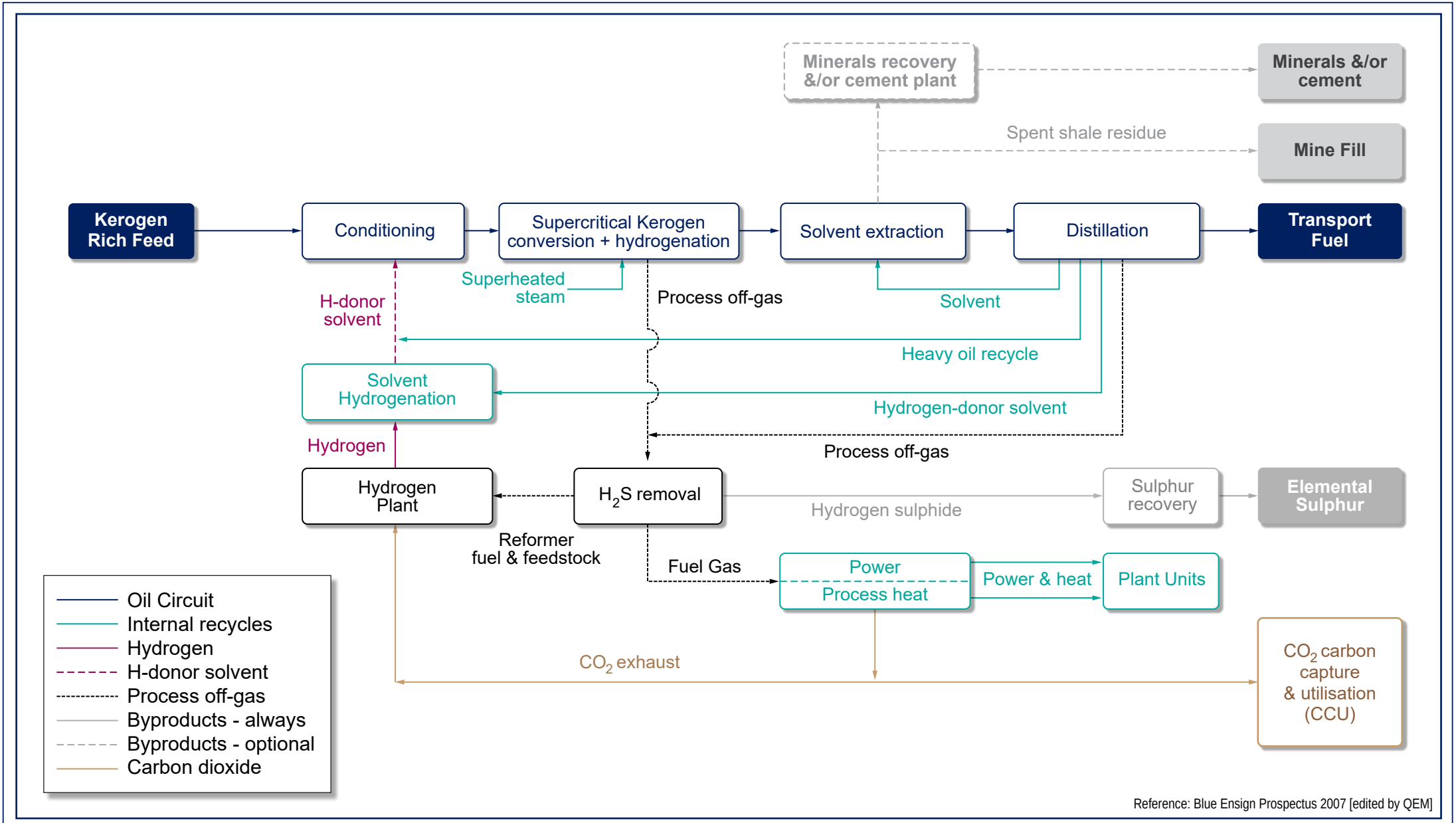

Reference: Blue Ensign Prospectus 2007 [edited by QEM]

LEGEND

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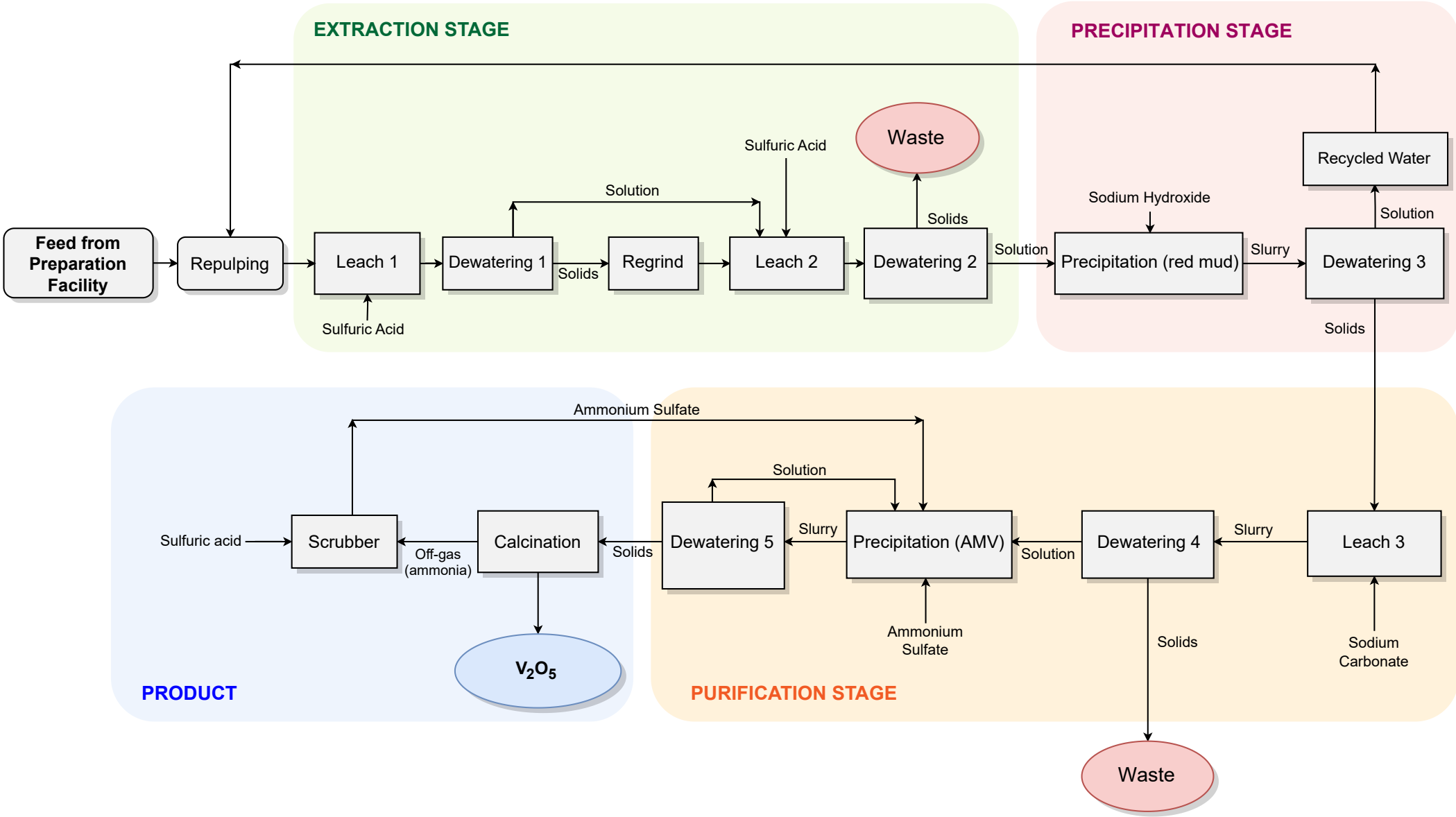
PROJECT

NAME: JULIA CREEK SCOPING STUDY

DRAWING: OIL RECOVERY FACILITY FLOWSHEET

FIGURE No.	PROJECT No.	Date
ES8	ADV-AU-00503	August 2024



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PROJECT

NAME: JULIA CREEK SCOPING STUDY

DRAWING: VANADIUM REFINING FACILITY FLOWSHEET

FIGURE No.	PROJECT No.	Date
ES9	ADV-AU-00503	August 2024

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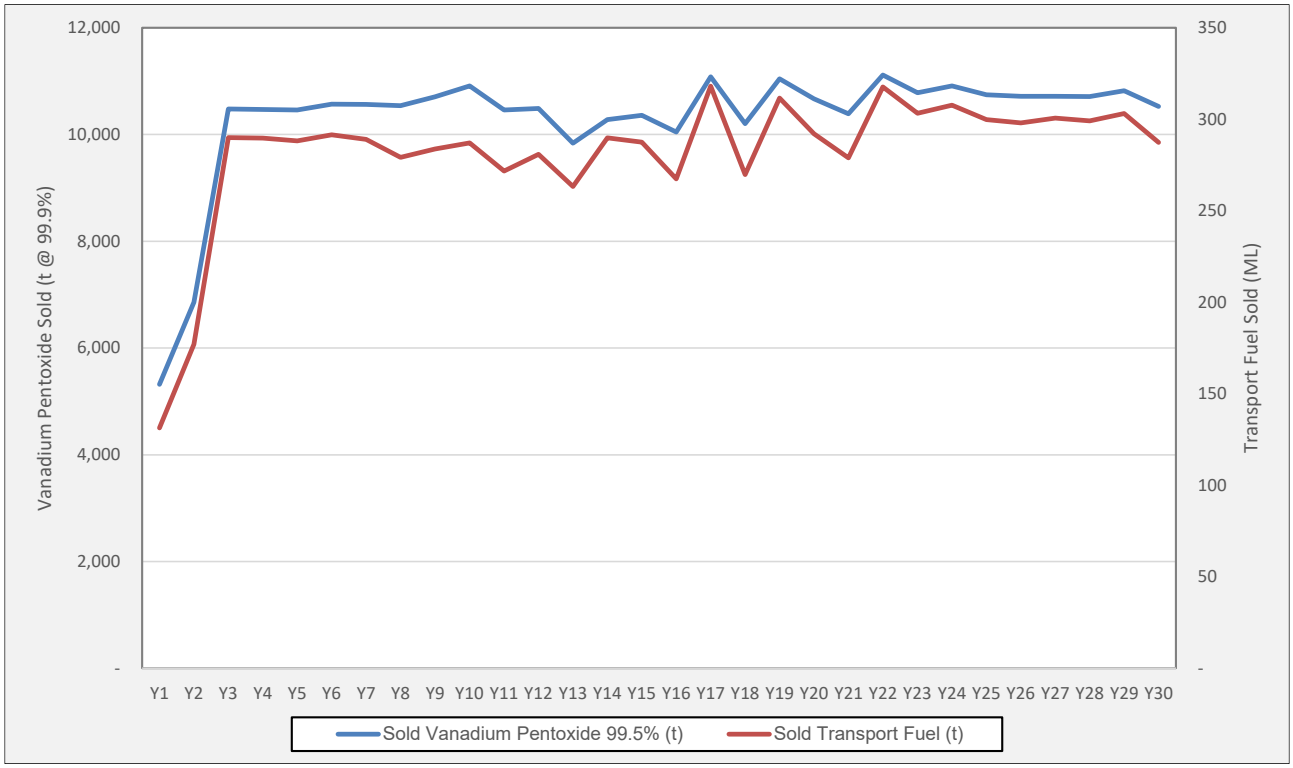
The overall vanadium recovery is 76%, while 70% of the crude oil recovered will be further processed into transport fuel. It is proposed to produce, on average 10,570 tpa of 99.5% V_2O_5 and 313 million litres per annum (MLpa) of transport fuel from the treatment of 5.1 million tonnes of CQL and OS ores. The quantity of high-purity vanadium pentoxide and transport fuel sold over the life of the schedule is provided in **Figure ES 10**.

Figure ES 10 Sold Vanadium and Transport Fuel



Infrastructure

The Mine Industrial Area (MIA) is located to the north of the site near the railway line and Flinders Highway for access to major transport corridors.

A new intersection on the Flinders Highway will be constructed, including turn-out lanes, acceleration and deceleration lanes, and waiting lanes. The site access road will provide access from the highway to the MIA and processing facilities. Permanent haul roads will link the MIA and ROM to pits and dumps. A rail siding and staging facility are assumed to be planned by external organisations.

The administration and mine support facilities areas will be close to mining operations and supplied with the required utilities. The ROM area will contain a hardstand space, the ROM dump station, crushing and screening equipment, and conveyors. The processing areas will contain the oil recovery facility, vanadium refining facility, feed preparation facility, incoming feed conveyors, and loading and unloading areas.

To establish pumping and raw water harvesting and intake amounts, QEM and RPM have estimated the net water demand after water recycling to be 2,120 ML/pa. This demand comprises 1,000 ML (FPF & VRF), 1,000 ML (ORF) and 120 kL for the remaining site operations. The preferred water source is water harvesting from the Flinders River of up to 5,000 ML annually, supported by an offsite water storage dam equivalent to two years of water demand.

The vanadium processing facility is expected to produce dry-stack tailings. Initial setup for the tailings storage facility is allowed, including site preparation and dyke.

The site's electricity demand is estimated at 97 GWh annually, most attributed to the feed preparation facility. QEM has advised that power will be provided by renewable energy sources connected to the proposed CopperString 2032 powerline infrastructure. QEM advises it has the option to sign a 10-year offtake agreement

on an arm's length basis for up to 25 MW firm capacity sufficient to support its future mine operations. QEM's access to renewable energy depends on the successful completion of the State-owned CopperString 2032 transmission line, which started early construction works in July 2024.

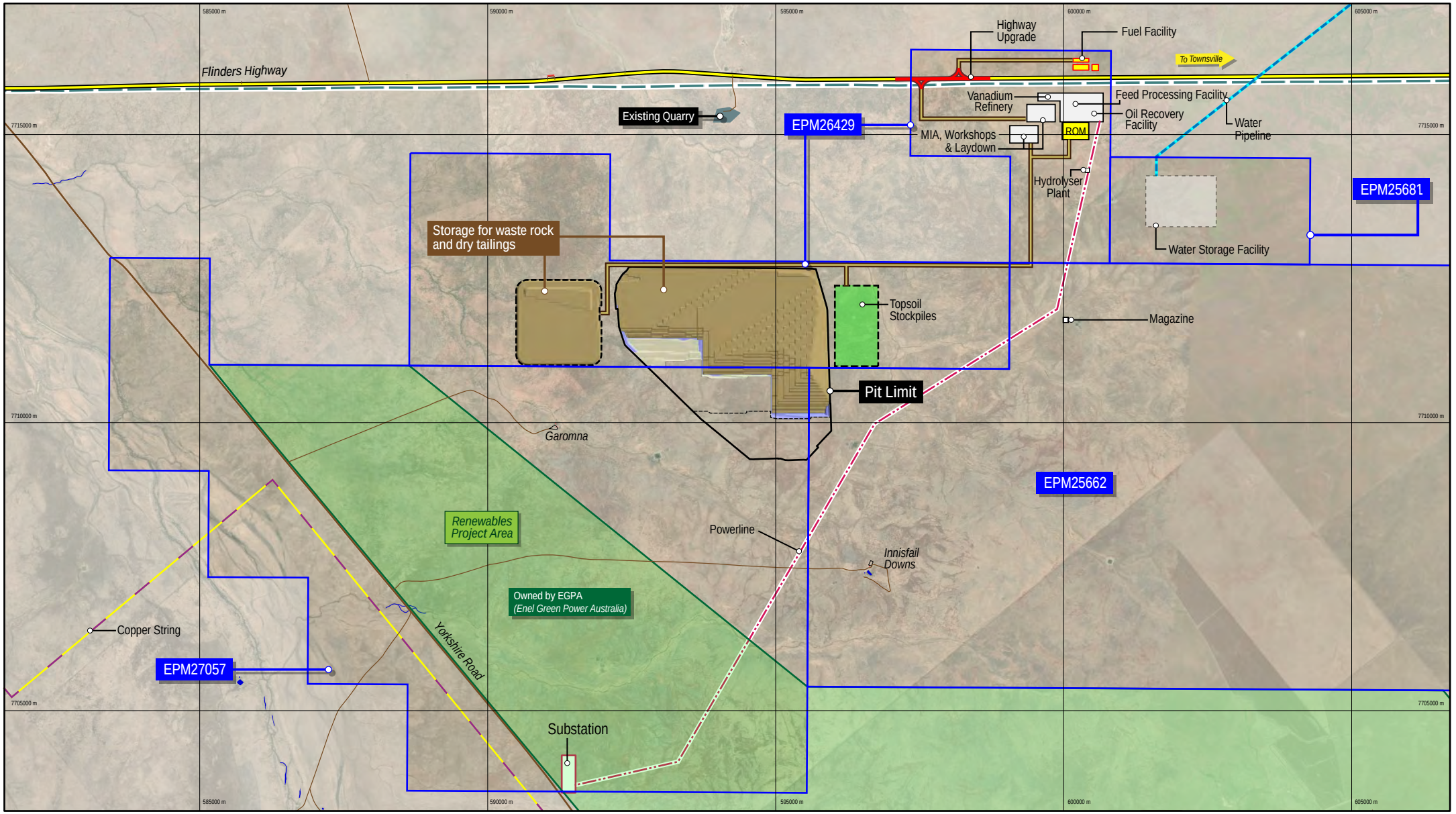
The Project will require a substantial skilled and semi-skilled workforce. The workforce numbers for mining were estimated based on the equipment requirements and necessary support services such as maintenance and supervision. The workforce for the plant and infrastructure was estimated from RPM's experience with similar projects. The manning is estimated to be 588, consisting of 309 mining, 106 processing, 133 infrastructure, and 40 admin personnel.

It has been assumed that approximately 35% of staff will live locally and, therefore, will not require camp accommodation. According to the manning and proposed shift patterns, 214 beds have been allowed in the permanent camp for external workers.

A construction camp addition is proposed to be hired for the plant and infrastructure construction. An allowance of 400 additional rooms with amenity support has been made for a total construction workforce of approximately 600 personnel.

Site-wide communication and connection to a local Telstra Node or the envisioned Copper String fibre optic network is allowed. Site radios and repeaters are also allowed.

The site layout is provided in **Figure ES 11**.



LEGEND

- EPM Boundary
- Rail
- Highway
- Secondary Highway
- Road
- Haul Road
- Copper String

N

0 2 4km

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QEM

PROJECT

NAME

JULIA CREEK SCOPING STUDY

DRAWING

POTENTIAL INFRASTRUCTURE LAYOUT

FIGURE No.	PROJECT No.	Date
ES11	ADV-AU-00503	August 2024

Environment and Approvals

Given the complexity of the Project, its value to the State and potential environmental impacts, the Project will seek Coordinated Project status, for which the primary approval pathway will be an Environmental Impact Statement (EIS) under the State Development and Public Works Organisation Act 1971. This assessment process is accredited under a bilateral agreement between the State and Commonwealth for assessment of Matters of National Environmental Significance under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Due to the potential occurrence of Julia Creek Dunnart (a threatened species under the EPBC Act) and its habitat a referral will be made to the Commonwealth under the EPBC Act. It is likely the referral will result in a Controlled Action decision by the Commonwealth. This decision will occur prior to the drafting of Terms of Reference for the EIS, enabling the State EIS process to be the single assessment process for both State and Commonwealth matters.

QEM has invested in the collection of long lead baseline environmental data and test work associated with ecology, surface water, groundwater and waste characterisation. These long lead items will inform the technical studies required for the preparation of an EIS in accordance with the Terms of Reference.

It is understood there is no Native Title recorded on or near the Project site. A Cultural Heritage Management Plan will be developed as part of the EIS and is a mandatory requirement when an EIS is the assessment decision.

QEM has established and maintained a strong presence in the Julia Creek community underpinned by transparent engagement. Engagement with various government agencies is ongoing, and the approvals and tenure pathways for the Project are well understood. The Stakeholder Engagement Plan developed for the project will outline future engagement activities required to support the project's development, including the EIS process.

Project Economic Modelling

The economic model comprises two pre-production years before contract mining commences. The start of Year -2 is when the decision is given for the Project to proceed. The model considers only expenditure from this point, with all previous expenses considered sunk costs. The Net Present Value (NPV) is calculated at a discount rate of 8% from Year -2, assuming cash flows occur at the end of this period. Other key modelling assumptions were:

- Model in Australian Dollars (AUD) unless otherwise stated.
- Contract Mining operation.
- All mining equipment is leased or owned by the mining contractor to minimise the capital costs of the mine owner. A mining contractor margin of 15% is assumed.
- Equipment maintenance is assumed to be by the Mining Contractors workforce.
- Process plant and support activities operated and managed by QEM.
- Vanadium products are assumed to be sold in Townsville, with a transport cost of AUD0.20 /t/km and a distance of 600 km.
- Transport fuel products are assumed to be sold at the fuel storage facility gate.
- Product pricing is:
  - V_2O_5 vanadium pentoxide (99.5% pure) sold : USD 11.56 /lb.
  - Transport fuel sold : AUD191.18/bbl (at 158.987 l/bbl) = AUD1.202 / litre (excl. excise and GST).
- Government royalty at 2.69% of transport fuel revenue and 2.5% of Vanadium revenue.
- Income tax at 30% of taxable income.
- Prime cost rather than diminishing value for depreciation.
- Fuel is provided free of charge to the mining Contractor.

- Exchange rate of AUD:USD 0.68.

RPM estimated production schedule quantities, mine equipment and staffing requirements, mine equipment capital costs, mine operating costs and overheads. The overheads were estimated from the RPM cost database based on mines of similar size and characteristics.

Capital Expenditures

RPM prepared the capital cost estimates, including mining support, the oil and vanadium processing facilities, and site infrastructure. A summary of capital expenditure is set out in **Table ES 5**.

The initial capital expenditure to develop the mine site is estimated at AUD1,096 M, which includes a contingency of 20%. The sustaining capital to maintain the facilities over the operational period of 30 years is estimated at AUD598 M (~AUD20 M per year). The total life of mine capital expenditure is estimated to be AUD1,694 M.

Table ES 5 Capital Expenditure (AUD M)

Capital	Initial	Sustaining	Total
Oil Recovery Facility	242	25	267
Feed Preparation Facility	249	46	295
Vanadium Refining Facility	114	28	142
Processing Infrastructure	27	39	66
Infrastructure	318	460	778
Contingency @ 20%	146		146
Total Capital Cost	**1,096**	**598**	**1,694**

The capital costs include direct and indirect costs, installed services, first-fill and spares, and EPCM and Owner's Costs. Sustaining capital costs have been based on 2.5% of the equipment capital costs.

Project Operating Costs

The Project's operating cost is estimated at AUD83.36/t plant feed (dry) Ore. The processing costs comprise 39% of the total operating costs while mining and transport costs comprise 37%. A summary of the operating costs is presented in **Table ES 6**.

Table ES 6 Operating Costs

Cost Centre	AUD/dmt Feed Ore
Waste Mining	12.06
Ore Mining	3.12
Support	2.77
Drill and Blast	2.30
ROM Rehandle	1.17
Tailings Handling	3.00
Overheads	1.89
Staff	2.33
Contractor Margin	4.22
Infrastructure	9.55
Feed Preparation Facility	2.87
Oil Recovery Facility	13.55
Vanadium Refining Facility	16.32
Mine to Port	0.25
Mine Closure	0.20
Sub Total Excluding Royalty & Gov't Charges	**75.60**
Royalty & Gov't Charges	3.79
Contingency @ 5%	3.97
Total Operating	**83.36**

Process Operating Costs

Separate operating costs have been estimated for the FPF, VRF, ORP, and General and Administration (G&A). The operating costs for the processing facilities are estimated at AUD197.23 M annually.

The operating costs for the Feed Preparation Facility are estimated at AUD14.13 M per annum or AUD0.60/lb of V_2O_5. Reagents are the most significant cost centre (58.7%), followed by labour (24.9%). The FPF's annual power consumption is estimated at 50.6 GWh and, based on a unit rate of AUD0.6175 /kWh (as provided by QEM), has a cost of AUD3.12 M annually. Twenty-two staff are required to operate the facility, with an annual cost of AUD3.52 M.

The operating costs for the Vanadium Refining Facility are estimated at AUD83.19 M annually, or AUD62.72 /t VRF feed. The most significant cost centres are reagents, labour and power. Sulphuric acid costs would be AUD61.41 million annually. Thirty-two staff members are required to operate the VRF, which includes maintenance personnel for both the VRF and FPF, for AUD 9.39 million per annum.

The Oil Recovery Facility's operating costs are estimated at AUD71.81 M per annum; the most significant cost centres are hydrogen, power, and maintenance. The hydrogen cost would be AUD64.9 M annually. Thirty staff are required to operate the facility, resulting in a total cost of AUD4.63 M annually.

General and Administration costs are estimated at AUD6.32 million annually, with labour being the dominant cost component. Forty-two staff are required,

Infrastructure

The infrastructure labour costs for the project come primarily from an internal RPM database. The total cost of labour for the on-site infrastructure is estimated to be AUD11.76 M, and AUD8.36 M for the village labour, for a total infrastructure labour cost of AUD20.12 M.

The assumed levelized power cost for the operation is AUD61.75 / MWh, developed by QEM and Oakley Greenwood (Electricity Pricing to the NWMP, Average Wholesale Price Forecast, Years 2027-2041). The total annual cost for power for the site is AUD5.99 M.

Site water supply and management is estimated at AUD7.4 M per annum. QEM advises that hydrogen is provided in an over-the-fence arrangement at a levelized cost of AUD 5.96/kg, including electricity. The total annual cost of hydrogen is AUD64.9 M.

Economic Outcomes

RPM prepared an economic model for the Project using its in-house economic modelling software. All values were in real terms. Key modelling assumptions include:

- Initial capital invested in Year -2;
- Tax rate of 30%, and
- Discount rate of 8%.

The Project is estimated to have a Post-Tax NPV of AUD1,106 M at an 8% discount rate, an IRR of 16.3% and a payback period of 5 years from the start of mining/processing ore. **Table ES 7** summarises the results of the economic evaluation. All financial outcomes reflect an approximate or estimated value.

Table ES 7 Economic Model Outcomes

Item	Units	Economic Value
Capital Costs		
Initial Capital	AUD M	$1,096
Sustaining Capital	AUD M	$598
Total Capital	AUD M	**$1,693**
Operating Costs		
Mining	AUD/dmt Feed	$25.64
Processing	AUD/dmt Feed	$42.30
Tailings Handling	AUD/dmt Feed	$3.00
Overheads	AUD/dmt Feed	$4.21
Transport	AUD/dmt Feed	$0.25
Mine Closure	AUD/dmt Feed	$0.20
Royalty	AUD/dmt Feed	$3.79
Contingency @ 5%	AUD/dmt Feed	$3.97
Total Operating Cost	**AUD/dmt Feed**	**$83.36**
Product Revenue and Margin		
Average Vanadium Selling Price	AUD/dmt Feed	$77.96
Average Transport Fuel Selling Price	AUD/dmt Feed	**$68.47**
Total Average Selling Price	AUD/dmt Feed	$146.43
Margin	**AUD/dmt Feed**	$63.07
Total Vanadium Revenue	AUD M	11,572
Total Transport Fuel Revenue	AUD M	10,164
Total Revenue	**AUD M**	**21,736**
Economic Indicators (Post-Tax)		
NPV @ 6% discount rate	AUD M	1,670
NPV @ 8% discount rate	**AUD M**	**1,106**
NPV @ 10% discount rate	AUD M	704
DCF-IRR (%)	%	**16.3%**
Payback	Yrs	**5.0**

The results of sensitivity analyses on product selling price, capital and operating costs, and product recovery are presented in **Figure ES 12** and in **Table ES 8**.

Figure ES 12 Project Economic Sensitivities

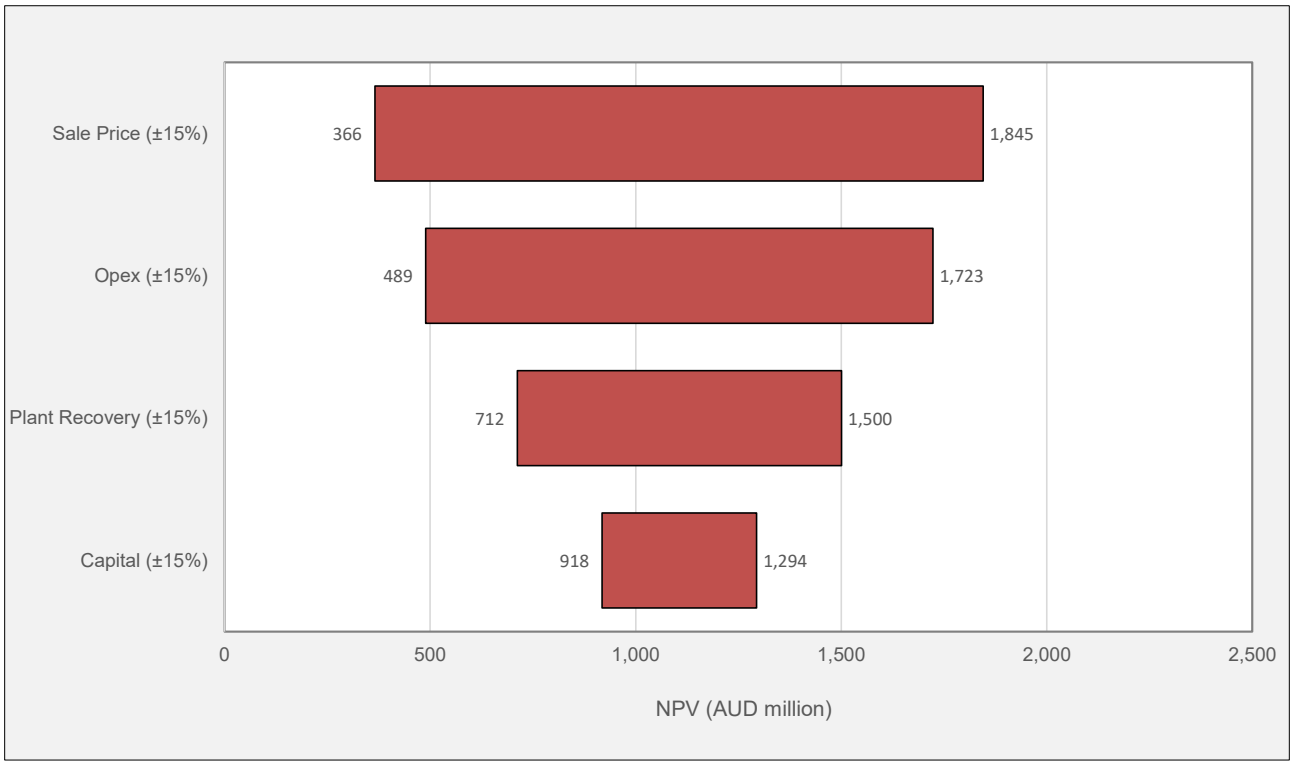

Table ES 8 Project Economic Sensitivities

Variable	Lower %	Upper %	Lower NPV (AUD million)	Upper NPV (AUD million)
Sale Price	85%	115%	343	1,847
Opex	115%	85%	462	1,732
Plant Recovery	95%	105%	837	1,356
Capital	115%	85%	909	1,285
Diesel for Mining Operations[a]	125%	75%	1,097	1,097

a Approximately 7% of the transport fuel produced by QEM is to be provided free-issue to the mining contractor to undertake the mining work. Fuel is provided free of charge to the mining Contractor, therefore, a change in the price of diesel (as a cost) is immaterial to the estimated NPV.

The results indicate that the Project is most sensitive to the product's selling price. The Project is insensitive to diesel costs as the fuel is free-issued to the site operations from the ORF.

A further sensitivity analysis was completed for the vanadium product price based on Vanitec's Forecast and Vanadium Market Overview presented in July 2024. In real terms (2023 USD), historical pricing data from 2004 to 2024 indicates that 75% of the time, the mean price of commodity grade V_2O_5 is between USD7.00/lb and USD13.00/lb V_2O_5. While Vanitec projects that the long-term average price will be USD12.26/lb V_2O_5, QEM's assumption for this Scoping Study is USD11.56/lb. The results are presented in **Figure ES 13** and indicate that the Project is at breakeven NPV@8% at the lower price and with substantial upside in value at the higher pricing.

Figure ES 13 Vanadium Price Sensitivity

Source: Vanitec's Forecast and Vanadium Market Overview, (or the period 2004 - 2024:
1) lower range
2. median price (or the period between 2004 - 2024
3. Vanitec's projected long-term average price
4. upper range

Project Implementation Schedule

QEM and RPM derived a preliminary project implementation schedule has been developed for the Project from the completion of this Scoping study to the commencement of operations, as illustrated in **Figure ES 14**. The schedule has operations commencing H1, 2030. The key development outcomes are:

- Pre-feasibility study completed from H2 2025 to H1 2026;
- Environmental impact assessment and approval process continues through 2025 and 2026, for leases and approvals granted by H1, 2027;
- Definitive feasibility study completed H2, 2027;
- Award of critical contracts by early H1, 2028;
- Approximately 15-18-month construction and commissioning period to end of H1, 2029; and
- Operations from H1, 2030.

Figure ES 14 Project Implementation Schedule

	2024		2025				2026				2027				2028				2029			
	H2		H1		H2		H1		H2		H1		H2		H1		H2		H1		H2	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Completion of Scoping Study	◆																					
Metallurgical and Petrology Testwork for PFS																						
State Government - Coordinated Project Declaration		◆																				
EPBC Controlled Action decision and CG publish Final Terms of Reference			◆																			
Infill Drilling and Resource Expansion																						
Pre-feasibility study																						
Technical studies for EIS completed							◆															
EIS Accepted and Notified for Public Comment								◆														
Further Metallurgical and Petrology Optimisation																						
CG issues EIS assessment report and EPBC Act approval granted										◆												
EA granted and PRC Plan schedule approved										◆												
Mining and Petroleum Leases/Licences Granted										◆												
Secondary Approvals and Management Plans Approved											◆											
Definitive Feasibility Study																						
Construction Tender Packages																						
FID															◆							
Mining Contract Awarded																						
Plant Procurement and Construction																						
Commissioning																						
Production starts																						◆

Risks and Opportunities

Several risks and opportunities have been identified in respect of the Project. High impact Project-specific risks and opportunities are summarized below.

Risks, which additional information could eliminate or mitigate, include:

- Delay in approvals or project changes required due to identified environmental or social constraints;
- Stakeholder project acceptance of producing transport fuel;
- Geological uncertainties that may affect Resources and future Reserves estimates;
- Metallurgical Recoveries and Grades;
- Hydrogenation Process technical and operating risk;
- Reliable access to water supply;
- Reliable access to power supply; and
- Increase in operating/capital costs and/or reduction in commodity pricing.

The key opportunities are:

- Drilling campaigns to increase the confidence of Mineral Resources within/around the proposed pit location and drill areas on the eastern side of the lease to identify potential new satellite pits currently classified as Inferred Resources to upgrade to Indicated Resources.
- The potential to increase production with significant quantities of potential economic ore identified throughout the exploration lease.
- Upsides and higher confidence in outcomes through further test work to confirm:
  - Increased calcite removal leads to less feed into the ORF and VRF, reducing grinding, reagent usage, equipment size, energy consumption and acid requirements;
  - Optimising leaching could lower acid consumption in the VRF, reducing operating costs;
  - Validation of FPF and VRF flowsheet provides confidence in the proposed metallurgy and recoveries are achievable, allowing optimisation of process plant design and performance;
  - Production of sulphuric acid on-site would lower VRF processing costs and dependence on external sources;
  - Consideration of alternative technologies to the hydrogenation process, such as pyrolysis, gasification, or combustion;
  - Produce aviation fuel, which attracts a high premium price;
  - Economic recovery of mineral values from spent shale residue;
  - Potential recovery of mineral by-products like molybdenum, nickel, copper, zinc, silica, alumina, and soda ash;
  - Ability to manufacture cement from ORF residues of certain oil shales and
  - Revenue can be generated by converting organic sulfur compounds to sulfur via hydrogen sulfide.
- Trade-off study to evaluate the economic and environmental outcomes between dry-stack tailings and alternative tailings disposal strategies.
- Work with Critical Minerals Queensland on common user water infrastructure to meet Project demands.
- Include a vanadium electrolyte production plant in the project scope, which will allow QEM to capture more value downstream from the Vanadium Refining Facility.

Mining is carried out in an environment where not all events are predictable. Whilst an effective management team can identify the known risks and take measures to manage and mitigate those risks, there is still the

possibility that unexpected and unpredictable events may occur. Therefore, it is impossible to remove all risks or state with certainty that an event that may have a material impact on the operation of a mine will not occur.

Conclusions and Recommendations

The Study approach has been comprehensive, with substantial background studies, test work and detailed information developed by QEM to support this level of service.

The Study has demonstrated that the Project has robust economic outcomes and no significant issues to prevent it from progressing to a pre-feasibility stage. The Project has been scheduled for 30 years, extracting 148.4M dmt (154.7 M wmt @ ~4% moisture) at 0.27% V_2O_5 and 54.1 L/t (MFA analysis). The geological confidence of the production is high for a scoping study with over 80% of the process plant feed Indicated Resources, with the remaining classified as Inferred. The initial capital expenditure is estimated at AUD1,096M, and sustaining capital of AUD598 M, resulting in a total capital expenditure of AUD1,694 M.

The NPV@8% for the capital expenditure and a mine cash operating costs average AUD83.36/dmt plant feed (including royalties, transport costs and contingency) is estimated at AUD1,106 M (Post-Tax). The internal rate of return is estimated at 16.3%, and the project has a payback period of 5 years from the start of mining.

Furthermore, opportunities have been identified to expand the Mineral Resources, improve product quality, and increase project value. Key issues for a future study are product transport, improved confidence in the processing outcomes and supply of services.

As a basis for the Pre-feasibility Study, it is recommended that the following technical work takes place:

- Continue undertaking long lead baseline data for environmental values to support the EIS.
- Continue to engage transparently with stakeholders, organise regular consultations, and implement corporate social responsibility initiatives to secure social license to operate and further minimise opposition risks.
- Further geological exploration to upgrade resource confidence levels (inferred to indicated) in the western area of the pit and (indicated to measured) in the northern area of the pit.
- Processing test work is required to support the FPF and VRF flowsheets further and confirm the metallurgical behaviour of the ores during the various processing stages based on representative ore samples and blends.
- Conduct process engineering studies to finalise process design criteria, mass, water and heat balances, impact of recycling solutions, and equipment selection and sizing to support the development of capital and operating costs for the FPF and VRF.
- Confirm and refine the Supercritical Hydrogenation Process to enhance yield and product quality through further pilot plant trials and data analytics.
- Explore alternative processing technologies like pyrolysis, gasification, and combustion to reduce technology risk.
- Investigate carbon capture and utilization (CCU) technologies to manage CO_2 emissions and create additional revenue streams.
- Investigate opportunities to identify technologies to reduce greenhouse gas emissions in future study phases.
- Research spent shale residue for by-product uses and establish partnerships for resource efficiency and profitability.
- Investigate co-disposal of waste rock with dry tailings to determine approach and stability.
- Undertake further assessment to confirm sufficient reliable water supply and associated costs.
- Consider implementing borehole infrastructure to support the operation when creek flows do not produce adequate water for site requirements.
- Undertake further assessment to confirm sufficient reliable power supply and associated costs.

IMPORTANT INFORMATION ABOUT THIS DOCUMENT

1. Our Client

RPM Advisory Services Pty Ltd (RPM) was engaged by QEM Limited (the Client) to prepare a Scoping Study for the Julia Creek Project. This Executive Summary is extracted from the Scoping Study and may not fully represent all considerations, risks, assumptions and information considered and identified by RPM as part of the full Scoping Study report. It should not be relied upon as a standalone document and should be read in conjunction with the full Scoping Study report.

2. Client Use

The Client's use and disclosure of this report is subject to the terms and conditions of the engaging Agreement under which RPM prepared the report.

3. Notice to Third Parties

RPM prepared this report for the Client only. If you are not the Client:

- *RPM has prepared this report having regard to the particular needs and interests of the Client, and in accordance with the Client's instructions and in accordance with the terms and conditions of its engagement. It did not draft this report having regard to any other person's particular needs or interests. Your needs and interests may be distinctly different to the Client's needs and interests, and the report may not be sufficient, fit or appropriate for your purposes.*
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4. Independence

RPM provides advisory services to the mining and finance sectors. Within its core expertise it provides independent technical reviews, resource evaluation, mining engineering, environmental assessments and mine valuation services to the resources and financial services industries.

RPM have independently assessed the subject of the report (the "Project") by reviewing pertinent data, which may include Resources, Reserves, existing approvals, licences and permits, manpower requirements and the life of mine plans relating to productivity, production, operating costs and capital expenditures. All opinions, findings and conclusions expressed in this report are those of RPM and specialist advisors.

Drafts of this report were provided to the Client, but only for the purpose of confirming the accuracy of factual material and the reasonableness of assumptions relied upon in this report.

RPM has been paid, and has agreed to be paid, professional fees for the preparation of this report. The remuneration for this report is not dependent upon the findings of this report. RPM does not have any economic or beneficial interest (present or contingent), in the Project, in securities of the companies associated with the Project or the Client

5. Inputs, subsequent changes and no duty to update

RPM has created this report using data and information provided by or on behalf of the Client. Unless specifically stated otherwise, RPM has not independently verified that data and information. RPM accepts no liability for the accuracy or completeness of that data and information, even if that data and information has been incorporated into or relied upon in creating this report (or parts of it).

The conclusions and opinions contained in this report apply as at the date of the report. Events (including changes to any of the data and information that RPM used in preparing the report) may have occurred since that date which may impact on those conclusions and opinions and make them unreliable. RPM is under no duty to update the report upon the occurrence of any such event, though it reserves the right to do so.

6. Inherent Mining Risks

Mining is carried out in an environment where not all events are predictable.

Whilst an effective management team can identify the known risks and take measures to manage and mitigate those risks, there is still the possibility for unexpected and unpredictable events to occur. It is not possible therefore to totally remove all risks or state with certainty that an event that may have a material impact on the operation of a mine, will not occur.

The ability of any person to achieve forward-looking production and economic targets is dependent on numerous factors that are beyond RPM's control and that RPM cannot anticipate. These factors include, but are not limited to, site-specific mining and geological conditions, management and personnel capabilities, availability of funding to properly operate and capitalize the operation, variations in cost elements and market conditions, developing and operating the mine in an efficient manner, unforeseen changes in legislation and new industry developments. Any of these factors may substantially alter the performance of any mining operation.

7. Limitations and Exclusions

RPM 's report is based on data, information reports, plans and tabulations, as applicable, provided by Client or on behalf of the Client. The Client has not advised RPM of any material change, or event likely to cause material change, to the operations or forecasts since the date of assets inspections.

The work undertaken for this report is that required for a technical review of the information, coupled with such inspections as RPM considered appropriate to prepare this report.

Unless otherwise stated specifically in writing, the report specifically excludes all aspects of legal issues, commercial and financing matters, land titles and agreements, except such aspects as may directly influence technical, operational or cost issues and where applicable to the JORC Code guidelines.

RPM has specifically excluded making any comments on the competitive position of the relevant assets compared with other similar and competing producers around the world. RPM strongly advises that any potential investors make their own comprehensive assessment of the competitive position of the relevant assets in the market.

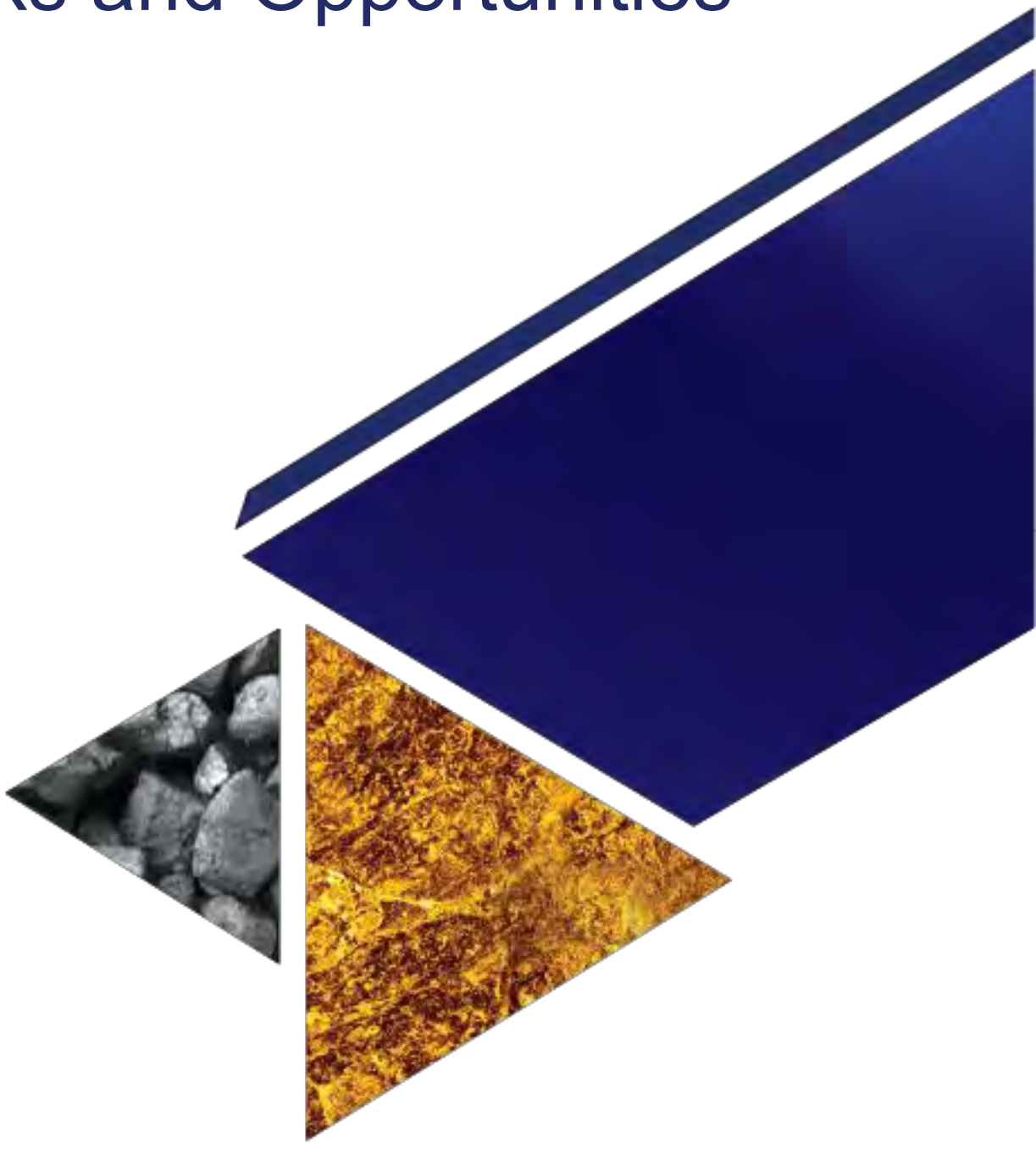
8. Indemnification

The Client has indemnified and held harmless RPM and its subcontractors, consultants, agents, officers, directors and employees from and against any and all claims, liabilities, damages, losses and expenses (including lawyers' fees and other costs of litigation, arbitration or mediation) arising out of or in any way related to:

- *RPM 's reliance on any information provided by Client; or*
- *RPM 's services or materials; or*
- *Any use of or reliance on these services or materials by any third party not expressly authorised by RPM,*

save and except in cases of death or personnel injury, property damage, claims by third parties for breach of intellectual property rights, gross negligence, wilful misconduct, fraud, fraudulent misrepresentation or the tort of deceit, or any other matter which be so limited or excluded as a matter of applicable law (including as a Competent Person under the Listing Rules) and regardless of any breach of contract or strict liability by RPM.

Appendix B.
Risks and Opportunities



Appendix B : Risks and Opportunities

Approach

A detailed assessment of the Project risks and opportunities was undertaken. The following is primarily to highlight the opportunities that may be available and the material risks to the Project.

Project Opportunities

Whilst the Scoping Study has settled on a preferred development case based on the existing work completed, RPM is of the opinion that there remains a number of opportunities that have the potential to improve the project viability and warrant further analysis as part of future studies and have been identified at this time are summarised in **Table B-1**.

Table B-1 General Project Opportunities

Opportunity	Explanation	Potential Benefit
General Project		
General Project Optimization	In the same way that overall CAPEX, OPEX, metallurgical recoveries, etc. are potential risks to the Project, they may also be opportunities.	Continued Value Engineering studies will be undertaken concurrent to Basic Engineering and will focus on improving the overall Project economics.
Expand the Project's scope to include vertical integration from primary producer to vanadium electrolyte producer.	There is an opportunity to include a vanadium electrolyte production plant in the project scope, which will allow QEM to capture more value downstream from the Vanadium Refining Facility.	Ability to supply directly to battery manufacturers.
GEOLOGY		
Exploration Potential Eastern side Deposit	The deposit characterisation and Whittle pit optimisation work identified high margin and low strip ratio areas on the eastern side of the deposit. This area has been sparsely drilled and further exploration work could identify significant high margin resources.	Another high margin area in the lease would allow for increased production and project scalability
In-pit conversion of Indicated Mineral Resources to the Measured category	Improve the confidence of the resource in the current mining area	Increased confidence means less risks and therefore more competitive financing opportunities and alternatives.
MINING		
Project Scalability	The Whittle pit optimisation work (not taking into account resource categorisation) indicated that at the 100% Revenue Factor shell, essentially the entire deposit is economical.	Project scalability
Stockpiling	Improved Stockpile Scheduling Strategy	An improved stockpiling scheduling strategy can increase value by stockpiling lower grade material and processing high grade ore earlier in the project schedule
PROCESSING		
Calcite Removal	Successful calcite removal (e.g. classification stage for CQL ores) can reduce mill size and associated costs;	Increased calcite removal at the front end of the plant means less feed into the Oil Recovery Facility (ORF) and Vanadium Refining Facility (VRF)

Opportunity	Explanation	Potential Benefit
		which means less grinding, reagents, smaller equipment and less energy It would also lower sulphuric acid leaching costs in the VRF
Leaching optimisation	The optimization of leaching stages could lower acid consumption in the Vanadium Refining Facility (VRF).	Reduced operating costs
Test Work	FPF and VRF Flowsheet validation: test work needs to be completed to ensure that proposed metallurgy, recoveries, and process efficiencies are achievable, mitigating risks and optimising performance.	Test work will provide confidence in the current assumptions but also provide opportunities to optimise the plant design and performance
Sulphuric acid production	The production of sulphuric acid on-site would significantly lower VRF processing costs and dependence on the availability of sulphuric acid from external sources	Roasting of the VRF feed which contains pyrite would provide the feed stock for a sulphuric acid plant. This would significantly lower VRF processing costs and may simplify the flowsheet with lower capital costs. Conduct a trade-off study to assess viability.
Economic recovery of mineral values from spent shale residue	Spent shale residue is a by-product of the Oil Recovery Facility which may have economic value	Increase revenue via another product stream
Recovery and sales of other minerals	Potential to recover molybdenum, copper, nickel, silica, alumina and soda ash.	Increase revenue via another product streams
Sale of solids sulphur	Organic sulphur compounds in the kerogen are converted first to hydrogen sulphide in the kerogen conversion step of the Hydrogenation Process, which then reports to the methane-rich process off-gas. After removal from the off gas, the hydrogen sulphide is then converted to solid sulphur and may be sold.	Increase revenue via another product streams
Production of Portland cement.	FLSmidth - Julia Creek QEM - Investigation of Raw Materials for the production of Portland cement.	Increase revenue via another product streams
Alternate technologies	The kerogen-rich feed presents QEM with the opportunity to explore technologies alternative to the hydrogenation process. If the Company seeks to reduce technology risk, proven processing technologies such as pyrolysis, gasification or even combustion are available.	Increases recovery with lower operating and capital costs
INFRASTRUCTURE		
Water Source	Water is a critical commodity for this project and securing economic water supply is essential for the project's success	Increase confidence into the water supply for the project
Tailings handling	Preliminary design and trade off for the tailings storage facility versus filtered tailings	An economic, environmental and stakeholder assessment would be undertaken to determine the preferred outcome for the project
ENVIRONMENTAL		

Opportunity	Explanation	Potential Benefit
Aviation Fuel	Supply of petroleum products that currently have no 'green' alternatives (e.g., aviation fuel) and provides an element of national security by enabling regional access to high quality petroleum products.	Producing and refining fuel locally as opposed to importing crude oil will be seen as an advantage by stakeholders
Hydrogen Production	Another opportunity is to advance the development of hydrogen production in an emerging industrial landscape in Australia with the full support of the government as detailed in State and National strategies, supporting innovation, facilitating investment, ensuring an effective policy framework, and building the necessary skills.	Being an industry leader in green hydrogen production will assist in developing skill sets for wider hydrogen production and have great project acceptance by all stakeholders
PROJECT ECONOMICS		
Rising Metal Prices	Increases in metal prices, would increase revenue and Project economics.	Increased revenue enhances financial factors.
Increase Diesel Price	Increased diesel price would increase revenue from diesel sales and also maintain the contractor mining cost as the diesel is free issue.	Increased revenue and stable contractor mining costs which will allow to project to be more cost competitive compared to competitor who are only mining vanadium
Reagent/Fuel Price Decreases	Reductions in reagent and consumable prices, especially fuel, power and cyanide, have the potential to decrease operating costs and enhance the Project economics.	Lower OPEX may lead to higher net revenue and enhanced Project economics.

Project Risks

A high-level identification of risks was undertaken to identify the potential risks and their mitigants associated with the Project.

Mining is a relatively high-risk business when compared to other industrial and commercial operations. Each deposit has unique characteristics and responses during mining and processing, which can never be wholly predicted. RPM's review of the Project indicate risk profiles above the industry average as it utilises new advances in innovative technologies.

RPM notes that in most instances it is likely that through enacting controls identified through detailed review of the Project's operation, existing documentation and additional technical studies, many of the normally encountered Project risks may be mitigated. The risk assessment outcome is set out in **Table B-2**.

The risk assessment should also be understood within the broad context of the Scoping Study and the industry risk. The Scoping Study is completed to an engineering accuracy of +/-40% with the objective if improving the Project Definition and increasing confidence in the economic and technical viability. Insufficient engineering has been completed to commence Project construction or necessarily identify all risks. Furthermore, Mining is carried out in an environment where not all events are predictable. Whilst an effective planning and management team can identify the known risks and take measures to manage and mitigate those risks, there is still the possibility for unexpected and unpredictable events to occur. It is not possible therefore to totally remove all risks or state with certainty that an event that may have a material impact on the operation of a mine, will not occur.

Table B-2 General Project Risks and Mitigations

Description	Risk	Mitigation
GENERAL PROJECT		
Julia Creek opposition risk – social licence	There is a risk that the plan to develop the Project as set out in this Scoping Study will meet with opposition from the local community or interest groups. Such opposition could adversely affect the Company's ability to meet its timetable or budget and could cause a temporary or permanent cessation of the project, and therefore adversely affect the operating and financial performance of the Company.	To mitigate the risk of opposition from the local community or interest groups, QEM has engaged in proactive and transparent communication with all stakeholders. This includes conducting thorough community consultations to understand and address concerns, fostering strong relationships with local leaders, and involving the community in the planning process. Additionally, implementing corporate social responsibility initiatives and demonstrating the project's benefits to the local community can help build support. Regularly monitoring and addressing any issues that arise promptly, along with developing contingency plans for potential delays or budget impacts, will help ensure the project remains on schedule and within budget, thereby safeguarding the company's operating and financial performance.
No operating history	QEM has not previously conducted operations on the scale contemplated by this Scoping Study. There are risks that the Company will not be able to transform itself from being an early stage company to a fully operating substantial entity. These risks should be assessed in the context that there is no developed vanadium industry in Australia based on the application of the Hydrogenation Process.	QEM's mitigation strategy is to engage with strategic partners that have the operational experience needed to develop and operate the project.
Government regulations	The Company will be subject to certain regulations under the Minerals Act and Petroleum Act. While the Company will take all reasonable steps to satisfy all current requirements, future changes in legislation and/or regulations regarding oil shale mining may result in significant increases in compliance costs.	QEM's mitigation strategy is to continue active engagement with government through various industry organisations.
Reliance on key personnel	QEM will be reliant on a management team comprising a number of key personnel and consultants. The failure to retain, or loss of, one or more of these key contributors could have an adverse impact on the realisation of the Project.	To mitigate the risk of losing key personnel and consultants, QEM should implement a comprehensive strategy including succession planning, retention initiatives, and contingency measures. This involves developing succession and knowledge transfer plans, offering competitive compensation and career development opportunities, fostering a positive work environment, and conducting regular risk assessments. Additionally, QEM should maintain a proactive recruitment strategy and a talent pipeline to ensure continuity. These actions will help retain critical

Description	Risk	Mitigation
		contributors and ensure the project's successful realization despite potential personnel changes.
Permit Acquisition or Delay	The ability to secure all of the permits to build and operate the Project is of paramount importance. Failure to secure the necessary permits could stop or delay the Project.	A thorough Environmental Impact Statement for the Project and a design that gives appropriate consideration to the environment and local community expectations and input is required and is in progress.
Ability to Attract and Maintain Experienced Professionals	The ability for QEM to attract and retain competent, experienced professionals is a key success factor for the Project.	The early search for, and retention of, professionals should help identify and attract critical people and mitigate this risk.
Change in Permit Standards, Processes, or Regulations	A change in standards, processes, or regulations could have a significant impact on Project schedules, operating cost and capital cost. Permit conditions could require design changes to the Project, increasing costs.	Participate in legislative and regulatory processes to ensure standards remain protective, fair and achievable.
Development or Construction Schedule	The Project development could be delayed or extended for a number of reasons, which could impact Project economics.	Opportunities exist to modify the construction activities schedule and delivery method such as accelerating construction of the new access road to build a greater percentage of the Project from that road versus undertaking appreciable early site construction from the existing road.
GEOLOGY		
Mineral Resource Modelling	The risk is the level of certainty in the Mineral Resource estimates and whether they can be confirmed with additional drilling.	Continue drilling campaigns to confirmed mineral resource
Additional faulting as a result of analysis of seismic	There is likely to be more faults that have been undiscovered	Continue exploration drilling around faulted areas defined by seismic.
Overall drop in oil yields and vanadium contents with additional drilling	More drilling is likely to identify areas of high and low grades.	There is now more certainty that the attributes as drilled are correct and reflect what is predicted in situ.
Infill drilling ahs shown there is some variability in grades across the seams	The variability still remains open to the west	Continue exploration drilling to increase certainty to increase resources to Measured.
Infill drilling has indicated thinning of the CQLB to the north and thinning of the OSU within the planned open cut area. east	A thinner CQLB and OSU may indicate diminishing tonnes. Tonnes are being influenced by 3 holes (024, 033 & 055), which needs additional holes to define the extents.	Continue exploration drilling to increase certainty
MINING		
Geotechnical assessment recommended for pit design parameters	A lower wall angle will result in increased waste stripping requirements.	Additional geotechnical studies and stability monitoring during construction and operations may improve understanding of geotechnics and reduce such risks. Continue to engage with Cartledge

Description	Risk	Mitigation
		Mining and Geotechnics to provide pit design recommendations
Geotechnical assessment recommended for in-pit and ex-pit dump design parameters	The design parameters of the in-pit dump will determine the quantity of waste placed in this dump and therefore affect haulage distances. The geotechnical study should advice the pit floor preparations required prior to in-pit dumping.	Continue to engage with Cartledge Mining and Geotechnics to design recommendations
PROCESSING		
Classification Stage	Uncertainty in the effectiveness of classification for calcite removal, impacting mill size and cost. In addition, not all ores may be amenable to classification.	Test work to determine the efficacy of classification methods for calcite removal before milling. Determination of the abundance of ores that are not amenable to classification.
Leaching in extraction stage	High reagent consumption	Conduct test work to optimise sulphuric acid consumption.
Validation of Flowsheets	Lack of comprehensive test work to validate flowsheets. Depression of vanadium and pyrite are required for the kerogen recovery stages.	Implement a test work program to validate each step of the FPF and VRF flowsheet.
Metallurgical Recoveries and Grades	Potential failure to achieve the proposed recoveries, grades, and mass recoveries across various processing stages.	
Capex and Opex	Potential increase in capital and operational expenditures if assumptions about calcite removal and process efficiencies are not achieved.	
Transport Fuel Production	The quality of the shale oil to be produced by the Company and offered to the market may differ from conventional transport fuel.	As a mitigation step, QEM commenced preliminary petrology work with Ampol and will continue detailed petrology work in subsequent project phases to further understand the crude oil's chemical properties and distillation/boiling point potential.
Hydrogenation Process Technical and Operating Risk	The Hydrogenation Process has yet to be demonstrated at scale. While the underlying chemistry has been demonstrated by laboratory tests and bench-scale pilot plant, there are risks that an eventual demonstration plant or the first commercial scale plant may not be able to be constructed for the costs expected, and their operating performance may not achieve the potential outcomes described in this Scoping Study.	The next stage of development of the hydrogenation is to move from a bench-scale pilot plant to a pilot plant with the aim of increasing feed volume and confirm process conditions determined during the scoping study phase. Before progressing to subsequent stages, the pilot plant testing will be rigorously evaluated from a technical, environmental and economic perspectives. Nevertheless, it is important to recognise that every process step and all the primary process equipment in the hydrogenation process have analogues in one or more other well established processes and industries. In many cases, these analogues operate not only at higher capacities, but also under more rigorous process conditions (for example, higher pressures, corrosive aqueous process fluids instead of non-corrosive oils, or more abrasive slurries) than

Description	Risk	Mitigation
		will be encountered even in full scale commercial plants implementing the hydrogenation Process.
FPF Downtime	Unplanned downtime would impact the operation of the ORF and VRF, resulting in revenue loss and overall plant performance	Introduce ORF and VRF feed storage capabilities
ORF Downtime	Unplanned downtime would impact the operation of the FPF, resulting in revenue loss and overall plant performance	Introduce ORF feed storage capability
VRF Downtime	Unplanned downtime would impact the operation of the FPF, resulting in revenue loss and overall plant performance	Introduce VRF feed storage capability
INFRASTRUCTURE		
Water Sourcing	Uncertainty in the effectiveness of screens for calcite removal, impacting mill size and cost	Test work to determine the efficacy of screens and potential gravity methods for calcite removal before milling
Power Supply	The electrical supply requirements for the over the fence generation of hydrogen has not been considered in this study and will need to be confirmed in the next project phase.	Continue to engage with Enel Green Power Australia and Copper String to ensure sufficient and reliable power can be supplied when required
Site Access Roads	development and application for access roads from the Flinders Highway	Engage with the relevant stakeholders on the design and approval requirements to ensure safe access to/from site and the diesel storage facility
Construction Material	There may be insufficient materials that meet construction and/or reclamation specifications within the project footprint.	Detailed construction material investigation for site sourcing of fill
Hydrogen Production	Although the proposed hydrogen generation facility is required on site further work will be required to appropriately position it for peripheral risk to operations.	Undertake a detailed risk assessment for the location of the hydrogen plant and associated storage facilities. Ensure regulatory considerations are included in this assessment.
Infrastructure Location	Location of infrastructure and processing plants has been considered for the study limits only, future resource access may require the areas to be rearranged.	Undertake a detailed risk assessment
Geotechnical	No consideration has been made as to the geotechnical stability of the areas to be used, the assumption has been made that in situ material can be sourced, and is suitable for engineered fill.	Geotechnical study to include areas where infrastructure will be built. Particular importance is the dam storage. Geotechnical work must include the design parameters for this storage facility
ENVIRONMENTAL		
Stakeholder Acceptance	Stakeholder acceptance to produce a mineral critical for the renewable transition while also producing a fossil fuel product that will still be required for decades to come.	Continue to engage with all stakeholder regarding to transition to renewable energy and that the petroleum product will be required for a successful transition
Green Hydrogen Production	Hydrogen production presents a risk to Project commencement in an emerging	Continue to engage with relevant Government authorities with regards to the approval process

Description	Risk	Mitigation
	industrial regulatory landscape, where associated regulatory assessment and approval processes in very early stages.	
Julia Creek dunnart and regulated vegetation	Australian and Queensland ecological offsets are likely to be required for the Project due to unavoidable impacts to the Julia Creek dunnart and regulated vegetation.	Mine design and infrastructure placement have considered these constraints based on currently available information. Avoidance and minimization of impacts to biodiversity should be considered further during future feasibility stages through options analysis or trade off studies based on baseline survey results when available.
Nature Positive Plan	The Project may be subject to the changes currently underway in the Australian parliament under the Nature Positive Plan that will introduce new legislation and assessment departments to replace the current EPBC process for future referrals. Changes to legislation introduce uncertainty, particularly changes of this magnitude, to approval timelines and associated costs.	Keep abreast of potential changes and ensure the project is dynamic to incorporate change if required
Native Title	Projects on Native Title land require the proponent to enter into an ILUA or a RTN with the Indigenous people with an official claim over the area.	A registered CHMP will also be required under State legislation. Where there is no claim, the proponent must advertise and seek potential claimants to the site. While this introduces another level of uncertainty regarding potential delays to the Project approval process, precedence has been set at the neighbouring vanadium project that were in a similar position however achieved approval.
Mining Licence	Granting ML tenure over State land under the Land Act 1994 is stated to be a time consuming and complex process in feedback received from DoR	The ML application process can be initiated simultaneous to environmental approvals, however mining cannot commence until both are granted.
Flood risks	Flood risks pose a risks to uncontrolled sediment/unwanted material release into clean water ways.	avoidance of blockage to fish passage and surface water contamination may feature significantly in several areas of the approval application process and if approved, likely conditioned heavily in the permits.
Water Sourcing Impacts	Access to water for the project and the perceived impacts to GDEs/third party users	Compensation agreements or offsets may need to be negotiated.
Safeguard Mechanism	The Project may be subject to the Safeguard Mechanism whereby a baseline number will need to be established under tighter best practice emissions factor specific to the Project	If the Project is subject to the Safeguard Mechanism, participation in the carbon trading market may be required which could introduce a cost or a benefit to the Project economics. This aspect should be estimated in future feasibility stages.
Grazing Land	As the pre-mining use of Project land is grazing, the reduction of available land will be a significant consideration during the land valuation and compensation stage if required.	Continue to engage with local land users and understand the need for the required compensation

Description	Risk	Mitigation
Hydrogen and Petroleum Storage	Community perception of the risks and hazards associated with hydrogen and petroleum storage at the Project	This will be considered during the Social Impact Assessment stage, which is a new consideration for the community and therefore could pose a challenge to ultimate acceptance.
PROJECT ECONOMICS		
Vanadium Price	The economic model is sensitive to changes in commodity pricing	Engage an external consultant to undertake a thorough study for future pricing of vanadium from Julia Creek. Maintain a conservative outlook to assess the project economics.
Transport Fuel Price	The future financial performance could be affected by the level of, and changes to, the price of transport fuel from time to time. Other than using oil hedging – in which respect the Company has yet to formulate any policy – the Company will not be able to influence the price and must therefore take the market price	The mitigation steps taken in formulating the Scoping Study are twofold: adopting the daily average wholesale price of transport fuel at the gate for the years 2023 and 2024 (ex. Brisbane) as published by the Australian Petroleum Institute ; also, the Study assumes that only 70% of the crude oil extracted will be processed into transport fuel.
CAPEX and OPEX	The ability to achieve the estimated CAPEX and OPEX costs are important elements of Project success.	Trade off of capitalised options including, fuel depot, accommodation camp, mining maintenance infrastructure. Additional engineering, cost estimating, and construction execution planning would increase the CAPEX and OPEX estimate's accuracy.
Capital Contingency	Capital contingency is applied to cover the known and unknown risks/growth of the project. Underestimating the contingency can lead to budget overrun at the execution phase of the project	Apply an appropriate level of contingency for the relevant stage of the project and then test the sensitivity to that assumption.
Shift/Roster systems	Shift systems need to be finalised to accurately estimate labour costs	Further study to ability to employ skilled labour locally and the difference will need to come from Fly-in-Fly-Out (FIFO) or Drive-In-Drive-Out (DIDO) personnel. The roster system will need to be finalised to estimate labour numbers and costs

IMPORTANT INFORMATION ABOUT THIS DOCUMENT

1. Our Client

RPM Advisory Services Pty Ltd (RPM) was engaged by QEM Limited (the Client) to prepare a Scoping Study for the Julia Creek Project. This Risk and Opportunities section is extracted from the Scoping Study and may not fully represent all considerations, risks, assumptions and information considered and identified by RPM as part of the full Scoping Study report. It should not be relied upon as a standalone document and should be read in conjunction with the full Scoping Study report.

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RPM provides advisory services to the mining and finance sectors. Within its core expertise it provides independent technical reviews, resource evaluation, mining engineering, environmental assessments and mine valuation services to the resources and financial services industries.

RPM have independently assessed the subject of the report (the "Project") by reviewing pertinent data, which may include Resources, Reserves, existing approvals, licences and permits, manpower requirements and the life of mine plans relating to productivity, production, operating costs and capital expenditures. All opinions, findings and conclusions expressed in this report are those of RPM and specialist advisors.

Drafts of this report were provided to the Client, but only for the purpose of confirming the accuracy of factual material and the reasonableness of assumptions relied upon in this report.

RPM has been paid, and has agreed to be paid, professional fees for the preparation of this report. The remuneration for this report is not dependent upon the findings of this report. RPM does not have any economic or beneficial interest (present or contingent), in the Project, in securities of the companies associated with the Project or the Client

5. Inputs, subsequent changes and no duty to update

RPM has created this report using data and information provided by or on behalf of the Client. Unless specifically stated otherwise, RPM has not independently verified that data and information. RPM accepts

no liability for the accuracy or completeness of that data and information, even if that data and information has been incorporated into or relied upon in creating this report (or parts of it).

The conclusions and opinions contained in this report apply as at the date of the report. Events (including changes to any of the data and information that RPM used in preparing the report) may have occurred since that date which may impact on those conclusions and opinions and make them unreliable. RPM is under no duty to update the report upon the occurrence of any such event, though it reserves the right to do so.

6. Inherent Mining Risks

Mining is carried out in an environment where not all events are predictable.

Whilst an effective management team can identify the known risks and take measures to manage and mitigate those risks, there is still the possibility for unexpected and unpredictable events to occur. It is not possible therefore to totally remove all risks or state with certainty that an event that may have a material impact on the operation of a mine, will not occur.

The ability of any person to achieve forward-looking production and economic targets is dependent on numerous factors that are beyond RPM's control and that RPM cannot anticipate. These factors include, but are not limited to, site-specific mining and geological conditions, management and personnel capabilities, availability of funding to properly operate and capitalize the operation, variations in cost elements and market conditions, developing and operating the mine in an efficient manner, unforeseen changes in legislation and new industry developments. Any of these factors may substantially alter the performance of any mining operation.

7. Limitations and Exclusions

RPM 's report is based on data, information reports, plans and tabulations, as applicable, provided by Client or on behalf of the Client. The Client has not advised RPM of any material change, or event likely to cause material change, to the operations or forecasts since the date of assets inspections.

The work undertaken for this report is that required for a technical review of the information, coupled with such inspections as RPM considered appropriate to prepare this report.

Unless otherwise stated specifically in writing, the report specifically excludes all aspects of legal issues, commercial and financing matters, land titles and agreements, except such aspects as may directly influence technical, operational or cost issues and where applicable to the JORC Code guidelines.

RPM has specifically excluded making any comments on the competitive position of the relevant assets compared with other similar and competing producers around the world. RPM strongly advises that any potential investors make their own comprehensive assessment of the competitive position of the relevant assets in the market.

8. Indemnification

The Client has indemnified and held harmless RPM and its subcontractors, consultants, agents, officers, directors and employees from and against any and all claims, liabilities, damages, losses and expenses (including lawyers' fees and other costs of litigation, arbitration or mediation) arising out of or in any way related to:

- *RPM 's reliance on any information provided by Client; or*
- *RPM 's services or materials; or*
- *Any use of or reliance on these services or materials by any third party not expressly authorised by RPM,*

save and except in cases of death or personnel injury, property damage, claims by third parties for breach of intellectual property rights, gross negligence, wilful misconduct, fraud, fraudulent misrepresentation or the tort of deceit, or any other matter which be so limited or excluded as a matter of applicable law (including as a Competent Person under the Listing Rules) and regardless of any breach of contract or strict liability by RPM.

APPENDIX B: JORC TABLE 1

Section 1 - Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	Explanation	Commentary

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 1 m samples from which 3 kg was pulverised to produce a 30 g 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.*
		- Sampling and testing conducted by contract geologists during the QEM 2015 drilling campaign is described below:
		- Testing took place on the Toolebuc Formation which is the target formation. Cored intersections of the target formation were sampled in 0.5 m sections except where samples were terminated against sharp contacts between sedimentary units. All samples were double bagged on site. Samples were assigned individual sample numbers and accompanied by a sample advice sheet.
		- Half cores were delivered to ALS Coal Division laboratory in Townsville Queensland for weighing, crushing, splitting and testing. Sampling was extensive, with standard tests for all samples including:
		  - Total Moisture;
		  - Inherent Moisture;
		  - Ash Content;
		  - Volatile Matter;
		  - ICP-AES analysis. ICP-AES analysis included a suite of 33 elements, the important ones from the projects prospective being Ca, Cu, Mo and V.
		- Composited samples selected following the above assays:
		  - Modified Fischer Assay
		- Industry standard coring (4C) and sampling methods have been used.
		- Sample representivity was ensured by careful observation of the core by a trained geologist during sampling in order to ensure that samples do not cross unit boundaries and by recording and tracking core recoveries.
		- During the 2018 and 2019 drilling campaign, sampling and testing was carried out by QEM staff geologists. A similar procedure was followed for sampling and analysis, except that the stage 1 analysis step was skipped, and the samples were combined into the relevant units (CQU, CQLA, CQLB, OSU and OSL) prior to Proximate Analysis and ICP.

Criteria	Explanation	Commentary

		- Sampling and testing conducted by contract geologists during the 2021, 2022 and 2023 drilling campaigns are described below:
		- Testing took place on the Toolebuc Formation which is the target formation. Cored intersections of the target formation were sampled in 0.5 m sections except where samples were terminated against sharp contacts between sedimentary units or they were truncated by the start or end of a core run. All samples were placed in 100 mm PVC splits to ensure structural integrity of the core was maintained and sealed inside layflat tubing. Samples were assigned individual sample numbers and accompanied by a sample advice sheet.
		- Full cores were delivered Mitra PTS laboratory in Gladstone, Queensland for slabbing, weighing, crushing, splitting and testing. All samples were slabbed on delivery at the lab with one quarter of each sample being used for the below workflow. Sampling was extensive, with standard tests (Stage 1) for all samples including:
		  - Total Moisture;
		  - Inherent Moisture;
		  - Ash Content;
		  - Volatile Matter;
		  - ICP-AES analysis including a suite of 33 elements, the important ones from the projects prospective being Ca, Cu, Mo and V.
		- Composited samples selected following the delivery of the above assays:
		  - Modified Fischer Assay
		- Industry standard coring (4C) and sampling methods have been used.
		- Sample representivity was ensured by careful observation of the core by a trained geologist during sampling in order to ensure that samples do not cross unit boundaries and by recording and tracking core recoveries.

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.).*	- The 2015 drilling programme involved the drilling of 10 drillholes across the tenements. These varied in depth from 72 m (drillhole QEM002) to the deepest hole at 120 m (QEM004), drilled during August 2015. The drilling was completed by rotary core drilling, using 4C (100mm) core. The drill diameter for the chipped section of the hole was 124 mm where PCD bit was used for chipping. - In 2018, QEM commissioned two 4C drill holes (100 mm) core, with non-core sections drilled using 124 mm PCD bits for the dual purpose of infill drilling and to supply material for processing studies. - In 2019, QEM commissioned five 4C drill holes (100 mm) core, with non-core sections drilled using 124 mm PCD bits for the dual purpose of infill drilling and to supply material for processing studies. The total cumulative drilling was 536 m for all seven 2018/2019 holes.

Criteria	Explanation	Commentary
		- The 2021 drilling programme involved the drilling of 6 drill holes across the tenements (plus one redrill). These varied in depth from 41.5 m (drillhole QEM023R) to the deepest hole at 83.5 m (QEM018). Drilling was completed by rotary core drilling, using 4C (100mm) core. The drill diameter for the chipped section of the hole was 124 mm where PCD bit was used for chipping. The total cumulative drilling was 458.5 m for all seven holes. - In 2022, QEM commissioned five 4C drill holes (100 mm) core, with non-core sections drilled using 124 mm PCD bits for the dual purpose of infill drilling and to supply material for processing studies. In total, 242 m was drilled. - In 2023, QEM commissioned twelve 4C drill holes (100 mm) core, with non-core sections drilled using 124 mm PCD bits for various purposes, focused on resource exploration, groundwater bore installation, geotechnical analysis and waste characterisation. In total, 620 m was drilled. - All QEM drill holes were geologically logged on site, photographed, geophysically logged and surveyed. Cores were labelled and boxed before dispatch to the laboratory for analysis.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *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.*	- Core loss has been documented in the field during logging and sampling of the core. - Calculations have been performed to accumulate total core loss over the sampled interval. The core recovery from the entire Julia Creek Project is >90%, which is deemed appropriate for resource classification purposes. Detailed records have been kept of core recoveries which have allowed for analysis of the influence of core recovery on quality during resource estimation. - Geophysical validation, via gamma, caliper and density down hole surveys have used to correct logs and identify sections of core loss.
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.*	- Detailed logging of chips and core was conducted. Chips and core photographs were taken as well. All cores were geologically logged, marked and photographed. - Final drill logs include information on detailed lithological logging of the drill core, geophysical logging, core recoveries, quality and the initial interpretation in terms of stratigraphy. All drillhole logs were corrected to downhole geophysics. - The detail contained in these logs is considered sufficient for the purpose of resource estimation.
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.*	- For the 2021 QEM drilling programme, each sample was delivered to the lab as full cores then slabbed lengthways to provide ¼ core for the below workflow. The other ¾ core was used for an alternative testing workflow. - All QEM core samples were double bagged on-site and transported to the laboratories for testing. The labs, ALS and Mitra PTS, comply with Australian Standards for sample preparation and sub-sampling. All samples were subjected to a coarse crush and fine crush. The coarse crush size was

Criteria	Explanation	Commentary
	• *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.*	-6mm for 70% of the sample. Samples were riffle split into 5 kg portions. One 5 kg portion was stored, and the other 5 kg portion was subjected to fine crush. Fine crush was -2mm for 70% of the sample. The fine crushed 5 kg portion was split into 2.5 kg portions - one for the proximate analysis and the other for ICP-AES analysis. For the 2015 drilling programme, the proximate analysis was done at ALS Gladstone division and ICP-AES done at Townsville division. For the 2018, 2019, 2021, 2022 and 2023 drilling programmes, ICP-MS and ICP-AES were conducted by Bureau Veritas. - For the 2015, 2021, 2022 and 2023 drilling programmes, following proximate analysis, Mitra PTS used the remaining sample, combined by length density weighting into sedimentary units as instructed by contract geologists, for Modified Fischer Analysis (MFA). - For the 2018 and 2019 drilling programmes, sample combination was not required before MFA testing, as original sampling was done to the lithological units.

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 (i.e. lack of bias) and precision have been established.*
		- ALS Minerals and Geochemistry Laboratory (ALS Townsville and ALS Gladstone laboratory in Queensland), Bureau Veritas and Mitra PTS adhere to internal QAQC and inter-laboratory QAQC checks. All determinations performed adhere to the American Society for Testing and Materials (ASTM) guidelines.
		- ALS, Bureau Veritas and Mitra PTS comply with ASTM standards for all ore quality tests and are certified by the National Association of Testing Authorities Australia (NATA). ALS laboratories and Mitra PTS are regularly benchmarked by external auditors against the highest professional laboratory standard – ISO 17025.
		- Accreditation to this standard provides assurance that the laboratory systems are robust and maintained at a world-class level.
		- The Quality Assurance/Quality Control processes employed by QEM are as follows:
		  - Duplicates were inserted at a frequency of 1 in 15 (approximately 7% of samples).
		  - Certified Reference Materials (CRM) were inserted at a rate of 1 in 10 samples. Five CRMs were used, consisting of high grade and low grade equivalent materials.
		  - Blanks were inserted into the sample stream at a rate of 1 in 30 (~3% of samples).
		  - Umpire Checks were conducted on 1 in 10 samples. These were tested by ALS in Brisbane with ICP-MS by analytical methods ME-MS61 and ME-MS81.
		  - Alternative Test Methods were utilised to ensure accuracy of the primary assay method. Both XRF and Lithium Borate Fusion digest with Laser Ablation ICP-MS finish were applied at a rate of 1 in 10 samples. These checks were completed by Bureau Veritas in Perth, using analytical methods with the laboratory codes XRF202 and LA101.

Criteria	Explanation	Commentary
		- Weatherford Wireline Services, Borehole Wireline Pty Ltd and Well Search Pty Ltd performed all downhole geophysical logging. Downhole sample spacing for all tools is 1 cm. Density, gamma, calliper, sonic, verticality and resistivity tools were run. - Weatherford Wireline Services, Borehole Wireline Pty Ltd, Well Search Pty Ltd are ISO9001 certified and use numerous Quality Control procedures, from the set-up and calibration of downhole tools to the final delivery of client data.
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*	- Verification of assay data was performed by means histograms of sedimentary unit composites constructed to check for outliers. - No outliers were found. Once imported into MineScape gridded assay values were visually inspected to check for anomalies. - The first two 2015 holes drilled (QEM001 and QEM002) were drilled adjacent to old CSR holes (597.8_709.9 and 596_710). Intersection depths for the top of the Coquina agreed with CSR holes to within 1 m. Although, the total thickness of the Toolebuc did differ by between 10% and 20%, however when the CQU unit is discarded (as it is from the resource) the remaining thickness of the Toolebuc Formation matched the historical holes to within an acceptable margin. - All results received from the laboratories were supplied in elemental format (ppm). As the Vanadium price is quoted according to the concentration of the oxide (V2O5), assay data in V ppm was converted to wt% oxide prior to importing into the Geological database. The ppm value was firstly divided by 10 000 to convert to wt%. The wt% of the element (V) was then multiplied by 1.7852 to convert to wt% V2O5. - Two historical drillholes were twinned as part of the 2021 drilling programme, for the purpose of further validating the reliability of historic data. The outcome of the twinned drillholes was that the thickness of, and depth to historic drilling results was confirmed, however the elevation of the units showed slight discrepancies. Further investigation has confirmed that the elevation of drillhole collars from historic data is less reliable than the collar elevations surveyed in 2021, which is consistent with previous assumptions. - The twin drillhole results between hole QEM018 and 592_710 show close agreement, however the results between hole QEM020 and 594_710 are less convincing. This suggests that although the historic data is sufficient supporting data for resource classification, it is preferential to use modern drilling as points of observation.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.*	- A differential GPS survey of all collars has been conducted upon completion of drilling by registered surveyors, M.H.Lodewyk Pty Ltd. The grid system used is MGA 94 Zone 54. - Old drillhole coordinates are in AMG 84/66 Zone 54 and were transformed into MGA 94 Zone 54 prior to importing into the database.

Criteria	Explanation	Commentary
	• *Quality and adequacy of topographic control.*	- The topography surface was generated from an airborne LiDAR survey completed by Aerometrix over the QEM tenure package flown in 2022. The surface resolution is >1 m.
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.* • *Whether sample compositing has been applied.*	- Data spacing is sufficient to establish continuity in both thickness and grade. - Samples have been composited by lithological unit (CQU, CQLA, CQLB, OSU and OSL) for the resource estimation. These composites range between 1.5 – 3 m in thickness.
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.*	- The deposit type is a weakly folded syngenetic sedimentary style deposit, therefore vertical drillholes are deemed an appropriate orientation for the purpose of unbiased sampling. - Minor extensional structures have been identified in the project with the assistance of seismic surveys, however these are not related to mineralisation and hence have not introduced a sampling bias.
Sample security	• *The measures taken to ensure sample security.*	- Sample security was ensured under a chain of custody procedure utilised between QEM and Contract personnel on-site and the receiving laboratories.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	- No audits of sampling etc. done however a comprehensive set of internal company procedures exist and have been adhered to.

Section 2 – Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

<table>
<tr><th>Criteria</th><th>Explanation</th><th>Commentary</th></tr>
<tr><td>Mineral tenement and land tenure status</td><td>• 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.</td><td>- QEM's Julia Creek Project comprises of EPM 25662, EPM 25681 EPM 26429 and EPM 27057. When combined, these leases cover a total area of 249.6 km².
<table>
<tr><th>Tenement</th><th>Concession Type</th><th>Area (km²)</th><th>Status</th><th>Granted</th><th>Expiry</th></tr>
<tr><td>EPM 25662</td><td>Exploration Permit Minerals other than Coal</td><td>134.5</td><td>Granted</td><td>22/01/2015</td><td>23/01/2025</td></tr>
<tr><td>EPM 25681</td><td>Exploration Permit Minerals other than Coal</td><td>6.4</td><td>Granted</td><td>06/03/2015</td><td>5/03/2025</td></tr>
<tr><td>EPM 26429</td><td>Exploration Permit Minerals other than Coal</td><td>35.2</td><td>Granted</td><td>16/03/2017</td><td>15/03/2027</td></tr>
<tr><td>EPM 27057</td><td>Exploration Permit Minerals other than Coal</td><td>73.6</td><td>Granted</td><td>02/05/2019</td><td>1/05/2024</td></tr>
</table></td></tr>
<tr><td>Exploration done by other parties</td><td>• Acknowledgment and appraisal of exploration by other parties.</td><td>- In 1981, CSR Ltd. drilled a series of exploration holes within the current QEM's Julia Creek Project for the measurement of oil yield and Vanadium content from the Toolebuc Formation. The drillholes reached a total depth of between 46 m and 161m, intersecting the Toolebuc Formation between 35 m to 142 m.</td></tr>
<tr><td>Geology</td><td>• Deposit type, geological setting and style of mineralisation.</td><td>- The Early Cretaceous Toolebuc Formation is the target geological horizon at the Julia Creek Project. This stratigraphic unit occurs throughout the Eromanga and Carpentaria Basins in eastern, central and northern Queensland and into portions of the Northern Territory and South Australia.
- The Eromanga Basin is a sub-basin of the Great Artesian Basin and consists of several thick sequences of non-marine to marine sedimentary units. The Toolebuc Formation is part of the Rolling Downs Group of the Eromanga Basin that covers a wide but relatively shallow structural depression in eastern Australia, over an area of 1.5 million Km^2.
- The Toolebuc Formation is an early Cretaceous aged (Albian approximately 110 My) sedimentary unit that consists of a lower kerogenous shale (Oil Shale) and an upper interbedded limestone (coquina) and shale unit (Coxhell and Fehlberg, 2000). The Toolebuc Formation crops out at the margins of the Eromanga and Carpentaria basins or, in the case of the Julia Creek area, where it is draped over an original basement high (the St Elmo Structure). Where the unit crops out, it forms low rubbly, topographic highs which have been the source of road-building materials.</td></tr>
</table>

Criteria	Explanation	Commentary
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* • *easting and northing of the drill hole collar* • *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* • *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*	- See the Appendix for a complete table of drill hole information relevant to the current mineral resource estimate.
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*	- For the mineral resource estimate, 0.5 m samples have been composited to the lithological units (CQU, CQLA, CQLB, OSU, OSL), typically between 1.5 – 3 m. - No metal equivalents or cut off grades have been used.
Relationship between mineralisation widths and intercept length	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole 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').*	- The orientation of drilling/sampling is not seen to introduce any bias as all drilling is vertical and mineralisation is stratiform, with the host Toolebuc Formation is regionally flat lying, exhibiting gentle folding across the project area.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any*	- See Appendices.

Criteria	Explanation	Commentary
	significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	
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.*	- All exploration results pertaining to holes drilled during QEM drilling at the Julia Creek Project have been fully documented in this report. Holes drilled previously have been reported in QDEX reports by CSR Ltd. and others.
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.*	- Extensional structures in the project area have been interpreted by Velseis, who completed two seismic surveys across the project in 2019 and 2023 respectively. - In 2019, QEM commissioned Velseis to conduct a 26 km 2D seismic survey using mini-SOSIE. The seismic survey consisted of two east-west lines, line 01 being 17 km and south of that line 02 being 9 km long. - In 2023, QEM again commissioned Velseis to conduct a 7.3 km 2D seismic survey using mini-SOSIE. The seismic survey consisted of two east-west lines. Line 01 is located north of the existing 2019 survey lines at a length of ~3.6 km and south of that is line 02, located between the 2019 survey lines, approximately 3.7 km long. - The results showed that seams are continuous across the surveyed area and that there are some minor N-S striking faults, with the largest fault displacement calculated at 12.5 m and the bulk of the interpreted structures appearing to be below the 3 m resolution limit.
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.*	- Additional drilling on the eastern side of the deposit is required to upgrade the resource confidence.

Section 3 – Estimation and Reporting of Mineral Resources

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

Criteria	Explanation	Commentary
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.*	- All data relevant to previous resource estimates was provided to Measured by QEM. This data was provided in the form of Minescape tables and design files, plus a series of Excel spreadsheets, las files etc. - Measured Group has created a GDB database and loaded all relevant data into that database. GDB is a proprietary database platform, provided by ABB. It includes a standard set of data validation checks which are tested during the data loading process. Any data which fails the validation checks cannot be loaded into the database. - In addition to data used for previous resource estimates, a large amount of historical and regional data was also captured, loaded to the database, and validated in a similar manner.
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.*	- The competent person visited the site in August 2022. There was a rig active during this visit, so the drilling, sampling and logging procedures were observed and found to be representative of the data used in this resource estimate.
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 factors affecting continuity both of grade and geology.*	- The main data sources used in the estimate are the lithological logs, core photographs, downhole geophysical logging, and assays for both base metals, proximate analysis and oil yield. - Confidence in the sedimentary correlations is considered high as they are based on downhole geophysics, assays and core photographs. Secondary confirmation of the interpretation is the results of the seismic surveys and gridded model itself which shows good continuity between data points. Therefore, the current drilling density is considered sufficient for seam thickness and quality and has been confirmed with geostatistics for the resource classifications assigned.
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.*	- See figures in appendices. - The target for the Resource (Toolebuc Formation) extends across the entire project area. The project area is approximately 30km wide by 12km. Target horizon (Toolebuc) found at depths of between 18 m and 140 m below surface. The Toolebuc Formation is centred around a regional basement high known as the St Elmo Structure.

<table>
<tr><th>Criteria</th><th>Explanation</th><th>Commentary</th></tr>
<tr><td>Estimation and modelling techniques</td><td>

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 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 drill hole data, and use of reconciliation data if available.

</td><td>

The FEM interpolator was used for surface elevation, thickness and trend. Ordinary Kriging has been used for interpolation of V_2O_5 wt%. Linear interpolation (Inverse Distance power 1) was used for other grade parameters including oil grade parameters
Grid cell sizes of 50 metres for the topographic model, 50 metres for the structural model and 250 metres for the quality model were used.
No assumptions have been made regarding the correlation between grade variables or selective mining units in regard to modelling techniques, however there is good evidence to suggest that high V_2O_5 is related to high oil content and that both variables are related to organic matter.
Visual validation of all model grids performed to ensure extreme values have not influenced any of the grids. The entire deposit is considered a single domain for each sedimentary unit in terms of unit thickness and grade.

</td></tr>
<tr><td>Moisture</td><td>

Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.

</td><td>

All tonnages have been adjusted to in-situ density, using the Preston Sanders method. In-situ moisture by stratigraphic unit has been applied as per the table below

<table>
<tr><th>Unit</th><th>In-situ moisture</th></tr>
<tr><td>CQLA</td><td>1.77</td></tr>
<tr><td>CQLB</td><td>2.82</td></tr>
</table>
</td></tr>
</table>

Criteria	Explanation	Commentary
		OSU 11.76 OSL 13.31
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	- The Mineral Resources contained in this report are confined within the concession boundaries. - No minimum thickness cut off was used for calculating resources. - No oil yield cut-off was applied to the oil shale estimate, however the CQLA unit was excluded from the oil shale estimate, because the oil yield was often below 40%. - A cutoff of 0.2 V_2O_5 wt% was used for the Vanadium resource in the Oil Shale units, and a cutoff of 0.15 V_2O_5 wt% was used for the Coquina Units. The lower cutoff for the Coquina units is based on recent and historical processing studies, which show that the limestone portion of the Coquina units can be separated from the oil shale portion of the coquina units through the use of simple beneficiation techniques. This simple beneficiation can upgrade Vanadium grade up to 3.5 times
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.*	- Open-pit mining methods are envisaged. A high-level pit optimisation study has been undertaken, based on production of a Vanadium product only. A sale price of $8.50 USD/lb was assumed, which is considered to be sustainable (perhaps conservative), given the high price of Vanadium over the past 3 years. Mining, processing and transport costs and parameters were built into the optimisation using estimates based on current open-cut operations in the region. The study resulted in a series of shells showing positive, break-even and negative margins. - Although not considered in the revenue factors used in the Pit Optimisation study, it is possible that additional by-products (other than V_2O_5 and crude oil) such as other base metals (Copper (Cu), Molybdenum (Mo), Nickel (Ni), Zinc (Zn), and Aluminum (Al)) and cement products could be produced as part of the Vanadium processing, which may have a positive impact on revenue assumptions. The competent person is satisfied that this deposit possesses reasonable prospects for eventual economic extraction at this stage.
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.*	- Processing studies have been completed by Brisbane Met Labs (BML), CORE Resources and Petrotec. The WH Bryan Mining Geology Research Centre at the University of Queensland have recently been engaged to provide characterisation studies on the vanadium deportment. GSA Environmental are currently engaged to assist in delineating the processing criteria to optimise the processing stream at Julia Creek. - The BML and CORE studies have concentrated on separation of the limestone component of the coquina from the oil shale component, using floatation, wavetable and upflow classifier techniques. The Vanadium is principally contained in the oil shale component, whilst the acid consuming Calcium is principally contained in the limestone component. Results of these studies are summarised as follows:

Criteria	Explanation	Commentary
		1. CORE Resources Float 5: 74% of Vanadium was recovered in 36% of the mass with a grade of 0.61% V2O5. Calcium carbonate (as indicated by Ca and total inorganic carbon assays) was rejected with only 24% recovery in FL5. 2. Brisbane Met Labs (BML) Wavetable (first pass): 54% of mass went to concentrate and 46% mass went into the combined tail. Importantly 60% of the Ca went into the concentrate and 67% of the V in the combined tail. This was a first pass test and involved no grinding. 3. BML Float (replicating CORE Resources Float): Recovered 73% of the V to the concentrate. This is in only 45% of the mass and only 36% of the Ca. 75% of the organic carbon has floated (This includes the oil-rich oil shale). It does appear like the V is associated with the organic matter, Zn, Al, Cu, and Si. 4. BML Up-flow classifier (Reflux): 92% V in 64% of mass 5. Petroteq: Extracted 65% of the oil and retained all the metals in the residual material which is 20% of the mass. - Recent characterisation studies completed at the WH Bryan Mining Geology Research Centre at the University of Queensland have indicated that montmorillonite clays are the predominant host for vanadium in the feed provided by QEM, hosting more than 90% of the total vanadium. Further work will be completed by UQ, focusing on separating montmorillonite from the bulk feed. - Furthermore, there was no significant vanadium hosted by calcite, which was shown to represent between 18 to 25% of the bulk original feed. This suggests that separation methods to remove calcite prior to leaching could effectively reduce acid consumption and processing costs. CORE have been engaged to continue testwork for pre-treatment of the CQLA and CQLB to reject calcite. - GSA Environmental are currently engaged to delineate the process criteria of the vanadium extraction process from the oil shale ash. The initial phase has highlighted several areas that will require optimisation testing. These findings are expected to be completed by mid-2024. Further testing stages will include a pilot-scale test, with a commercial scale test to follow.
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*	- Measured has not conducted any environmental assessment in the concession area.

<table>
<tr><th>Criteria</th><th>Explanation</th><th>Commentary</th></tr>
<tr><td></td><td>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.</td><td></td></tr>
<tr><td>Bulk density</td><td>• 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.</td><td>- Relative density (ad) has been determined from analysis and modelling of samples within each of the modelled units. The method of analysis was conducted using Australian Standard AS1038.21.1.2/21.1.1
- Relative density has then been adjusted to in-situ density, using the Preston Sanders method, and this in-situ density has been used to estimate tonnes. In-situ moisture by stratigraphic unit has been applied as per the table below
<table>
<tr><th>Unit</th><th>In-situ Moisture</th></tr>
<tr><td>CQLA</td><td>1.77</td></tr>
<tr><td>CQLB</td><td>2.82</td></tr>
<tr><td>OSU</td><td>11.76</td></tr>
<tr><td>OSL</td><td>13.31</td></tr>
</table></td></tr>
<tr><td>Classification</td><td>• The basis for the classification of the Mineral Resources into varying confidence categories.
• Whether appropriate account has been taken of all relevant factors (i.e. 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.</td><td>- Resource classification is based on an assessment of the variability of critical variables (Vanadium grade, oil grade and sedimentary unit thickness) through statistical analysis, geostatistical analysis and by an assessment of the degree of geological complexity (general dip and structure).
- The presence of assay results for Vanadium has been set as the minimum requirement for a point of observation.
- Minimum spacing between points of observation has been set to 4000m (and no further than 2000m from a point of observation) for the inferred category, and 1200m (and no further than 600m from a point of observation) for the indicated category, based on ranges derived from variography. No attempt has been made to classify the resource at measured status, at this stage of the project. The further acquisition of data (infill drilling) will be required to obtain an upgrade in confidence of the Vanadium Resource.
- Within the Indicated category polygon, the classification of resources within a 10-meter corridor of the interpreted faults has been downgraded to the inferred category. This adjustment is attributed to reduced geological confidence, the potential for resource loss, and other related mining factors.</td></tr>
</table>

Criteria	Explanation	Commentary
Audits or reviews.	• *The results of any audits or reviews of Mineral Resource estimates.*	- No audits or reviews of this estimate have been done to date.
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 resource classification is considered to address the level of confidence in thickness and base metal/oil yield variability across the deposit on a global basis. - Faults have been well defined in the indicated portion of the deposit through use of a number of techniques, including drilling, 2D seismic and analysis of regional topography.