

10 July 2024



## *Boda-Kaiser Scoping Study*

Alkane Resources Ltd ('Alkane') (ASX: ALK) is pleased to announce its Scoping Study for the Boda-Kaiser Project.

The Boda-Kaiser Project is a large gold-copper porphyry system in Central West NSW with potential for a long-term bulk-tonnage mining and processing operation. To understand the project economics and potential economies of scale from different-sized operations, and identify a potential pathway to development, Alkane has evaluated three possible scenarios:

- Mining and processing 20 million tonnes of ore per annum
- Mining and processing 10 million tonnes of ore per annum
- Mining and processing 5 million tonnes of ore per annum

Evaluation shows that the largest development scenario is the highest value due to the potential economies of scale. Given its positive economics, the 10 million tonnes per annum development could form part of a staged build for a larger project, or as a standalone project in a rising gold and copper price environment. It is unlikely that a 5 million tonnes per annum development would meet Alkane's investment return hurdles at current gold and copper prices.

The considered underground mining option uses a Long Hole Open Stoping (LHOS) mining method, consistent with Alkane's experience at its Tomingley Gold Operations. Given that a high throughput is beneficial to the project economics, future studies will evaluate the potential for sub-level caving or a similar bulk tonnage underground method.

The 20 million tonnes per annum scenario:

- **Processes 323 million tonnes of ore at 0.26g/t gold and 0.15% copper over 17 years.**
- **Mines 319 million tonnes from open cut mining and 4 million tonnes from underground mining. 85% of the ore mined comes from Indicated Resource and 15% from Inferred.**
- **Produces an average 35,600 tonnes of copper and 159,300 ounces of gold per annum for the first five years of operation.**
- **Costs were estimated at A\$630 per gold ounce (with copper by-product credit) over the 17-year life (2024 dollars).**
- **Undiscounted free cash flow of A\$5.7 billion would be generated over the 17-year life (using an average price of A\$15,000/t for Cu and A\$3,500/oz for gold).**
- **A forecast capital cost of A\$1,783 million with an additional A\$223 million of development and sustaining capital over the 17-year life.**
- **An estimated Net Present Value (NPV 7%, pre-tax) of A\$1,808 million, estimated 24% Internal Rate of Return (IRR, pre-tax), with a Pre-Tax NPV to Start-up Capital ratio of 1.0.**

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Alkane's next steps for the Boda-Kaiser Project will be:

- Conducting the baseline environmental monitoring and impact assessments that will be required for project approval in the future;
- Evaluation of the potential for sub-level caving or a similar bulk tonnage underground method;
- Further consideration of the potential routes for infrastructure to the project area, particularly for the supply of power and water;
- Ongoing metallurgical testwork and optimisation of the flowsheet;
- Continued engagement with local stakeholders;
- Continued exploration throughout the broader Northern Molong Porphyry Project area; and
- Continued evaluation of potential funding pathways and potential partners, the outcome of which will contribute to the selection of which development option to progress further into feasibility.

The table on the next page presents the Summary of Financial Outcomes.

Alkane Managing Director, Nic Earner, said: *"This scoping study shows that at current copper and gold prices a large mine and processing facility can be built at Boda-Kaiser with strong economic returns that could provide supply into global gold and copper markets – both highly attractive commodities with strong market fundamentals over the long term.*

*"There remains significant potential to add both to the overall resource with further exploration, and to the potential project economics with further examination of mining cost and method, particularly large-scale underground mining.*

*"Our focus over the next year at Boda-Kaiser is regional exploration, environmental studies, increasing our understanding of mining options and discussions with potential strategic partners.*

*"Alkane's Board would like to thank the team of dedicated employees and consultants involved in the completion of this study."*



## Summary of Financial Outcomes (real terms, 2024 Australian dollars)

		5Mtpa	10Mtpa	20Mtpa
<b>Economic Assumptions</b>				
Copper	A\$/t	15,000	15,000	15,000
	A\$/lb	6.80	6.80	6.80
Gold	A\$/oz	3,500	3,500	3,500
<b>Operating Parameters</b>				
Throughput	Mtpa	5,000	10,000	20,000
Initial Project LOM	yrs	30	26	17
Total Ore Processed	Mt	150.0	251.0	323.5
Average Copper Grade	%	0.20	0.17	0.15
Average Gold Grade	g/t	0.32	0.28	0.26
Average Copper Recovery	%	83.7	83.7	83.5
Average Gold Recovery	%	76.4	76.5	76.3
<b>Production</b>				
Total CuEq Produced	tonnes	527,412	750,482	893,760
Total Copper Produced	tonnes	250,947	347,505	413,733
Total AuEq Produced	oz	2,260,659	3,216,809	3,830,948
Total Gold Produced	oz	1,185,017	1,727,289	2,057,553
Annual AuEq Production LOM average	oz	75,355	123,723	225,350
Annual Copper Production (yrs 1-5)	tonnes	11,603	17,808	35,611
Annual Gold Production (yrs 1-5)	oz	61,088	95,354	159,334
<b>Capital</b>				
Pre-production	A\$M	856.8	1,262.8	1,782.5
Post-production	A\$M	206.1	232.3	223.2
<b>TOTAL</b>	<b>A\$M</b>	<b>1,062.9</b>	<b>1,495.1</b>	<b>2,005.7</b>
<b>Operating Costs</b>				
AISC (Gold Equivalent)	A\$/oz	2,073.9	1,984.3	1,901.8
AISC (By-product credit basis)	A\$/oz	891.0	783.4	630.4
Total Opex Cost per tonne milled	A\$/t milled	28.8	23.4	20.6
Processing, general administration	A\$/t milled	16.6	12.8	10.6
Open pit mining cost	A\$/t ore mined	9.6	9.2	9.0
Underground mining cost	A\$/t ore mined	80.0	80.0	80.0
<b>Financials</b>				
Pre-tax NPV7%	A\$M	473.2	1,034.7	1,808.5
Pre-tax IRR	%	13.1	16.9	24.0
Pre-tax NPV / Start-up Capital		0.6x	0.8x	1.0x
Capital payback period	yrs	7.0	6.0	4.0
LOM Average Annual Free Cashflow	A\$M	92.9	166.0	324.1
LOM Operating Cashflow	A\$M	2,993.3	4,549.1	5,733.7
First 10-Years Free Cashflow (excluding capex in yr 0)	A\$M	1,220.6	2,274.5	4,290.7



## Cautionary Statements

*Based on preliminary technical and economic studies, the Scoping Study referred to in this announcement examines the viability of developing the Boda-Kaiser Project by constructing an open cut and underground mine(s) and processing facility to produce copper-gold concentrate for export and gold dore for domestic refining and sale. The Scoping Study outcomes, production targets and forecast financial information referred to in this document are based on low accuracy level technical and economic assessments. The Scoping Study has been completed to a level of accuracy of +/- 35% in line with typical scoping level study accuracy. While each of the modifying factors was considered and applied, there is no certainty of eventual conversion to Ore Reserves or that the production targets themselves will be realised. Further exploration and evaluation work and appropriate studies are required before Alkane Resources Ltd ("Alkane", "the Company") will be in a position to estimate any Ore Reserves or to provide any assurance of an economic development case. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study or this announcement.*

*Alkane has reasonable grounds for disclosing Production Targets, since approximately 85% of the Life-of-Mine (LOM) Production Target is in the Indicated Mineral Resource category, and 15% is in the Inferred Mineral Resource category. There is a lower level of geological confidence associated with Inferred Mineral Resources. Inferred Mineral Resources are scheduled later in the LOM as they are at the outer edges and deeper in the Resource Model. While Alkane considers all the material assumptions in the scoping study to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated will be achieved.*

*The Mineral Resources underpinning the production target in the Scoping Study have been prepared by a competent person in accordance with the requirements of the JORC Code (2012). The Competent Person's Statement is found below.*

## Forward-Looking Statements

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*Forward-looking statements, opinions and estimates included in the scoping study and this announcement are based on assumptions and contingencies. There are material assumptions supporting the forward-looking statements contained within this document, including projected product pricing and resultant revenues, the projected production rates and quantities, the capital costs to develop and operate the project, the availability, certainty and sources of funding, and financial performance (including the discounted cashflows analysis supporting the net present value and internal rate of return information included in the study and this announcement).*

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**14 December 2023 – Boda Resource Update Increases Gold and Copper Grades**

**14 November 2023 – Boda and Kaiser Met Testwork Delivers Strong Recoveries**

*Alkane 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 those ASX releases continue to apply and have not materially changed.*

## General disclaimer

*Except for statutory liability which cannot be excluded, Alkane, its officers, employees and advisers expressly disclaim any responsibility for the accuracy or completeness of the material contained in the study and this announcement and exclude all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in the study or this announcement or any error or omission there from.*

*The study and this announcement does not take into account the individual investment objectives, financial or tax situation or particular needs*





of any person. It does not contain financial advice. Investors should consider seeking independent legal, financial and taxation advice in relation to the contents of the study and this announcement.

Except as required by applicable law, Alkane does not undertake any obligation to release publicly any revisions to any forward-looking statement to reflect events or circumstances after the date of the study or this announcement, or to reflect the occurrence of unanticipated events, except as may be required under applicable securities laws.

#### Competent persons

The information in the study and this announcement relating to Mineral Resource and Ore Reserve estimates has been approved by individuals having sufficient experience to qualify as a Competent Person, as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC 2012). Such experience relates to the style of mineralisation and type of deposit under consideration, and the activity undertaken. All Competent Persons named below have provided prior written consent to the inclusion of the matters based on their information in the study and this announcement, in the form and context in which it appears.

Information relating to	Competent Person
Mineral Resources and Ore Reserves overview	Mr D Ian Chalmers (FAusIMM, FAIG), who is Executive Director of Alkane Resources Ltd.
Boda and Kaiser Mineral Resource estimates	Mr David Meates (MAIG), who is Exploration Manager NSW and an employee of Alkane Resources Ltd.

This document has been authorised for release to the market by Nic Earner, Managing Director.

ABOUT ALKANE - [www.alkane.com.au](http://www.alkane.com.au) - ASX: ALK

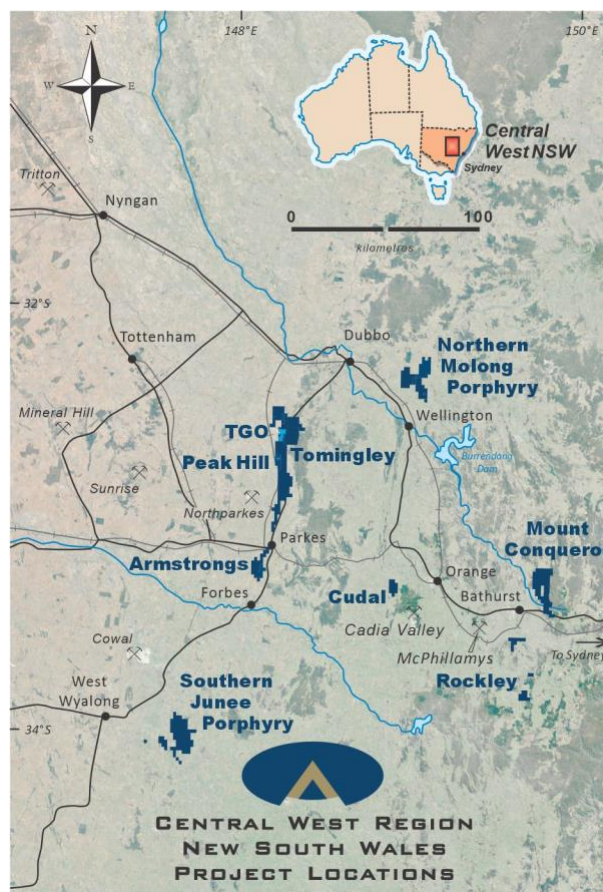
Alkane Resources intends to grow to become one of Australia's multi-mine gold and copper producers.

The Company's current gold production is from the Tomingley Gold Operations in Central West New South Wales, which has been operating since 2014 and has the resources to continue to operate beyond 2030.

Alkane has an enviable exploration track record and controls several highly prospective gold and copper tenements. Its most advanced exploration projects are in the tenement area between Tomingley and Peak Hill, which has the potential to provide additional ore for Tomingley's operations.

Alkane's exploration success includes the landmark porphyry gold-copper mineralisation discovery at Boda in 2019. With drilling ongoing adjacent to the initial resource identified at Boda, Alkane is confident of further consolidating Central West New South Wales' reputation as a significant gold and copper production region.

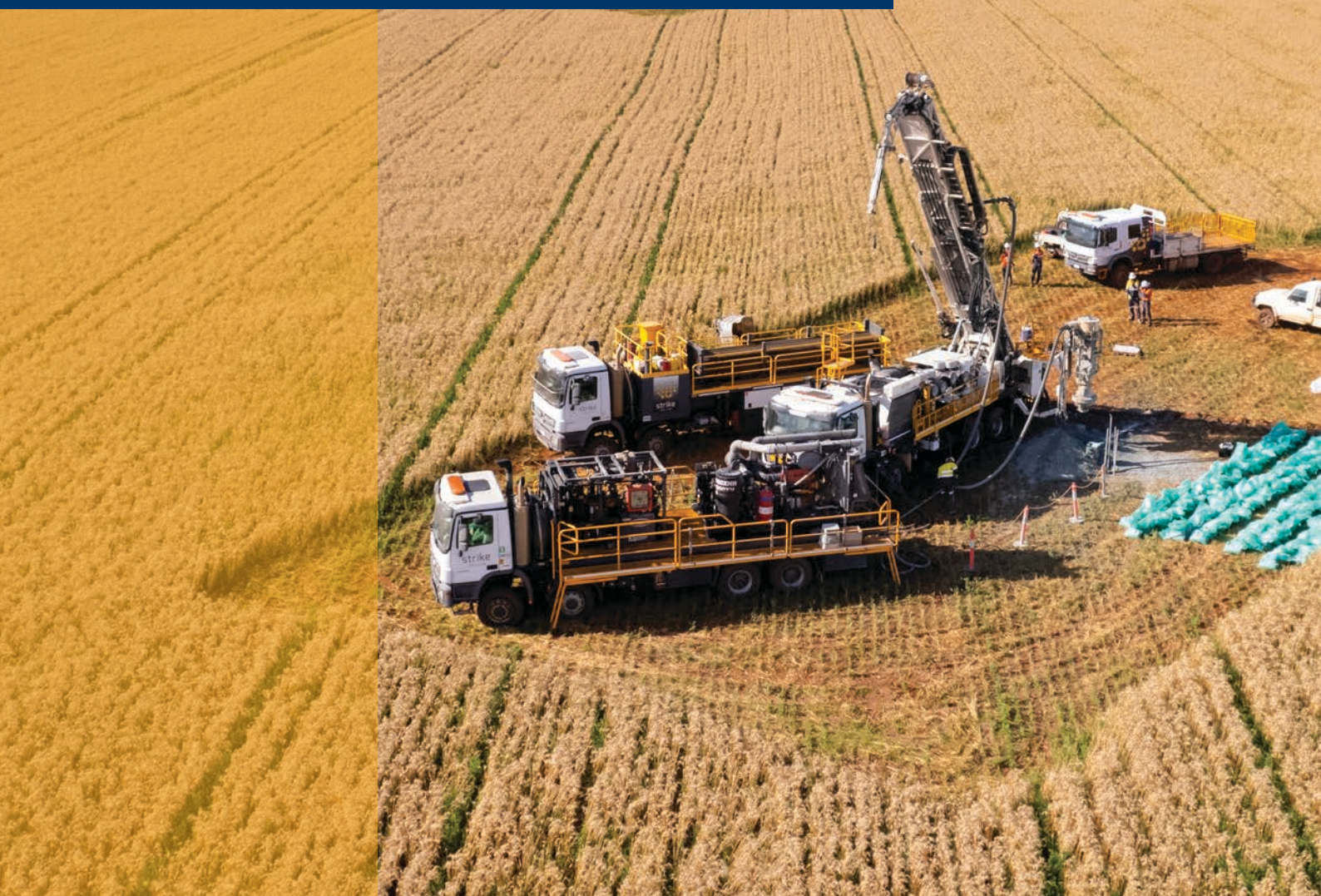
Alkane's gold interests extend throughout Australia, with strategic investments in other gold exploration and aspiring mining companies.





# BODA-KAISER PROJECT SCOPING STUDY

July 2024



# About Alkane

**Alkane Resources Ltd** is a gold exploration, development and production company with projects and operations located in Central West New South Wales.

The company holds several highly prospective gold and copper tenements in NSW, including the Boda and Kaiser deposits near Bodangora, east of Dubbo. These deposits are considered amenable to the development of a large-tonnage gold-copper development and are the subject of this Scoping Study. The Boda-Kaiser Project is part of Alkane's Northern Molong Porphyry Project.

Alkane also owns and operates Tomingley Gold Operations, an open pit and underground gold mining development southwest of Dubbo, which has been in operation since 2014.

Alkane is headquartered in Perth, Western Australia, and fields an exploration team based in Orange, New South Wales. The company was incorporated in 1969 and is listed on the Australian Securities Exchange (ASX:ALK).

## Company Information

ACN 000 689 216  
ABN 35 000 689 216

### Directors

I J Gandel	Non-Executive Chairman
N P Earner	Managing Director
D I Chalmers	Technical Director
A D Lethlean	Non-Executive Director
G M Smith	Non-Executive Director

### Joint Company Secretaries

D Wilkins  
J Carter

### Registered office and principal place of business

Level 4  
66 Kings Park Road  
West Perth WA 6005  
Telephone: 61 8 9227 5677

### Share register

**Automic Pty Ltd**  
Level 5  
126 Phillip Street  
Sydney NSW 2000

### Securities exchange listings

Ordinary fully paid shares

**Australian Securities Exchange (Perth)**  
ASX code: ALK

### Contact

alkane.com.au  
mail@alkane.com.au



# Summary of the Scoping Study

**The Boda-Kaiser Project** is a large gold-copper porphyry system in Central West NSW with potential for a long-term bulk-tonnage mining and processing operation. To understand the project economics and potential economies of scale from different-sized operations, and identify a potential pathway to development, Alkane has evaluated three possible scenarios:

- Mining and processing 20 million tonnes of ore per annum
- Mining and processing 10 million tonnes of ore per annum
- Mining and processing 5 million tonnes of ore per annum

Evaluation shows that the largest development scenario is the highest value due to the potential economies of scale. Given its positive economics, the 10 million tonnes per annum development could form part of a staged build for a larger project, or as a standalone project in a rising gold and copper price environment. It is unlikely that a 5 million tonnes per annum development would meet Alkane's investment return hurdles at current gold and copper prices.

The considered underground mining option uses a Long Hole Open Stopping (LHOS) mining method, consistent with Alkane's experience at its Tomingley Gold Operations. Given that a high throughput is beneficial to the project economics, future studies will evaluate the potential for sub-level caving or a similar bulk tonnage underground method.

## **The 20 million tonnes per annum scenario:**

- Processes 323 million tonnes of ore at 0.26g/t gold and 0.15% copper over 17 years.
- Mines 319 million tonnes from open cut mining and 4 million tonnes from underground mining. 85% of the ore mined comes from Indicated Resource and 15% from Inferred.
- Produces an average 35,600 tonnes of copper and 159,300 ounces of gold per annum for the first five years of operation.
- Costs were estimated at A\$630 per gold ounce (with copper by-product credit) over the 17-year life (2024 dollars).
- Undiscounted free cash flow of A\$5.7 billion would be generated over the 17-year life (using an average price of A\$15,000/t for Cu and A\$3,500/oz for gold).
- A forecast capital cost of A\$1,783 million with an additional A\$223 million of development and sustaining capital over the 17-year life.
- An estimated Net Present Value (NPV 7%, pre-tax) of A\$1,808 million, estimated 24% Internal Rate of Return (IRR, pre-tax), with a Pre-Tax NPV to Start-up Capital ratio of 1.0.

**The steps forward for the Boda-Kaiser Project from today are:**

- Conducting the baseline environmental monitoring and impact assessments that will be required for project approval in the future;
- Evaluation of the potential for sub-level caving or a similar bulk tonnage underground method;
- Further consideration of the potential routes for infrastructure to the project area, particularly for the supply of power and water;
- Ongoing metallurgical testwork and optimisation of the flowsheet;
- Continued engagement with local stakeholders;
- Continued exploration throughout the broader Northern Molong Porphyry Project area; and
- Continued evaluation of potential funding pathways and potential partners, the outcome of which will contribute to the selection of which development option to progress further into feasibility.

Table 0-1 on the next page presents the Summary of Financial Outcomes.

Drilling at Boda-Kaiser in 2023



Table 0-1 Summary of Financial Outcomes (real terms, 2024 Australian dollars)

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	A\$/lb	6.80	6.80	6.80
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Pre-production	A\$M	856.8	1,262.8	1,782.5
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<b>TOTAL</b>	<b>A\$M</b>	<b>1,062.9</b>	<b>1,495.1</b>	<b>2,005.7</b>
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# 1. Introduction

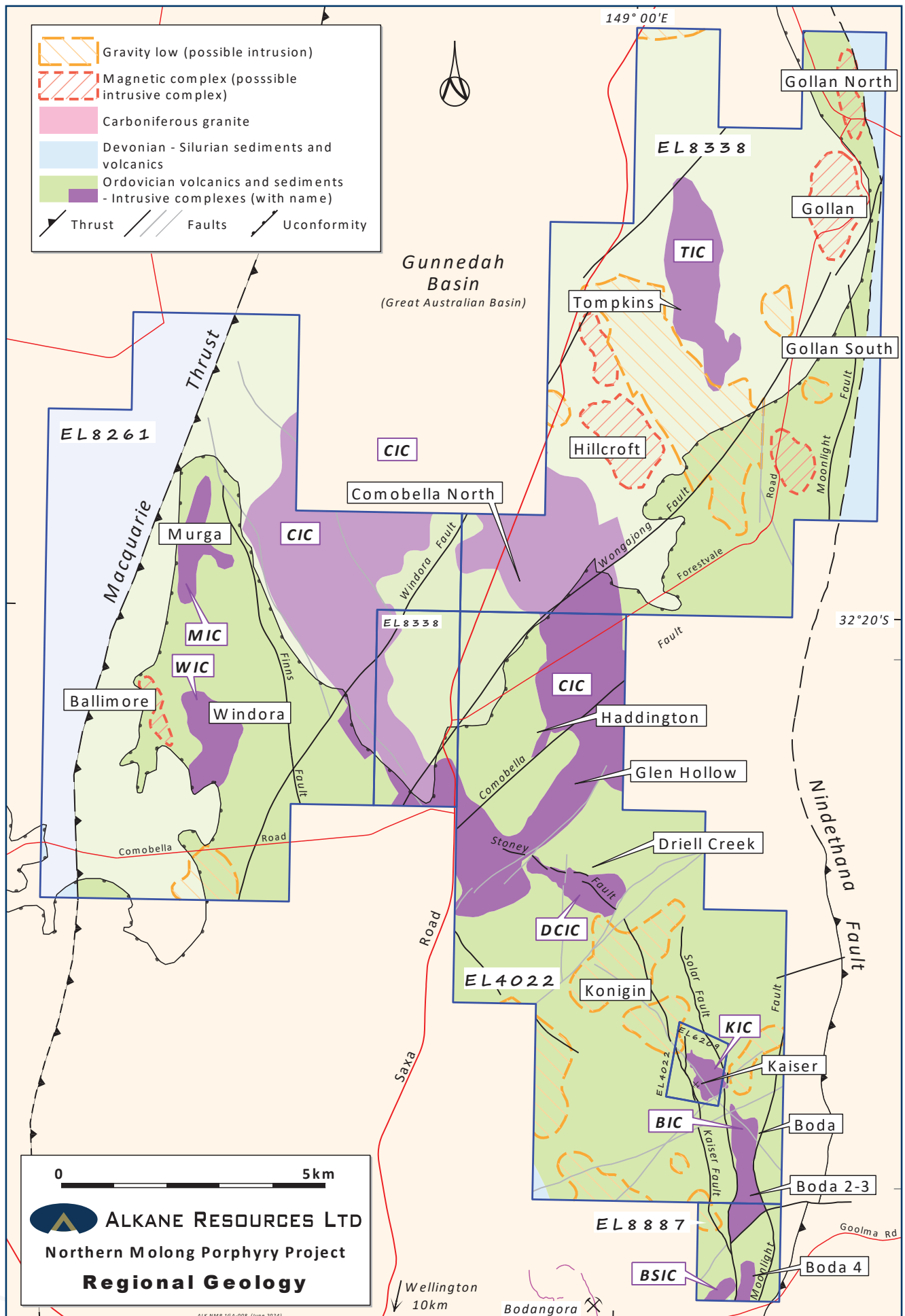
Alkane Resources Ltd is evaluating options to develop the Boda-Kaiser Project, a large gold-copper porphyry system with potential for a long-term bulk-tonnage mining and processing operation. The project is located near the village of Bodangora, 15km northeast of Wellington in Central West New South Wales (NSW), Australia, approximately 400km northwest of Sydney.

Alkane has several Exploration Licenses (ELs) in the broader area, encompassing the Boda and Kaiser deposits, referred to by Alkane as the Northern Molong Porphyry Project (NMPP). Alkane currently owns two properties within the NMPP, including the land on which the Boda and Kaiser deposits are located.

Figure 1-1 Location of the Boda-Kaiser Project



Figure 1-2 The NMPP Exploration Licences, including the Boda-Kaiser Project



This study evaluates three possible development scenarios of the Boda-Kaiser Project:

- Mining and processing 20 million tonnes of ore per annum
- Mining and processing 10 million tonnes of ore per annum
- Mining and processing 5 million tonnes of ore per annum

Evaluation shows that the largest development scenario is the highest value due to the potential economies of scale. Given its positive economics, the 10 million tonnes per annum development could form part of a staged build for a larger project, or as a standalone project in a rising gold and copper price environment. It is unlikely that a 5 million tonnes per annum development would meet investment return hurdles at current gold and copper prices.

Which scenario or variant thereof that Alkane chooses to advance to feasibility and subsequently approval will depend on many factors, such as the results of baseline environmental monitoring and impact assessments, commodity pricing, infrastructure requirements, stakeholder consultation, exploration results, potential project partners and other funding options.

The considered mining scenarios include the staged development of open cut mining at both the Boda and Kaiser deposits, as well as the development of an underground mine at Boda. The costs used for mining are based on the operating costs at Alkane's Tomingley Gold Operations (Tomingley), adjusted for the scale of operations expected at the Boda-Kaiser Project.

The considered underground mining option uses a Long Hole Open Stoping (LHOS) mining method, consistent with Alkane's experience at Tomingley. Given that a high throughput is beneficial to the project economics, future studies will evaluate the potential for sub-level caving or a similar bulk tonnage underground method.

The considered processing scenarios all utilise the same simple flowsheet comprising crushing, grinding, stage flotation with regrind, concentrate dewatering and cleaner tail leaching to dore<sup>1</sup>. Each processing scenario therefore uses the same type of equipment, but different sizes and economies of scale. Capital and operating cost estimates for the potential processing facilities were supervised by consultants Scott Dalley Franks and performed by GR Engineering Services, with input from Land & Marine Geological Services for the tailings dam (residue storage facility). Fixed infrastructure costs were estimated by Alkane using experience from previous project developments.

Alkane combined the results of these work streams internally to prepare the results described and tabled in this document. They demonstrate the strong potential to build a large, long-life mine and processing facility.

<sup>1</sup>As documented in ASX Announcement 14 November 2023

## 2. Mineral Resources

### 2.1 Resources

The Scoping Study is prepared on the Boda<sup>2</sup> and Kaiser<sup>3</sup> Mineral Resources, which together contain ~8.3 million ounces of gold and ~1.5 million tonnes of copper (~14.7 million ounces of gold equivalent). Alkane considers cut-off grades of 0.3g/t AuEq and 0.4g/t AuEq reasonable for the prospect of extraction using bulk tonnage mining methods for open cut or underground respectively. A notional pit shell was used to determine what resources were considered open pittable.

Table 2-1 Boda Mineral Resource

Resource Category	AuEq Cut-off	Tonnes (Mt)	Grade			Contained Metal		
			AuEq (g/t)	Au (g/t)	Cu (%)	AuEq (Moz)	Au (Moz)	Cu (Mt)
Open Pittable Resources (cut-off 0.3g/t AuEq)								
Indicated	0.3g/t	191	0.59	0.36	0.17	3.63	2.22	0.32
Inferred	0.3g/t	42	0.51	0.29	0.16	0.68	0.38	0.07
Subtotal	0.3g/t	233	0.58	0.35	0.17	4.31	2.60	0.39
Underground Resources (cut-off 0.4g/t AuEq)								
Indicated	0.4g/t	151	0.61	0.34	0.20	2.96	1.64	0.30
Inferred	0.4g/t	198	0.58	0.34	0.18	3.67	2.14	0.35
Subtotal	0.4g/t	350	0.59	0.34	0.18	6.63	3.78	0.65
TOTAL		583	0.58	0.34	0.18	10.9	6.38	1.03

The numbers used to calculate Mineral Resources are more precise than the rounded numbers shown in the tables, hence small differences may result if the calculations are repeated using the tabulated figures.

Table 2-2 Kaiser Mineral Resource

Resource Category	AuEq Cut-off	Tonnes (Mt)	Grade			Contained Metal		
			AuEq (g/t)	Au (g/t)	Cu (%)	AuEq (Moz)	Au (Moz)	Cu (Mt)
Open Pittable Resources (cut-off 0.3g/t AuEq)								
Indicated	0.3g/t	179	0.54	0.27	0.20	3.12	1.56	0.35
Inferred	0.3g/t	10	0.48	0.29	0.14	0.16	0.10	0.01
Subtotal	0.3g/t	189	0.54	0.27	0.19	3.28	1.66	0.37
Underground Resources (cut-off 0.4g/t AuEq)								
Indicated	0.4g/t	16	0.60	0.30	0.22	0.30	0.15	0.03
Inferred	0.4g/t	8	0.63	0.36	0.20	0.16	0.09	0.02
Subtotal	0.4g/t	24	0.61	0.32	0.21	0.46	0.24	0.05
TOTAL		213	0.55	0.28	0.20	3.74	1.90	0.42

The numbers used to calculate Mineral Resources are more precise than the rounded numbers shown in the tables, hence small differences may result if the calculations are repeated using the tabulated figures.

<sup>2</sup>As documented in ASX Announcement 14 December 2023

<sup>3</sup>As documented in ASX Announcement 29 April 2024

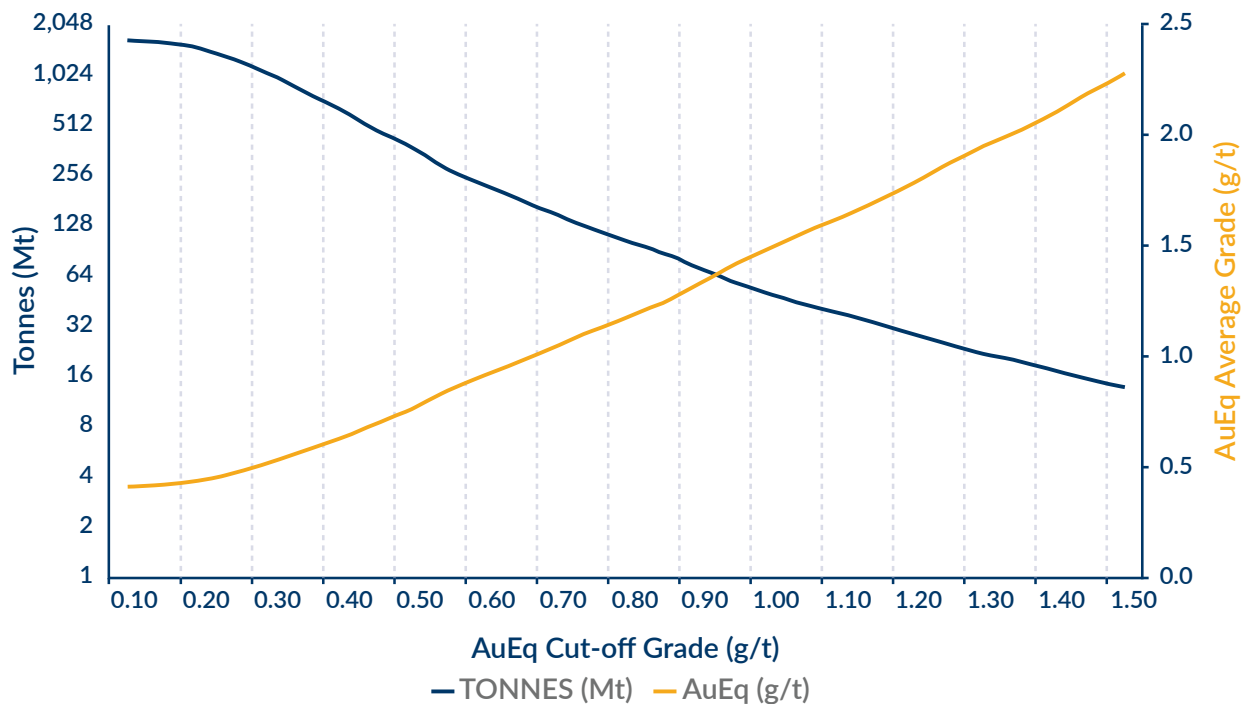


Table 2-3 Total Boda and Kaiser Mineral Resources

DEPOSIT	INDICATED			INFERRED			TOTAL				METAL		
	Tonnes (Mt)	Au (g/t)	Cu (%)	Tonnes (Mt)	Au (g/t)	Cu (%)	Tonnes (Mt)	AuEq (g/t)	Au (g/t)	Cu (%)	AuEq (Moz)	Au (Moz)	Cu (Mt)
<b>Open Pittable Resources (cut-off 0.3g/t AuEq)</b>													
Boda	191	0.36	0.17	42	0.29	0.16	233	0.58	0.35	0.17	4.31	2.60	0.39
Kaiser	179	0.27	0.20	10	0.29	0.14	189	0.54	0.27	0.19	3.28	1.66	0.37
Subtotal	370	0.32	0.18	52	0.29	0.16	422	0.56	0.31	0.18	7.59	4.26	0.76
<b>Underground Resources (cut-off 0.4g/t AuEq)</b>													
Boda	151	0.34	0.20	198	0.34	0.18	350	0.59	0.34	0.18	6.63	3.78	0.65
Kaiser	16	0.30	0.22	8	0.36	0.20	24	0.61	0.32	0.21	0.46	0.24	0.05
Subtotal	167	0.34	0.20	206	0.34	0.18	374	0.59	0.34	0.18	7.09	4.02	0.70
<b>TOTAL</b>	<b>537</b>	<b>0.32</b>	<b>0.19</b>	<b>258</b>	<b>0.33</b>	<b>0.18</b>	<b>796</b>	<b>0.58</b>	<b>0.33</b>	<b>0.18</b>	<b>14.7</b>	<b>8.28</b>	<b>1.46</b>

The numbers used to calculate Mineral Resources are more precise than the rounded numbers shown in the tables, hence small differences may result if the calculations are repeated using the tabulated figures.

Figure 2-1 Total Boda-Kaiser Grade-Tonnage Curve



The gold equivalent calculation formula is  $\text{AuEq(g/t)} = \text{Au(g/t)} + \text{Cu\%/100} \times 31.1035 \times \text{copper price}(\$/\text{t}) / \text{gold price}(\$/\text{oz})$ . The prices used were 12-month averages of US\$1,950/oz gold and US\$8,600/t copper, and A\$:US\$0.67. Estimated recoveries are 87% Cu and 81% Au for Boda and 81% Cu and 71% Au for Kaiser from metallurgical studies of the Boda and Kaiser ore. Alkane considers the elements included in the metal equivalents calculation have a reasonable potential to be recovered and sold.



Inspecting Boda-Kaiser core

## 2.2 Geology

### 2.2.1 Boda

The Boda Deposit is located within a northwest trending structural corridor on the northwestern margin of a significant magnetic complex with dimensions of approximately 2km x 0.7km. The mineralisation is hosted within a package of submarine basaltic to andesitic lavas. The volcanic sequence is intruded by monzogabbroic and monzodiorite volcanic feeder dykes and later monzodiorite-monzonite units and related magmatic-hydrothermal breccias. The deposit is crosscut by numerous post-mineralisation dykes and sills of varying composition.

Intrusive- to magmatic-hydrothermal breccias appear to be the focus for the calc-potassic alteration and gold-copper mineralisation at Boda. The mineralisation is related to a series of northwest-trending monzodiorite intrusions that manifest as a series of vertically extensive intrusive breccias forming a stock central to Boda and Boda 2-3. These intrusive breccias transition to hydrothermal breccias to which the highest gold-copper grades are related. The majority of brecciation is in the form of a 'crackle breccia' that can either have a hydrothermal matrix usually comprising of calcite  $\pm$  actinolite  $\pm$  pyrite  $\pm$  magnetite  $\pm$  chalcopyrite or an igneous matrix dominantly of monzodiorite.

The magmatic-hydrothermal brecciation event was likely to have occurred syn- and post-emplacement of monzodiorites and pre-emplacement of the weakly altered and mineralised monzonites. The intrusive breccia is a likely 'causative' to the main Boda mineralisation and is observed as monzodioritic in composition.

The Boda volcanic package has undergone intense and extensive calc-potassic to potassic alteration often replacing both phenocrysts and the groundmass. This alteration is apparent over a strike length of approximately 3.5km from Kaiser, southeast to Boda, then rotating and continuing south to Boda 2-3, with more significant mineralising centres occurring at each of the deposits. The calc-potassic alteration comprises fine-grained biotite-actinolite-epidote-magnetite with lesser internal zones of potassic alteration comprising only hydrothermal biotite.

Veining within the calc-potassic zone is dominated by calcite-quartz vein assemblages that are typically sulphide poor. Fine grained calcite occurs both as veinlets, usually along brittle fractures and as a widespread disseminated phase within the calc-potassic altered rocks.

Copper mineralisation is observed throughout the prospect primarily as chalcopyrite with subordinate bornite and chalcocite, and rare covellite. Within the magmatic hydrothermal breccias, chalcopyrite and to a lesser extent bornite occur predominantly as a cement mineral between the calc-potassic altered clasts. Outside of the breccias, copper mineralisation is observed within calcite  $\pm$  quartz  $\pm$  epidote dominant veins and as disseminations and patches, often intergrown with epidote.

Gold is observed within the mineralised breccias often without magnification, associated with chalcopyrite and bornite in the hydrothermal cement.

Calc-potassic alteration grades into propylitic alteration away from the breccia complex and has a typical assemblage of actinolite-hematite-epidote-pyrite ( $\pm$  trace chalcopyrite) proximal to the calc-potassic alteration zone. Moving further away from the mineralised centre, the typical assemblage becomes more chlorite-calcite-albite-pyrite dominant.

Boda is overprinted in the northeast by phyllic alteration comprising sericite-quartz-calcite  $\pm$  albite with up to 10% pyrite by volume. The pyrite occurs as disseminated spots, aggregates, and short veinlets. The phyllic alteration is copper-poor, however gold grades over hundreds of metres can average from 0.2g/t – 0.6g/t Au with occasional thin intervals of >10g/t Au.

Three significant west dipping reverse faults (Solar, Moonlight and Reids) bound and dislocate the mineralisation at Boda and Boda 2-3. The Solar Fault bounds the western margin of mineralisation at Boda and Boda 2-3. Moonlight Fault dislocates the calc-potassic Au-Cu mineralisation at Boda and Boda 2-3. The Reids Fault is the easternmost fault and bounds the shallow level Au-pyrite mineralisation from calc-potassic Au-Cu mineralisation to the west at Boda 2-3. All three thrusts have an inferred movement of over 400 metres along the moderately west dipping structures.

There is negligible post-mineral cover on the Boda deposit. Weathering and oxidation of the mineralised bedrock extends on average approximately 15 metres from surface.

## 2.2.2 Kaiser

The Kaiser Deposit is located within a northwest trending structural corridor on a significant magnetic high with dimensions of approximately 800m x 700m, named the Kaiser Intrusive Complex (KIC). The mineralisation is hosted within a package of submarine basaltic to andesitic lavas. The volcanic sequence is intruded by monzodiorite-monzonite units and related magmatic-hydrothermal breccias. The deposit is crosscut by several post-mineralisation dykes and sills of varying composition.

Intrusive to magmatic-hydrothermal breccias are the focus for the calc-potassic alteration and gold-copper mineralisation at Kaiser. The mineralisation is related to a series of northwest-trending monzodiorite-monzonite intrusions that manifest as a series of vertically extensive intrusive breccias forming a stock central to the KIC. These intrusive magmatic breccias transition to hydrothermal breccias to which the highest gold-copper grades are related.

The majority of brecciation is in the form of a 'crackle breccia' that can either have a hydrothermal matrix usually comprising calcite  $\pm$  actinolite  $\pm$  pyrite  $\pm$  magnetite  $\pm$  chalcopyrite or an igneous matrix. The intrusive breccias are a likely 'causative' to the main mineralisation event at Kaiser.

The volcanic package at Kaiser has undergone intense and extensive calc-potassic to potassic alteration, often replacing both phenocrysts and the groundmass. The calc-potassic alteration comprises fine-grained biotite-actinolite-epidote-magnetite with lesser internal zones of potassic alteration comprising only hydrothermal biotite. Veining within the calc-potassic zone is dominated by calcite-quartz vein assemblages that are typically sulphide-poor.

Copper mineralisation is observed throughout the deposit primarily as chalcopyrite with lesser bornite and subordinate chalcocite and covellite. Within the intrusive hydrothermal breccias, chalcopyrite and to a lesser extent bornite occur predominantly as a cement mineral between the calc-potassic altered clasts. Outside of the breccias, copper mineralisation is observed within calcite  $\pm$  quartz  $\pm$  epidote dominant veins and as disseminations and patches, often intergrown with epidote.

Gold is observed within the sulphide cemented breccias often without magnification, associated with pyrite, chalcopyrite and/or bornite in the hydrothermal cement.

Calc-potassic alteration grades into propylitic alteration away from the breccia complex and has a typical assemblage of actinolite-hematite-epidote-pyrite ( $\pm$  chalcopyrite). More distal from the mineralised centre, the assemblage typically becomes more chlorite-calcite-albite-pyrite dominant.

Kaiser includes a zone of potassic alteration comprising wholly of biotite alteration with quartz-calcite veining, with up to 10% pyrite by volume along its northeast flank. The pyrite occurs as disseminated spots, aggregates, and as breccia cement. The alteration is generally copper-poor, however gold grades over several tens of metres can average from 0.2g/t – 0.4g/t Au, with occasional thin intervals of >10g/t Au associated with pyrite cemented breccias.

Two significant reverse faults bound and dislocate the central zone of calc-potassic mineralisation at Kaiser. The Kaiser Fault dips east and thrusts the deeper Kaiser Main zone over the Kaiser West zone of mineralisation. The Solar Fault dips west and thrusts the Kaiser Main zone over the Kaiser East zone.

There is negligible post-mineral cover on the Kaiser Deposit. Weathering and oxidation of the mineralised bedrock extends, on average, approximately 15 metres from surface. The Kaiser Fault zone is associated with minor supergene copper forming as native copper. The native copper zones can extend hundreds of metres down the Kaiser Fault and can permeate up to 50 metres away from the structure.

## 2.3 Drilling

The combined Boda and Kaiser Mineral Resources are based on a nominal drill hole grid of 50m x 50m in the Indicated Resources and a nominal 100m x 100m in the Inferred. Alkane has drilled to depths averaging approximately 800 metres. The combined resources utilise assay results captured from 403 drill holes for a total of 240,237 metres, comprising 143,769 metres of diamond core and 96,468 metres of RC drilling.



Figure 2-2 Schematic of the Boda and Kaiser Deposits

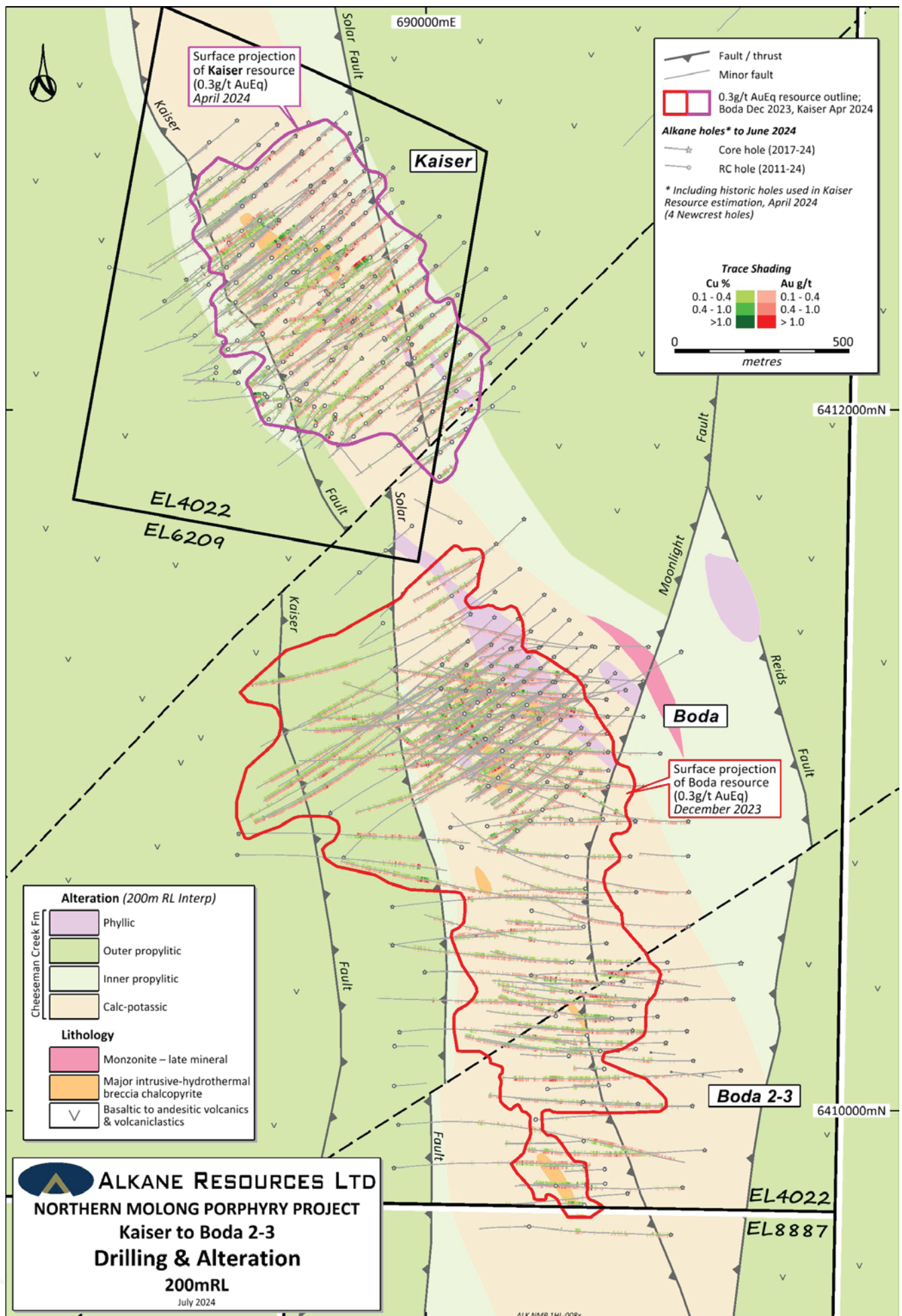
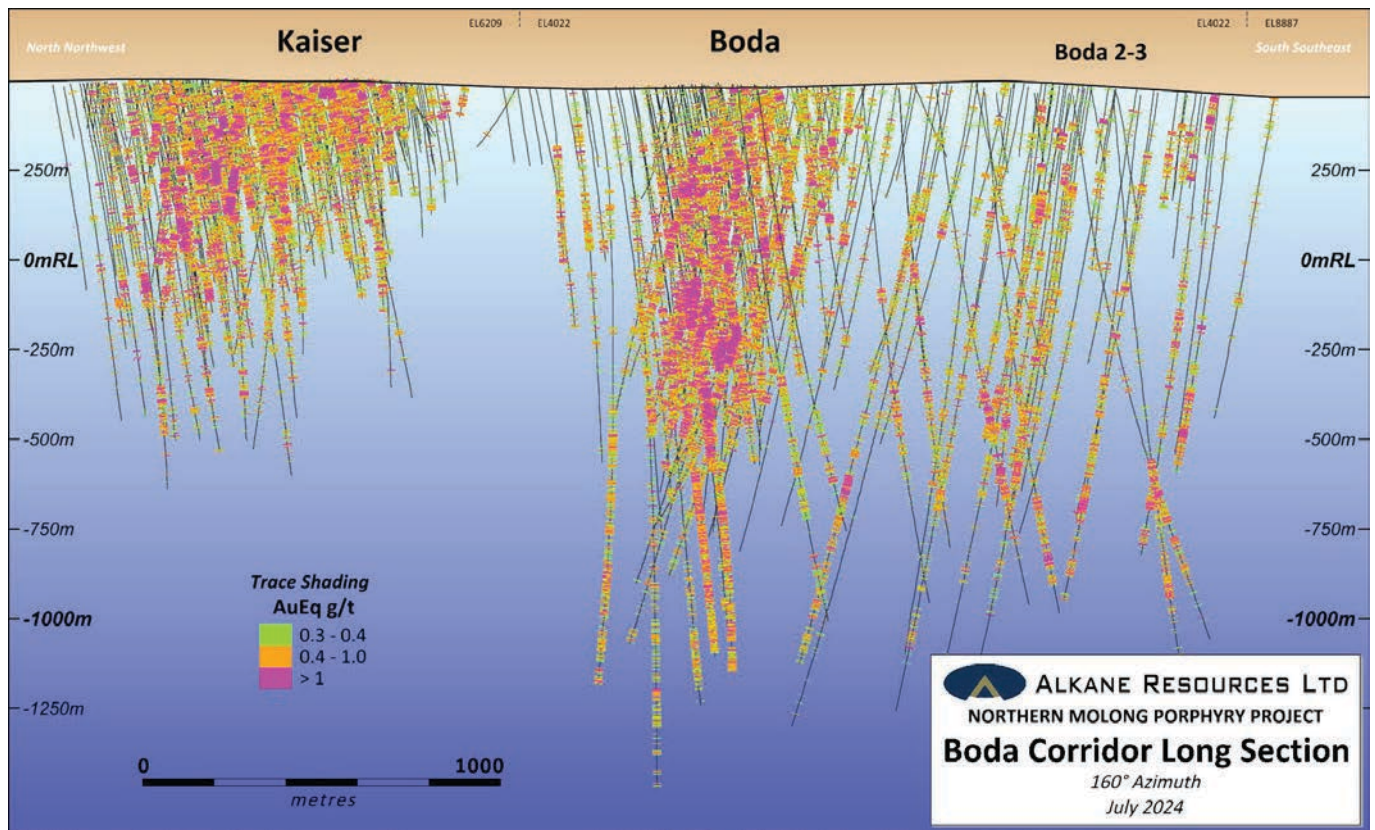


Figure 2-3 Long-section of the Boda and Kaiser Deposits



#### Competent persons

The information in this report relating to Mineral Resource and Ore Reserve estimates has been approved by individuals having sufficient experience to qualify as a Competent Person, as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC 2012). Such experience relates to the style of mineralisation and type of deposit under consideration, and the activity undertaken. All Competent Persons named below have provided prior written consent to the inclusion of the matters based on their information in this report, in the form and context in which it appears.

Information relating to	Competent Person
Mineral Resources and Ore Reserves overview	<b>Mr D Ian Chalmers</b> (FAusIMM, FAIG), who is Executive Director of Alkane Resources Ltd.
Boda and Kaiser Mineral Resource estimates	<b>Mr David Meates</b> (MAIG), who is Exploration Manager NSW and an employee of Alkane Resources Ltd.



## 3. Operations

### 3.1 Operations Overview

Alkane has evaluated three possible development scenarios of the Boda-Kaiser Project:

- Mining and processing 20 million tonnes of ore per annum
- Mining and processing 10 million tonnes of ore per annum
- Mining and processing 5 million tonnes of ore per annum

Evaluation shows that the largest development scenario is the highest value due to the potential economies of scale. Given its positive economics, the 10 million tonnes per annum development could form part of a staged build for a larger project, or as a standalone project in a rising gold and copper price environment. It is unlikely that a 5 million tonnes per annum development would meet investment return hurdles at current gold and copper prices. Which scenario or variant thereof that Alkane chooses to advance to feasibility and subsequently approval will depend on many factors, such as the results of baseline environmental monitoring and impact assessments, commodity pricing, infrastructure requirements, stakeholder consultation, exploration results, potential project partners and other funding options.

The considered mining scenarios include the staged development of open cut mining at both the Boda and Kaiser deposits, as well as the development of an underground mine at Boda. The costs used for mining are based on the operating costs at Alkane's Tomingley Gold Operations (Tomingley), adjusted for the scale of operations expected at the Boda-Kaiser Project.

The considered underground mining option uses a Long Hole Open Stoping (LHOS) mining method, consistent with Alkane's experience at Tomingley. Given that a high throughput is beneficial to the project economics, future studies will evaluate the potential for sub-level caving or a similar bulk tonnage underground method.

The considered processing scenarios all utilise the same simple flowsheet comprising crushing, grinding, stage flotation with regrind, concentrate dewatering and cleaner tail leaching to dore. Each processing scenario therefore uses the same type of equipment, but different sizes and economies of scale.

Tomingley open cut



Reagents are expected to be delivered by the public road network. Water is assumed to be supplied from bores and a pipeline; it will be both recycled and harvested from the solid residue storage facility. Electricity is assumed to be supplied from the grid network, including renewable supply sources, which has nearby infrastructure.

Waste rock (weathered material or rock containing insufficient metals for processing) will be extracted and transported to be used in the walls of the solid residue storage facility (RSF) or to a waste rock emplacement (WRE) adjacent to the open cuts.

## 3.2 Mining

Mining of the ore deposit in the open cuts will use traditional drill and blast methods to fragment material that will then be transported to the Run-of-Mine (ROM) Pad for crushing and grinding.

### 3.2.1 Mining Schedules

The open cut mining studies were undertaken internally by Alkane and based on the company's experience in open cut mining at Tomingley. The pit designs are based on whittle shells with high level scheduling. An owner-operated financed equipment model / dry hire model has been assumed. Equipment selection is consistent across the scenarios, assuming 600-tonne excavators loading 200-tonne capacity trucks. Mining flitches are assumed at 5 metres on a 10-metre bench height. Overall ore loss and dilution are estimated at 0% each, due to the large bulk nature of the operation. The Boda and Kaiser pits have less than 20 metres of cover to be mined before ROM feed material is exposed.

The underground mining studies were undertaken by Alkane and based on the company's experience in underground mining at Tomingley. The following have been assumed: an owner-operated financed equipment model; portal entry from the Boda or Kaiser pit (depending on scenario) with a paste-filled standard LHOS mining method; mining dilution of 15% to 18% and ore recovery of 82% to 92%, depending on the location within the mining sequence. Different mining methods such as sub-level caving have not been considered as part of this Scoping Study but will be evaluated as the project moves to subsequent stages of feasibility analysis.

**Alkane emphasises that the mining scenarios have been developed to enable the company and investors to understand the potential development paths available. The blend of open cut mining, underground mining, underground mining method, different processing rates and the corresponding capital requirements will continue to be evaluated in the subsequent stages of feasibility analysis.**

#### 3.2.1.1 Mining 20 Million Tonnes of Ore per Annum

The open cuts will be developed in multiple stages with the initial stage commencing at **Kaiser**. The first stage of the Boda open cut is expected to commence in year 3 of mining. Mining would occur across a **13-year period**, with sufficient ore stockpiled to allow a **further four years of processing**. At the end of open cut mining the pits would have a depth of approximately 550 metres.

In year 2 of mining, the portal from Kaiser to enable the underground mining of Boda will be developed. After a year's development, the underground operation is expected to ramp up to 1 million tonnes per annum of ore extraction. At the end of a **5-year life**, the underground development is expected to have reached a depth of ~840 metres below surface.



Figure 3-1 Pit Outlines for 20 Million Tonnes of Ore per Annum Scenario

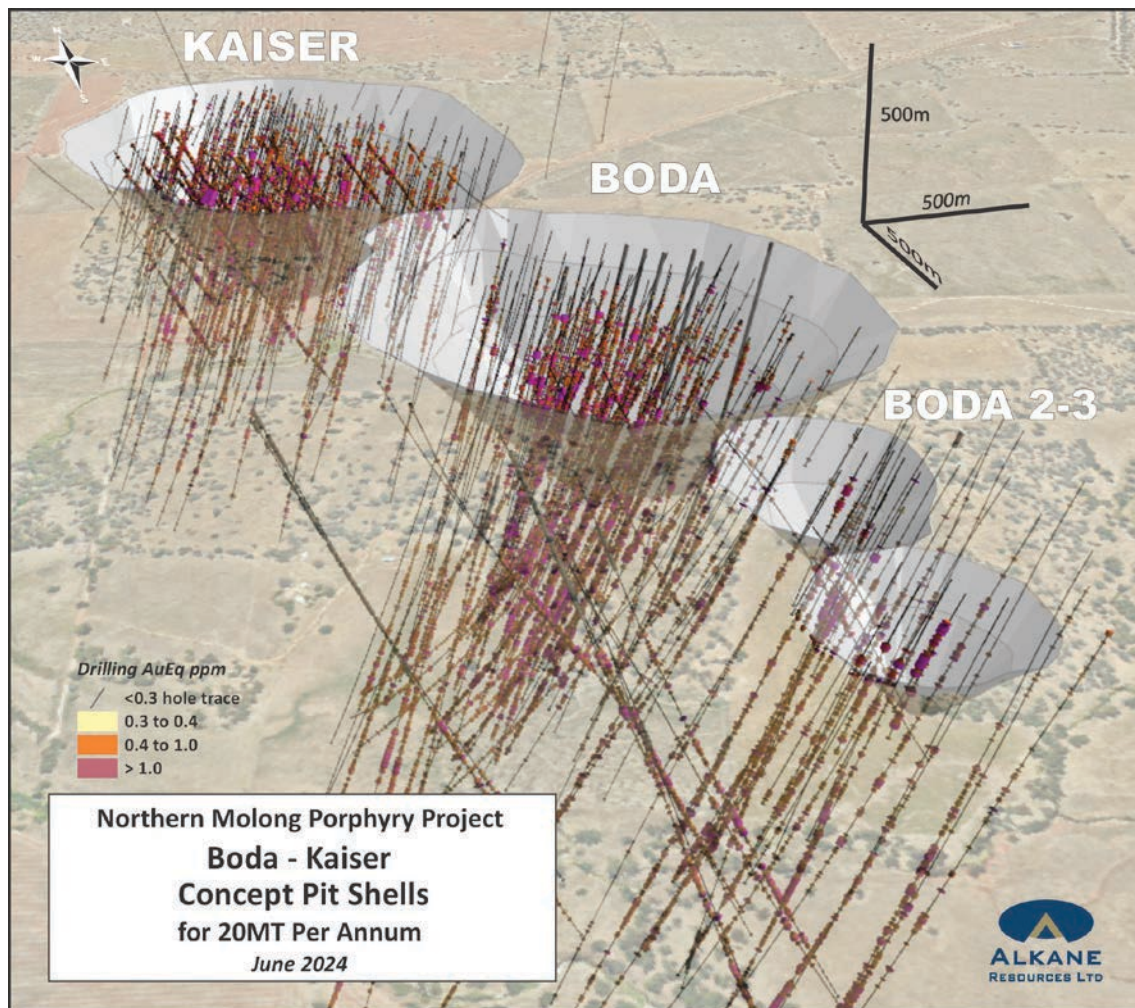
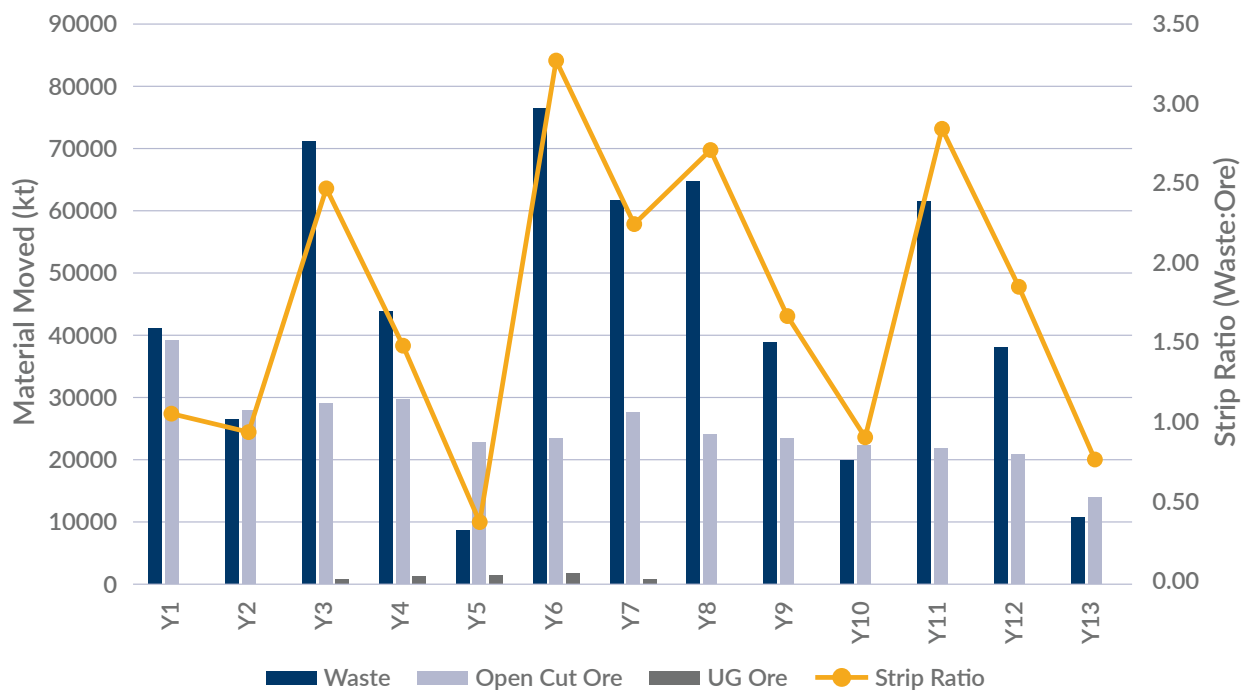


Figure 3-2 Annual Mining Schedule for 20 Million Tonnes of Ore per Annum Scenario

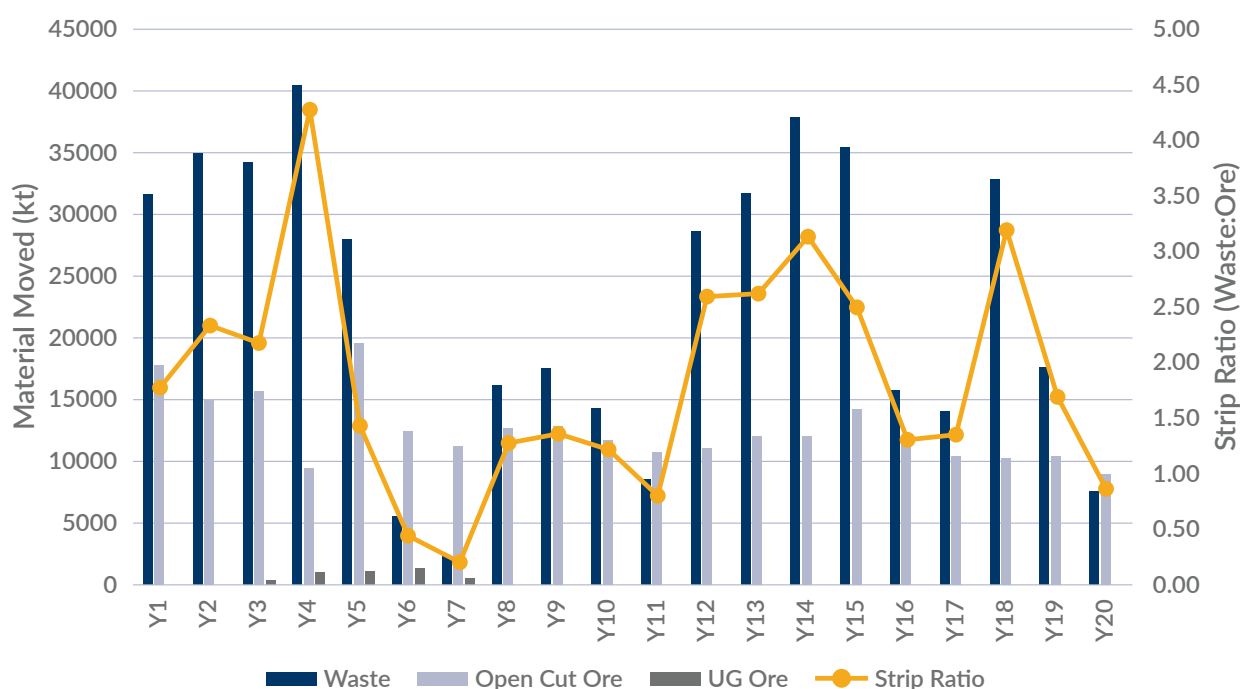


### 3.2.1.2 Mining 10 Million Tonnes of Ore per Annum

The open cuts will be developed in multiple stages with the initial stage commencing at **Boda**. The first stage of the Kaiser open cut is expected to commence in year 3 of mining. Mining would occur across a **20-year period**, with sufficient ore stockpiled to allow a **further six years of processing**. At the end of open cut mining the pits would have a depth of approximately 450 metres.

In year 2 of mining, the portal from Boda to enable the underground mining of Boda will be developed. After a year's development, the underground operation is expected to ramp up to 1 million tonnes per annum of ore extraction. At the end of a **5-year life**, the underground development is expected to have reached a depth of ~840 metres below surface.

Figure 3-3 Annual Mining Schedule for 10 Million Tonnes of Ore per Annum Scenario

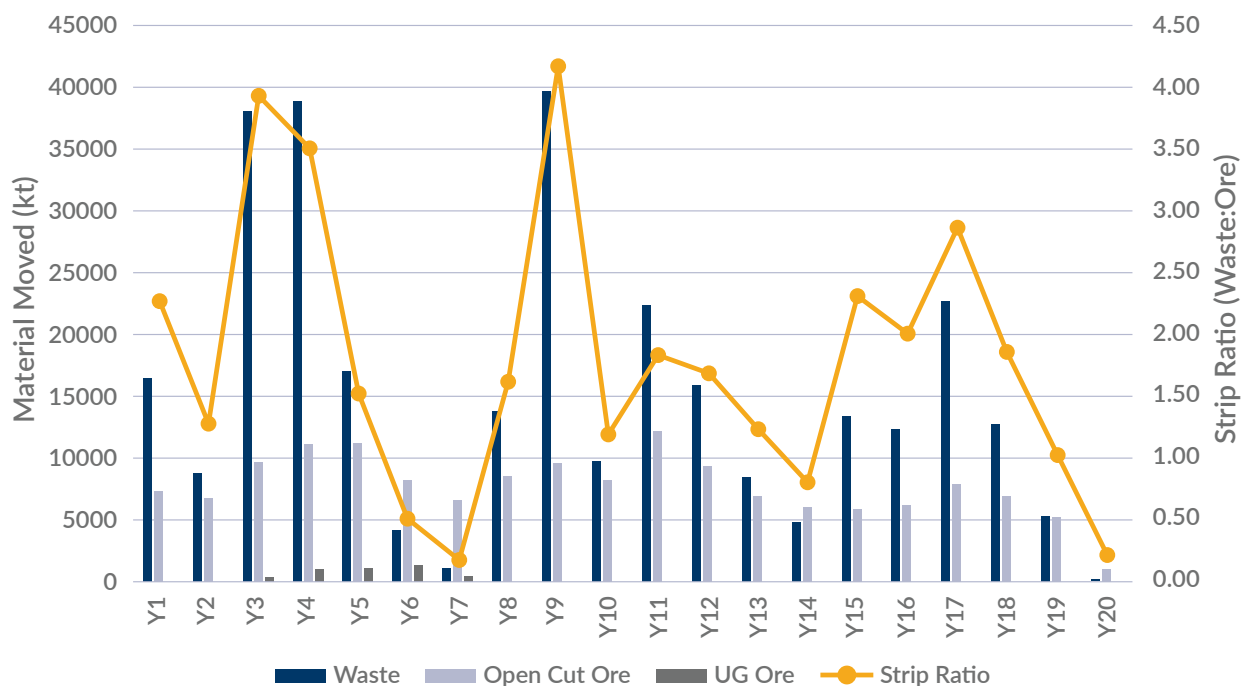


### 3.2.1.3 Mining 5 Million Tonnes of Ore per Annum

The open cuts will be developed in multiple stages with the initial stage commencing at **Boda**. The first stage of the Kaiser open cut is expected to commence in year 3 of mining. Mining would occur across a **20-year period**, with sufficient ore stockpiled to allow a **further ten years of processing**. At the end of open cut mining the pits would have a depth of approximately 370 metres.

In year 2 of mining, the portal from Boda to enable the underground mining of Boda will be developed. After a year's development, the underground operation is expected to ramp up to 1 million tonnes per annum of ore extraction. At the end of a **5-year life**, the underground development is expected to have reached a depth of ~840 metres below surface.

Figure 3-4 Annual Mining Schedule for 5 Million Tonnes of Ore per Annum Scenario



### 3.2.1.4 Summary of Mining Scenarios

A summary of the three different options is shown below.

Table 3-1 Summary of Mining Scenarios

	5Mtpa LOM 30 yrs	10Mtpa LOM 26 yrs	20Mtpa LOM 17 yrs
<b>Open Cut</b>			
Waste Mined (Mt)	307	456	563
Ore Mined (Mt)	150	251	323
Grade Mined (Au g/t)	0.32	0.28	0.26
Grade Mined (Cu %)	0.2	0.17	0.15
Strip Ratio (Waste:Ore)	1.98	1.82	1.74
<b>Underground</b>			
Ore Mined (kt)	4,340	4,340	4,340
Grade Mined (Au g/t)	1.46	1.46	1.46
Grade Mined (Cu %)	0.61	0.61	0.61

## 3.2.2 Waste Rock Management

Material that is excavated to enable access to the defined ore, or which contains insufficient grades of the targeted minerals, will be primarily used for the construction of the walls of the residue storage facility (RSF). This material may also be placed within a waste rock emplacement (WRE) located alongside the open cuts. The low strip ratio of the open cuts and the need for material for RSF construction will reduce the volume of waste rock going into the WRE. Alkane expects the WRE to be designed to reside sympathetically within the natural environment.



## 3.3 Ore Processing and Production

### 3.3.1 Process Overview

The considered processing scenarios all utilise the same simple flowsheet, described below, the development of which has been previously documented<sup>4</sup>.

The process entails mined ore delivered by internal haul road to the Run-of-Mine (ROM) pad, where it undergoes two stages of crushing in the crushing circuit. The ore then passes into a high-pressure grinding circuit (HPGR) and is further ground in a ball mill circuit to a nominal p80 of ~106 micron.

The ground ore passes through a standard rougher-scavenger flotation circuit, with the scavenger tailings reporting to a thickener and then the RSF. Water is recycled from the RSF.

The rougher concentrate is reground to a p80 of ~30 micron and enters a standard cleaner-scavenger flotation circuit. The cleaner concentrate is thickened and dewatered in a filter press, ready for transport to customers.

The cleaner tail passes through a standard Carbon-in-Leach (CIL) plant for gold recovery to dore. The tailings from the CIL are filtered prior to disposal to the RSF, with the filtrate passing through a precipitation circuit to recover some of the remaining copper. The precipitate is added to the cleaner concentrate prior to filtration.

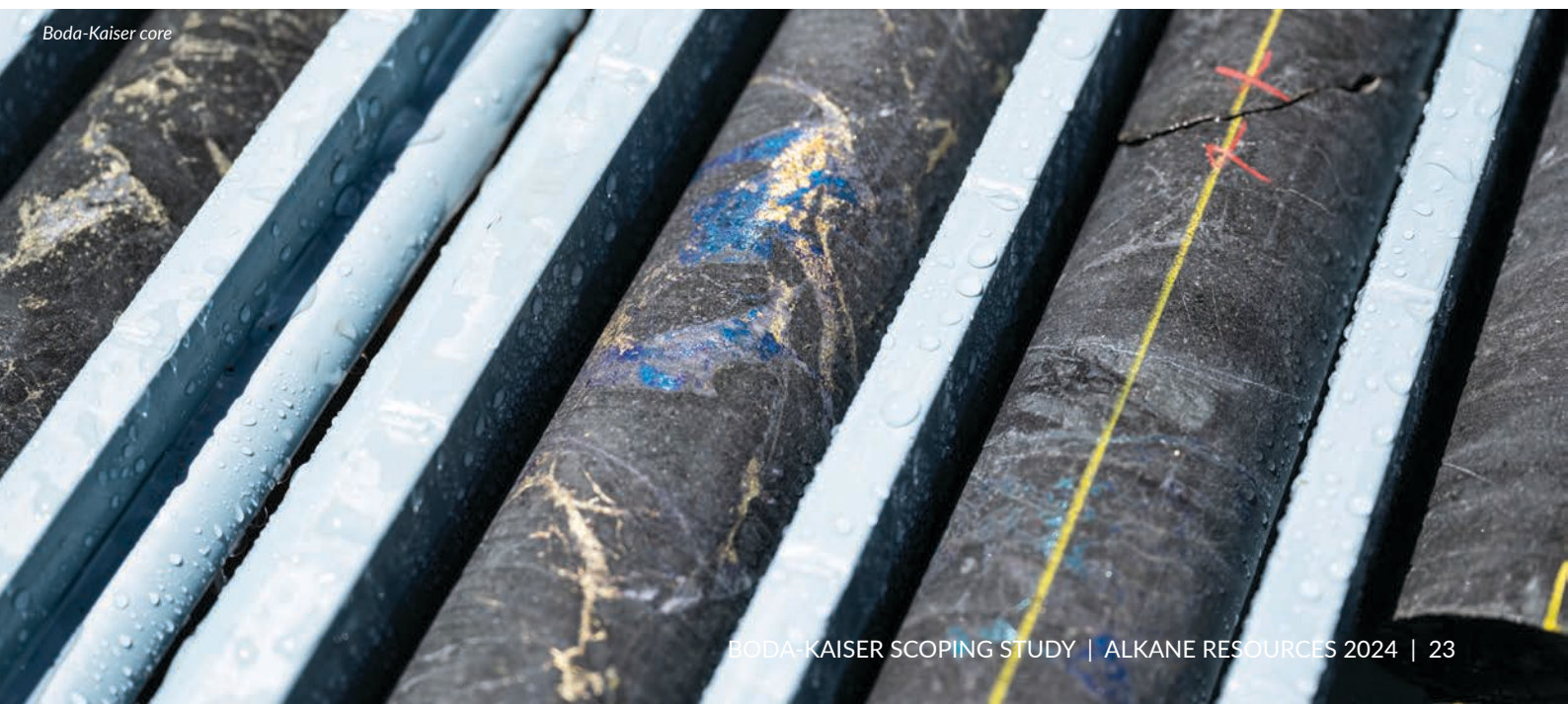
The process is illustrated in the flowsheet on the next page.

### 3.3.2 Processing Schedules and Recoveries

The ore processing schedules were developed by Alkane using the outputs from the mining studies. The overall recoveries were calculated using the feed grade-to-recovery relationship developed from the metallurgical testwork program.

<sup>4</sup>As documented in ASX Announcement 14 November 2023

Boda-Kaiser core







### 3.3.2.1 Processing 20 Million Tonnes of Ore per Annum

The average feed grade over the 17 years is **0.26g/t gold** and **0.15% copper**. The average recovery from feed is 76% for gold and 84% for copper. This produces an annual average of approximately **24,300 tonnes of copper** and **114,100 ounces of gold** in concentrate, as well as **6,900 ounces of gold** in dore (a total of approximately **225,000 equivalent ounces of gold**).

Figure 3-6 Plant Feed for 20 Million Tonnes of Ore per Annum Scenario

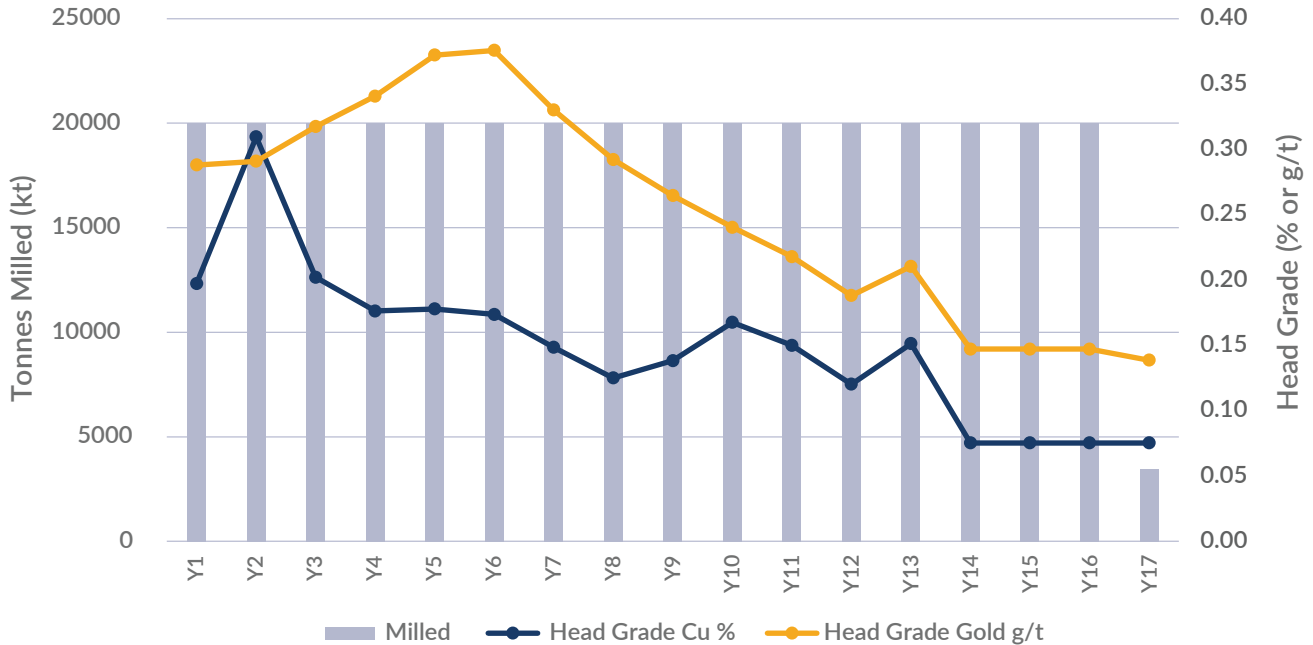
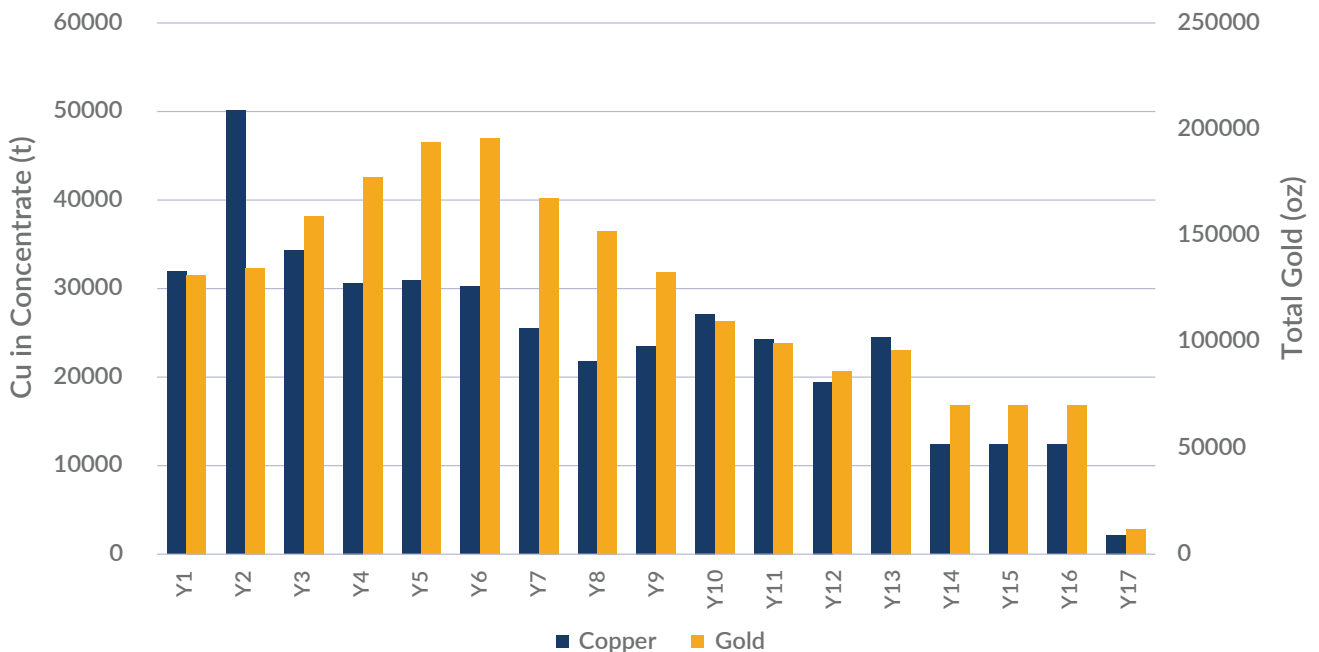


Figure 3-7 Gold and Copper Products for 20 Million Tonnes of Ore per Annum Scenario



### 3.3.2.2 Processing 10 Million Tonnes of Ore per Annum

The average feed grade over the 26 years is **0.28g/t gold** and **0.17% copper**. The average recovery from feed is 77% for gold and 84% for copper. This produces an annual average of **13,400 tonnes of copper** and **62,600 ounces of gold** in concentrate, as well as **3,800 ounces of gold in dore** (a total of approximately **124,000 equivalent ounces of gold**).

Figure 3-8 Plant Feed for 10 Million Tonnes of Ore per Annum Scenario

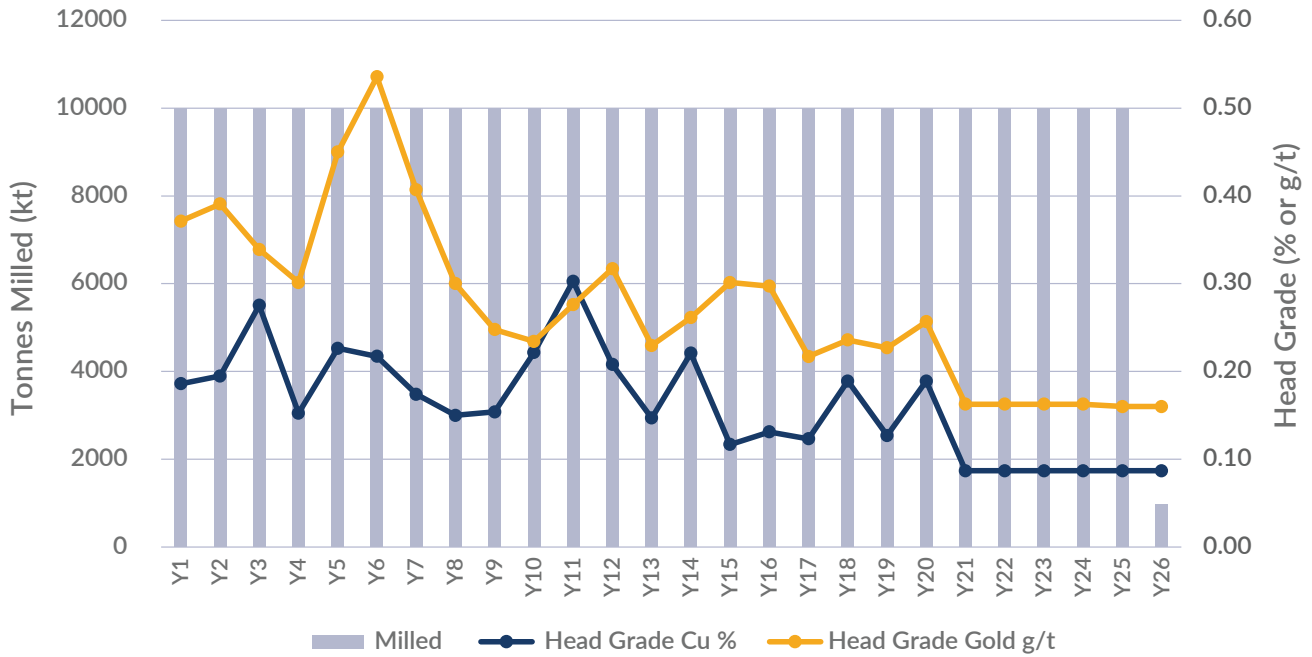
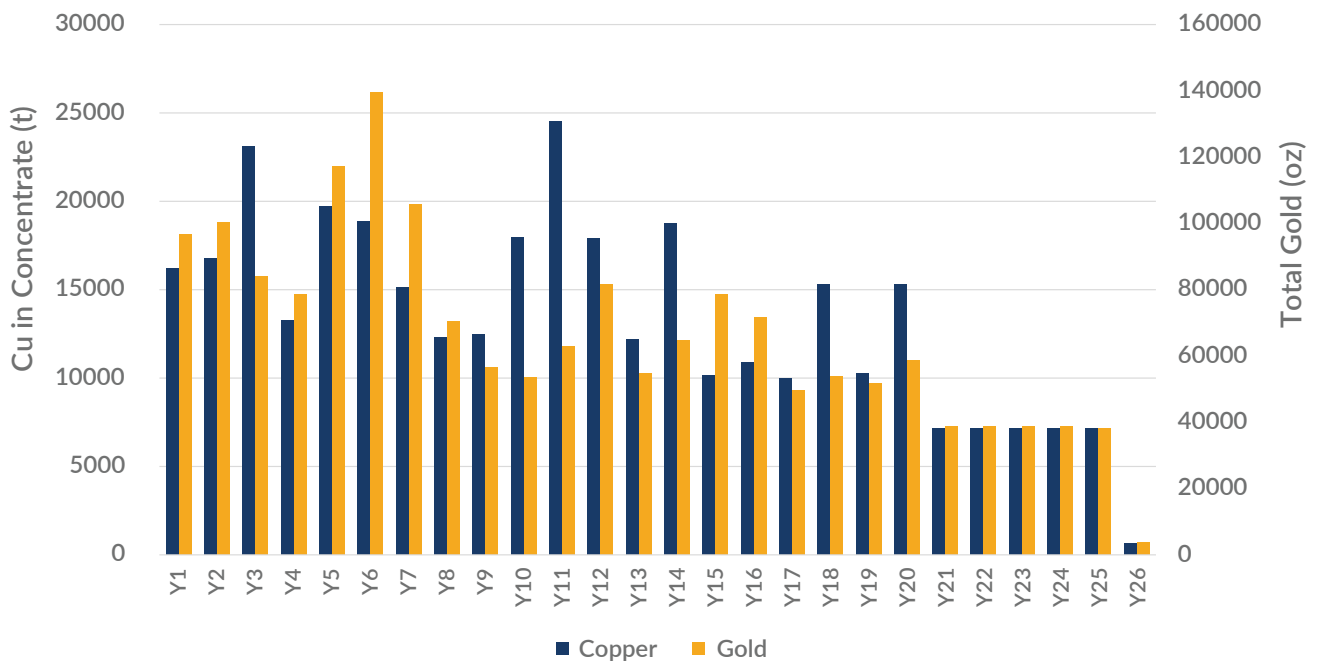


Figure 3-9 Gold and Copper Products for 10 Million Tonnes of Ore per Annum Scenario



### 3.3.2.3 Processing 5 Million Tonnes of Ore per Annum

The average feed grade over the 30 years is **0.32g/t gold** and **0.20% copper**. The average recovery from feed is 77% for gold and 84% for copper. This produces an annual average of **8,400 tonnes of copper** and **37,200 ounces of gold** in concentrate, as well as **2,300 ounces of gold** in dore (a total of approximately **75,400 equivalent ounces of gold**).

Figure 3-10 Plant Feed for 5 Million Tonnes of Ore per Annum Scenario

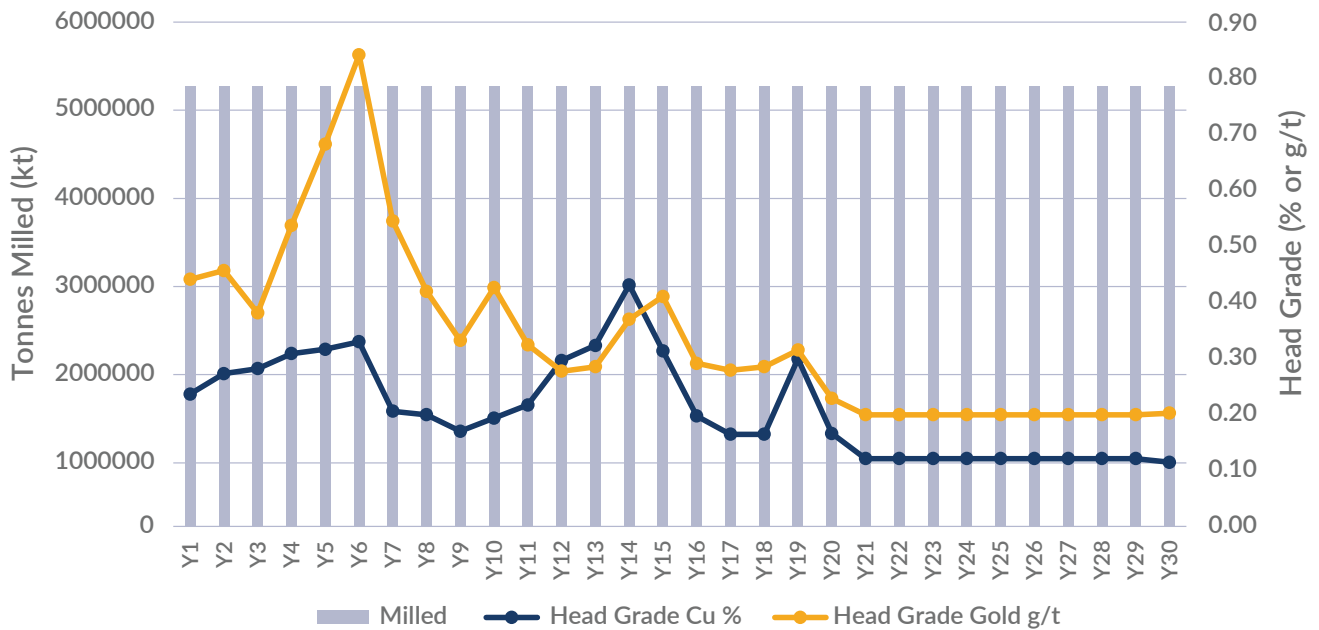
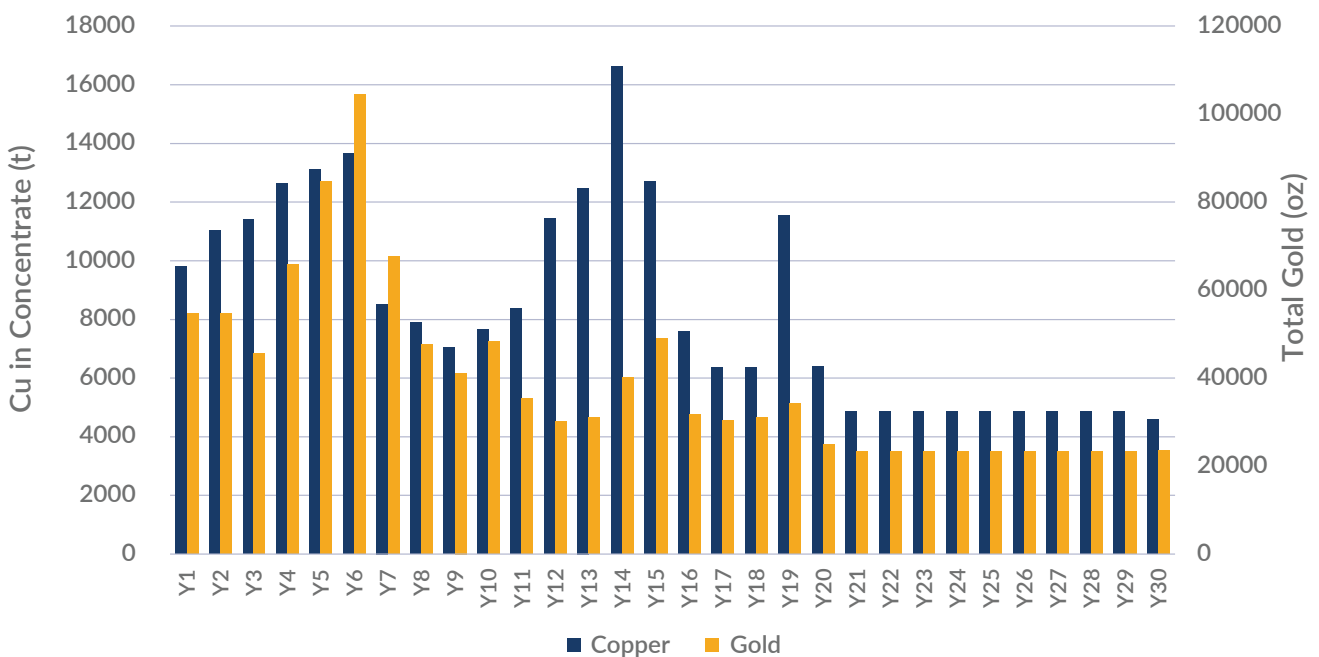


Figure 3-11 Gold and Copper Products for 5 Million Tonnes of Ore per Annum Scenario



### 3.3.2.4 Summary of Processing Scenarios

A summary of the three different options is shown below.

**Table 3-2 Summary of Processing Scenarios**

		5Mtpa	10Mtpa	20Mtpa
<b>Operating Parameters</b>				
Throughput	Mtpa	5,000	10,000	20,000
Initial Project LOM	yrs	30	26	17
Total Ore Processed	Mt	150.0	251.0	323.5
Average Copper Grade	%	0.20	0.17	0.15
Average Gold Grade	g/t	0.32	0.28	0.26
Average Copper Recovery	%	83.7	83.7	83.5
Average Gold Recovery	%	76.4	76.5	76.3
<b>Production</b>				
Total CuEq Produced	tonnes	527,412	750,482	893,760
Total Copper Produced	tonnes	250,947	347,505	413,733
Total AuEq Produced	oz	2,260,659	3,216,809	3,830,948
Total Gold Produced	oz	1,185,017	1,727,289	2,057,553
Annual AuEq Production LOM average	oz	75,355	123,723	225,350
Annual Copper Production (yrs 1-5)	tonnes	11,603	17,808	35,611
Annual Gold Production (yrs 1-5)	oz	61,088	95,354	159,334

### 3.3.2.5 Feed Grade versus Overall Recovery

The overall recoveries were calculated using the feed grade-to-recovery relationship developed from the metallurgical testwork program. This relationship shows that recovery is dependent on the mineralogy of the deposit, represented in the simple formula below by the copper-to-sulphur ratio. The usual relationship of increased feed grade resulting in increased recovery is seen when processing both Boda and Kaiser ore, although the dominant factor is the copper-to-sulphur ratio.

**Table 3-3 Boda and Kaiser Geometallurgical Algorithms – Short Form**

	Boda	Kaiser
Overall Copper Recovery (%)	= $91.5 - 12 \times (\text{Cu:S ratio})$	= $90.0 - 12 \times (\text{Cu:S ratio})$
Overall Gold Recovery (%)	= $\text{Cu Rec\%} - 5$	= $\text{Cu Rec\%} - 6$

### 3.3.2.6 Expected Concentrate

The results from the previously reported metallurgical testing show that the copper concentrate is of good quality, having an expected gold and silver credit and being low in penalty elements. Only fluorine was measured to be in the range that may require negotiation with potential customers, being in the typically negotiable range of 150–300ppm.

Table 3-4 Boda and Kaiser Final Concentrate Analysis from Testwork

Element	Unit	Boda Final Concentrate	Kaiser Final Concentrate
Cu	%	24.8	28.5
Ag	ppm	58	54
Au	ppm	48.7	25.7
Fe	%	23.1	21.4
S	%	26.1	24.6
SiO <sub>2</sub>	%	12.8	13.1
<b>Penalty Elements</b>			
As	%	<0.01	<0.01
Bi	%	<0.002	0.005
Cd	ppm	<5	<5
Cl	%	<0.01	<0.01
Co	%	0.010	0.004
F	ppm	200	250
Hg	ppm	1.3	0.8
Ni	%	0.03	<0.01
Pb	%	0.01	0.03
Sb	ppm	12.7	30.3
Se	ppm	215	190
Te	ppm	8.4	10
Zn	%	0.01	<0.01

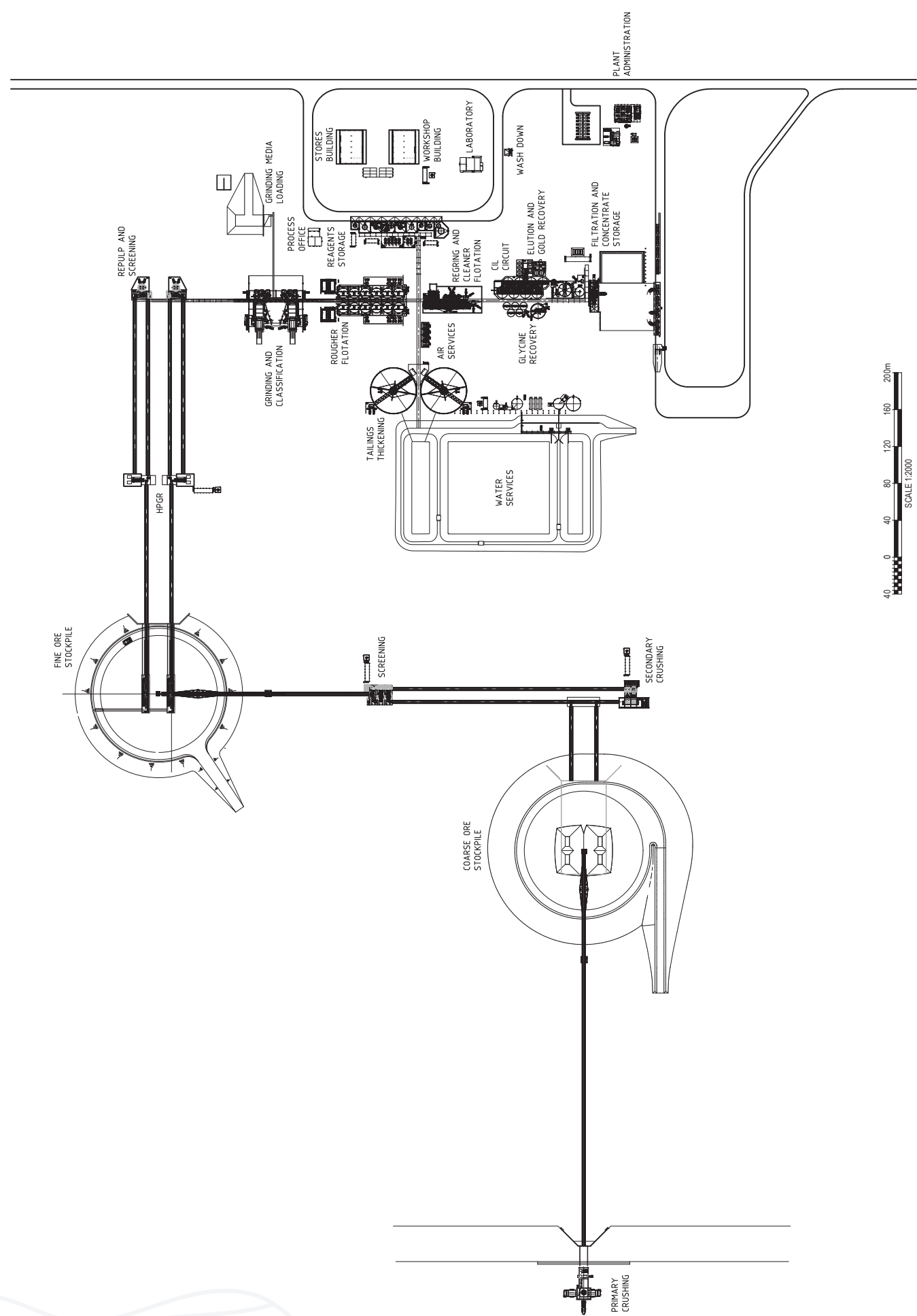
### 3.3.3 Mineral Processing Facility

The main physical plant process areas required to deliver the above process are:

- Comminution (crushing and grinding)
- Flotation and Re grind (rougher, scavenger, cleaner flotation, re grind)
- Thickening (concentrate and tailings)
- Concentrate Filtering and Handling (copper/gold concentrate)
- Waste Treatment (solid waste residue deposition, water recycling)
- Water Services (raw water, process water, fire water, potable water)
- Reagents (chemical storage and handling)
- Site Wide Infrastructure (instrument and plant air, offices, workshops and roads)

A potential design layout of the Boda-Kaiser Project mineral processing facility is shown on the next page. Alkane emphasises that the conceptual layout shown is similar for each of the scenarios, and that future layouts may take into account the possibility of staged expansion.

Figure 3-12 Mineral Processing Facility Design (20 Million Tonnes per Annum Scenario shown)





## 4. Infrastructure & Services

### 4.1 Site Access and Roads

The Boda-Kaiser Project is located close to the Mitchell Highway, which connects the major regional NSW cities of Dubbo and Orange. The project area is connected to the nearby town of Wellington by mostly sealed road of approximately 20 kilometres. Alkane anticipates some sections of the road will need to be upgraded or sealed to provide all-weather site access that minimises the impact on the local community. Alkane expects that the road (and potentially rail) networks will be used for reagent delivery and concentrate transport for sale. An allowance has been made in the capital estimate based on Alkane's experience upgrading roads in NSW.

### 4.2 Power

Installed plant and mine power requirements are estimated to be approximately 25MW for the 5 million tonnes per annum rate and 80MW for the 20 million tonnes per annum rate. Alkane intends to meet this power requirement from the NSW grid. A new 132kV transmission line will likely be required to site. The connection point will be determined in later feasibility studies. An allowance has been made in the capital estimate, based on Alkane's experience with installation of power lines in NSW.

The Boda-Kaiser Project is located in the Central West Renewable Energy Zone, which has several major solar and wind power projects under development; these are changing the power infrastructure landscape in the area. The already operating Bodangora Wind Farm is located immediately adjacent to the project, with an estimated four turbines potentially needing to be relocated for the development. Relocation discussions will occur in later feasibility stages as the project layout is selected.

*Bodangora Wind Farm at the Boda-Kaiser Project*



## 4.3 Water Supply

Water requirements for the site are estimated to be approximately 2GL per year for the 5 million tonnes per annum rate and 7GL per year for the 20 million tonnes per annum rate. The residue storage facility preliminary designs seek to maximise water recycling, and the annual rainfall highly influences off-site water requirements.

The required operational and construction water has several potential sources that are being evaluated. These include water access licences in the Macquarie-Cudgegong System, the Lachlan Fold Belt fractured rock aquifer, and potential piping from saline water sources to the east of the project area. An allowance has been made for bores and water pipelines in the capital estimate, based on Alkane's experience with the installation of water supply pipelines in NSW.

## 4.4 Site Buildings and Infrastructure

Project site buildings will be used by personnel working on operational, logistics and administrative tasks, and the servicing and repair of plant and machinery.

Buildings include:

- Main administration building
- Dispersed satellite crib and toilet facilities
- Laboratory
- Change house and laundry
- Processing plant control room building
- Stores warehouse
- Product store
- Maintenance workshop

The site will also require a bitumen or similar road network for reagent and stores delivery, as well as the efficient movement of maintenance vehicles.

Across the project area, the NSW government has a rail easement for a rail line that was never completed. Partial construction of the Gulgong to Maryvale section of the Sandy Hollow line occurred 1937-1951. Discussions for the potential relocation of this easement will occur in later feasibility stages as the project layout is selected.

# 5. Engineering

## 5.1 Engineering Studies

The physical works of the Boda-Kaiser Project can be broadly grouped into two categories:

- Process infrastructure, being the process plant itself; and
- Non-process infrastructure, being the supporting infrastructure that provides access to the site along with necessary services and utilities.

For the **process infrastructure**, consideration has been given to construction in the most cost-effective manner for each throughput scenario. The considered processing scenarios all utilise the same simple flowsheet comprising crushing, grinding, stage flotation with regrind, concentrate dewatering and cleaner tail leaching to dore. Each processing scenario therefore uses the same type of equipment, but different sizes and economies of scale. In the case of the 20 million tonnes per annum plant, dual identical 10 million tonnes per annum trains would be used.

Capital and operating cost estimates for the potential processing facilities were supervised by consultants Scott Dalley Franks and performed by GR Engineering Services, with input from Land & Marine Geological Services for the tailings dam (residue storage facility).

When considering the **non-process infrastructure**, the capacity of the plant may not have a direct impact on the cost of the work. For example, land must be purchased and the road upgrades in the area must be completed regardless of whether a 5 or 20 million tonnes per annum plant is built. Services to site (such as electricity, water and gas) will be needed. Potentially, with consumption reduced, these could be sized smaller to save money; but the possibility of later upgrades may often make these initial cost savings not worthwhile. As a result, fixed infrastructure costs are similar for each scenario.

Fixed infrastructure costs were estimated by Alkane using experience from previous project developments.



Road to the Boda-Kaiser Project

## 5.2 Outcomes of the Engineering Studies

The key financial assumptions, estimates and modelling outcomes from the engineering studies are summarised in Table 5-1 below. In the calculation of capital cost, each study contemplated building to full plant capacity in one campaign, rather than any staged build. Consideration of a staged build will occur in later feasibility stages.

Table 5-1 Outcomes of Engineering Studies (A\$M, 2024 dollars)

	5Mtpa	10Mtpa	20Mtpa
<b>Processing Facility</b>			
Process Plant	299	509	815
Site Non-Process Infrastructure	27	31	31
Construction Indirects	145	220	293
Spares & First Fills	10	17	27
Growth Margin	52	84	127
<b>TOTAL</b>	<b>533</b>	<b>861</b>	<b>1,293</b>
<b>Non-Processing Costs</b>			
Property, Biodiversity & Rehabilitation	80	95	105
Roads & Power	33	33	33
Water Pipeline & Licences	26	32	45
Residue Storage Facility	90	110	133
Mining Infrastructure	10	14	16
<b>TOTAL</b>	<b>239</b>	<b>284</b>	<b>332</b>



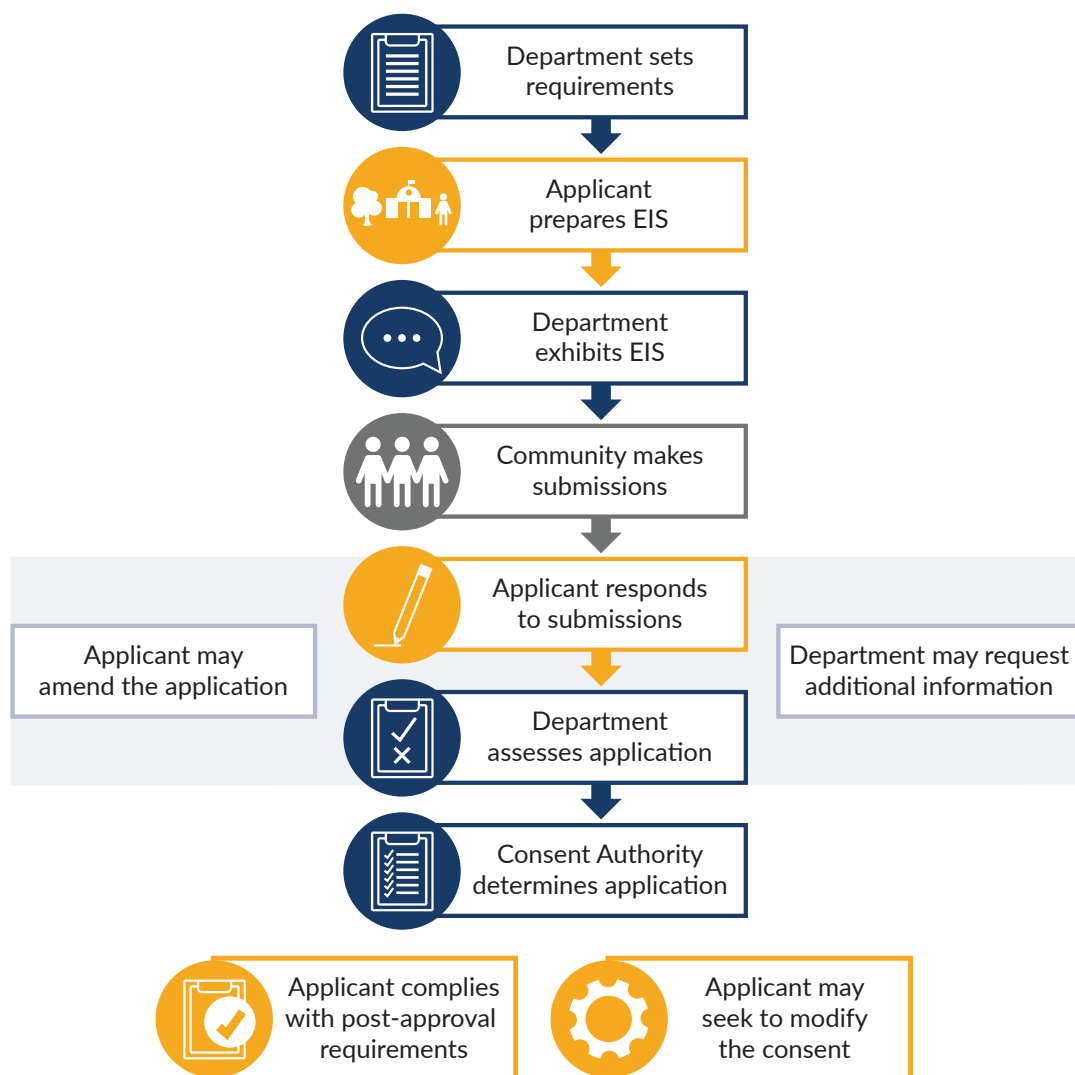
## 6. Project Approvals & Stakeholders

### 6.1 Project Approval Pathway

In the event Alkane makes a development application, the Boda-Kaiser Project will be assessed as a New South Wales State Significant Development (SSD). All SSD projects require development consent from either the Independent Planning Commission or the Minister (or their delegate) before they may proceed. Although SSD projects may require approvals under other legislation – in addition to development consent – they all go through an integrated assessment under the Environmental Planning and Assessment Act before these approvals may be granted. Historically, metalliferous projects such as Boda-Kaiser take one to two years to pass through the planning approval process.

Once the Department of Planning has accepted the development application, the high-level Assessment Steps are shown below.

Figure 6-1 State Significant Development application process





Wellington is the closest town to the Boda-Kaiser Project.

## 6.2 Environmental and Impact Assessments

To gather the required data for an environmental impact statement (EIS), baseline environmental studies in the region of the Boda-Kaiser Project will commence in 2024. The studies will consider the three considered processing scenarios and include meteorological conditions, flora and fauna, surface and ground water, soils and land use capability, visual amenity, transport, noise, air quality, and Aboriginal and European heritage. Typically, at least two years of baseline data is collected prior to impact assessment.

The potential impacts on agricultural land (some of which has been mapped as Biophysical Strategic Agricultural Land (BSAL)) will also be assessed. Part 2.4 (Divisions 2–4) of *State Environmental Planning Policy (Resources and Energy) 2021* establishes the requirements for certificates to be applied for/addressed prior to the submission of an SSD application, in cases where BSAL would be affected.

## 6.3 Community and Stakeholders

The Boda-Kaiser Project is located in a district (Bodangora) that has a gold mining history dating back to the 1850s. The project lies within the Dubbo Regional Council LGA, with neighbours to the project being farming families and the village of Bodangora (population approximately 100).

Wellington is the closest town to the development and has the potential to reap the most significant benefits from the jobs and economic activity that would be generated by the project, potentially for decades.

Throughout the exploration phase, Alkane has consulted with immediately affected farmers in-person and with the wider district via community events and regular newsletters launched May 2023. Alkane has participated in and sponsored community activities in the immediate Wellington area for several years.

Specialist consultants will prepare social and economic impact assessments, taking into consideration the three considered scales of operation.

# 7. Costs and Financial Analysis

## 7.1 Capital Cost Estimate

Capital expenditure for the three scenarios is shown below. The initial capital cost establishes the open cut mines, infrastructure and processing facility. Additional capex is required to establish the underground mine, with the development year depending on the scenario. Sustaining capex has been estimated at a baseline 1% of the processing plant capital; underground and potential lifts of the RSF walls are additional.

Table 7-1 – Initial Capital Costs (A\$M, 2024 dollars)

	5Mtpa	10Mtpa	20Mtpa
<b>Processing Facility</b>			
Process Plant	299	509	815
Site Non-Process Infrastructure	27	31	31
Construction Indirects	145	220	293
Spares & First Fills	10	17	27
Growth Margin	52	84	127
Subtotal	533	861	1,293
<b>Non-Processing Costs</b>			
Property, Biodiversity & Rehabilitation	80	95	105
Roads & Power	33	33	33
Water Pipeline & Licences	26	32	45
Residue Storage Facility	90	110	133
Mining Infrastructure	10	14	16
Owner's Team Costs	25	30	35
Subtotal	264	314	367
Contingency	60	87	123
<b>TOTAL</b>	<b>857</b>	<b>1,262</b>	<b>1,783</b>

Additional notes for the capital cost estimates:

- It is presented in Australian dollars, based on exchange rates at March 2024; and
- Labour and commodities rates are at a March 2024 base.

## 7.2 Operating Expenditure

The estimated All In Sustaining Cost (AISC) of the 20 million tonnes per annum scenario of A\$630 per gold ounce, after copper by-product credit, would place the Boda-Kaiser Project in the bottom quartile of costs for Australian gold producers.

Estimated operating costs for the three scenarios are summarised below:

Table 7-2 – Operating Costs (2024 dollars)

		5Mtpa	10Mtpa	20Mtpa
<b>Mining Costs</b>				
Open Cut	A\$/t total material	3.3	3.3	3.3
Open Cut	A\$/t ore mined	9.6	9.2	9
Underground	A\$/t ore mined	80	80	80
<b>Processing Costs</b>				
Power	A\$/t milled	4.7	3.7	3.3
Maintenance	A\$/t milled	2.2	1.8	1.4
Consumables	A\$/t milled	4.5	4.3	4.1
Labour	A\$/t milled	2.5	1.4	0.8
Other	A\$/t milled	0.8	0.5	0.4
G&A (full site)	A\$/t milled	1.9	1.1	0.6
Total Processing	A\$/t milled	16.6	12.8	10.6

Electricity comprises approximately 30% of the processing cost and has been assumed at ~10c/kWh. Maintenance costs are estimated at ~3% of the installed equipment cost.

## 7.3 Product Pricing and Exchange Rate

A long-term gold price of A\$3,500 per ounce and copper price of A\$15,000 per tonne were used in the analysis. These were selected by Alkane as suitable estimates based upon current spot prices. Sensitivities to price and cost assumptions are shown in Figure 7-2.

Payment terms for the concentrate have been estimated at 96.5% payable on copper in concentrate and 97.5% on gold in concentrate. The Treatment Costs (TCs) are estimated at US\$50 per dry metric tonne of concentrate and Refining Charges (RCs) estimated at US\$0.05 per pound of payable copper. No penalties for deleterious elements have been included.

## 7.4 Financial Modelling and Evaluation

The financial model commences at a nominal year zero and uses a discount rate of 7%. No discounting has been applied to the time between the date of this study and a future construction date. A summary of the financial modelling results is shown in Table 7-3.

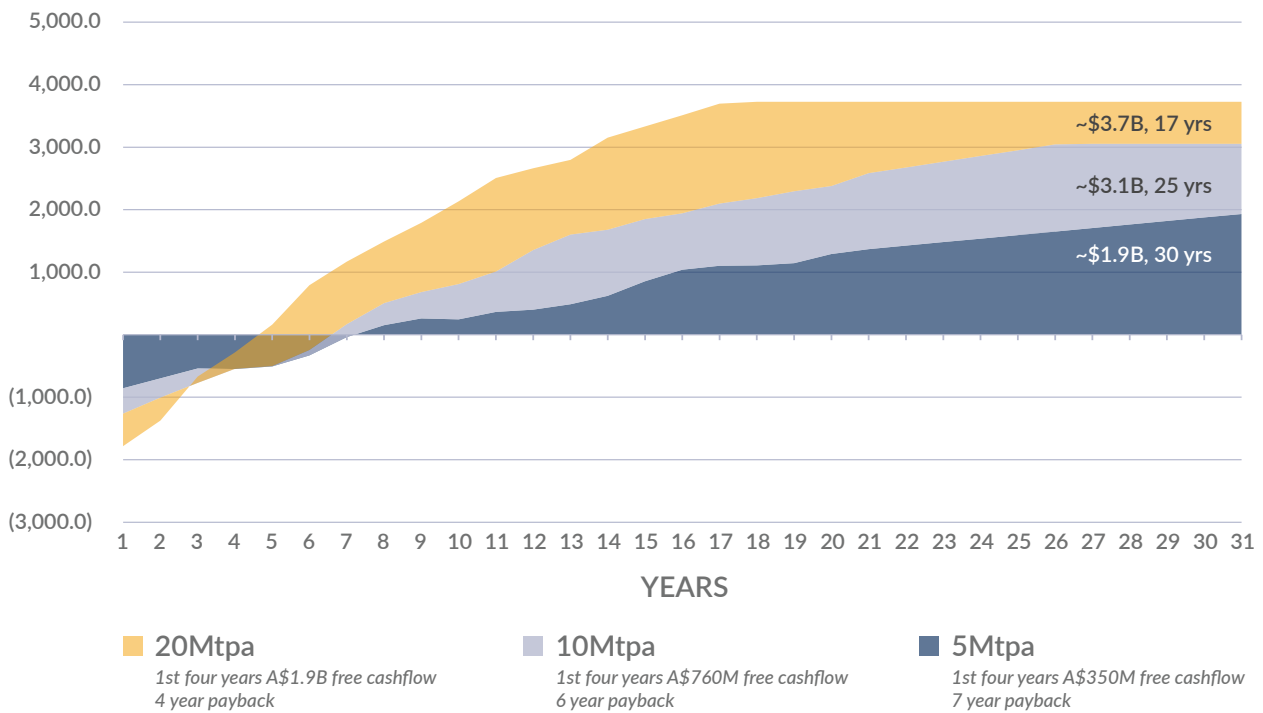


Table 7-3 Summary of Financial Outcomes (real terms, 2024 dollars, USD:AUD 0.67)

		5Mtpa	10Mtpa	20Mtpa
<b>Economic Assumptions</b>				
Copper	A\$/t	15,000	15,000	15,000
	US\$/t	10,000	10,000	10,000
	US\$/lb	4.54	4.54	4.54
Gold	A\$/oz	3,500	3,500	3,500
	US\$/oz	2,333	2,333	2,333
<b>Operating Parameters</b>				
Throughput	Mtpa	5,000	10,000	20,000
Initial Project LOM	yrs	30	26	17
Total Ore Processed	Mt	150.0	251.0	323.5
Average Copper Grade	%	0.20	0.17	0.15
Average Gold Grade	g/t	0.32	0.28	0.26
Average Copper Recovery	%	83.7	83.7	83.5
Average Gold Recovery	%	76.4	76.5	76.3
<b>Production</b>				
Total CuEq Produced	tonnes	527,412	750,482	893,760
Total Copper Produced	tonnes	250,947	347,505	413,733
Total AuEq Produced	oz	2,260,659	3,216,809	3,830,948
Total Gold Produced	oz	1,185,017	1,727,289	2,057,553
Annual AuEq Production LOM average	oz	75,355	123,723	225,350
Annual Copper Production (yrs 1-5)	tonnes	11,603	17,808	35,611
Annual Gold Production (yrs 1-5)	oz	61,088	95,354	159,334
<b>Capital</b>				
Pre-production	A\$M	856.8	1,262.8	1,782.5
Post-production	A\$M	206.1	232.3	223.2
<b>TOTAL</b>	<b>A\$M</b>	<b>1,062.9</b>	<b>1,495.1</b>	<b>2,005.7</b>
<b>Capital</b>				
Initial capital	US\$M	571.2	841.9	1,188.3
Post-production	US\$M	137.4	154.9	148.8
<b>TOTAL</b>	<b>US\$M</b>	<b>708.6</b>	<b>996.8</b>	<b>1,337.1</b>
<b>Operating Costs</b>				
AISC (Gold Equivalent)	A\$/oz	2,073.9	1,984.3	1,901.8
	US\$/oz	1,382.6	1,322.9	1,267.9
AISC (By-product credit basis)	A\$/oz	891.0	783.4	630.4
	US\$/oz	594.0	522.2	420.2
Total Opex Cost per tonne milled	A\$/t milled	28.8	23.4	20.6
	US\$/t	19.2	15.6	13.7
Processing, general administration	A\$/t milled	16.6	12.8	10.6
	US\$/t	11.1	8.5	7.0
Open pit mining cost	A\$/t ore mined	9.6	9.2	9.0
	US\$/t	6.4	6.1	6.0
Underground mining cost	A\$/t ore mined	80.0	80.0	80.0
	US\$/t	53.3	53.3	53.3
<b>Financials</b>				
Pre-tax NPV7%	A\$M	473.2	1,034.7	1,808.5
	US\$M	315.5	689.8	1,205.7
Pre-tax IRR	%	13.1	16.9	24.0
Pre-tax NPV / Start-up Capital		0.6x	0.8x	1.0x
Capital payback period	yrs	7.0	6.0	4.0
Average Annual Free Cashflow	A\$M	92.9	166.0	324.1
LOM Operating Cashflow	A\$M	2,993.3	4,549.1	5,733.7
First 10-Years Free Cashflow (excluding capex in yr 0)	A\$M	1,220.6	2,274.5	4,290.7
Average Annual Free Cashflow	US\$M	61.9	110.7	216.1
LOM Operating Cashflow	US\$M	1,995.5	3,032.7	3,822.5
First 10-Years Free Cashflow (excluding capex in yr 0)	US\$M	813.7	1,516.3	2,860.5

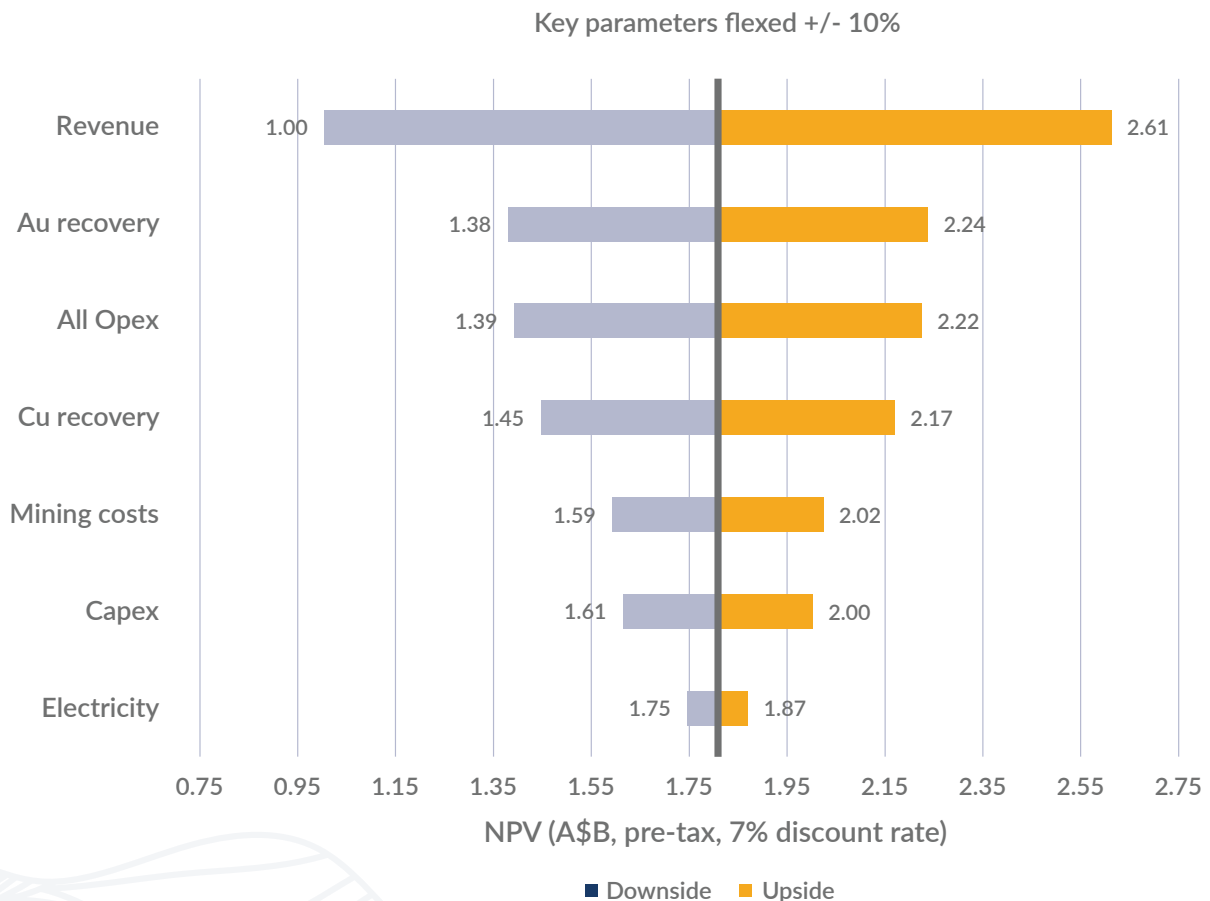
The Boda-Kaiser Project generates significant positive cashflow in all three considered scenarios. The project is expected to repay up-front capital within four to seven years, depending on the scenario.

Figure 7-1 Cumulative Cashflow Before Tax (A\$M)



The potential financial impact of changes to some of the key assumptions or projections are shown below.

Figure 7-2 Sensitivity analysis – 20Mtpa scenario



## 8. Future Activities and Options

### 8.1 Underground Mining Method

The considered underground mining option uses a Long Hole Open Stopping (LHOS) mining method, consistent with Alkane's experience at Tomingley. Given that a high throughput is beneficial to the project economics, future studies will evaluate the potential for sub-level caving or a similar bulk tonnage underground method.

Understanding high-tonnage underground options is important, since significant resources are below the considered open cut depths. Taking the 20 million tonnes per annum scenario, only 2.05 million ounces of gold and 0.41 million tonnes of copper will have been recovered from the 8.28 million ounces of gold and 1.46 million tonnes of copper in the resource.

### 8.2 Mining Automation

The open cut mining studies have assuming 600-tonne excavators loading 200-tonne capacity trucks on a dry-hire owner-operated basis, such as Alkane uses at Tomingley. Large mining fleets in large consistent orebodies, such as porphyries, are often compatible with using automated mining equipment. This can result in reductions in mining unit cost and will be evaluated in further studies.

### 8.3 Processing Recoveries

The processing testwork to-date has established a conventional flowsheet for the recovery of metal and has supplied a considerable amount of data for process design. Whilst this is the case, more testwork will be required to prove the envelope for plant design and ensure the work performed to date is representative.

Future testwork will focus on providing further variability data (comminution and flotation) to improve on the outcomes and estimates prepared to-date and provide a more accurate geometallurgical model. The variability testwork will confirm the criteria used for plant design and provide metallurgical algorithms for future open pit optimisation studies.

## 8.4 Exploration

A number of high-grade breccia zones within and peripheral to the defined resources in the Boda 2-3 deposits (ASX Announcements 28 March 2023 and 25 August 2023) have potential to increase the grade of this resource and provide higher-grade zones suitable for underground mining. The mineralisation is also open to the south and extends into the Boda 4 target.

Significant potential also exists for the discovery of further deposits like Boda and Kaiser across the Northern Molong Porphyry Project tenement package. Exploration continues and is currently focused in the Driell Creek area to the north of Kaiser (see ASX Announcement 21 June 2024).

## 8.5 Potential Partners

Over some time, Alkane has received various forms of interest in relation to Boda-Kaiser from potential strategic partners, private equity firms and some major and mid-tier gold producers. While this report represents the first time Alkane has published economics on the development of Boda-Kaiser, the company is aware that many of these entities monitor ongoing exploration results and will have their own view on the economics of various development scenarios.

Alkane considers that developing a project of this scale with a larger partner makes sense for its shareholders. Nevertheless, with the resource drilling program complete and ongoing exploration costs reset to a lower run rate, progressing the Boda-Kaiser Project through the next stage of development involves a lower rate of expenditure and is within Alkane's capability. Consequently, there is no short-term requirement to embark on a formal strategic partner process at this stage.

Alkane remains open to dialogue and completing a strategic partner transaction earlier; however, the logical entry point for a strategic partner may come as expenditure is accelerating to secure early-stage infrastructure options and also as key development parameters are being formalised. This is likely to be once environmental baseline studies are complete and the approvals process is further advanced.

Boda-Kaiser Project





