HILLGROVE RESOURCES

ASX RELEASE

Cautionary Statement

The Economic Assessment discussed herein has been undertaken to explore the technical and economic feasibility of developing an underground mine to economically and sustainably exploit the Kanmantoo Copper Gold Deposit, located in South Australia.

The Kanmantoo Copper Gold Project (Kanmantoo or Project) is 100% owned by Hillgrove Resources Limited.

The Production Target and financial forecasts presented in the Economic Assessment are shown on a 100% Project basis. The Production Target underpinning the Base Case financial forecasts included in the Economic Assessment comprises 72% Indicated Resources and 28% Inferred Resources. The Production Target included in the Economic Assessment relating to the project payback period of 7 months post the completion of pre-production works comprises 82% Indicated Resources and 18% Inferred Resources. The Mineral Resource Estimate underpinning the Base Case Production Target has been prepared by a Competent Person in accordance with the requirements in the JORC Code 2012.

There is a lower level of geological and grade continuity confidence associated with Inferred Resources and there is no certainty that further exploration work will result in the conversion of Inferred Resource estimates to Indicated Resource estimates or return the same grade and tonnage distribution.

The economic outcomes associated with the Economic Assessment are based on certain assumptions made for commodity prices, concentrate treatment and recovery charges, exchange rates and other economic variables, which are not within the Company's control and subject to change from time to time. Changes in such assumptions may have a material impact on economic outcomes.

To achieve the range of outcomes indicated in the Economic Assessment, additional funding will likely be required. Investors should note that there is no certainty that Hillgrove Resources 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 Hillgrove's existing shares.

This announcement contains forward-looking statements. Hillgrove has concluded it has a reasonable basis for providing the forward-looking statements included in this announcement and believes it has a reasonable basis to expect it will be able to fund the development of the project. However, several factors could cause actual results, or future 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 on the results of the Economic Assessment.

Competent Persons Statement

The information in this release that relates to Exploration Results, Exploration Targets and Mineral Resource Estimates is based on information compiled by Mr Peter Rolley, who is a Member of The Australian Institute of Geoscientists. Mr Rolley is a full-time employee of Hillgrove Resources Limited and has sufficient experience relevant to the styles of mineralisation and type of deposit under consideration 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 Code)'. Mr Rolley has consented to the inclusion in the release of the matters based on their information in the form and context in which it appears. All exploration drill results, soil sampling images, and rock chip results have previously been reported to the ASX by a Competent Person at the time.

Tuesday, 14 December 2021

KANMANTOO UNDERGROUND STAGE 1 ECONOMIC ASSESSMENT CONFIRMS OUTSTANDING POTENTIAL

- **Economic Assessment of Kanmantoo Underground Stage 1 demonstrates strong free cash flow potential (A$196M) from recommencement of operations in 2022**
- **Existing, well-maintained infrastructure allows for a fast restart (~7 months from FID) at industry leading capital costs (A$26M) and capital intensity (US$1,550/t)**
- **Updated Mineral Resource Estimate of 5.7Mt @ 1.1% Cu, 0.3 g/t Au with further drilling underway**

STAGE 1 ECONOMIC ASSESSMENT:

Financials	**Post-tax free cash flow: A$196M**[1] **NPV$_8$: A$166M** **Internal rate of return: 389%** **Payback Period: 7 months post completion of pre-production works**
Mining Inventory	Initial three year mine plan of 3.3Mt, targeting production of **36k tonnes of copper** and **10k ounces of gold**.
Resource	Mineral Resource Estimate upgraded to **5.7Mt @ 1.1% Cu, 0.3 g/t Au**, increasing copper metal by 82% from 34.4kt to 62.5kt[2].
Near Term	First copper sales within **7 months** of final investment decision.
Low Capex	**Low capital costs of only A$26M** results in one of the lowest capital intensity projects in the world, at just US$1,550/t of annual copper produced.
Healthy Margins	**All in sustaining cost of A$6,991/t** copper (US$2.22/lb) provides good margins at current and projected copper price.
Low Risk	*Regulatory*: Tier 1 jurisdiction, with all **permitting in place**. *Technical*: Very **well understood geology**, geotech and metallurgy with the plan focussing on extensions of the same lodes that were previously mined and processed in the open pit. *Costs*: Capex is predominantly working capital, with **infrastructure already in place**. Opex is based on tendered costs for mining and contracts as well as historical costs for processing.

[1] *Assumptions: Cu (US$9,450/t), Au (US$1,750/oz), Ag (US$22/oz), AUD/USD (0.70)*
[2] *ASX release 14 December 2021 Updated Kavanagh Underground Mineral Resource Estimate compared to ASX release 7 December 2020 Kanmantoo Underground Mineral Resource Estimate*

POTENTIAL UPSIDE:

Drilling	A **16,000m drill program is underway** to potentially increase geological confidence and annual production ahead of planned commencement in 2022. A number of additional lodes within the permitted mine site sit outside of the current drilling program and provide an opportunity to further expand resource base after commencement of the initial mine plan.
Additional Throughput	Processing plant infrastructure operates at 40% of capacity, providing the **ability to increase annual throughput with no additional permitting or capital expenditure**, uniquely positioning Hillgrove to be able to respond to changing commodity prices to maximise value.

MANAGING DIRECTOR'S STATEMENT:

Commenting on the economic assessment of the Kanmantoo Underground, Hillgrove CEO and Managing Director, Lachlan Wallace said:

"The study confirms the excellent project potential. Kanmantoo Underground Stage 1 presents a unique opportunity to produce copper in a Tier 1 jurisdiction at a time of record prices, generating post-tax cash flows of $196M in the initial stage, with resource upside through depth extensions, strike extensions, and additional lodes.

Low capital intensity
The project requires only $26M of development capital, due to the existing processing facility and tailings storage infrastructure, both of which are being maintained in a ready restart condition. The existing infrastructure and the short distance from the portal to the copper lodes, positions Kanmantoo as one of the lowest capital intensity copper development projects in Australia at US$1,550/t of annual copper production in the first three years, well below other development projects which average over US$16,000/t[3].

Early decline development brings forward first copper production
The strong potential project economics reinforce the decision earlier this year to commence the underground decline development ahead of the final investment decision. The first 500m of the decline is being established under trial conditions using a continuous mining machine which has the potential to transform existing mining development processes; making them safer, faster, more cost effective, and as a fully electrical machine, has the potential to facilitate industry's transition towards zero emission mining. The initial 500m of decline is funded through a $2m grant from the South Australian government, and deferred payment terms with Komatsu. Orchestrating funding in this manner enables Hillgrove to establish the decline for very little up-front capital outlay, accelerating what is already a very short time to first copper, whilst at the same time, enabling this technology to be tested for the benefit of the mining industry.

[3] *AME, 2017, Copper - Capital Intensity of New Copper Mine*

Opportunity to reduce unit operating cost with additional annual throughput

The project benefits from its location, providing access to grid electricity, mains water, a short transport route, and a skilled local workforce without any fly in fly out requirements. The latent capacity in the processing facility, which only operates for approximately 40% of the time under the Stage 1 plan, provides an opportunity to reduce the operating costs further with additional annual throughput.

Mineral Resource Estimate increased by 82%

The Kanmantoo Underground Stage 1 economic assessment is based on the updated Mineral Resource Estimate (MRE)[4] which increased metal content by 82%, after the 17,200m drill program completed in 2021. The increase to the MRE is all within the Kavanagh lodes below the pit.

16,000m drill program underway

A further 16,000m drill program is underway, focussed on other lodes within the permitted mining lease, with a view to bringing these areas into the early stages of mining at Kanmantoo. Bringing in additional work areas such as these provides an opportunity to increase annual production for modest additional capital, which would be expected to further reduce the all-in sustaining cost.

Mineral lodes extend up to 500m below the pit and open at depth

The drilling indicates that the mineralisation extends 500m below the base of the main pit above Kavanagh, and over 200m below the Nugent pit, however the Stage 1 mine plan only extends 250m below the main pit and 150m below the Nugent pit due primarily to lack of drilling density at depth. Both of these areas remain open at depth and exploration drilling will continue in parallel with the Kanmantoo Stage 1 development, with a view to replace resource depletion from underground mining and to extend the mine life beyond Stage 1.

Ability to quickly respond to changing commodity prices to maximise value of resource

The drilling program completed in 2021 confirmed that many of the higher-grade zones are surrounded by lower grade haloes which presents an opportunity to further increase value through a lower grade bulk mining approach which better utilises the existing mill capacity. The spare processing capacity enables Hillgrove to respond to changing commodity prices by flexing the cut-off grade to maximise value from the Kanmantoo Underground, without the need for additional capital expenditure. Whilst most other producers would need to consider permitting, capital costs and lengthy construction times to expand production to take advantage of changing prices, the Kanmantoo project can react quickly which may prove valuable as the world continues to decarbonise, fuelling demand for copper.

[4] *ASX release 14 December 2021 Updated Kavanagh Underground Mineral Resource Estimate*

Low risk
As a fully permitted brownfield project, there is relatively low risk compared to other mining start-ups. The project extracts the same lodes that were mined and processed for almost a decade in the open pit, which materially reduces the technical risk around geology interpretation, ground support requirements, and metallurgical recovery. In addition, with all the infrastructure already in place and being maintained at a high standard, the risk of capital blowout on restart is considered low.

Fully funded to FID
Hillgrove Resources is fully funded to complete the current 16,000m drilling program and the initial 500m of decline, after which we expect to be in a position to make a final investment decision. In parallel, we have commenced discussions with potential funding partners."

For more information contact:

Mr Lachlan Wallace
CEO & Managing Director
Tel: +61 (0)8 7070 1698

Mr Joe Sutanto
Chief Commercial Officer & Company Secretary
Tel: +61 (0)8 7070 1698

HILLGROVE RESOURCES

SUMMARY REPORT

Kanmantoo Underground

Stage 1

PROJECT ECONOMIC ASSESSMENT

HILLGROVE RESOURCES LIMITED ACN 004 297 116
5 – 7 King William Rd, Unley SA 5061, Australia | T +61 8 7070 1698

Contents

1 Project Highlights

Hillgrove Resources Limited (Hillgrove or HGO) has completed an economic assessment of the Kanmantoo Underground Stage 1 Project. Highlights of the assessment include the following:

- Free cash flow generation of A$196M from an initial mine life of three years with an internal rate of return of 389%.
- Project net present value (NPV_8) of A$166M and all-in sustaining costs (AISC) of A$6,991 per tonne, providing considerable margin on the copper price of A$13,500 per tonne at the time of writing.
- 3.3 million tonnes processed for 36k tonnes recovered copper and 10k ounces recovered gold based on the current mineral resources at a cut-off grade of 0.6%. A further 16km drilling program is underway potentially increase geological confidence and annual production ahead of planned commencement in 2022.
- Low capital costs due to existing processing plant and tailings infrastructure and 350 metre open pit haul road providing access to the portal. The capital intensity of the project of $US1,550 per tonne (US$ 0.70/lb) of annualised copper production for the first three years, which is an order of magnitude below the global average of $US16,000 per tonne (US$7.26/lb).
- Low operating costs including grid electricity, water, transport, and labour with no fly-in fly-out workforce requirements due to the project's proximity to Adelaide.
- Permitting and licensing in place, allows for first revenues to be received within seven months of an investment decision.
- Processing plant infrastructure operating at ~40% of capacity provides the ability to increase additional throughput, with no additional capital expenditure. This may also provide an opportunity to increase copper production and project value by reducing the cut-off grade based on prevailing metal prices.

Table 1 provides an overview of the key areas of the Kanmantoo Underground Stage 1 Project.

Table 1: Project Overview

Financial	Free Cash Flow	A$196M
	NPV 8%	A$166M
	IRR	389%
	AISC	A$6,991
Mining	2021 Mineral Resource Estimate	5,669kt at 1.1% Cu and 0.33g/t Au
	Stage 1 Mining Zones	Kavanagh (east, central, west) to 650mRL Nugent to 900mRL
	Mining Rate	Peak 120,000 tonnes per month
	Mine Life	3 years (Stage 1)
	Operations	Mining contractor
Processing	Processing plant	> 3 million tonnes per annum processing plant, currently in care and maintenance
	Flowsheet	Crushing, grinding, flotation, dewatering
	Operation Life	30 months (Stage 1)
	Copper Grade	1.17%
	Gold Grade	0.17g/t
	Recoveries	Cu 93.0% (average - feed grade dependent) Au 55%
	Concentrate Grade	24% Cu
	Production	14kt Cu per annum (average) 4koz Au per annum (average)
	Processing operations	Hillgrove owned and operated
Infrastructure	Tailings Storage Facility	Approved capacity of 7 million tonnes of tailings, currently in care and maintenance
	Access to portal	Open pit haul road to the lower portal approximately 350 metres below surface
	Electricity	Grid power with 10 MW 132-11 kv switch yard on site. Overhead power lines to supply power to the mine portal.
	Water	Agreements and pipelines in place
	Fuel	Diesel fuel storage tanks currently established on site including at the portal
Logistics and Marketing	Logistics	Concentrate to be trucked in containers to Port Adelaide for bulk shipping
	Customers	Offtake agreements in place for all production

2 Background

The Kanmantoo Copper Mine is located in the Adelaide Hills region of South Australia. The original mine site contained several underground workings from the mid to late 19th century and the original Kanmantoo Copper Mine open pit, which was in operation from 1970 until 1976 on the Kavanagh copper zones. Approximately 4.1Mt @ 0.9% Cu was mined from the open pit before operations closed in 1976 due to low copper prices. In 1976, Kanmantoo Mines drilled and developed an underground operation around the Kavanagh and East Kavanagh copper lodes, but the low copper prices resulted in its abandonment before underground production began.

Hillgrove undertook exploration work at the site from 2004, which proved up additional mineral resources adjacent to and below the historical Kavanagh open pit. This led to Hillgrove commencing open pit mining on the Kavanagh, Valentine, Matthew, Emily Star, Spitfire and Nugent lodes, and processing ore on the site from 2011. Mining of the main open pit - Giant - was completed in May 2019 with final ore from the depth extensions of the West Kavanagh lode and the processing of stockpiled ore concluded in March 2020. From 2011 to 2020, the operation produced 137k tonnes of copper and 56k ounces of gold from several open pits.

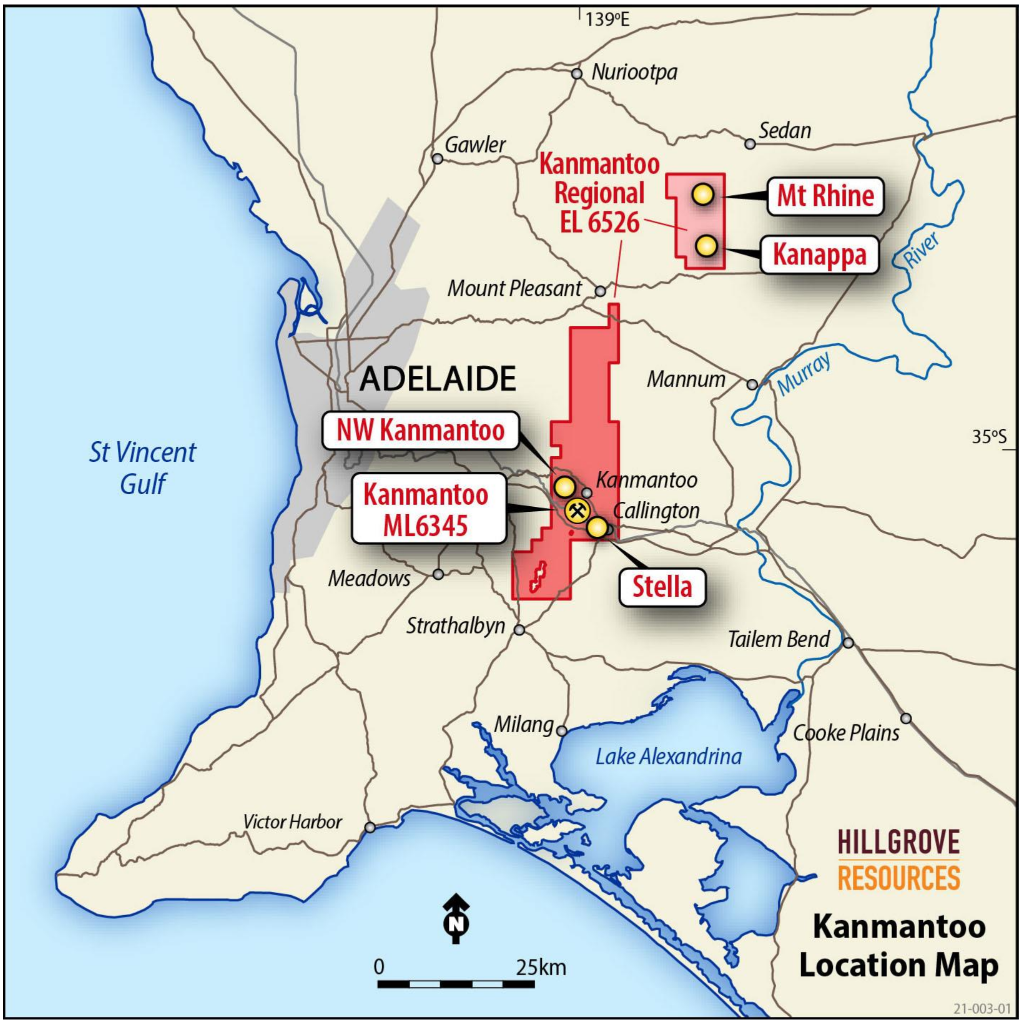

Figure 1: Location of the Kanmantoo Copper Mine (ML6345) and exploration tenements

The project's location, 55 kilometres from Adelaide, and three kilometres from the main dual carriageway leading to the export port of Port Adelaide, brings inherent operating and capital cost advantages. This includes low cost grid electricity, water, transport and labour due to their being no requirement for a fly-in fly-out workforce. The mine's location in the Adelaide Hills - one of South Australia's most attractive settings - also helps to attract and retain a high quality workforce who predominantly live within the region.

This economic assessment investigates mining the known resources of Kavanagh and Nugent, forming the Kanmantoo Underground Stage 1 Project. As evident from Figure 2, areas included in this assessment only form a portion of the known mineralised areas on the mining lease. Hillgrove anticipates this to be the first stage in a larger operation, with results of the current drilling program not included in this assessment.

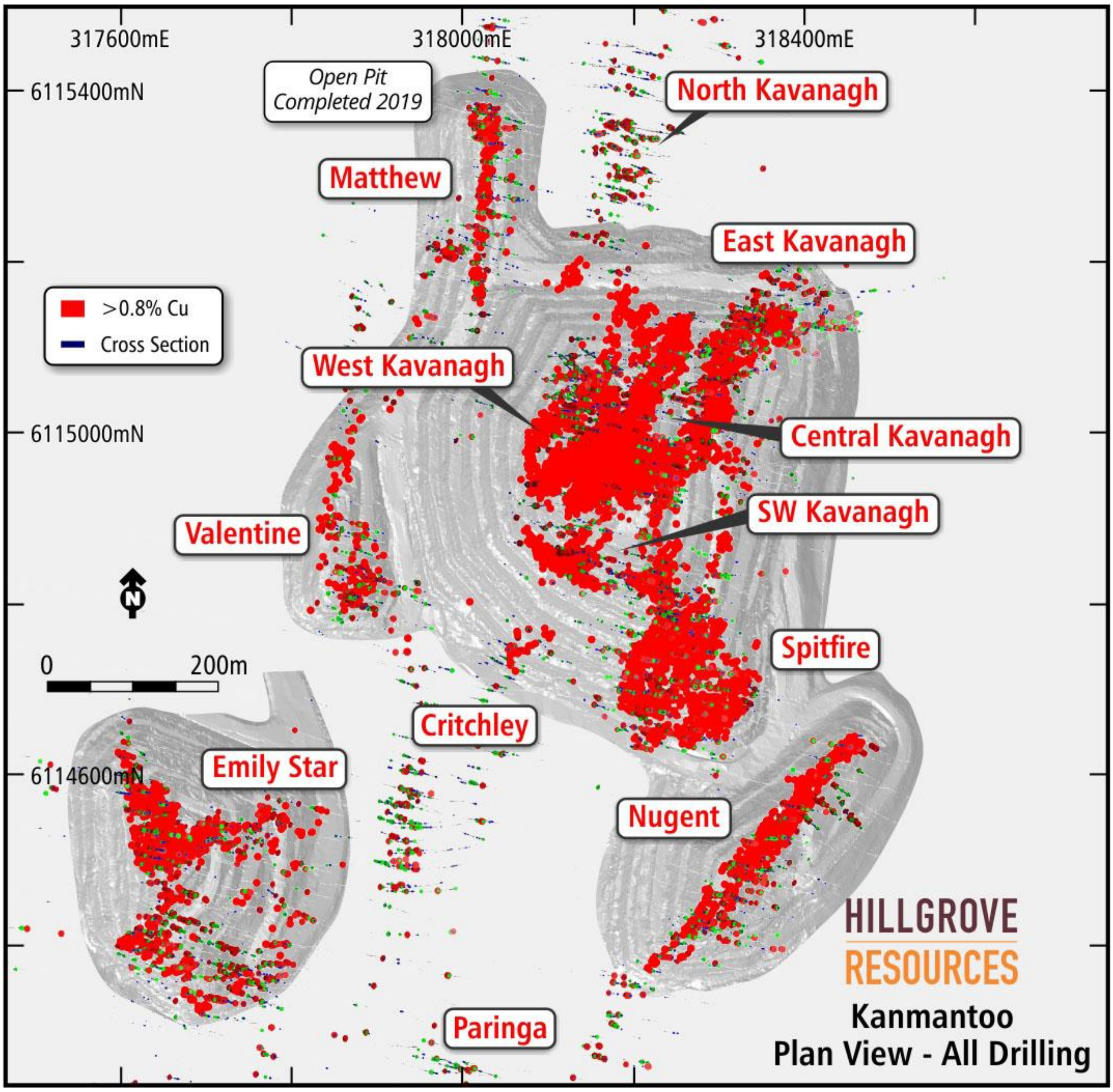

Figure 2: All drilling with >0.8% copper grades showing the location of the Cu/Au zones at Kanmantoo

3 Underground Mineral Resource and Geology

A detailed explanation of the Kanmantoo underground resource is contained in the 2021 Mineral Resource Estimate[1]. A summary of the current resource used in this economic assessment and a brief history of the development of the current resource is provided in the following sections.

3.1 Regional Geology

The Kanmantoo copper deposits are located 55 km south-east of Adelaide, South Australia at latitude -35.083^{0}S, longitude 139.00^{0}E, on the Barker (SI-5413) 1:250,000 map sheet.

The pelitic meta-sedimentary rocks of the Cambrian Kanmantoo Group in the Adelaide Geosyncline are host to numerous copper, gold, lead, zinc, silver, pyrite deposits over a 300km N-S strike length of which Kanmantoo is the largest. The copper-gold deposits at Kanmantoo are hosted within Fe-rich meta-pelites and are emplaced post peak-metamorphism and syn to post peak deformation of the Delamerian Orogen from magmatic fluids in a structurally controlled shear system.

The Fe-rich meta-pelites are regionally thermally altered to andalusite – sillimanite grade schists which are locally quarried for "bluestone" flagging. The mine sequence is characterised by an abundance of andalusite dominant schists interbedded with quartz biotite schists.

3.2 Extent of Post Open Pit Exploration Drilling

In June 2019, Hillgrove commenced diamond drilling to test the continuity of the Central and East Kavanagh lodes below the eastern wall of the mined Giant open pit. Since then, drilling programs have been completed in 2020 and 2021 to test the extents of Kavanagh, Spitfire and Nugent Cu-Au zones. At the conclusion of each drill program, an updated Mineral Resource Estimate (MRE) has been released.

Table 2 below summarises the 2020 Nugent MRE and the Kavanagh 2021 MRE (incorporating the Kavanagh and Spitfire zones).

The 2020 Nugent MRE and the 2021 Kavanagh MRE are Stage 1 of the Kanmantoo Underground Project, with further drilling currently being undertaken to improve the confidence in the Mineral Resources and to drill test additional Cu-Au mineral zones.

The current resource only includes Kavanagh (East, Central and West, South-West and North-East) and the upper levels of Nugent and Spitfire. There are no resources included in the Stage 1 mining inventory for the North Kavanagh and Emily Star areas, as these have not yet been drilled. There are also no resources included for Nugent below 900mRL. Drilling has identified continuation of the Kavanagh Cu-Au mineral zones to approximately 350mRL, which is 500 metres below the completed Giant open pit. All areas drilled to date, including Kavanagh and Nugent, remain open at depth.

[1] *ASX release 14 December 2021 Updated Kavanagh Underground Mineral Resource Estimate*

Table 2: 2021 Underground Mineral Resource Estimate

Deposits	JORC 2012 Classification	Tonnage (kt)	Cu (%)	Au (g/t)	Cu Metal (kt)
Kavanagh 2021 (0.6% Cu COG)	Indicated	3,530	1.1	0.11	38.9
	Inferred	1,480	1.01	0.1	15
	Sub-Total	5,010	1.08	0.11	53.9
Nugent 2020 (0.8% Cu COG)	Indicated	202	1.4	0.47	2.8
	Inferred	457	1.3	0.7	**6**
	Sub-Total	659	1.32	0.61	8.7
Totals	**Indicated**	**3,732**	**1.12**	**0.13**	**42**
	Inferred	**1,937**	**1.08**	**0.73**	**21**
	Total	**5,669**	**1.10**	**0.33**	**62.5**

3.3 Kavanagh

Figure 3 below is a longitudinal section along the strike of the Kavanagh Central and East Cu-Au mineral zones showing the final position of the Giant open pit and all the reverse circulation (RC) and diamond drilling (DD) exploration drilling completed by Hillgrove in this area. The longitudinal section highlights the significant drill intersections with the best of these located from approximately 900mRL to 700mRL (approximately 200m below the bottom of the open pit).

The drilling demonstrates that the Kavanagh mineralisation continues below 350mRL (approximately 500m below the bottom of the open pit), however more drilling is required to convert this deeper mineralisation to mineral resources adequate for mine planning.

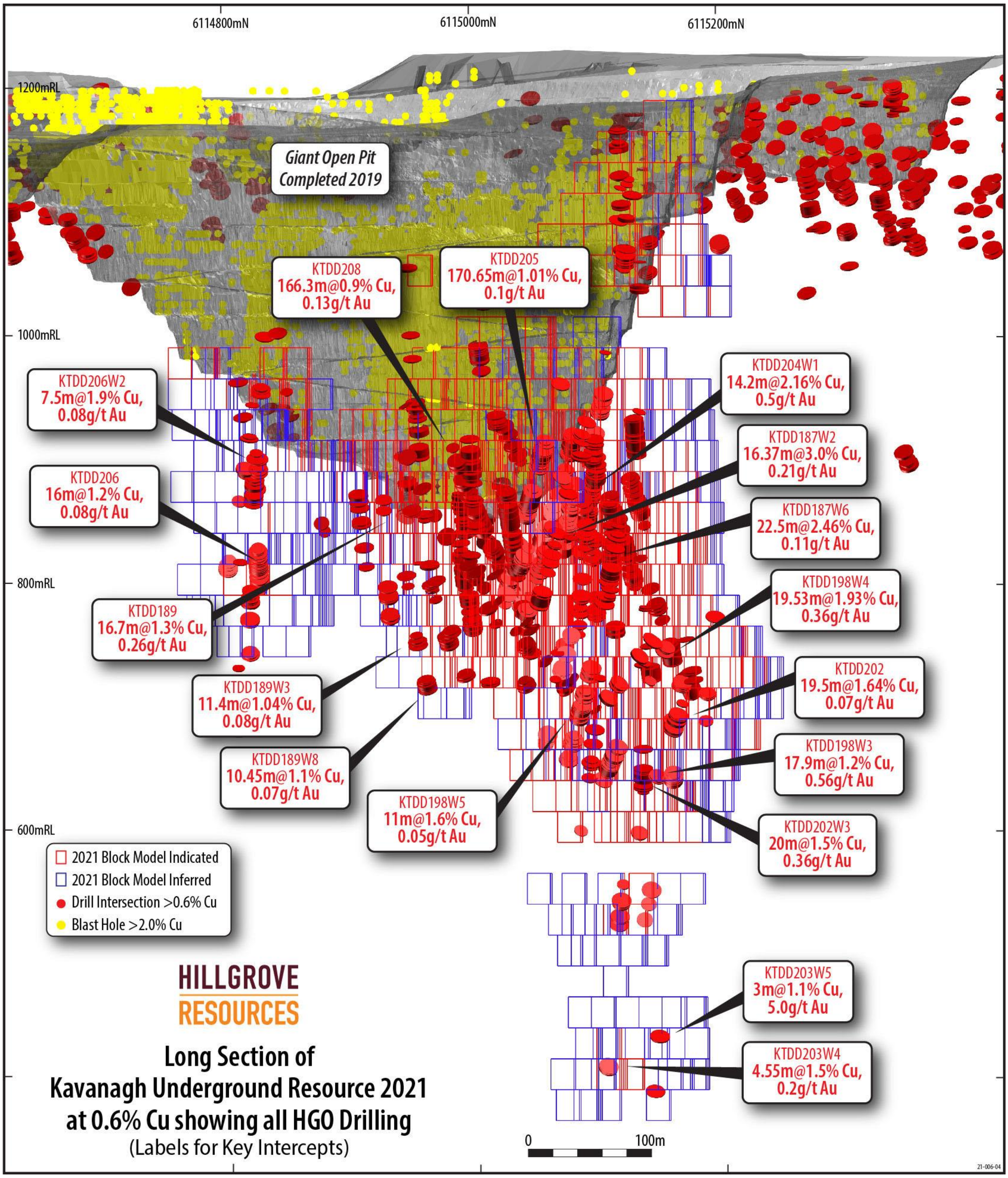

Figure 3: Longitudinal section of Kavanagh drilling with key drill Intercepts labelled

3.3.1 Kavanagh Mineralisation

The various Kavanagh Cu-Au mineralised zones are hosted within Biotite Chlorite Garnet Schist (BCGS) and/or Garnet Andalusite Biotite Schist (GABS) with sulphide distribution controlled by the structural fabric, both as finely disseminated sulphides along the S2 fabric and as massive sulphide veins. The sulphide mineralisation is dominated by coarse grained pyrrhotite and chalcopyrite with minor bismuthinite, pyrite and rarely free gold.

The Kavanagh Cu-Au mineral zones of intense sulphide veining and sulphides vary between 3 to plus 20 metres in width with haloes of lower density sulphide veining up to 10 to 20 metres in width.

The various Kavanagh lodes are characterised by their local alteration styles and mineral assemblage. For example, the East Kavanagh mineralisation is often associated with strong gold and bismuth endowment, whilst West Kavanagh has minimal gold and bismuth and has a higher ratio of pyrrhotite to chalcopyrite compared to Central Kavanagh.

Drill holes KTDD205 (170.65m @ 1.01% Cu, 0.10g/t Au) and KTDD208 (166.3m @ 0.90% Cu, 0.13g/t Au) demonstrate that in the centre of the Kavanagh mineral system, where all Kavanagh mineral lodes are structurally well developed, the cumulative extent of the sulphide veining is expressed over 160 metres in width.

Figure 4: Central Kavanagh core showing mineralised BCGS

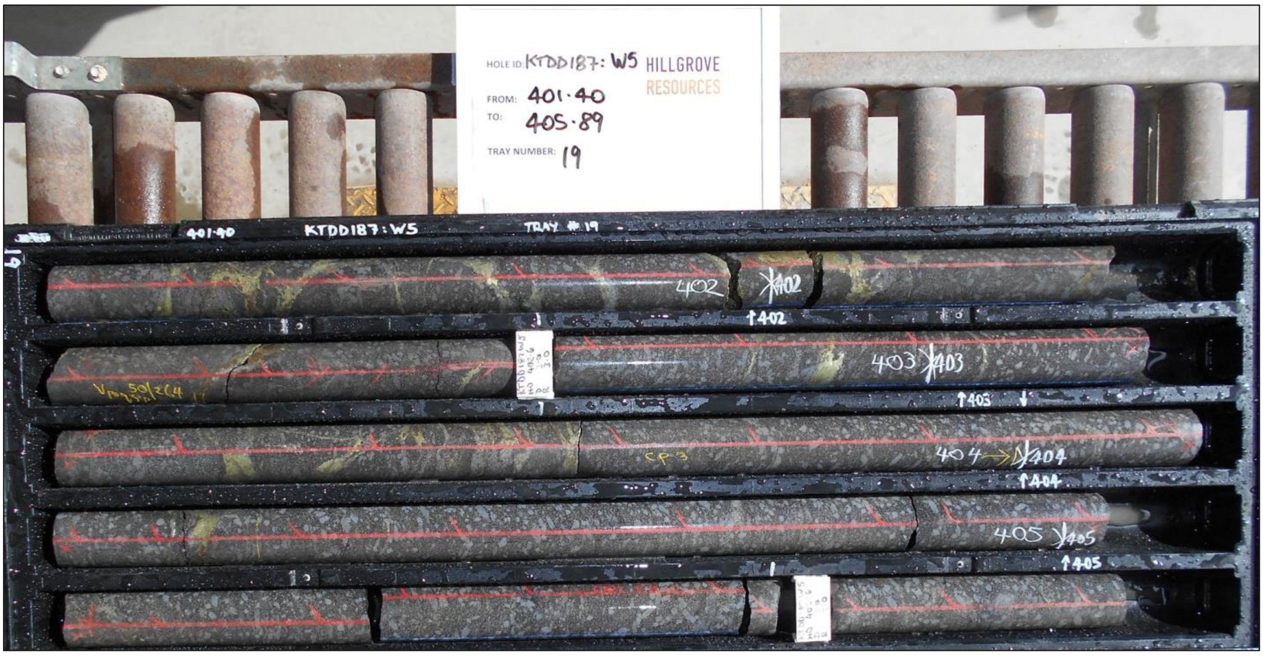

Figure 5: East Kavanagh core showing mineralised GABS

Figure 6: West Kavanagh core showing the interbedded GABS and BCGS within the mineralised shoot

3.4 Nugent

Figure 7 is a longitudinal section along the strike of the Nugent zone showing the final position of the Nugent open pit and all the RC and DD exploration drilling completed by HGO in the area. The longitudinal section highlights significant intersections along strike and down-dip demonstrating that the Nugent Cu-Au mineralisation is open at depth and along strike. Drilling is currently underway with intent to convert the Inferred Resource to Indicated Resource.

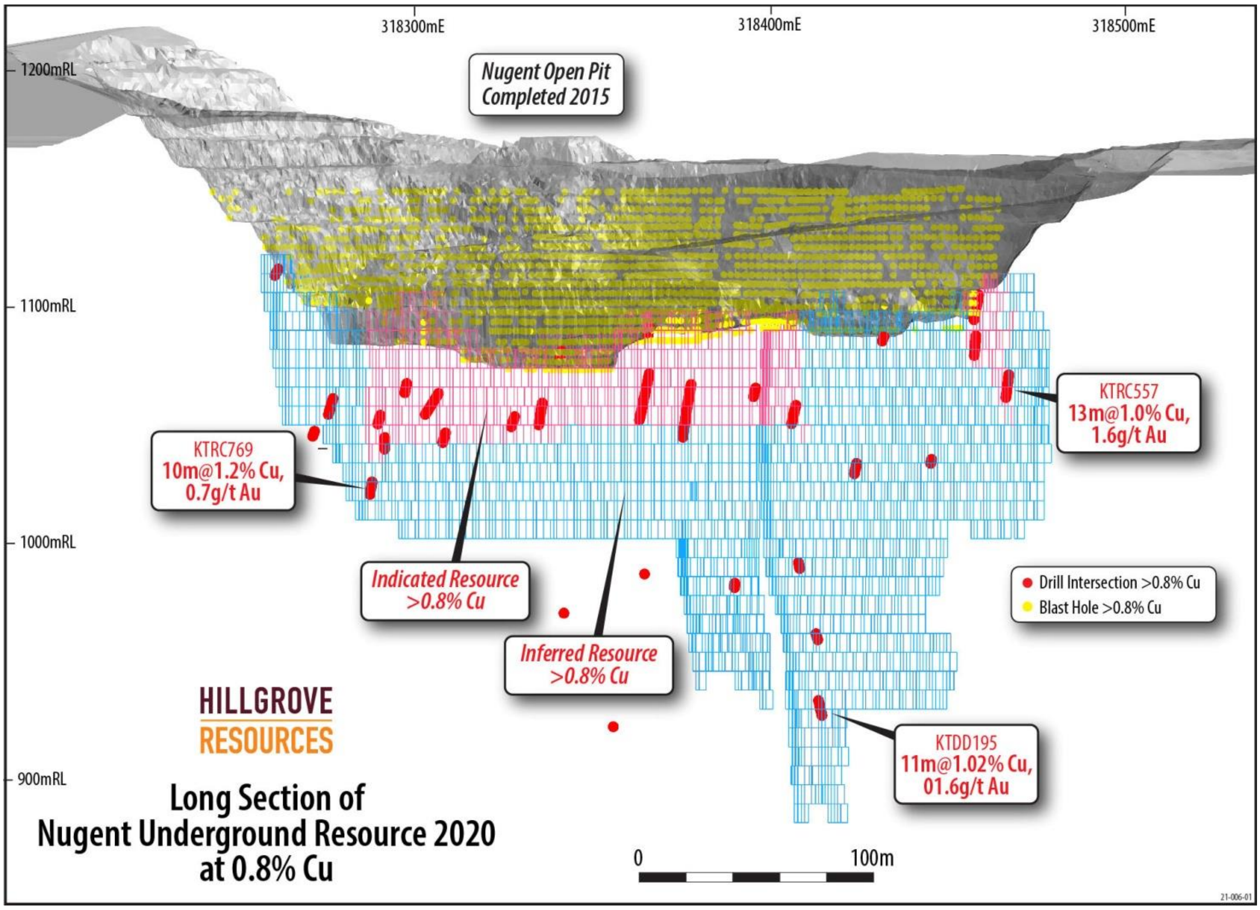

Figure 7: Longitudinal section of Nugent drilling with key drill intercepts labelled

The Nugent Cu-Au mineral zone strikes NE-SW (~040° direction) dips sub-vertically toward the south-east, with the mineralisation following the shear corridor and hosted within a silicified BCGS zone. The Nugent alteration system shows a significant increase in silica in comparison to the Kavanagh systems, both as a pervasive overprint and as defined quartz veins, with sulphide and gold mineralisation generally confined to zones of structurally complex quartz veining in a silica rich variety of the BCGS.

Figure 8: Core from KTDD195 showing the silicious BCGS from Nugent

Gold is also enriched in the Nugent lode system, with intersections including KTDD141 of 12m @ 2.2% Cu and 7.9g/t Au. Towards the south-west end of the Nugent lode zone, there are gold only intersections including KTRC086 6m @ 0.06% Cu, 4.3g/t Au from 92m downhole. Gold is generally very fine grained and rarely visible as shown in Figure 9.

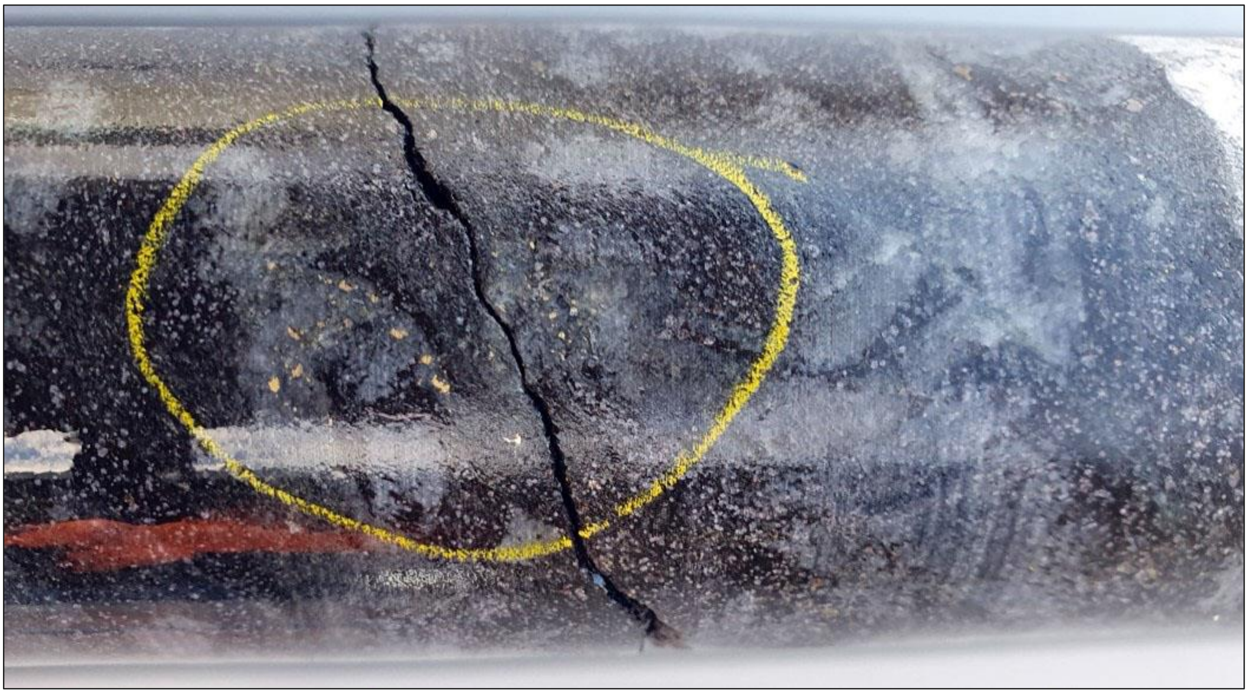

Figure 9: Free gold in Nugent KTDD209 at 339.7m depth downhole

3.5 Mineralisation Continuity

The geologic interpretation of the geometry of the mineralisation is often conditioned to the sulphide vein density and hence the spatial continuity is dependent on the applied copper cut-off grade. As a result, the higher grade copper zones do not have a hard, structurally controlled boundary. In reality, the boundary between higher grade copper zones and low grade copper zones are subjective and spatially variable. To assist with the geological understanding, a 0.2% Cu wireframe has been interpreted to visualise the overall continuity of the copper mineralisation. If the economic cut-off grade is increased to 1.0% Cu, the mineral zones become truncated into a series of disconnected pods, with much higher variability in grade and spatial continuity.

The Kavanagh mineralised lodes are generally within a broad sulphide alteration zone, within which there is localised variation in the concentration of copper sulphides. In contrast, the Nugent zone is generally a single zone of sulphide alteration of varying width and intensity of copper-gold. While both mineral systems have, on average, a consistent overall geometry, within the mineral zone, the higher grade portions can vary in length along strike and plunge.

The 2021 Kavanagh Underground MRE has been estimated using Multiple Indicator Kriging (MIK) with the estimation parameters aligned to be concordant with the dominant S2 fabric that controls most of the sulphide distributions.

The MIK estimation process has estimated the proportion of each panel above three copper cut-off grade thresholds of 0.4% Cu, 0.6% Cu and 0.8% Cu. The 2021 MRE has reported the MIK estimate at 0.6% Cu cut-off grade. Full details of the Kavanagh Underground MRE can be found in the Kavanagh Underground MRE December final report.

Figure 10 below presents a cross section through the Kavanagh mineral system showing drill hole copper grades, the generalised alteration outlines showing the continuity of the mineralisation, and the MIK estimated panels for those panels with a volume greater than 50% above 0.6% Cu.

Classification of the 2021 MIK Kavanagh resource estimate is based on the MIK parameters and Indicated Resources have an average drillhole intercept spacing of between 20m and 40m and are not based on a single drill hole or single drill section. Inferred Resources have an average drillhole intercept spacing over 40m.

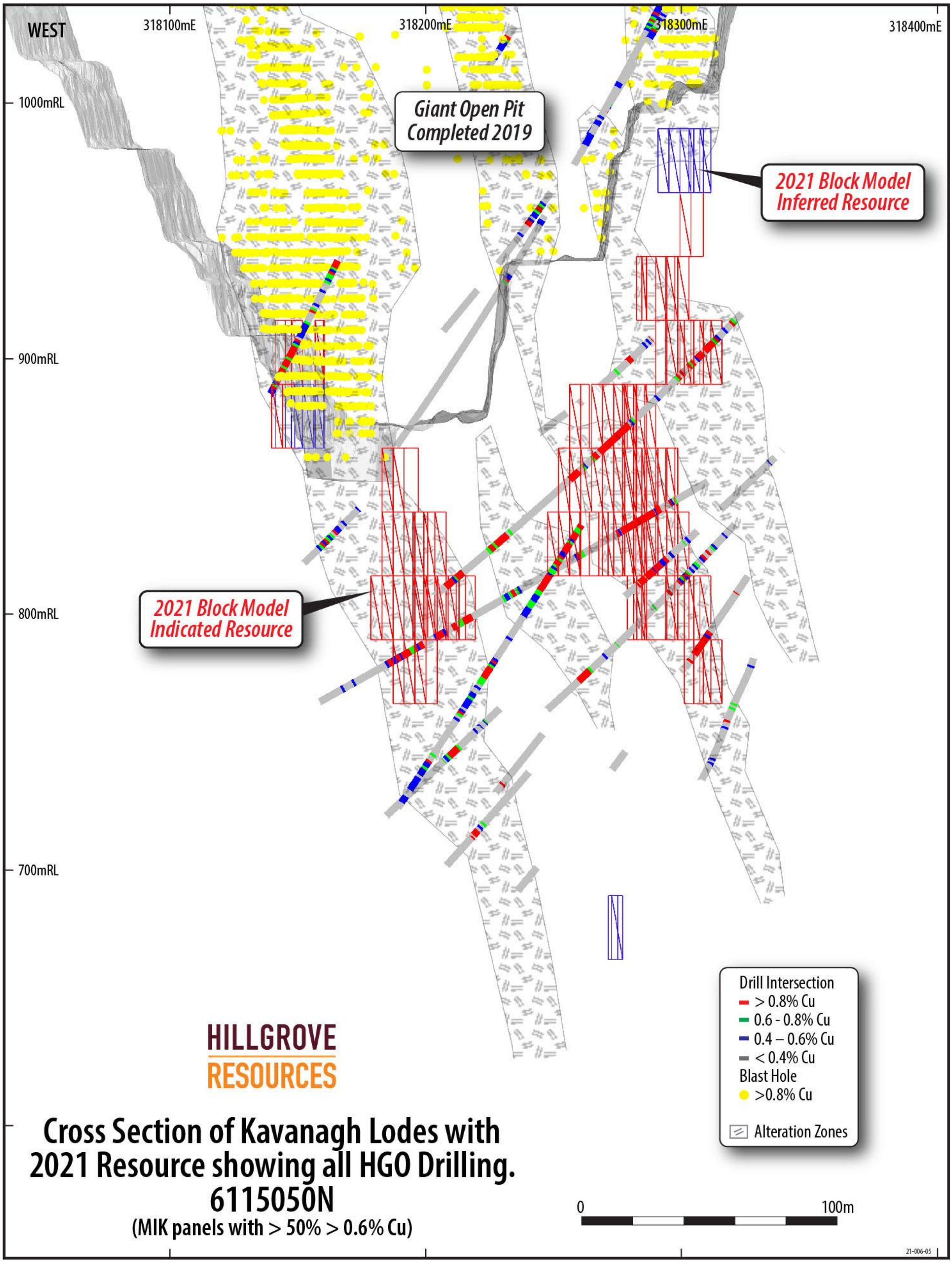

Figure 10: Cross section of Kavanagh drilling and Cu grades

Ordinary Kriging (OK) has been used to estimate the Nugent 2020 MRE, with copper grades assigned to individual blocks within the 0.8% Cu modelled wireframes. The OK estimation parameters are aligned with the Nugent mineral trends of -75 deg to 135 deg (dip/dip-direction). Classification of the estimated Nugent OK blocks is based on drill hole density, with Indicated based on the area below the open pit with a drill density of 35m by 35m and Inferred otherwise.

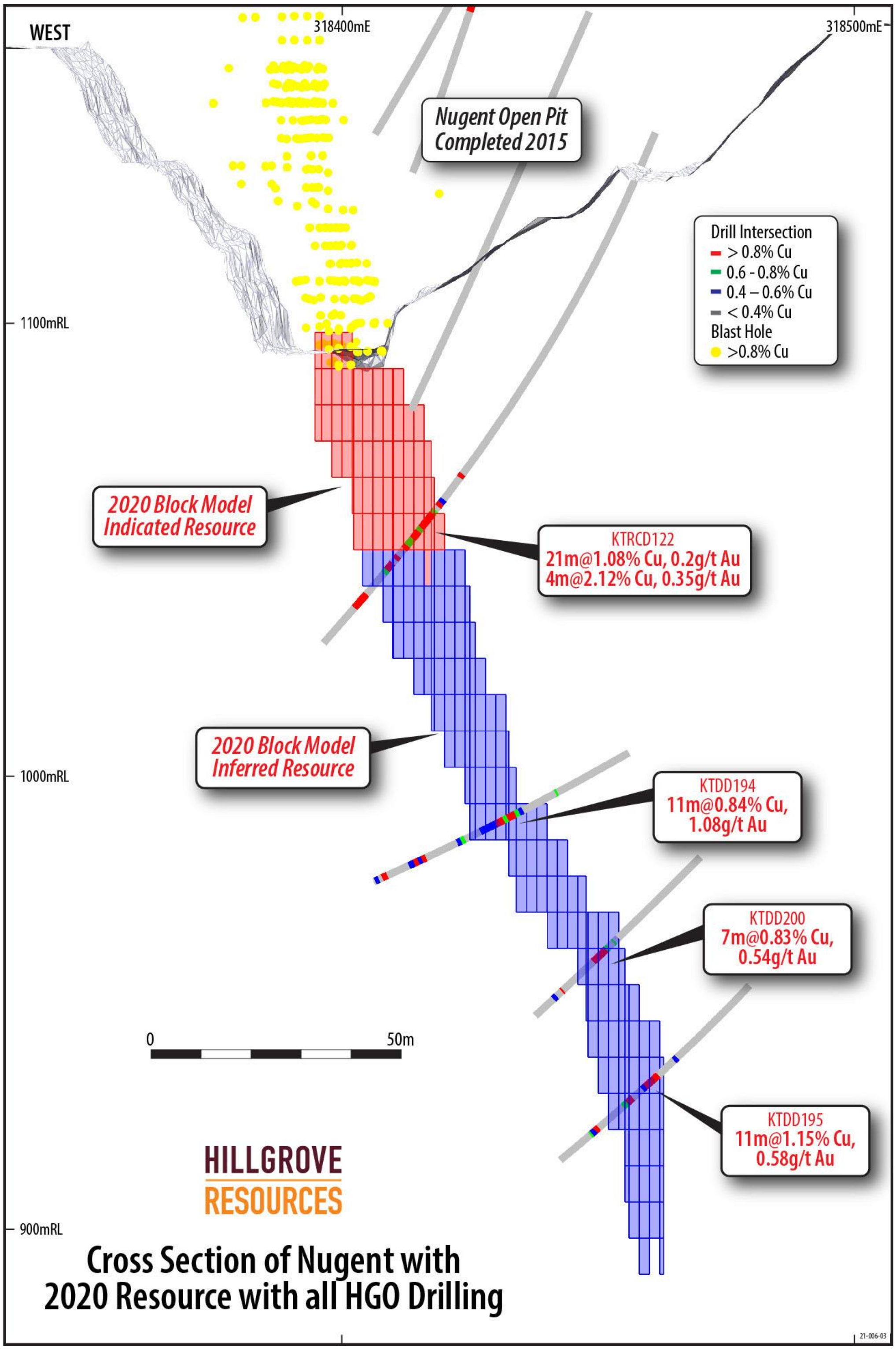

Figure 11: Cross section of Nugent drilling and Cu grades

3.6 Planned Underground Geology Production Activities

3.6.1 Face Mapping

Underground development is planned to be undertaken based on survey control following confirmation of the location of the mineralisation from drilling and development crosscuts.

All development headings, backs and walls will be LIDAR scanned and photographed (both colour and Infra-Red) and these data sets used to digitally map the faces, backs and walls of the underground development and thereby to interpolate with the drill hole data into 3D space the mineralised structures, geotechnical and hydrologic observations. The use of photography/scanning materially reduces the time spent in active mining areas and removes the requirement for any sampling or work at the face, which significantly reduces the risk usually associated with face sampling tasks.

It is critical that the scanning and photography data is rapidly reviewed, processed and interpolated to enable higher risk geotechnical zones or unexpectedly poor copper continuity zones to be identified and incorporated in mine planning responses.

3.6.2 Kavanagh Stope Definition Drilling

Additional drilling will be required to enable final mine planning of stope boundaries and development designs. This additional drilling is planned to be undertaken from underground development, including the exploration decline that is currently being developed.

As the initial Kavanagh and Nugent declines proceed, drill cuddies will be developed from the relevant declines and diamond drilling will proceed from these cuddies to enable the drilling of east-west intercepts (towards the west for Kavanagh and towards the southeast for Nugent) through the Indicated mineral zones on an approximate 20m (north) x 25m (elevation) spacing to mitigate the uncertainty associated with the short scale spatial continuity of the copper mineralisation.

The initial underground drill program is planned to define the Kavanagh and Spitfire mineralisation between 950mRL and 820mRL. The number of drill rigs will be scheduled to match underground development and stope prioritisation.

The oriented drill core will be auto-structurally logged, photographed (colour and Infra-Red) and sample boundaries geologically delineated. Samples will be crushed on site and analysed on-site by portable XRF for Cu, Bi, S (a process utilised very successfully in the Giant open pit for grade control).

The colour and infra-red photography will be used to interpolate alteration, sulphide veining, geotechnical and mineralisation controls in an expeditious and optimal manner to enable integration into the resource drill hole database and the underground face mapping database to rapidly interpolate updated 3D models of geotechnical and copper grade boundaries for incorporation into mine planning optimisation.

The drilling productivity will be maintained ahead of all stope planning to enable higher risk geotechnical or mineralised zones to be identified and incorporated in mine planning responses.

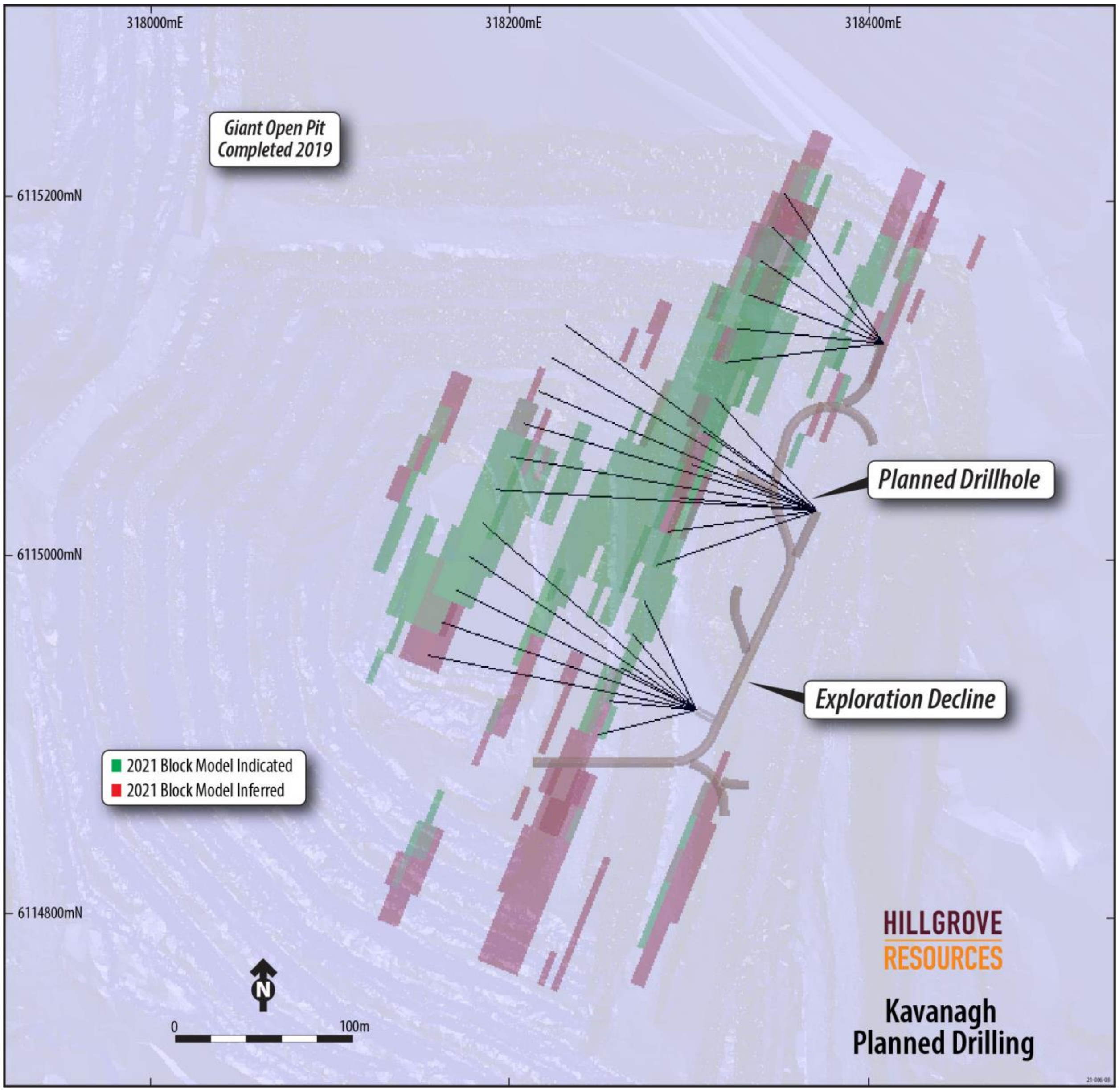

Figure 12: Plan view of underground diamond drilling

The 20 x 25m pattern describe above will be replicated for each level going forward with ~25 drill holes for each of the Kavanagh and Nugent work areas with an average hole length of 200m (increasing with each level) required for each level to cover all the planned stope areas.

3.6.3 Underground Geotechnical Drilling

Three oriented drill holes are planned from each UG diamond drill cuddy drilling toward the east to test the geotechnical and hydrological conditions for the decline development.

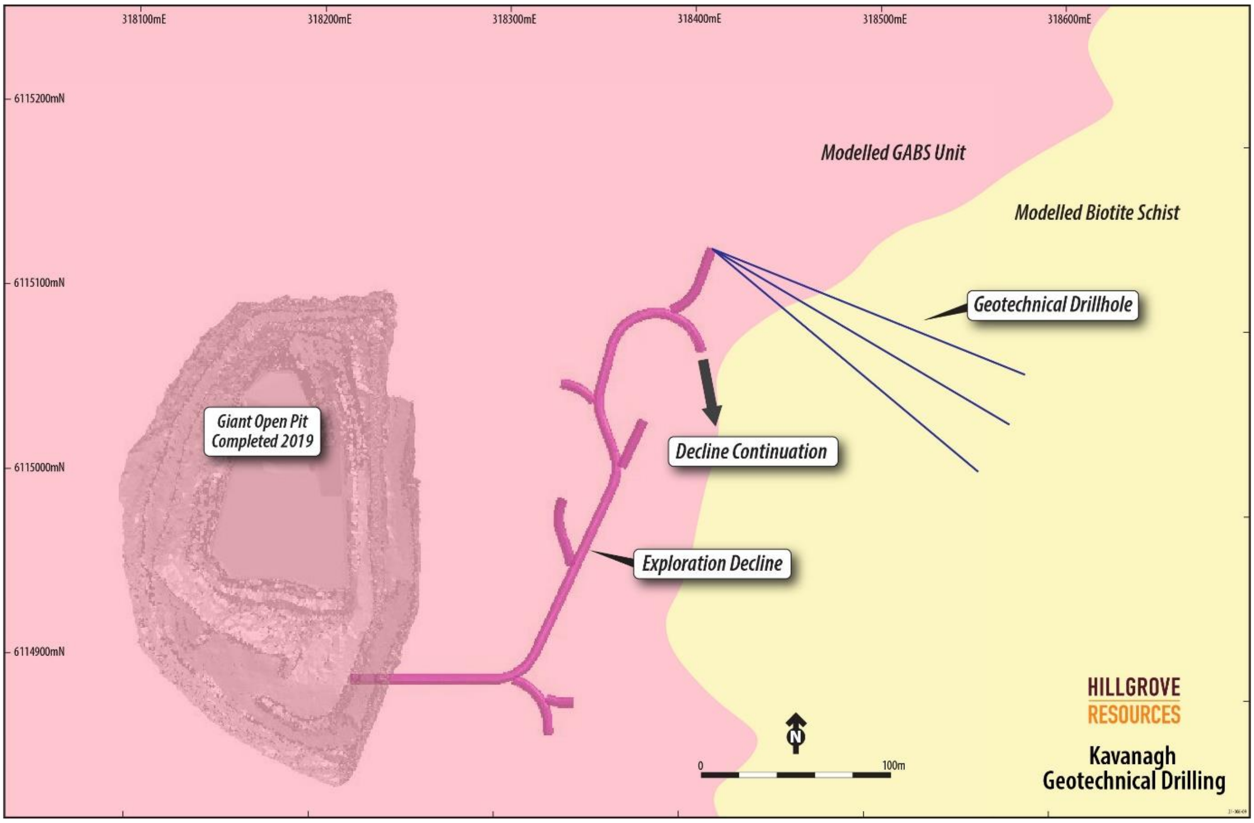

Figure 13: Plan view of underground geotechnical diamond drilling

3.7 Ongoing Resource Definition Work

The current drilling program of approximately 16km will focus on Nugent (blue in Figure 14), SW Kavanagh and Spitfire (orange), North Kavanagh (green) and West Kavanagh (pink). The majority of drill metres are focused on converting Inferred Resources to Indicated Resource at Nugent and West Kavanagh, with additional holes drilled into extending the Spitfire mineralisation and testing the North Kavanagh mineralised zone. Should the Spitfire and North Kavanagh drilling be successful, the addition of these mineralised zones to the mining inventory will increase the number of underground working areas and thus maximise annual copper production and provide additional project value through more efficient utilisation of the existing processing capacity at Kanmantoo. Updates to the current Nugent and Kavanagh MREs will occur at the conclusion of the 2021-2022 drilling program.

Going forward, each year, surface drilling will be undertaken to identify the along-strike and down dip extensions of the additional lodes and along strike for the main lodes as shown in Figure 14 to potentially add Inferred Resources to the project to be converted to Reserves with underground drilling.

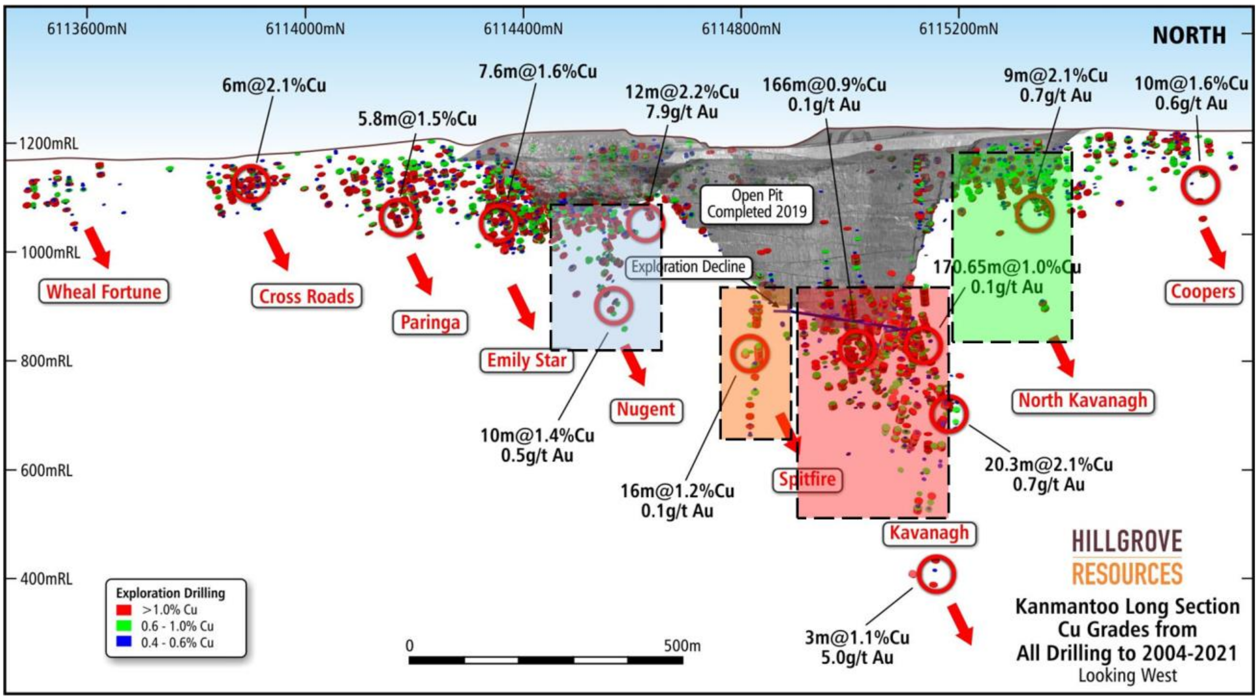

Figure 14: Section view of drill targets in current drilling program

4 Mine Geotechnical Evaluation

4.1 Geotechnical Setting

Most of the proposed development and production is hosted in the garnet andalusite biotite schist (GABS) unit and the GDM1a geotechnical domain. This is a very competent rock unit with three well known discontinuity sets. The rock unit has been metamorphosed and in the open pit is excavated with steep 75° -90° batters, up to 36m in height. On the western side of the Giant open pit there is a fourth well established foliation discontinuity set, but on the eastern side of the pit foliation discontinuities are rarely seen.

Variation in rock type and geotechnical domain occurs in the northern end of Nugent where the biotite schist (BS) unit is observed. This is within the GDM2 geotechnical domain due to its differing rock properties to the GABS.

4.2 Geotechnical Modelling

Due to the significant existing mine exposure in the various pits on site and the significant history of geotechnical evaluation of the site, Mining One consultants were engaged to undertake underground geotechnical analysis on a preliminary mine design within the Kavanagh work area based on geological shapes. A FLAC^{3D} model was created to assess:

- the geotechnical stability of mine development and stoping, as well as the expected overbreak associated with stoping, and
- the stability of the areas around the interface between the underground mine and the existing pits.

The review identified that a suitable maximum stable open span of stoping for the assessment was in the order of 25m x 75m. Significant recommendations from the review also included the following:

- Larger stope spans would have significant potential for block failure and dilution. Thick pillar spans would be required to maintain a suitable slenderness ratio. However, this would result in significant material loss in these pillars.
- If open stoping with no backfill was selected as the preferred mining method, the rib and sill pillars would need to remain stable for the life of the mine.
- Strategic pillar placement would be based on orebody geometry and grade distribution.
- Backfill and secondary ground support would be beneficial in maintaining opening stability and increasing recovery from the orebody.
- A significant crown pillar would be required to be left beneath the Giant open pit if stopes were to remain open long term, to ensure the stability of the pit, if required.

The Stage 1 mine design has addressed these recommendations in Kavanagh. A similar review will be carried out for the Nugent work area to confirm the design parameters.

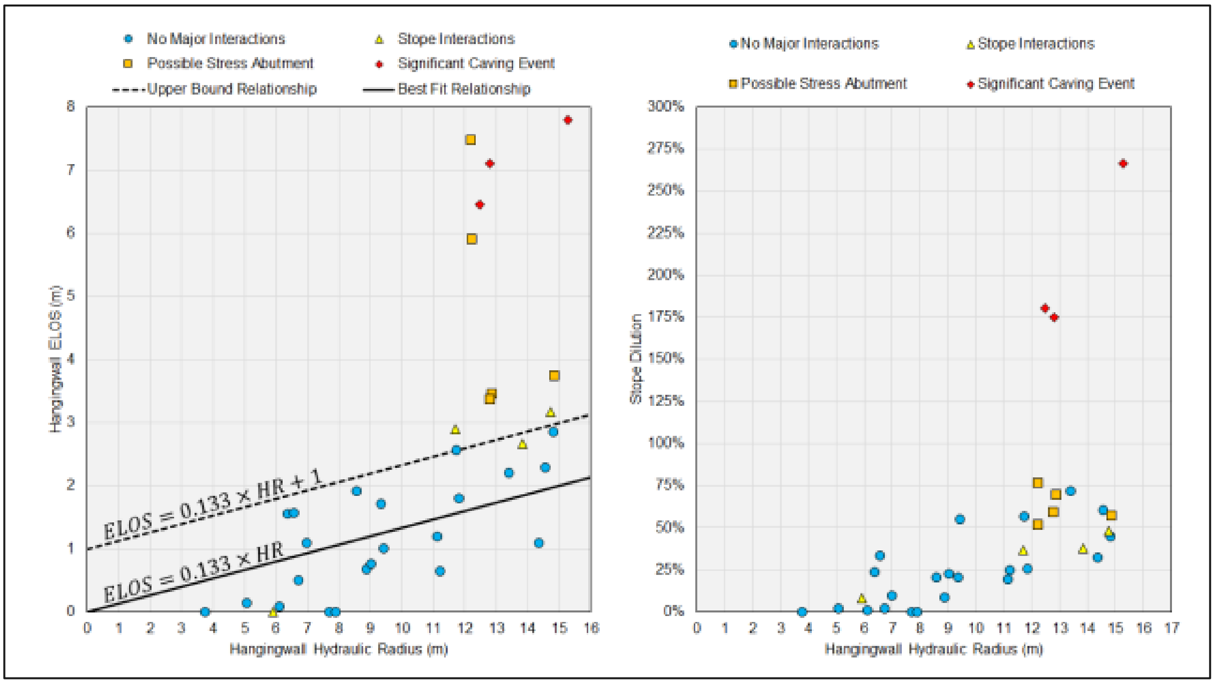

Figure 15: Overbreak estimation on initial stope modelling

4.3 Ground Control Management Plan

An initial Ground Control Management Plan (GCMP) has been prepared for the mine to enable the mining of the exploration decline within the Giant open pit, with this decline likely to become the primary mine decline for several years when the mine commences production. The GCMP details the following:

- the responsibilities of parties in relation to ground control in the mine.
- data collection requirements.
- required design parameters.
- criteria to ensure risk management in ground control within the mine.
- implementation of the design and standards, required quality assurance and training requirements to ensure the controls are effective.

The economic assessment has used the GCMP to quantify personnel, equipment costs and systems requirements including periodic external review.

4.4 Access Via the Giant Open Pit

Access to the portal will be via the 2.8km long open pit ramp as shown in Figure 16. Historically, access to the pit was closed during high rain events due to the slippery nature of the biotite schist. An all-weather pavement will be established for the underground to maintain continued access.

Access during rain periods heightens the rockfall risks of the open pit. Controls either completed or planned and budgeted to manage these risks include:

- The narrowing of dual lane ramps to single lanes (on the outside of the ramp) with passing bays (completed).
- The establishment of large windrows down the centre of the dual lane ramp to provide extra rockfall catch capacity (completed).
- The refurbishment of existing drape mesh installations above critical areas of the lower east wall single lane ramp system (completed and ongoing).
- Additional drape mesh installations above critical infrastructure to be installed on mining approval and costed in the economic assessment.
- Adopting a periodic scaling routine by a local rope specialist contractor that has extensive experience at Kanmantoo.
- Continuous laser scanning monitoring regime of walls above working and trafficable areas, with periodic scanning of all pit walls for change over time (active and ongoing).

Figure 16: Access and rockfall protection

4.5 Portal Areas

The mine design currently has at least four portals, the exploration decline portal on the 900mRL bench, the ventilation adit portal on the 940mRL Bench (PB4), the top Nugent access adit located on the 1040mRL Bench (PB1) and the 915mRL level adit off the in-pit ramp midway between PB4 and the 900mRL Bench. There are also options to access several strike drives on the 915mRL and 965mRL levels from the pit. Each of these portals into the pit will be supported to a standard as defined for the exploration decline which includes surface support of the wall above the portal, 12m Self Drilling Anchor (SDA) perimeter support to protect the portal pillars and where required additional rockfall protection above the portal. An example of the support for the 900RL level portal can be seen in Figure 18. Each portal will be mapped (Figure 17) and the regime of support endorsed by the site geotechnical engineers with review by a geotechnical consultant.

Figure 17: Mapping of the dominant geotechnical features in the exploration decline portal face (left) and the established exploration decline portal (right)

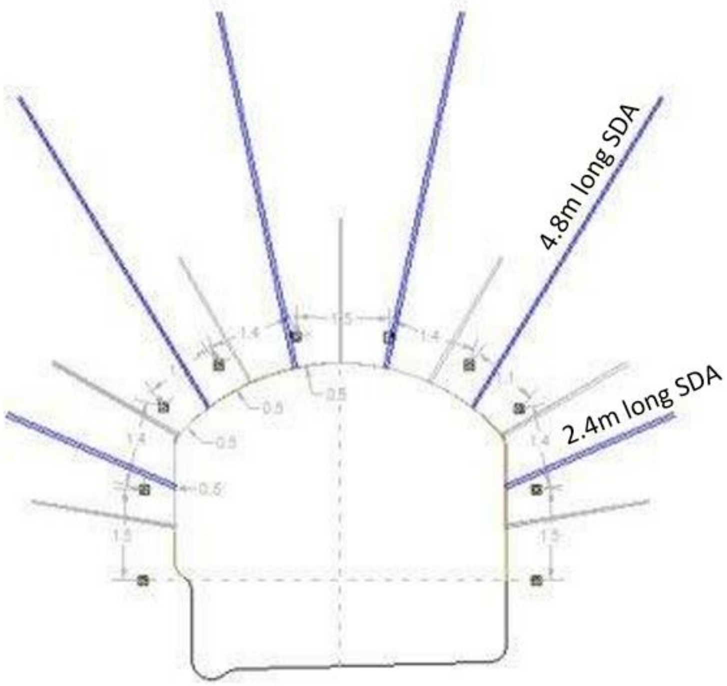

Figure 18: Lateral and radial SDAs for portal reinforcement

4.6 Development Ground Support

Based on the geotechnical analysis of the mine from core and pit exposures, there does not appear to be the need for fibrecrete surface support through the mine based on weathering, spalling or seismicity. As such, conventional primary support will likely be based on using friction stabilisers and steel mesh as is industry standard for shallow Australian mines. Geotechnical consultants, Mining One, undertook several reviews of the rock mass quality and core to determine recommended development and stope ground support. These reviews of the Kavanagh and Nugent lodes concluded that the above-mentioned support was suitable and fitted well when benchmarked with existing operations.

Ground support standards have been applied to the various development profiles and functions which consider their use, longevity and exposure to mining induced stress. These standards are based on current industry best practices, such as surface support down to 2.0m from the floor on the drive walls and face support as shown in Figure 19.

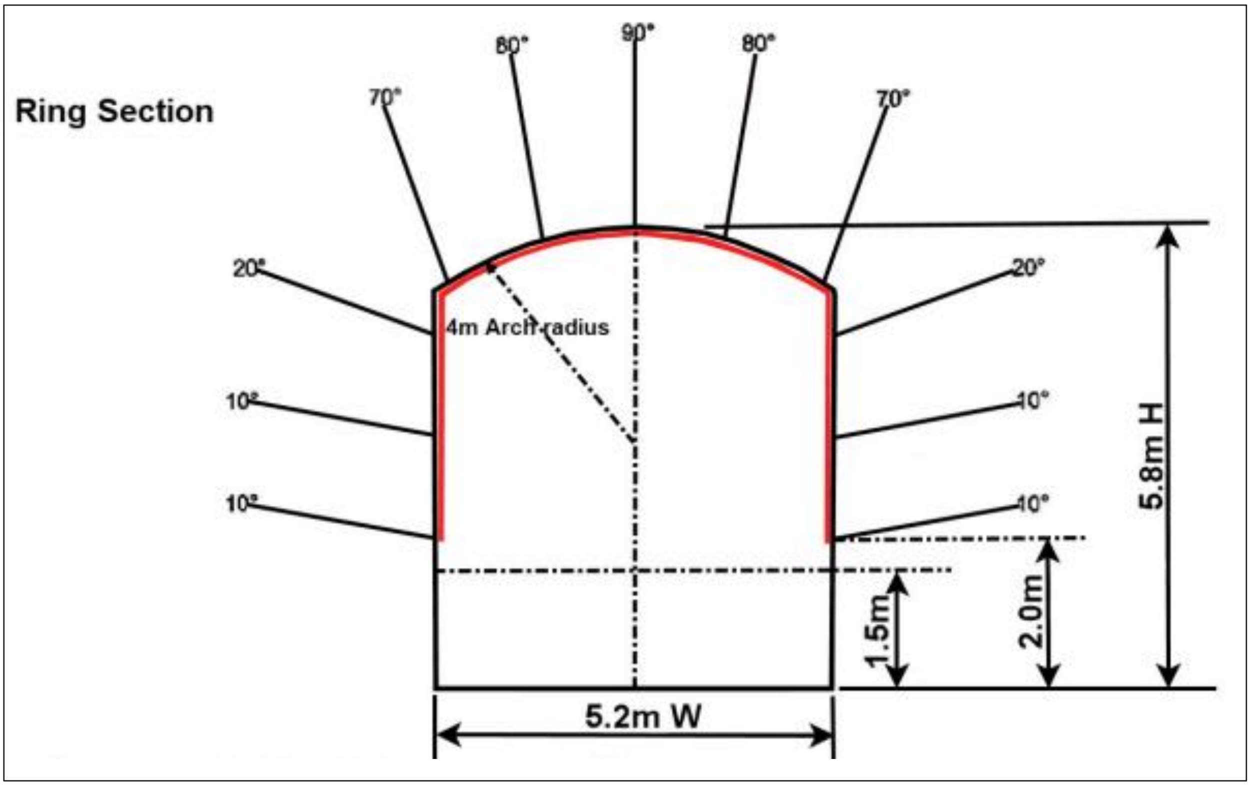

Figure 19: Example of typical ground support standard

A kinematic review of the ground support for the exploration decline based on exploration holes in the immediate area of the exploration decline verified suitability of the ground support standards adopted for evaluation in the economic assessment.

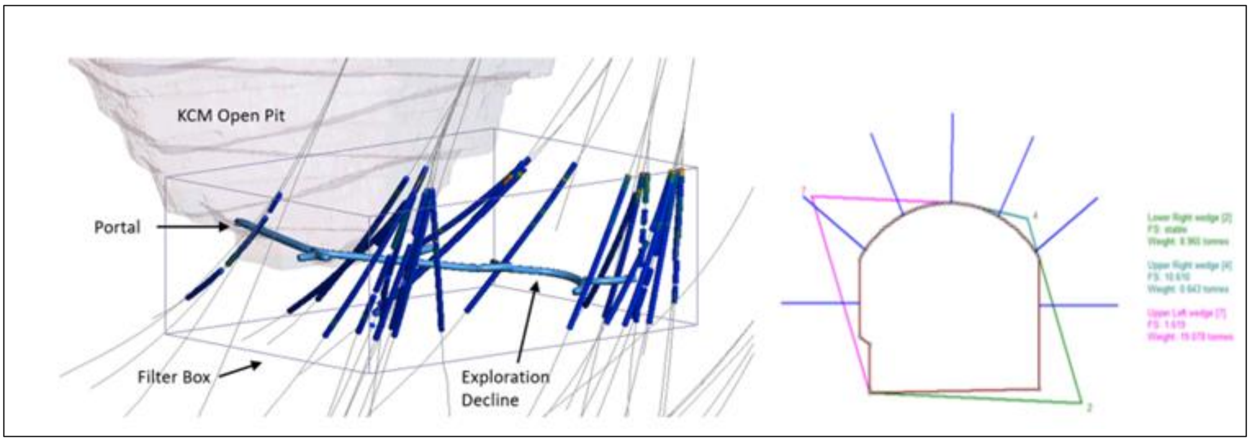

Figure 20: Exploration decline filtered data set and assessment wedge formation

Deep intersection support using resin grouted SDA's rather than cable bolts has been assumed based on improved performance, improved installation safety, cost effectiveness and increasing industry acceptance. The calculation process for the deep encapsulated SDAs is the same as used in cable bolt centric designs, with depth and density being determined by the rock mass characteristics and inscribed circle of the intersection opening, inclusive of likely overbreak on the shoulders of the intersection. The majority of intersections in the mine design have an inscribed radius of 9m (Table 3) and this has been used in the economic assessment as the default for calculating the quantity and cost of this deep support. A factor of safety of 1.2 has been used for all intersection designs.

Table 3: SDA installation quantity and length

Span (m)	Mass (t/m)	No. of R32	No. of R38	Min Length
9	296	13	7	4.5
10	406	18	10	4.8
11	540	24	13	5.2
12	701	30	17	5.5
13	892	38	21	5.8
14	1,114	48	27	6.2

Hanging wall cable bolts have currently not been allowed for in the economic assessment but have been flagged to be considered in additional work to reduce stope dilution, improve mining recovery, and reduce pillars or fill requirements.

4.7 Vertical Development Stability

Escape ways will be raise-bored to 1.1m diameter and lined with prefabricated escape route modules. Return air raises will be slotted using raise-bore techniques then long-hole drilled and blasted to 4m x 4m profiles and left unsupported unless geotechnical review identifies significant structures. In this case, they will be fibrecreted and bolted using a lowered platform. The Nugent ventilation raise will be raise-bored to 3m diameter and remote fibrecreted using shaft lining contractors. A geotechnical hole will be drilled to assist further geotechnical evaluation, however it is expected to be stable given the location in the GABS rock-type unit.

4.8 Mine Design Stope Stability

Stable stope span has been limited to a hydraulic radius (HR) of < 11 as per Table 4 below for 25m level intervals used for the mine design. Typically, a bottom-up approach has been adopted using a combination of cemented and uncemented rockfill and open stopes as indicated in Figure 21 and discussed in detail in Section 5.1.3. This will enable adjacent mining without the need to leave pillars, with evaluations showing this to be the best economic outcome at current metal prices. Stopes require fill to facilitate subsequent stoping up dip.

Table 4: Mathew's Method - hydraulic radius for stope hanging walls

		Length (m)								
		20	30	40	50	60	70	80	90	100
Height (m)	25	5.6	6.8	7.7	8.3	8.8	9.2	9.5	9.8	10.0
	50	7.1	9.4	11.1	12.5	13.6	14.6	15.4	16.1	16.7
	75	7.9	10.7	13.0	15.0	16.7	18.1	19.4	20.5	21.4
	100	8.3	11.5	14.3	16.7	18.8	20.6	22.2	23.7	25.0
	125	8.6	12.1	15.2	17.9	20.3	22.4	24.4	26.2	27.8
	150	8.8	12.5	15.8	18.8	21.4	23.9	26.1	28.1	30.0
	175	9.0	12.8	16.3	19.4	22.3	25.0	27.5	29.7	31.8

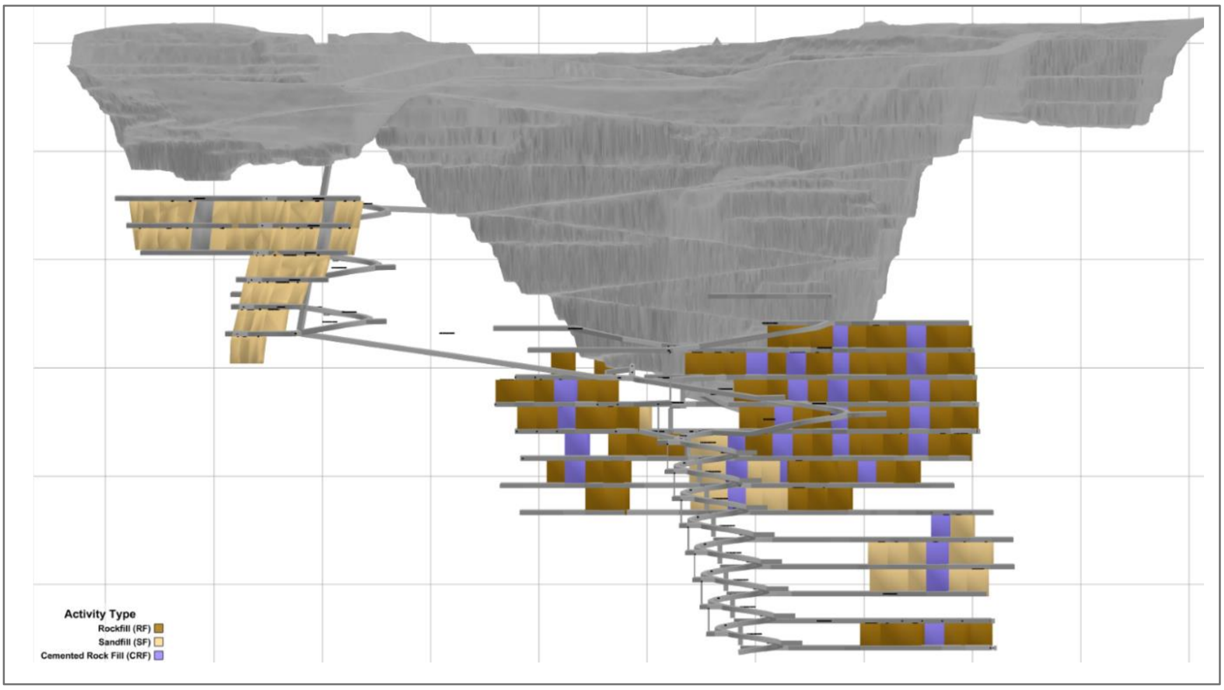

Figure 21: Stope backfill showing fill type and stope spans per level

The application of bottom-up bench stoping allows control of hanging wall exposures and enables mining of crown pillars between the underground stopes and the pit leading to significantly higher recovery of the resource. Connecting the Nugent decline to Kavanagh provides an alternate access to Kavanagh which enables the Kavanagh crown pillar to be mined, increasing recovery of the Kavanagh lodes and reducing rockfall risk along the lower single lane pit access ramp.

5 Mining

The Kanmantoo Underground Stage 1 Project involves mining the Kavanagh zones to the 650mRL and the Nugent zone to the 900mRL. The approximate extent of these areas relative to drill targets in the current drilling program is shown in Figure 22.

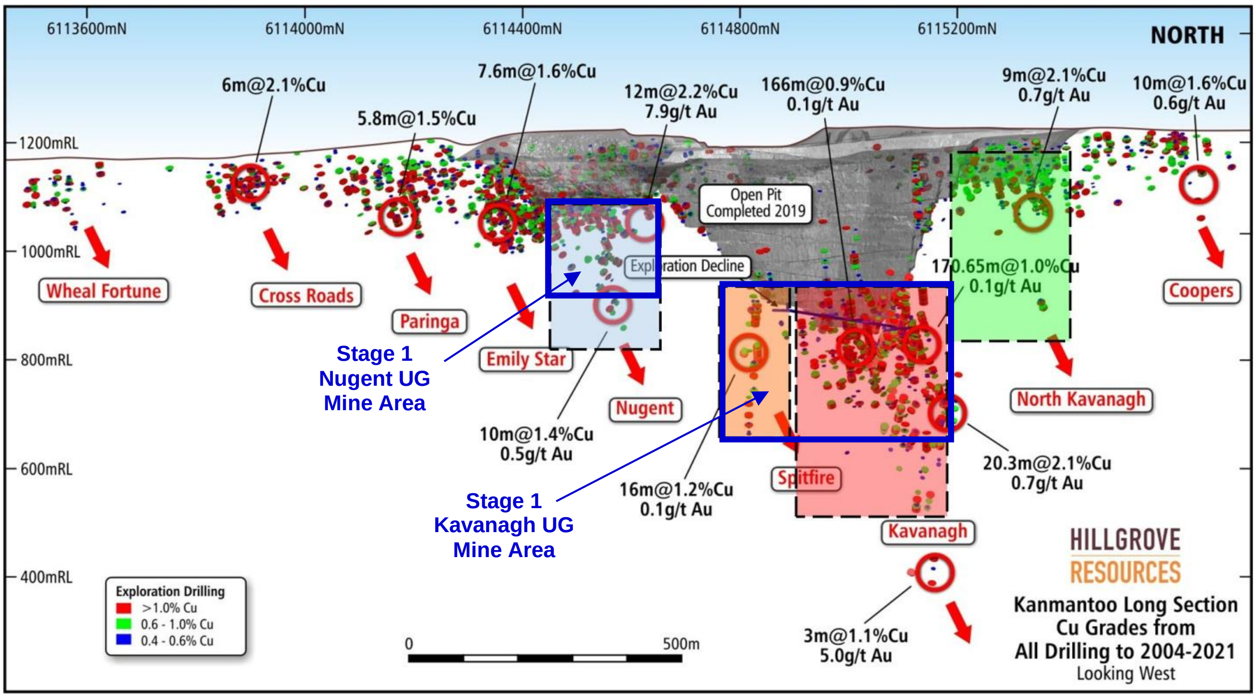

Figure 22: Approximate areas of the Kanmantoo Underground Stage 1 Project (blue boxes)

5.1 Mining Approach

An initial ~500 metre exploration decline from the 900mRL near the bottom of the Giant open pit will be developed to allow further definition drilling to be undertaken prior to the commencement of stope mining. This will use trial technology in the form of a Komatsu MC51 Continuous Miner. This development, along with future mine development will be based on conventional existing Australian hard rock mining practices with key designs parameters as follows:

- Declines will be mined 5.5m wide and 5.8m high at a grade of 1:7.
- Capital development will be mined flat also with dimensions 5.5m x 5.8m.
- Ore drives will be slightly smaller at 5m x 5m which will be sufficient to accommodate standard medium sized mining equipment.
- Mining will be by conventional drill and blast methods using drilling jumbos, charge units and 20 tonne loaders.
- A 25m sublevel interval has been selected for the current assessment based on average orebody width, geotechnical stability and the sites experience with drill hole deviation in the pit.
- Development has been designed proximal to the lodes. This enables drill cuddy positions for stope definition drilling in advance of level access and drives.

- A minimum standoff of 50m from the decline to the lodes allows for capital pillars around open voids and provides room to mine level stockpiles, loading bays and ventilation access drives.

5.1.1 Development

The lower section of the Kavanagh decline is currently designed as a spiral decline; however, this will be reviewed to provide improved lateral extent access from diamond drill cuddies to the north and south of the current spiral location with depth. Current designs for the Stage 1 Underground Project are shown in Figures 23 to 25.

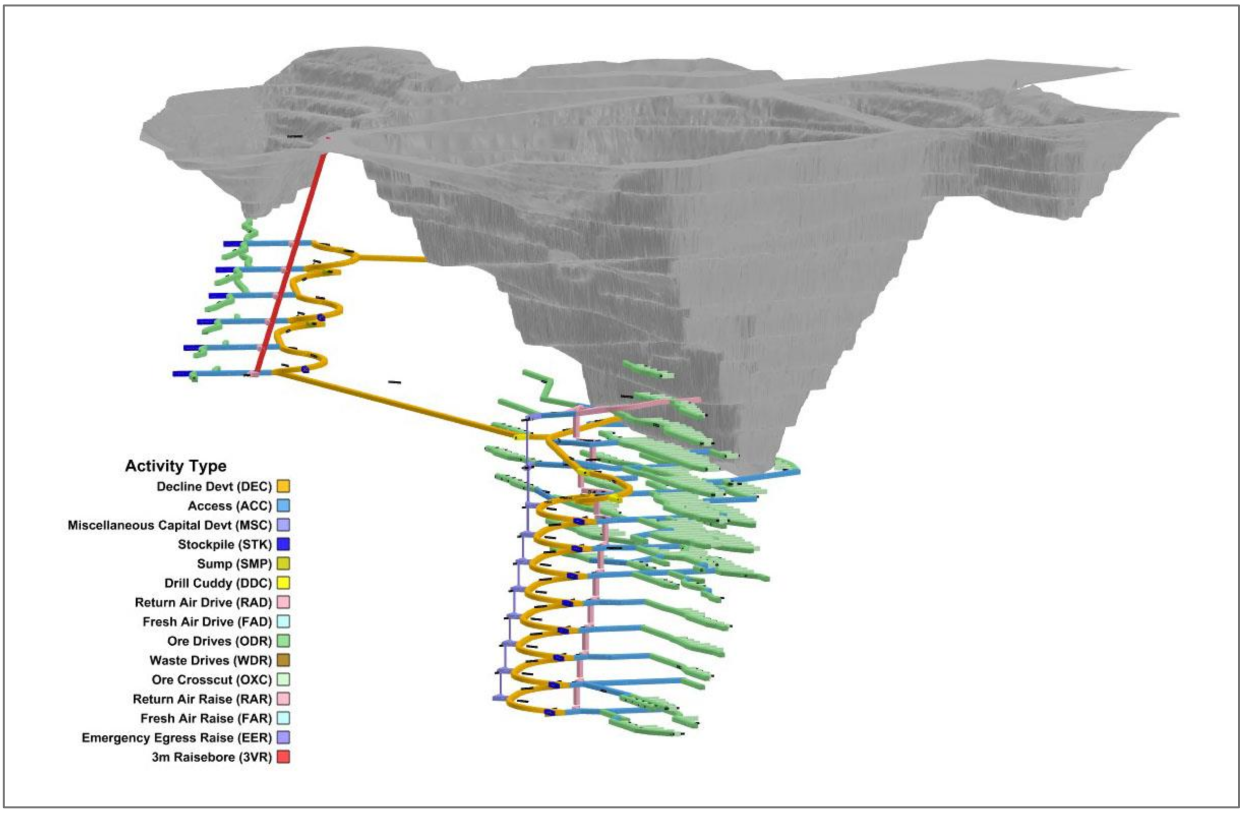

Figure 23: Mine development isometric view

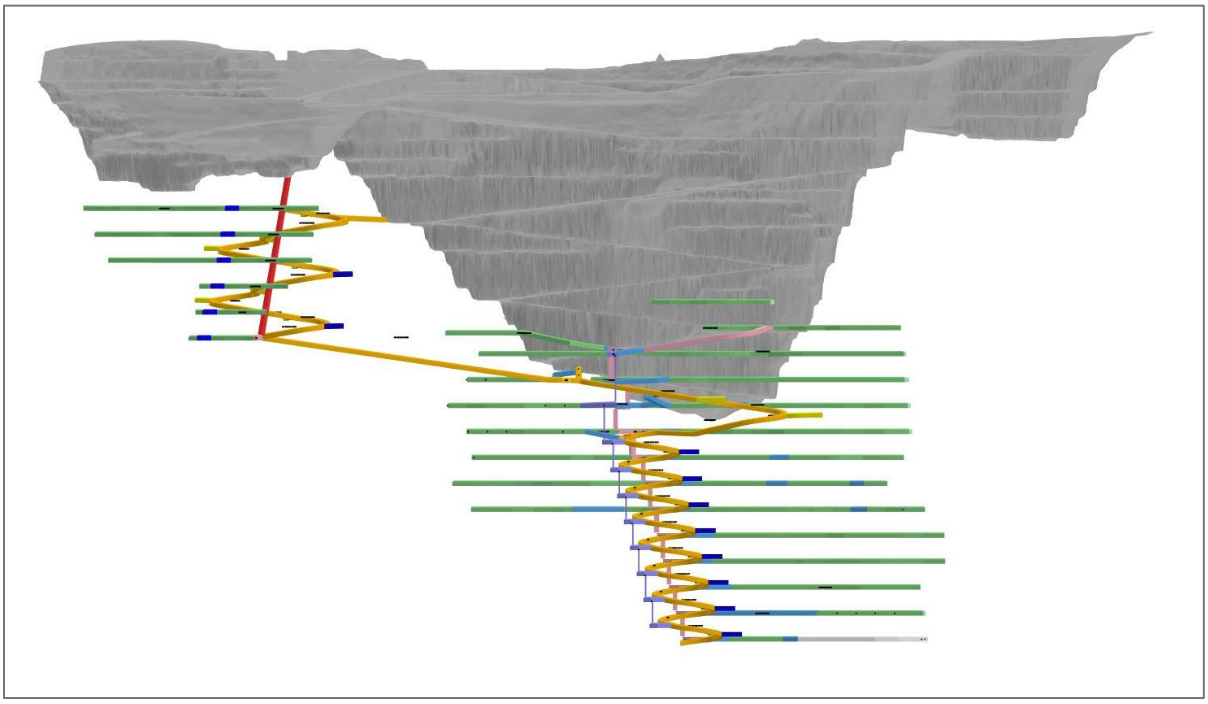

Figure 24: Mine development long section

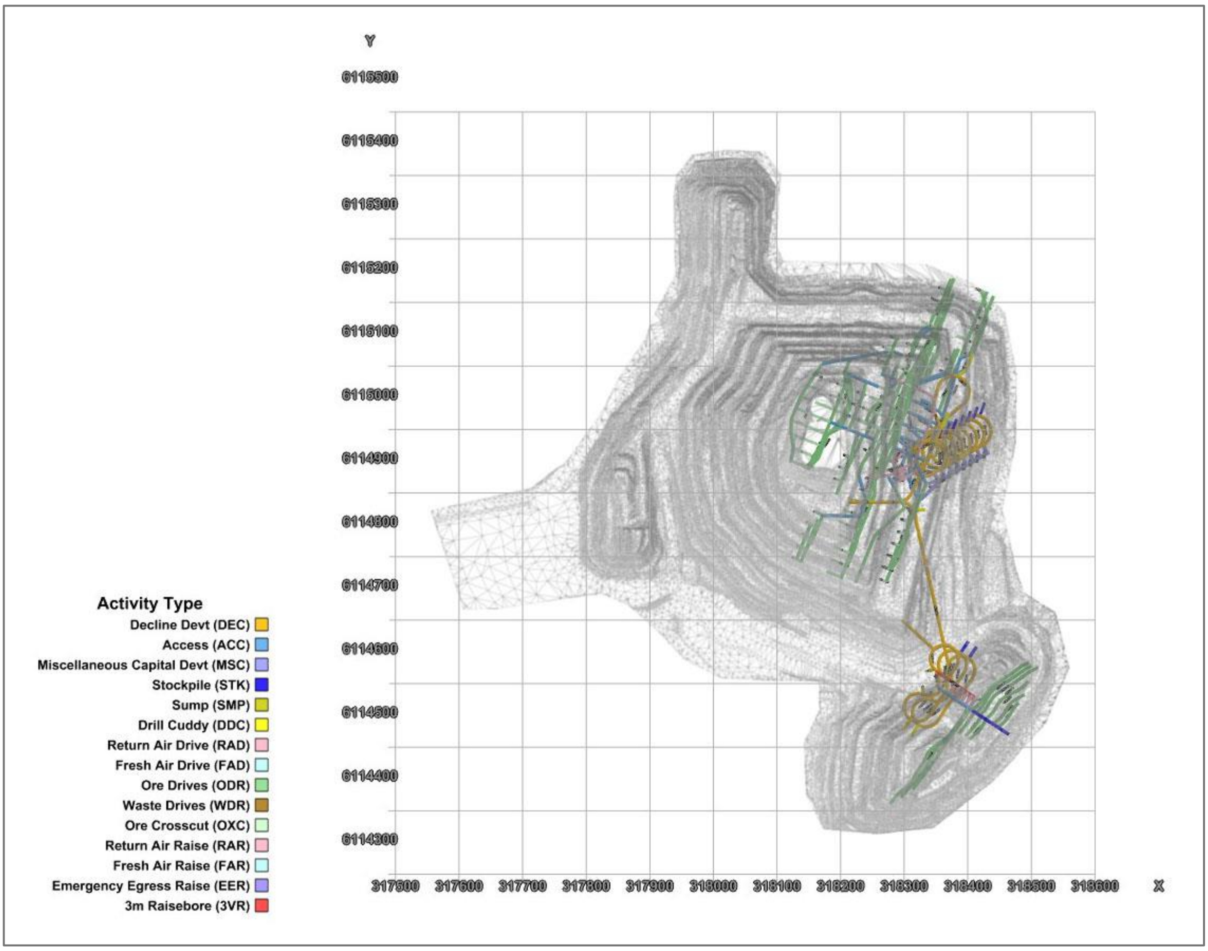

Figure 25: Development plan view under pit

5.1.2 Stoping

Several different stoping methods have been used in the design, primarily due to the variable geometry of the lodes being mined and their proximity to the Giant open pit. Based on the tonnage in the core of the Kavanagh mineral lodes, a complete recovery approach has been adopted. Caving was ruled out based on the relatively small spans and competent nature of the rock mass as evident in the Giant open pit. The predominant mining method will be long hole open stoping with blind up-hole stopes or bench-stoping with fill used for some areas.

Based on the geotechnical modelling and evaluation, a hydraulic radius less than 11 was considered acceptable for medium term access and mining. A conservative approach of bench stoping approximately 60m to 80m strike length and filling initially with a cemented rock fill (CRF) wedge followed by rockfill has been modelled and costed, which is expected to reduce the risk of significant stope failure. It also allows for some split transverse mining in very wide sections if required in the core of the mineralised zone. Where possible, blind up-hole stopes will be used at the top of panels to reduce the quantity of fill required.

Currently there is no deep hanging wall support in the mine design or cost model. This will be considered in future iterations of the mine design to optimise the size of stopes that can be mined in a single exposure.

Mining several selective mining units (SMU's) laterally to form a stope is less efficient than mining in a vertical sequence. However, a trade off study determined that the increased the quantity and cost of fill required to mine vertical sequence was materially higher than the bogging efficiencies. A vertical approach also greatly increases the exposure to open holes for a greater length of time. Open stopes will have stope poles fitted to the brows of each stope to prevent accidental loss of machinery or personnel over a vertical edge. Based on these assumptions the stoping panels generally are being retreat mined bottom up. The final stope design will be based on additional data obtained from stope definition drilling. Figures 26 and 27 show the designs around stope backfill.

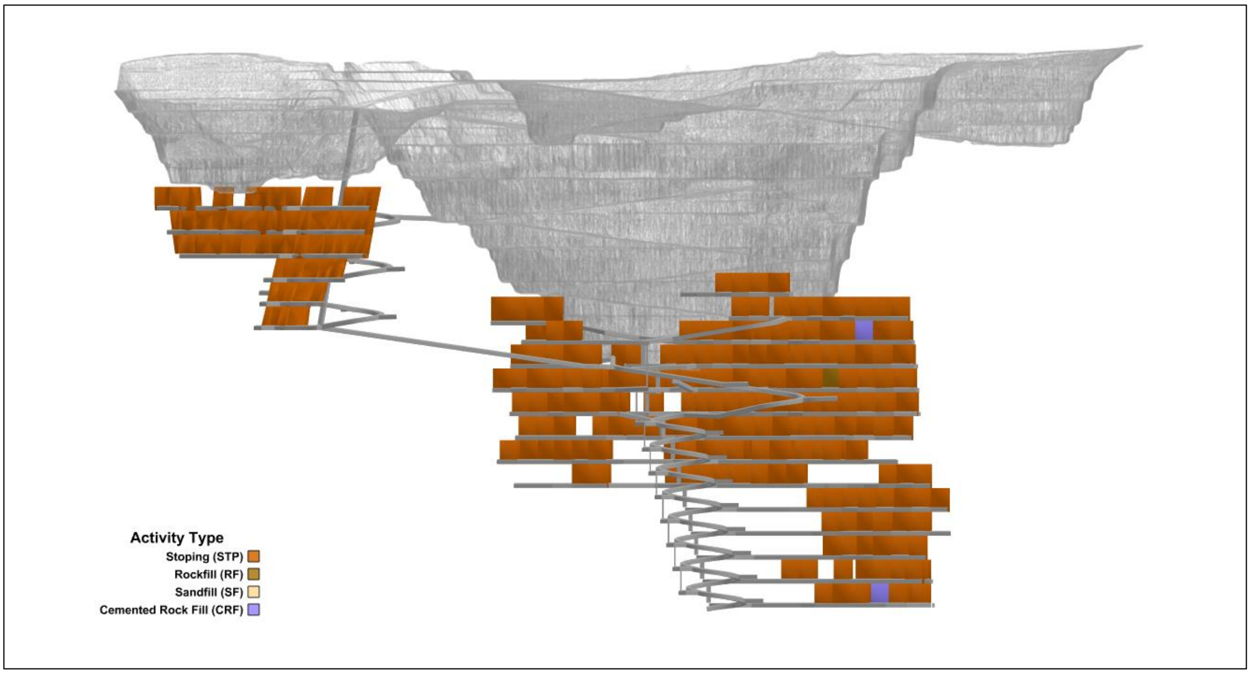

Figure 26: Stoping long section

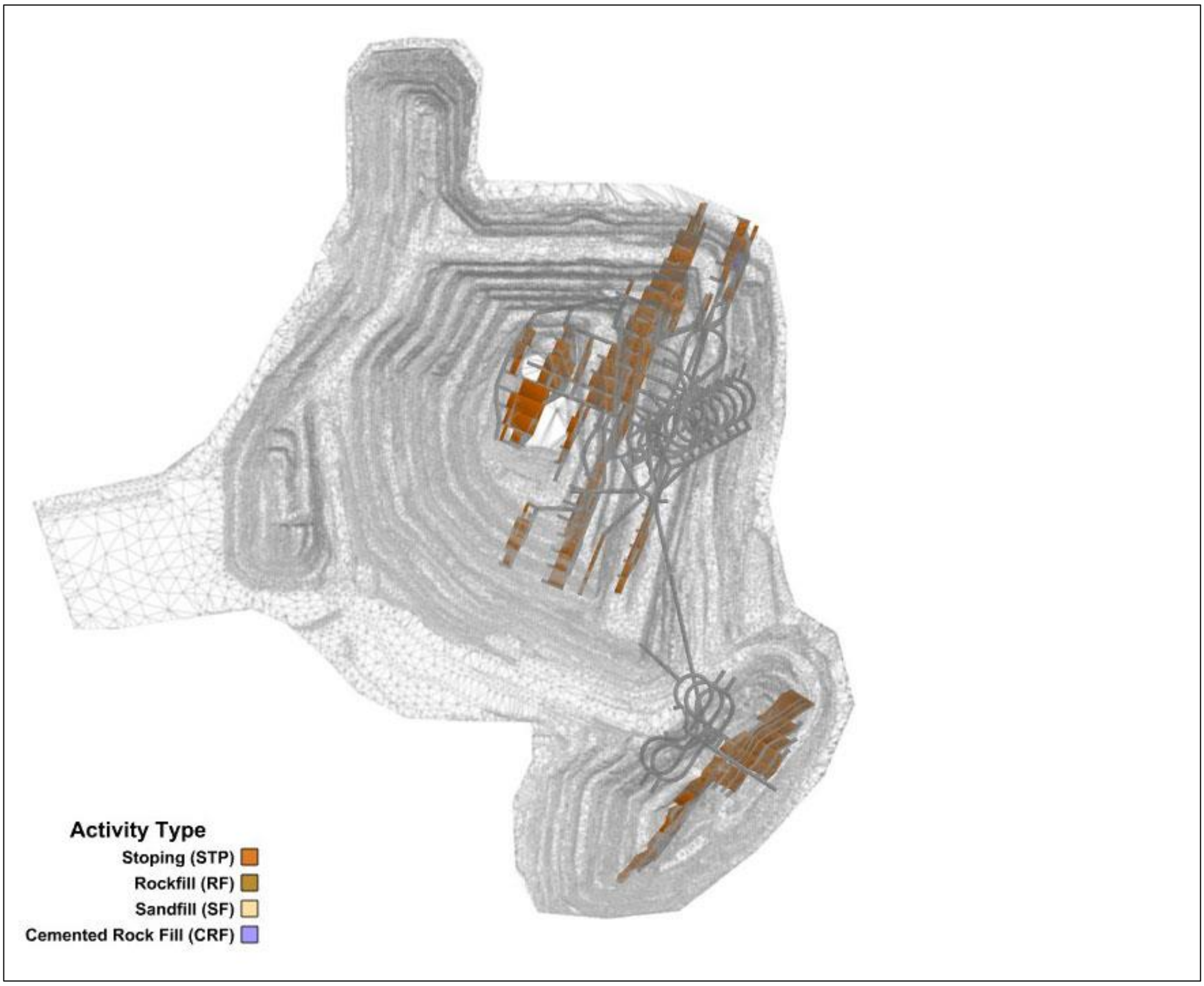

Figure 27: Stoping plan view through open pit

5.1.3 Backfill

Previous mine designs of the Kavanagh and Nugent mineralised zones with higher cut-off grades have been based on open long hole stoping with sill and rib pillars to limit the span of designed stopes and provide stable openings. At the current lower, economically viable cut-off grades used in this assessment, the span and widths of stoping panels would result in a significant amount of potentially economic mineralised material being left in pillars. An evaluation of the value of mineralisation in these pillars compared with the cost of a consolidated fill justified the use of such fill to recover this mineralised material.

Paste or cemented hydraulic fill systems were considered and discounted based on the relatively low quantity of this fill required to replace strategically placed pillars in the mine design and the high cost of capital to establish.

CRF has been selected due to its relatively low capital requirement, ease of placement and availability of waste rock on site. Hillgrove has recruited a team with significant experience in setting up and operating CRF in similar mines. Several cement batch plants are located within 10km of the mine site and bulk cement delivery to the site is easily facilitated. The current mine plan requires approximately 600,000 tonnes of CRF.

CRF will be selectively used to replace pillars in stoping panels at the limit of their lateral extent for each level. The fill will form a wedge in the stope and once the rill reaches the fill point with a 5m thickness, the CRF will cease and the remainder of the stope will be filled with either waste rock or sandfill. This minimises the use of CRF from a cost management perspective while providing a stable free face from which to recommence the next lateral stoping panel. CRF cement content of 4% has been used for costing.

Rockfill will be used where possible to fill stope voids to provide a working horizon for mining the stoping panels up dip and to minimise voids for regional long-term stability in the mine. Mine capital development will produce in the order of 750,000 tonnes of waste material that will be placed directly into stopes where possible, minimising rehandle. The current mine plan requires 1.4 million tonnes of rockfill in addition to CRF. Therefore, rock will be sourced from existing open pit waste stockpiles within the Giant open pit. Costs have been budgeted to excavate, backload and place this material.

The mine plan has also allowed for 690,000 tonnes of sandfill (dry tailings) to be used for stope fill based on approval to use this material. The coarse free draining nature of the tails at Kanmantoo suggests this would be an excellent source of fill for the underground mine and with appropriate study work this proportion may be increased, offsetting some of the rockfill required to be mined from surface stockpiles. This has the additional benefit of increasing tailings storage requirements which would reduce tailings storage facility (TSF) construction costs. There also remains the potential to post-fill inject this material with cementitious grout or resin to replace CRF. It is planned to review this option and the potential to deliver this material to the core of the Kavanagh stoping panels via small passes from the surface. Figure 28 shows areas of the mine where this may be a viable option.

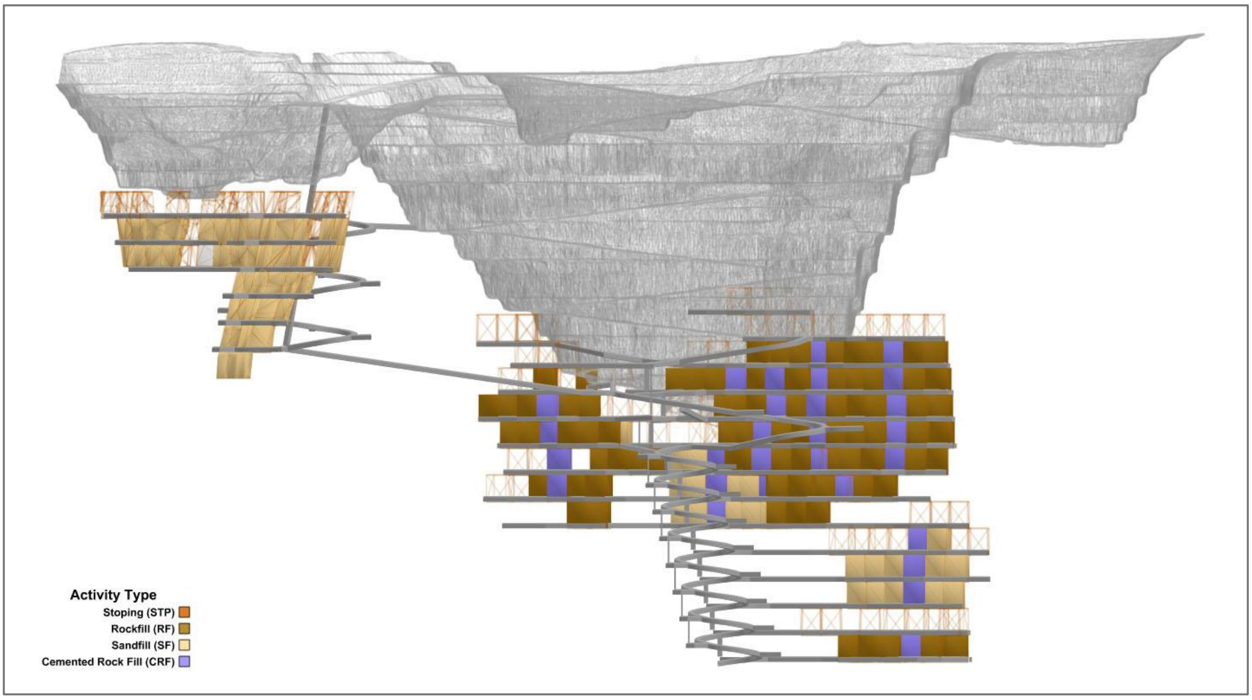

Figure 28: Mine fill long Section

5.2 Design Standards

5.2.1 Lateral Development

The main access declines will be mined 5.5m wide by 5.8m high, at a grade of 1:7 and a minimum radius of 25m. This allows for use of typical 60 tonne underground trucks currently available on the market, access for Epiroc Easers or Sandvik Rhinos and is matched to the ventilation intake requirements through the mine. Underground stockpile areas will be 25m deep, 6m wide and 6m high to be effective as stockpiles and allow safe loading at stockpile intersections. Capital development will typically be mined at 5.5m wide by 5.8m high to facilitate truck loading from the declines and ventilation duct clearance. Sumps will be mined 12m deep, below the levels on the declines at a gradient of 1:7.

Drives and crosscuts will be mined at 5m wide by 5m high at gradients of at least 1:50 to promote drainage on the levels. This drive size width permits 20 tonne loaders when bogging stopes and has low enough backs to facilitate optimal up-hole production drilling.

All primary ground support (mesh and bolts) will be galvanised and deep support will be fully resin encapsulated. Mesh will be installed to a height of no more than 2.5m from the floor to the walls. Costing is based on the geotechnical review as detailed in the Section 4 and recommended minimum standards, however the initial exploration decline is trialling the suitability of thin spray on liner (TSL) for temporary face support which, if successful, may result in reduced ground support costs. Ground support regimes will be determined based on rock conditions with minimum ground support plans used for each mining profile and rock mass classification.

5.2.2 Vertical Development

The current mine design negates the requirement for a ventilation raise to the surface for the Kavanagh mining area. Instead, the upper ventilation adit will be mined from the 940mRL bench in the pit. This adit will provide initial access to the top of the 915mRL stope block for fill and stability purposes. It will also provide access to a primary fan located in the crosscut drive and connected to the mine below through a series of mined 4m x 4m ventilation return air raises (RAR's).

RAR's will be mined by long hole drill and blast methods around a 750mm raise-bored slot. Allowance has been made to remote fibrecrete these open raises. However, geotechnical evaluation using a mapping LIDAR will be used to validate this requirement. As each level is developed, the level crosscut will head directly to the return access drive to allow immediate mining of the level RAR. This ensures forced ventilation is not stretched past its operational capability and keeps the mine primary ventilation circuit as close to the operating development as possible.

Emergency egress raises will be required to be mined in the Kavanagh mining area as the area is accessed by a single decline. The Nugent mining area is accessed from declines both from above and below which will negate the need for a second means of egress to be established. For the Kavanagh egresses they will be mined and fitted out prior to stoping on the level which they access. Currently these raises are planned to be a 1.1m diameter raise-bore with either an Epiroc Easer or Sandvik Rhino fitted with either a Safescape ladder system or equivalent steel ladder module.

A 3m ventilation raise has been designed for the Nugent stoping block. This raise will daylight the surface between the Giant and Nugent open pits in the GABS rock unit. A primary ventilation fan will be installed on this raise to draw air out from the Nugent workings. This raise will be fibre spray lined to ensure longevity. It is planned that this raise will be pulled through in one pass from the 930mRL level through to the surface.

5.2.3 Stoping

Each stope will be designed based on defined stope cut-off grades, minable shapes, interactions and backfill method. Designs will be done in association with the mine geologist and mine geotechnical engineer. For this study, stopes were designed based on the SMU of 20m long, 4m wide and 25m high, with the MIK model used to determine the tonnes and grade for each stoping panel including the proportion of tonnes and grade from that panel. SMU's above the mine cut-off grade have been composited to form the stopes interrogated and scheduled for this stage of design.

5.3 Mining Contract

The current mine model is based on using a mining contractor to develop and operate the mine. Hillgrove will provide key consumables such as power, diesel, explosives and ground support. The cost model details all personnel involved in the mine operation. Hillgrove will provide key technical personnel to facilitate mine geological, geotechnical, design and planning functions. This also includes mine surveyors and geological technicians. Several smaller contractors will also be engaged to support ancillary services such as surface dust suppression, CRF contracts, logistics and road maintenance. This will provide cost efficiencies and ensure requisite focus on these ancillary services, whilst enabling the principal contractor to focus on mine development and production.

Hillgrove has been provided with several rounds of preliminary costing from multiple contractors. There is a strong level of interest amongst contractors to provide a successful mining tender, partially due to the location of the site which makes the mine relatively easy to staff with experienced underground miners living in the area. Hillgrove has had expressions of interest from several qualified mining contracting companies and maintains relationships with multiple contractors following on from tendering for the exploration decline.

The mine start-up schedule provides flexibility for contractors to ramp up mobilisation and operations within the planned timeframe and allows for the use of conventional machinery which is readily available.

5.4 Mining Equipment

5.4.1 Development

Development will be mined with standard jumbos – typically Sandvik DD421 or Epiroc M2C's. An allowance for three jumbos has been made in the cost model which will both bore and install ground support, allowing flexibility in the fleet. An alternate option under consideration is to operate with two bolting jumbos and one boring jumbo, which may improve development quality and overall drill fleet performance. The development profile has been levelled using three standard jumbos averaging one 4.1m cut every shift which results in 750m per month at peak development. Charging will be undertaken using a dedicated charge unit such as a Normet MC605 or equivalent. A charging basket will also be available to use on other available site equipment to cover maintenance and breakdowns of the charge unit.

5.4.2 Production Drilling

Horseshoe production drill rigs will be used for production drilling of both up and down holes utilising 89mm bits and ST58 tube strings. The drill and hole size is driven by the stope width, sub level interval and the drill hole deviation experienced at Kanmantoo in blast hole and exploration drilling. Production drills will drill stope charge holes, capital vertical development LH raise holes and any service holes required for the mine infrastructure, such as cable and drain holes.

Production drilling design is based on a stope drilling yield of 8.5 tonnes per drill metre, based on an average stope width of 12m. While it may be possible undertake all drilling using two production drills, during peak production the site will use two front line production drills with a third drill used for short-term excess demand. The modelled production drill productivity is 6,500m per month.

5.4.3 Slotting

For this project assessment, Hillgrove has made the decision to de-risk the mine production critical path activity of stope slotting by specifying that stope slots will be mined with a mobile raise boring unit such as an Epiroc Easer or Sandvik Rhino. While the unit cost to open a slot with this method is generally higher than long hole raising, it reduces operational risk and as such has a higher reliability of achieving planned productivity. Slots will be raise-drilled either up or down to a 750mm diameter, after which production drills will drill around this slot-raise to open the slot to the width of the stope. Pricing and availability has been obtained from two separate suppliers. A rig will be required on site full time from first production at a schedule rate of 100m per month, which provides sufficient surge capacity for higher rates if required.

Figure 29: Epiroc Easer and Sandvik Rhino Rigs

5.4.4 Production Charging

A second charge unit similar to that used for development will be used for up-hole production charging. A mixing truck will be used to load down-hole drilled holes. At this stage it is envisaged that ANFO will be used with Nonel detonators and electronic starter detonators for blasting. Several explosive specific light vehicles will be required.

5.4.5 Loading

Standard 20 tonne load haul dump (LHD's), such as Sandvik 621's or Caterpillar 2900's, will be used for material handling. All remote bogging will be done with tele remotes using relocatable tele remote cabins, truck mounted cabins or from surface tele remote stations to facilitate stope bogging over shift changes. Both loader models under consideration are capable of loading the range of trucks detailed below.

5.4.6 Haulage

The mine plan is based on operating a fleet of 45 tonne articulated dump trucks (ADT). Several contractors have provided tender pricing and contract proposals for these trucks, which have been independently substantiated by an increasing number of these types of trucks being used in the industry. These trucks have a significantly lower capital and operating cost and are more readily available compared to underground specific haul trucks. Their diesel burn is significantly lower than their underground equivalents. Larger 60 tonne versions of these trucks are now available but yet to be proven to be more efficient. The decline dimensions allow for future use of the larger trucks if they prove successful elsewhere.

Ejector tray trucks will form part of the fleet, which will facilitate periodic cost efficient sheeting of the main haulage ways and direct tipping of waste into fill stopes, which negates the need for additional loaders to undertake this activity.

An evaluation of tipping material at the 900mRL portal bench and then using a subcontracted surface operator to rehandle into 100 tonne open pit trucks to haul to the ROM pad was undertaken. This demonstrated for the 2.8km distance, the economies of scale using larger trucks did not offset the rehandle costs.

Hillgrove is considering a trial of a trolley assist/charge system for use on a section of the open pit haul road. The potential to install such a system would facilitate the use of battery electric trucks in the mine. The driver for such a change would be reduced truck numbers due to increased up-grade speed and reduced ventilation requirement, the combination of which would be expected to result in reduced truck operating cost. This would also reduce carbon emissions. This economic assessment has not considered trolley assist.

5.4.7 Backfill

CRF will be delivered underground using a dedicated CRF truck which transports in the order of 12 tonnes of dry cement per load to a mixing bay proximal to the stope to be filled. This truck will then mix the cement and water into a slurry in a mixing bay, a benched stockpile, for a standard LHD to then mix with waste rock and place in the stope. Fill rates for CRF have been calculated at 420 tonnes per day which equates to 3 mixes per 12-hour shift. Use of a CRF truck will significantly reduce the risk and diesel loading compared to running agitator trucks for the same function.

5.5 Mine Infrastructure

5.5.1 Power

Short term power is currently supplied by a 900 kVa generator located on the 900mRL bench adjacent to the portal. This will be used for initial mine start-up. Simultaneous to this, an overland 11kV arial power line will be installed from the processing plant substation to the south-eastern corner of the pit. From there, it will be fed to an underground substation located on the 865mRL level. As the mine is developed, additional 1.5MVa underground substations will be installed on the Nugent decline at the 1005mRL Level and in the lower Kavanagh decline at the 765mRL level. The total installed power peaks in the mine power model at 3MW, with capacity to draw up to 4MW from the processing plant substation.

Combined with the smart mine control, system fans will be run on as needs basis driven by EMS units on each level, this will minimise power draw on this variable load to the minimum required to maintain suitable set ventilation levels.

5.5.2 Ventilation

The mine primary ventilation circuit is based on an extraction principle of drawing fresh air in through the declines and adits for supply through the mine to ventilation exhaust returns. Primary fans suitable for the current mine plan have been secured, and these would be installed in a vent return drive on the 940mRL level. This arrangement minimises cost and provides redundancy in the event that one fan is unserviceable as mining can continue on a reduced rate with one fan. A third primary fan will be installed on the top of the Nugent 3m diameter ventilation raise. Simple Ventsim analysis demonstrates that the 300kW of installed fan power will produce significant draw though the mine for the planned fleet loading. The air volume required through the mine is based on 0.4m^3 per kW of diesel power underground. Individual levels will be ventilated using secondary ventilation fans mounted on stands in the decline blowing into the working areas and then returning to the surface via the RAR's. Fans will be controlled via smart controls and environmental monitors such that they are only operating when required for mining activities or to ventilate blast fumes from a heading.

5.5.3 Water Supply

Mine water will be supplied directly from the raw water pipeline to the site. An existing 90mm polyethylene (PE) line from the top of the Giant open pit, down the haul road to the 900mRL portal will be extended into the exploration decline and subsequent mine development. Pressure reducers are installed periodically to maintain water pressure within pipeline specifications. The line along the haul road additionally facilitates ramp dust suppression sprinklers and access for emergency firefighting water. The 90mm lines will continue into the mine via the main declines and fed to the levels via 63mm PE pipe. All underground fittings will be electrofusion to improve reliability and reduce the cost, leaks and losses associated with standard screw fittings.

5.5.4 Dewatering

Based on hydrogeological modelling previously conducted, the mine dewatering system is currently designed to allow for up to 20L/s from the mine. The modelling has a safety factor of 200%. Recent monitoring of the pit since pit closure until December 2021 shows an average inflow rate into the pit of 3.6L/s from groundwater and rainfall runoff within the catchment.

5.5.4.1 Giant Open Pit Dewatering

As part of the mine risk review it has been determined that no mining will be conducted beneath the bottom of the Giant open pit while it has any significant water in the base of the pit. The pit currently has approximately 190ML of water in its base, filling the bottom 33m of the pit to the 883mRL. Dewatering is planned to commence in early 2022 and occur over eight months at a rate of 10L/s. A floating electric bore pump will pump the water from the pit up through protected 4” well master hose to a 200mm poly line from the northern ramp back to the processing plant. Subsequently, a small pump will be maintained in the pit floor to transfer runoff water from the pit to the mine dewatering system until the West Kavanagh crown stopes are mined. Post mining of these stopes, open pit runoff will be collected on the 865mRL level and directed to a dedicated sump and pump system.

5.5.4.2 Underground Water Management

Ground water and mine operations water will be collected through the mine in level sumps. These will be periodically connected with drain holes to allow settling capacity and reduce dedicated pumps in each sump. 8kW Flygt pumps will be used to pump from these sumps to travelling mono pumps located every 250 vertical metres through the mine in dedicated pump cuddies. Decline faces will be dewatered with on board drill snort pumps and 5kw electric face pumps.

90mm PE pump lines will be installed in the declines to facilitate removal of water from the mine. Dual lines from the 900mRL to the surface via the Nugent and Kavanagh declines will provide adequate capacity without the need to increase pipe size and allow for operational maintenance and downtime for the pumping system. Pumps will be monitored through the mine data and control system.

5.5.5 Compressed Air

Compressed air will be reticulated through the mine to support mining operations. Mine air will also be routed to the mine refuge chambers as a primary source of air in an emergency. The mine owns 2 x Compare Delcos 3100 - 132kW - 875CFM compressors, one of which is installed at the 900mRL Portal and the other which will be installed as required at the collar of the Nugent ventilation shaft. These compressors are mid-way though their life and will service the mine for the Stage 1 Underground.

Compressed air will be reticulated through the mine via 90mm PE pipes in the decline and 63mm PE pipe in the levels, using electrofusion joins to reduce air loss and leakage.

5.5.6 Communications

Two forms of communication will be established in the mine. An existing MST leaky feeder radio system will be extended through the mine to support operational requirements, with multiple channels for operations, maintenance and emergency communications. All vehicles, refuge chambers and key infrastructure will have VHF radios fitted.

Blasting will be conducted using an MST Ped-Blast firing system over the leaky feeder on a dedicated channel. In addition to this a Firefly smart lighting system will be extended through the mine to facilitate emergency response, traffic management in the declines and support WIFI communications and integrated infrastructure control.

5.5.7 Explosives Magazines

The site has previously had explosives magazines and bulk explosive compounds on site for detonators, packaged and bulk emulsion. The magazines are owned and licensed to the previous explosive contractors. The sites of these magazines have been maintained and licencing remains current. Hillgrove will transfer these licences to enable use of these magazines. There is sufficient capacity within these magazines to store sufficient stocks for the proposed mining production rate. Explosives would be manufactured on site to reduce handling and storage costs and reduce exposure to pre-packaged explosives being unavailable.

5.5.8 Refuge Chambers

Refuge chambers will be installed at key locations through the mine. Primary Refuge chambers will typically accommodate 20 persons. The location of these will be based on the travel time of personnel from the furthest location to the refuge in the event of an irrespirable atmosphere matched to the duration of their personal self-rescuers (MSA 30/100's).

Smaller mobile 6-person refuge chambers will be positioned in mine development areas where the risk of entrapment exists. Typically, cuddies will be mined for these smaller refuges to be placed by IT's such that multiple activities can occur as the mine is developed. Refuge chambers will be connected to mine air, have their own air sources and be linked by two forms of communication.

The capacity of refuge chambers will be matched to the number of personnel working within their catchment area in the mine and be managed through the mine control system and allocated tags on the mine tag boards both manual and digital. Refuges will have programmed periodic maintenance and testing.

5.6 Mine Design

The mine design was undertaken using Maptek Vulcan software. The MIK model for Kavanagh and Ordinary Kriging block models for Nugent were used to create stopes and drives on a 25m sublevel interval. The basis point for these levels was determined primarily on suitable crown pillar thicknesses between the Giant open pit and West Kavanagh lodes and to some degree the pit and the East Kavanagh lodes daylighting into the ramp system on the eastern wall of the pit.

The mine infrastructure, declines, ventilation system, and associated development has been designed in the hanging wall of the lodes and drives in order to optimise the location of the decline for drill cuddy location, access and haulage optimisations. Stopes have been coalesced from the MIK smallest mining units (SMU's) and tonnes and grades reported.

5.7 Mine Scheduling

The mine design was imported into Minemax iGantt visual scheduling package. All data was then populated in the scheduling package and interactions between all the tasks in the mine were scheduled. This schedule was then animated and checked for mining accuracy. Links include hard physical links, operational links and optimisation links. Once linked activities and aligned resources were established, the model was levelled on development advance per month and total production per month. Physical outputs from the scheduling files were then loaded into the mining cost model.

5.8 Mining Cost Model

A mining cost model has been built to use the mine schedule outputs, apply the appropriate unit cost rates and add mine fixed costs and overheads to determine the total mining costs based on the mine schedule. Checks for equipment and personnel requirements are included in the model to ensure the practicality of the design and schedule, and allocation of sufficient resources in the cost model to support mine ramp up.

5.9 Mining Risk Management

In accordance with the Work Health and Safety Regulations, 2012 (SA), the mine has established interim Principal Mining Hazard Management Plans (PMHMP) in anticipation of mine commencement and is currently operating the exploration decline development under these plans.

6 Processing

The existing Kanmantoo processing plant will be used for the underground operation. The process plant consists of crushing, grinding, flotation and dewatering processes and a flowsheet of the processing plant is provided in Figure 30. A single product (copper concentrate) will be produced with a grade of approximately 24% copper and containing gold and silver credits.

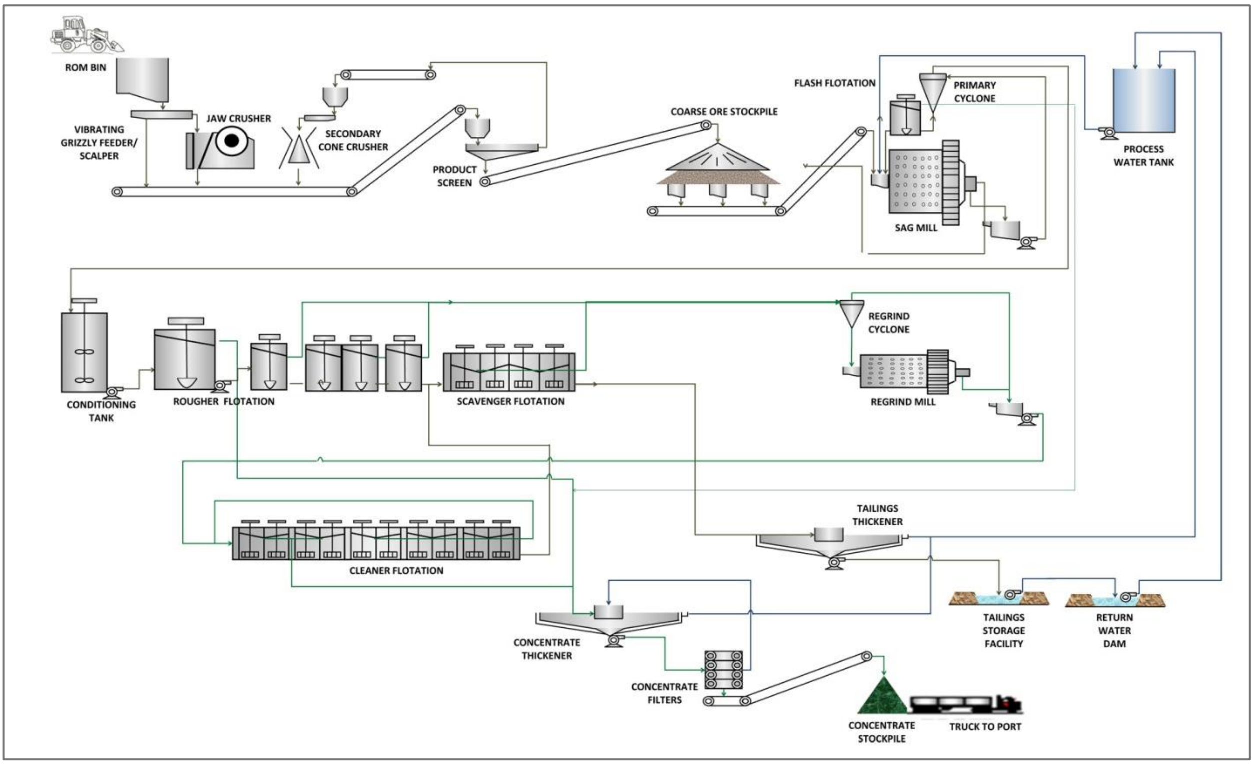

Figure 30: Kanmantoo processing plant simplified flowsheet

6.1 Processing Overview

The processing plant is capable of annual throughput in excess of 3 million tonnes. This was demonstrated during the open pit operation with a peak annual throughput of 4.1million tonnes in 2015. The Kanmantoo Underground Stage 1 Project produces around 1.3 million tonnes of plant feed per annum meaning the processing plant is approximately 40% utilised. This provides capacity to increase throughput as the mining operation expands without any additional capital requirements. Due to the lower annual output of the underground, the plant will be operated with fewer employees on a campaign basis to minimise unit costs. The plant will also be operated at a reduced hourly throughput rate resulting in a finer grind and improved metallurgical performance. This increase in metallurgical performance is not currently factored into the recovery model and remains upside.

Processing unit costs are forecast to be higher than the open pit operation at around $13 per tonne compared to $8-9 per tonne due to the fixed cost component of the processing plant, combined with the reduced throughput. However, if the output of an expanded underground operation increases in future stages of the project, the processing unit cost will decrease.

The major assumptions for processing used in this economic assessment are summarised in Table 5.

Table 5: Processing assumptions used in the economic assessment

Milled Tonnes	1.3 million tonnes per annum
Milling rate:	Circa 350 tonnes per operating hour (tpoh)
Primary Grind Size P80	212 um
Flotation Residence Time	22 minutes
Copper Recovery	Average 93.0% (tail mode based on feed grade)
Gold Recovery	55%
Concentrate Copper Grade	24%
Processing Costs	Fixed cost of $580k per month plus $7.50 per tonne processed variable cost. Average unit cost $13.00 per tonne

Figure 31: Kanmantoo Copper Mine processing plant and workshops

6.2 Copper Metallurgy

6.2.1 Copper Recovery Model

The metallurgy of the Kanmantoo copper mineralisation is well understood, with 8 years of experience processing open pit ore from the same zones that are planned to be mined in the underground operation. The copper containing mineral of the Kanmantoo zones is almost entirely coarse-grained chalcopyrite, with pyrrhotite the prevalent gangue sulphide mineral. During the open pit operation, a linear tail model was developed and used to predict tailings grade, and therefore copper recovery, based on operational data from the processing plant. The models are shown in the graphs below, with Figure 32 showing the linear tail model and Figure 33 showing the resulting copper recovery versus feed grade model. As the Kanmantoo underground is a continuation of the same Kavanagh and Nugent lodes that were mined in the open pit, the material produced will be very similar from a mineralogical perspective. Therefore, this model is a reasonable, if not conservative, estimate metallurgical performance of Kanmantoo underground mining inventory. Further metallurgical test-work on core produced from the underground drilling has been undertaken to successfully confirm this, as outlined in subsequent sections.

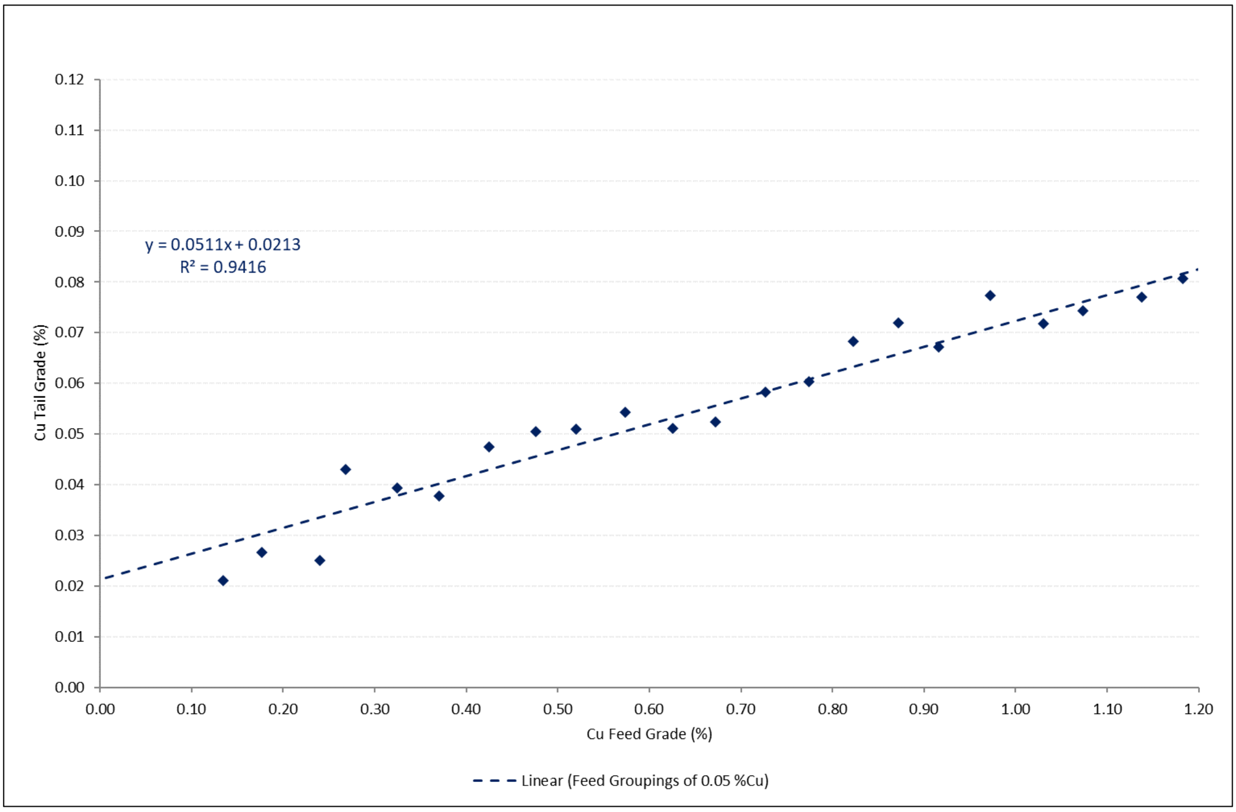

Figure 32: Tail copper grade versus feed copper grade (linear tail model)

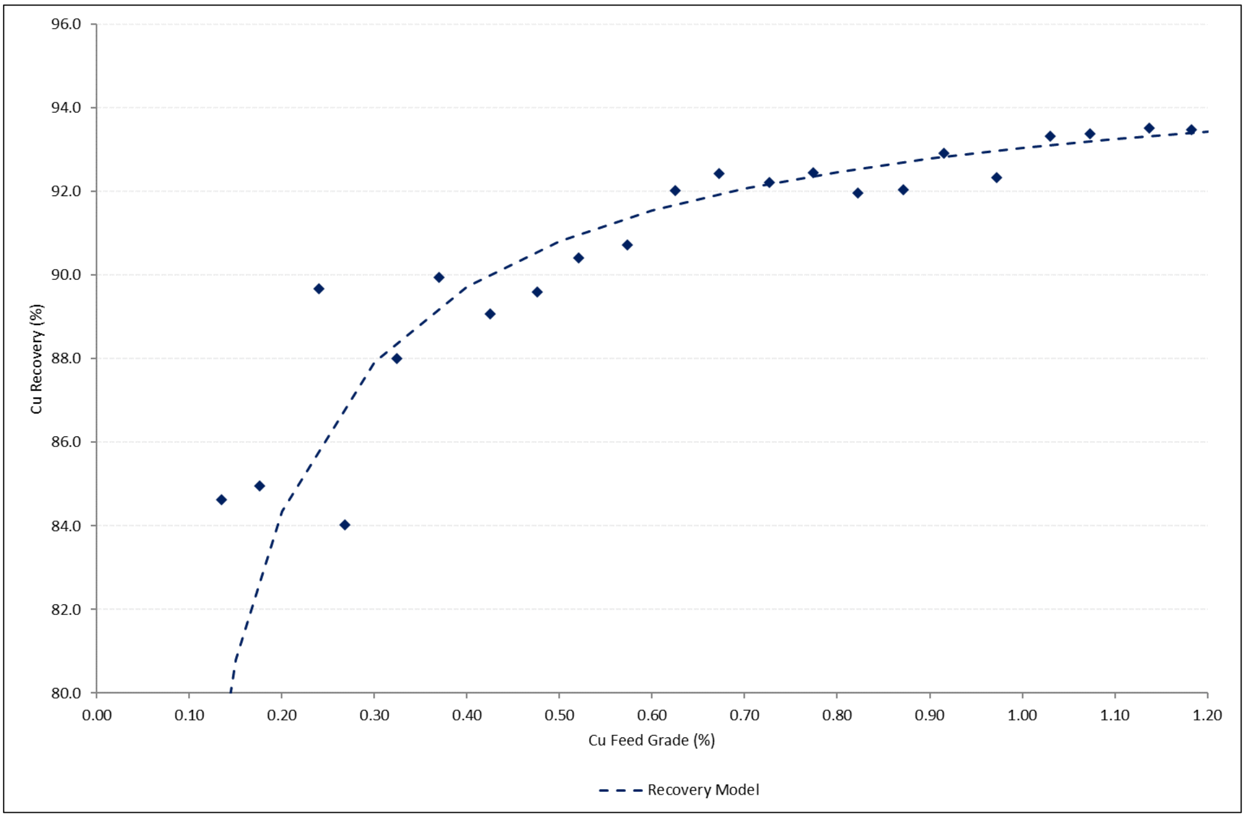

Figure 33: Copper recovery versus feed grade from linear tail model

The Stage 1 Underground average copper recovery is 93.0%, with a range of 92.3% to 93.3% based on a range of monthly feed grades from 1.01% to 1.33%.

6.2.2 Underground Metallurgical Test Work

Approximately 30 flotation tests have been conducted using various conditions on samples from the 2019 and 2020 underground drilling programs. The test-work to date has primarily focussed on Kavanagh samples with some minor works conducted on Nugent samples. The locations of the drill holes samples are shown in Figure 34 with the Kavanagh composite consisting of mineralised intercepts from two drill holes in East and Central Kavanagh at the 900mRL and 700mRL and three holes from a 100m vertical span through Nugent. This program was designed to confirm underground copper recovery assumptions and to investigate gold recovery. The parameters tested included grind size, reagent regime, pH, regrind size, gangue depressants and slurry density. The gold aspects of this economic assessment are discussed in Section 6.3, however the copper metallurgical results support the historical recovery model and provide potential to improve on this performance.

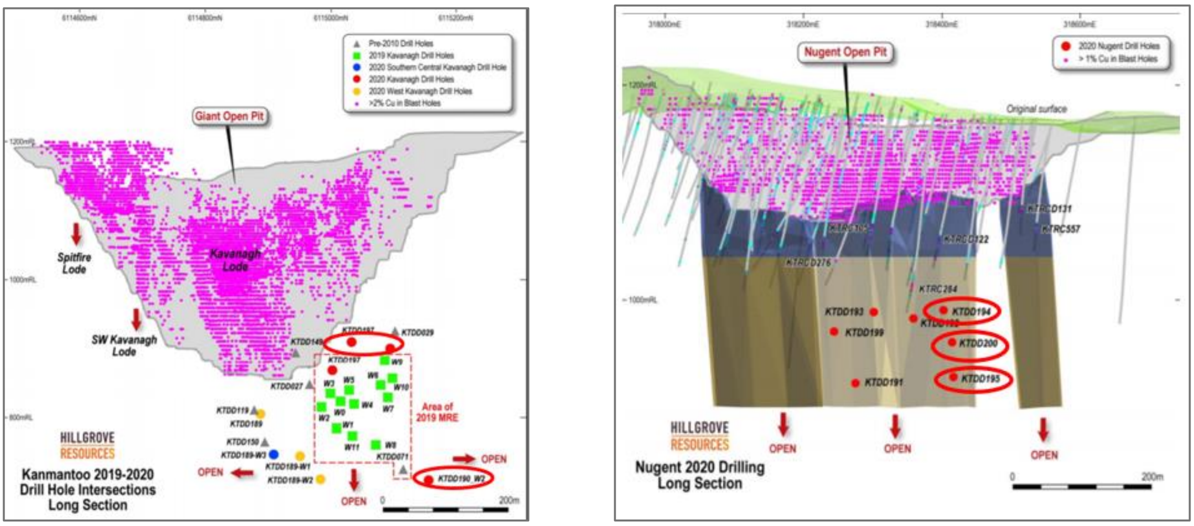

Figure 34: a. Kavanagh sample locations *b. Nugent sample locations*

The optimal flotation conditions were confirmed to be the use of Aerophine 3418A (the incumbent collector), elevated pH of 10.5, grind size of 212 um, and slurry density of 35% solids. The reagents and pH used will be identical to those used during the open pit operation. The target grind size will be finer and the slurry density lower compared to the open pit operation, both of which are achievable due to the reduced hourly throughput for the underground material. There were no overall metallurgical benefits with a grind size finer than 212 um due to the coarse grained chalcopyrite characteristics of the Kanmantoo lodes. The finer grind sizes tested resulted in additional pyrrhotite liberation and a reduced concentrate grade. The coarse grind size remains a key contributor to the low operating costs for the processing plant.

Excellent copper metallurgical performance of above 25% copper concentrate grade at above 96% copper recovery was achieved under the above conditions in the laboratory tests (Figure 35). The fast flotation kinetics of the chalcopyrite resulted in almost 97% of the copper being recovered in the first 5 minutes of flotation (Figure 35).

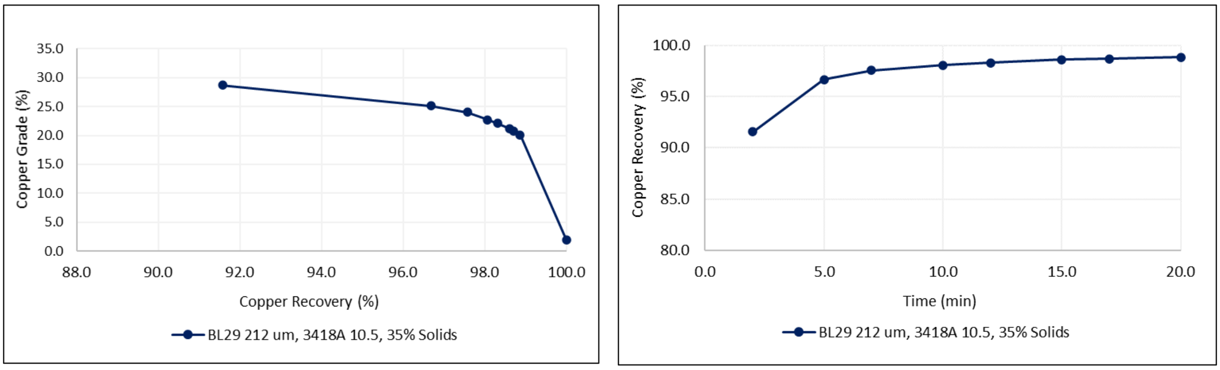

Figure 35: Copper grade/recovery and kinetics for flotation test BL29

Flotation tests using acidic Tailings Storage Facility (TSF) water did not result in any detrimental effects on metallurgical performance which is important as this will be the primary water source for processing.

6.3 Gold Test Work

A gold recovery rate of 55% for Stage 1 of the underground is assumed. This is based on the historical performance of the circuit in its current configuration, including the flash flotation circuit. Gold formed only a small portion (circa 5%) of Hillgrove's revenue stream during the open pit operation therefore there was limited focus on gold. Although overall gold revenue for Stage 1 is also around 5% of total project revenue there is the potential for that to change in Spitfire, Nugent and East Kavanagh where gold endowment is expected to be higher than historical averages.

Recent gold test-work at Kanmantoo includes the following:

- 2016 plant trials at lower pH to increase recovery of gold associated with iron sulphide minerals whilst processing high gold grade ore from the Spitfire zone of the open pit. This resulted in increased gold recovery at a lower concentrate grade. For this period, the value of the additional gold recovered outweighed the reduction in copper concentrate grade.
- 2017 diagnostic cyanidation leaching of three plant tail samples of Kavanagh ore resulted in 75% of the gold contained in the tails being leachable.
- 2017 Gravity Recoverable Gold test (Knelson and table) on a plant cyclone underflow sample obtained whilst processing high gold grade ore from the Spitfire zone of the open pit. This test demonstrated the propensity of this Spitfire sample to gravity concentrate.
- 2020 Mineralogical analysis (QEMSCAN) on 32 polished section slides (Nugent, Kavanagh, and exploration areas) which is discussed below.
- 2020 Heavy Liquid Separation and Gravity Recovery Gold test work (Knelson and Mozley) using Nugent KTDD200 core.
- 2021 flotation project previously discussed in Section 6.2.

The most significant of the early test-work was determining the propensity for gravity concentration of gold contained in a plant cyclone underflow sample. The cyclone underflow was targeted because this inherently contains a higher proportion of gold than the plant feed due to the specific gravity of the gold. The plant was processing high gold grade ore (>1 g/t) from the Spitfire area of the pit at the time the sample was collected. This cyclone underflow sample had a gold assay of 4.5g/t. The results were promising, with production of a table concentrate (from a laboratory Knelson concentrate) of a grade of 300 g/t gold and recovery of 61.7% of the gold in the plant underflow sample. The distribution of copper in the table concentrate was low at 1.08%. Spitfire zones are being drilled as part of the current drilling program to determine whether they can be added to the mining inventory. If there are high-grade gold zones in this area there remains the potential to improve gold recovery in a future stage of the project.

Mineralogical analysis on recent core from drilled areas of Kavanagh and Nugent has revealed the gold as being fine grained and associated with several minerals. The gold in the Kavanagh samples was found to be mainly present as fine grain gold (<10µm) associated with (but not limited to), chalcopyrite, bismuth minerals, pyrrhotite, mica (biotite), quartz and Fe Al Silicate. The gold in the Nugent samples was found to be mainly present as fine grain gold (<10µm) associated with (but not limited to), chalcopyrite, bismuth minerals, Fe Silicates, and quartz.

The gold in these samples was not able to be recovered by gravity methods, however this may change for areas where there are higher gold grades, in particular Nugent where visible gold has been observed in recent core.

The flotation test-work program conducted in 2021 investigated modifying flotation parameters to increase gold recovery through the existing plant. Some notes from this program are below:

- Unlike copper performance, gold recovery increased with the reduced grind sizes of 106 and 150 um. Essentially this is due to the same reasons that copper performance viz concentrate grade was reduced. Additional gold was recovered with an increase in sulphur recovery and iron recovery. This is due to fine gold associated with pyrrhotite being recovered as pyrrhotite becomes liberated from gangue minerals.
- A reduction in pH to 8 resulted in increased gold recovery but lower concentrate grade. This is because the lower pH has the effect of increasing the iron and sulphur kinetics as elevated pH acts as iron sulphide depressant. This results in a movement further up the gold/iron and gold/sulphur selectivity curves and down the gold recovery-copper grade curve.
- With a reduced pH and a stronger collector (Potassium Amyl Xanthate) up to 80% gold recovery was achieved with 100% sulphur recovery. However, the copper concentrate grade was significantly reduced to 10-15% copper and bismuth recovery was significantly increased under these conditions.

With the average gold feed grade of 0.17 g/t and gold revenue circa 5% of total revenue for Stage 1 Underground, targeting a higher gold recovery through the flotation plant is not economically viable due to the reduced copper grade/recovery and increased bismuth in concentrate. However, this may change depending on commodity prices and the gold to copper feed grade ratio and is discussed further in Section 6.5.

The current drilling program for Nugent contains some areas where there is significantly higher gold endowment. Further test-work will be undertaken on these samples to determine if there is free gold that may be recoverable through gravity methods. Drilling of Spitfire, which previously has contained gravity recoverable gold, is also being undertaken. If sufficient gold endowment is present, further tests will be undertaken on this material to optimise the value of the project.

6.4 Bismuth

The only deleterious element of significance in the Kanmantoo mineralisation is bismuth in the form of the bismuth sulphide - bismuthinite. A bismuth recovery model has been developed to determine bismuth concentration in the final concentrate. This has been used in the project financial model. The range of bismuth in concentrate for the period covered by Stage 1 Underground is between 300 and 800 ppm which is allowable under the concentrate offtake agreement with associated minor penalties factored into the financial model. The variability of bismuth concentration will reduce on a ship-by-ship basis which will minimise the penalty regime.

6.5 Metallurgical Parameter Summary

Table 6 below shows the relationship between various operating parameters on metallurgical performance, with green arrows representing a favourable response and red arrows representing an unfavourable response. The size of the arrows provides an indication of the relative impact of the change. In general, a higher pH regime results in improved copper grade / recovery and reduced bismuth concentration, but lower gold recovery. Due to the relative values of copper grade/recovery and bismuth penalty compared to the value of the gold, the plant will be operated predominantly under the base case strategy. However, if there is elevated gold concentration in the material from individual zones of the mine then this strategy may be modified to increase the value of gold recovered. A net smelter return (NSR) financial model has been developed to assess the optimum operating point on the grade-recovery curve based on a range of parameters. A higher gold recovery regime would involve reducing the pH to recover gold associated with pyrrhotite.

Table 6: Effect of processing variables

	Cost implications	Copper grade/recovery	Gold recovery	Bismuth grade in concentrate
212 um v 106 um	↓ (green)	↑ (green)	↓ (red)	↑ (red)
pH 10.5 v pH8	→ (grey)	↑ (green)	↓ (red)	↓ (green)
3418A v PAX	→ (grey)	↑ (green)	→ (grey)	↓ (green)
35% v 45% solids	→ (grey)	↑ (green)	→ (grey)	→ (grey)
TSF v tap water	↓ (green)	→ (grey)	→ (grey)	↓ (green)
22 g/t v 55 g/t 3418A	↓ (green)	↑ (green)	→ (grey)	→ (grey)
Sodium silicate addition	↑ (red)	→ (grey)	→ (grey)	→ (grey)

Due to the trade-off between copper grade/recovery and gold/bismuth, several flotation tests were undertaken assessing the potential to produce two concentrates:

- A standard copper concentrate at 24% copper, 93-94% copper recovery, 50-55% gold recovery and low-medium bismuth.
- A second concentrate which would recover the remaining sulphur with high bismuth and additional gold recovery (80% total).

Several laboratory tests were completed to assess this option. The most significant of these involved using three stages of 3418A at a pH of 10.5 and then two stages with PAX at a reduced pH of 8. The key results of this test are shown in Figure 36. The black line on each chart represents the point where the conditions were changed to the low pH regime. At this operating point, it is evident that in order to obtain the circa 25% additional gold recovery, a significant increase in bismuth, sulphur and iron recovery will occur relative to copper recovery. The gold/iron and gold/sulphur selectivity chart remain approximately linear meaning additional gold was recovered at the same rate as iron and sulphur (gold associated with pyrrhotite).

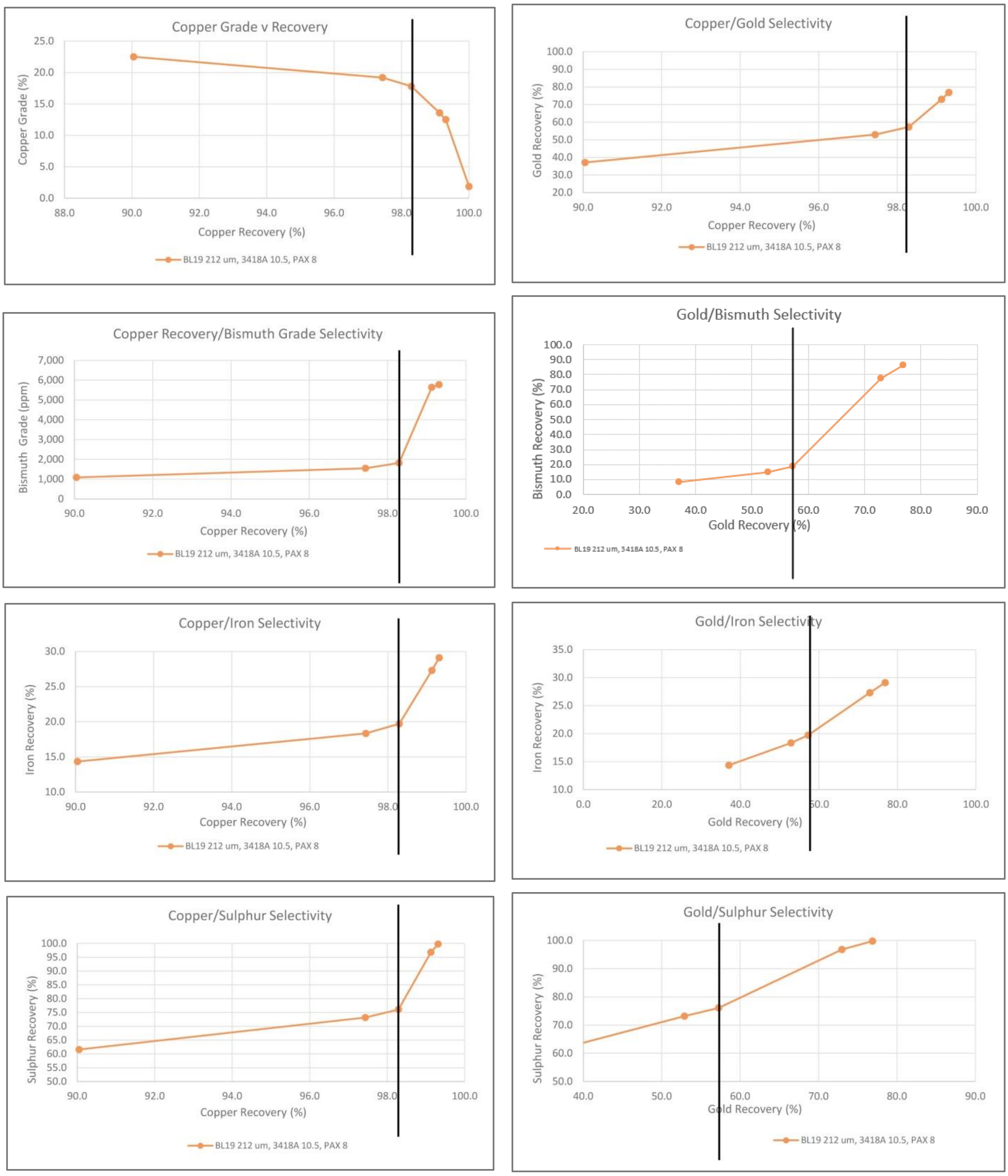

Figure 36: "Two concentrate" metallurgical results

The resulting product from the low pH and PAX stages was as follows:

- Cu 0.45%
- Au 2.0 g/t
- Fe 44.1%
- S 25.4%
- Bi 13,120 ppm

It is unknown whether a product with these attributes would realise any additional value. However, if there were high gold grades in future plant feed sources, the gold concentration in this product would likely be significantly higher. This may provide an opportunity to produce a gold rich concentrate product to sell or leach on site. The capital costs to modify the processing plant to produce this concentrate would be minimal due to the additional capacity and flexibility in the installed processing infrastructure. This will be investigated further as project upside.

The initial operating strategy will be to utilise the NSR model to determine operating conditions to optimise value based on copper and gold head grades. If feed sources with a high gold grade are processed, the pH may be modified to increase gold recovery as was successful with Spitfire ore during the open pit operation. This will be an economic trade-off between additional gold recovery and lower concentrate grade and higher bismuth.

6.6 Processing Cost Model

The processing operating cost model has been developed from first principles based on the lower throughput that an underground mine would deliver relative to the open pit ore throughput. This results in considerably higher unit costs per tonne processed due to the fixed components of these costs such as labour, electricity connection, water and equipment hire. A cost model has been developed as $580k per month fixed plus $7.50 per tonne variable. This results in an average Stage 1 processing unit cost of $13.00 per tonne compared to around $8.50 to 9.00 per tonne for the previous open pit operation. The processing unit cost will decrease should the amount of material available for processing increase as per Figure 37.

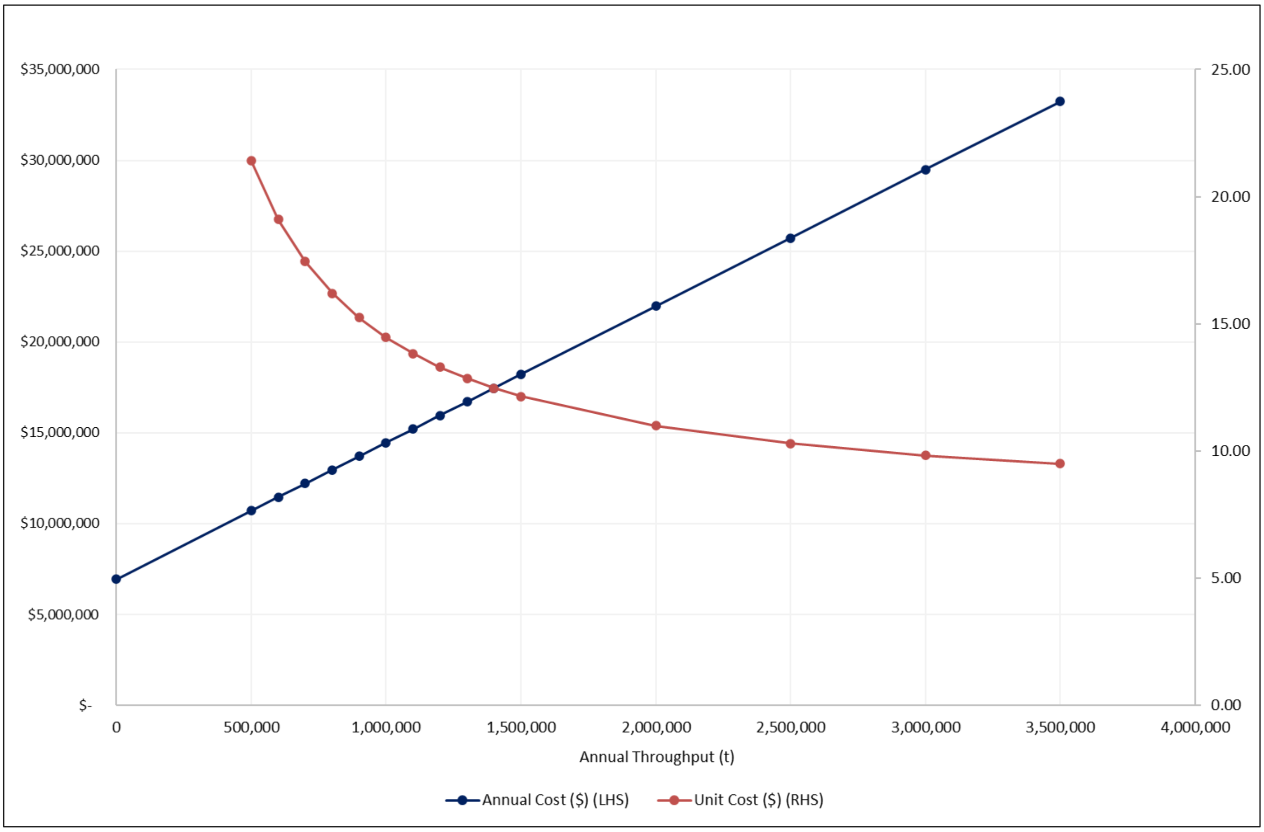

Figure 37: Processing cost model (total and unit cost)

Opportunities to reduce processing costs through continuous improvement initiatives will be investigated as the project progresses.

6.7 Operating Plan for the Processing Plant

It is anticipated that the processing plant will be operated for between 12-14 days per month at a daily throughput rate of around 8,500 tonnes. This is significantly lower than the historical 10,500 tonnes per day at a run-time for 29-30 days per month (94% run-time). The plant will be operating at approximately 40% of installed capacity meaning that additional feed sources can be processed with no additional capital and fixed costs, resulting in significantly reduced unit costs.

No major modifications to the circuit are required to allow this lower throughput operating strategy but optimisation will occur during the initial months of processing underground material.

Hillgrove employees will operate the processing plant.

7 Tailings Storage Facility

The existing permitted tailings storage facility (TSF) will be used for the tailings produced from the underground operation. The TSF consists of a centre decant tower and an underdrainage system to allow for the recycling of tailings water to be used in the processing plant. The permitted TSF design allows for a further 7 million tonnes of tailings to be stored based on the TSF crest being constructed to a height approximately 12-14 meters above the existing height to the 1274mRL. However, at this future height, the dam has not reached its technical limits and should the mining inventory increase beyond 7 million tonnes in the future, it is expected that further raises would be approved. Due to the capital invested in the early stages of the TSF, incremental costs to raise the embankments are relatively low.

The construction sequence of the approved TSF is shown in Figure 38. However, only Stage 7c, Stage 8 and a small part of Stage 9A are required to be constructed for Stage 1 Underground.

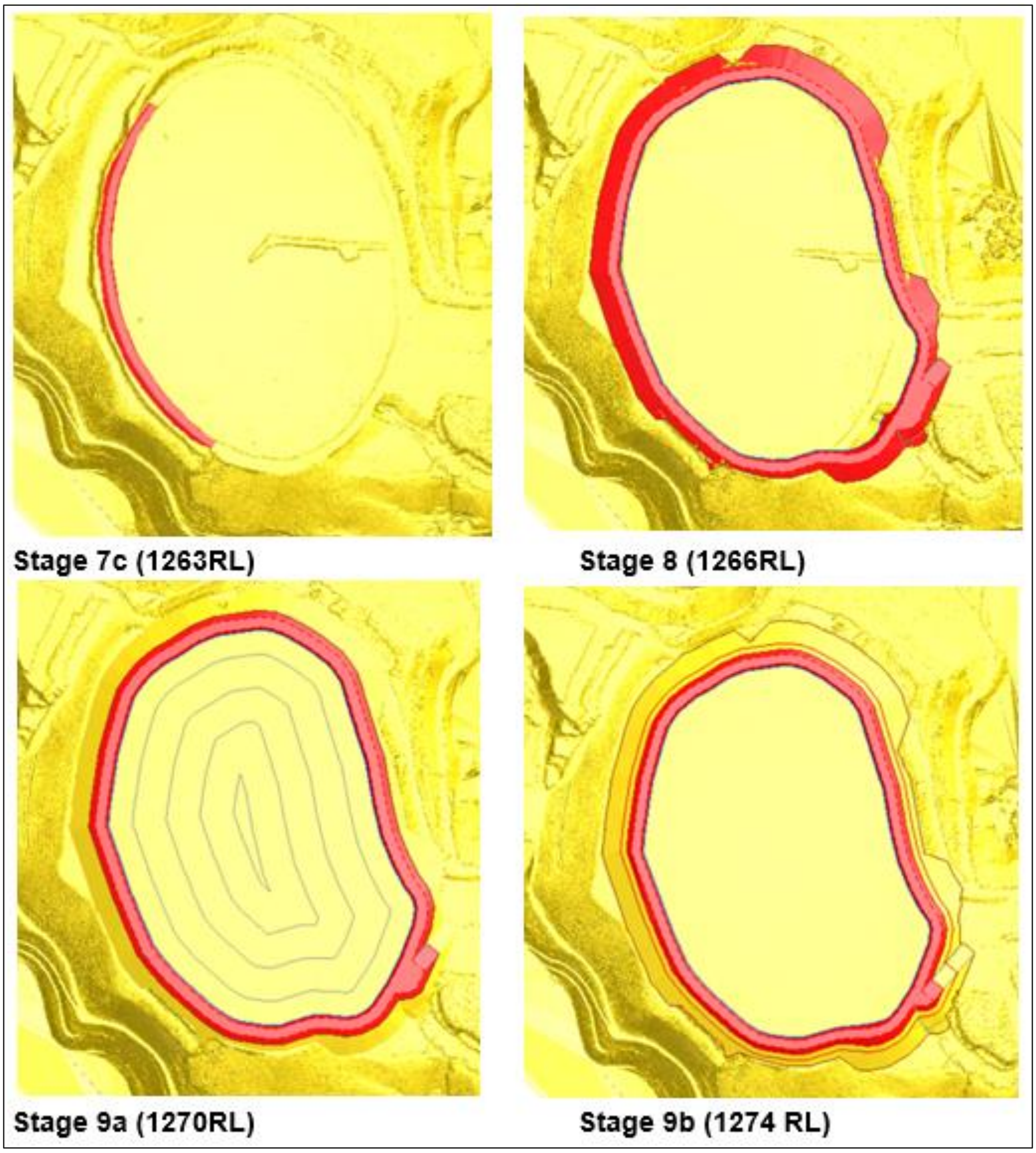

Figure 38: Approved TSF Design. ***Note: decant road raise not shown for simplicity.***

For Stage 1 Underground, the TSF will be raised a total of approximately six meters. Timing of the construction will occur over three periods to manage the timing of the capital cost outflow. These are scheduled as follows:

- Stage 7C: Raise the western perimeter of the TSF 3 meters to 1263mRL. Note previous stages 1-7B were constructed as part of the open pit operation.
- Stage 8: Raise entire perimeter to 1266mRL.
- Stage 9A (partial): Raise entire perimeter to 1267mRL to accommodate the remaining tails from Stage 1 Underground. Stage 9A is permitted to be raised further to accommodate increases in the mining inventory.

The cost estimate of TSF construction for Stage 1 Underground is $3.1M across years 1 and 3 of the project. Further stages would be constructed if required for future stages of the Kanmantoo underground operation.

TSF costs have been estimated using the volumes of waste rock to construct the embankments and current pricing for heavy equipment hire and labour. The cost estimates for each of the stages are summarised in Table 7.

Table 7: TSF construction volumes and costs

Stage	Embankment Volume (m^3)	Tails Storage (dmt)	Cost ($)
Stage 7C	56k	0.90MT	$0.3M
Stage 8	609k	2.0MT	$2.4M
Stage 9A	70k	0.55MT	$0.4M

There is sufficient waste rock located adjacent to the TSF to be used for construction of the embankments. An area at the top of the Integrated Waste Landform has been left open for this purpose as shown in Figure 39.

Figure 39: Integrated waste landform showing rehabilitated areas and open areas containing waste rock for future TSF construction

8 Infrastructure

The majority of the infrastructure required for the site is currently in place. This includes workshops, warehouses, offices, changerooms, fuel storage, explosives magazine, ablutions and communications. An overall site layout of key features of the Kanmantoo mine site is provided in Figure 40 and Figure 41.

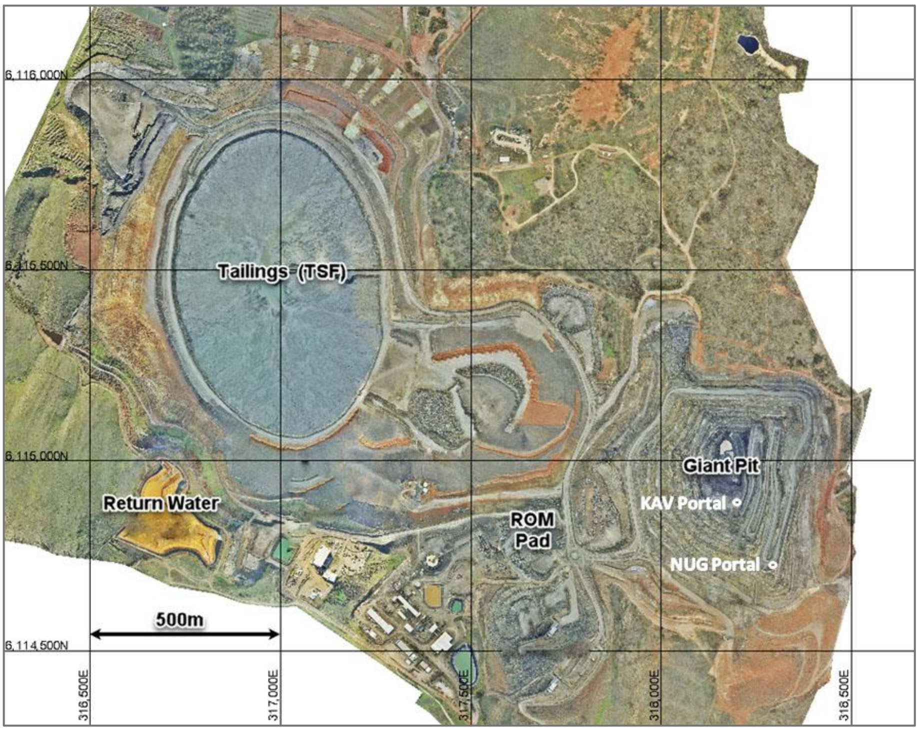

Figure 40: Site layout showing key features

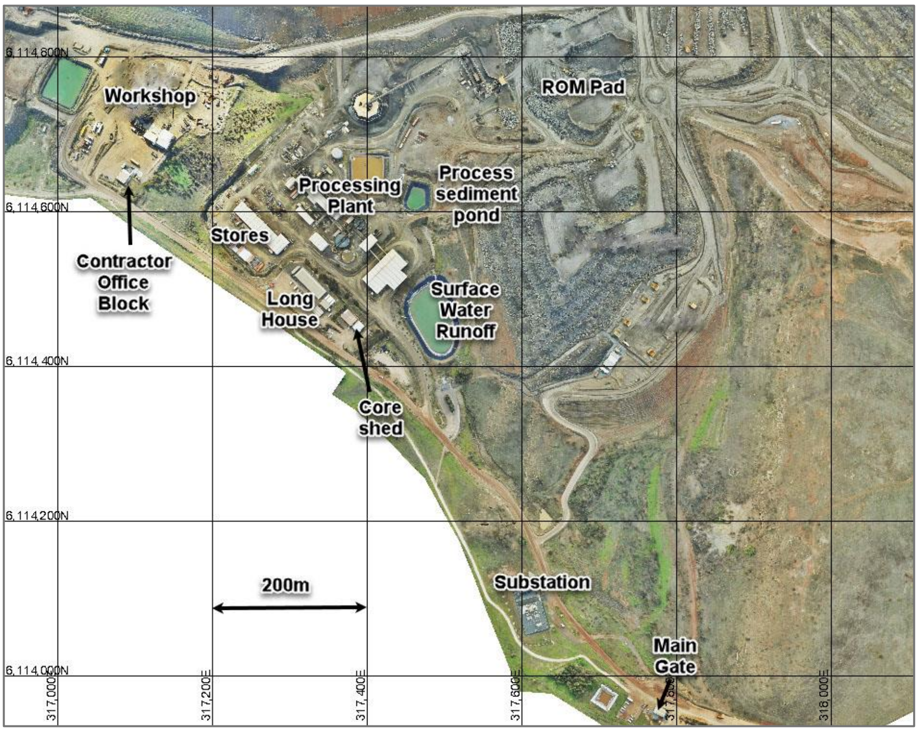

Figure 41: Site layout of key surface infrastructure

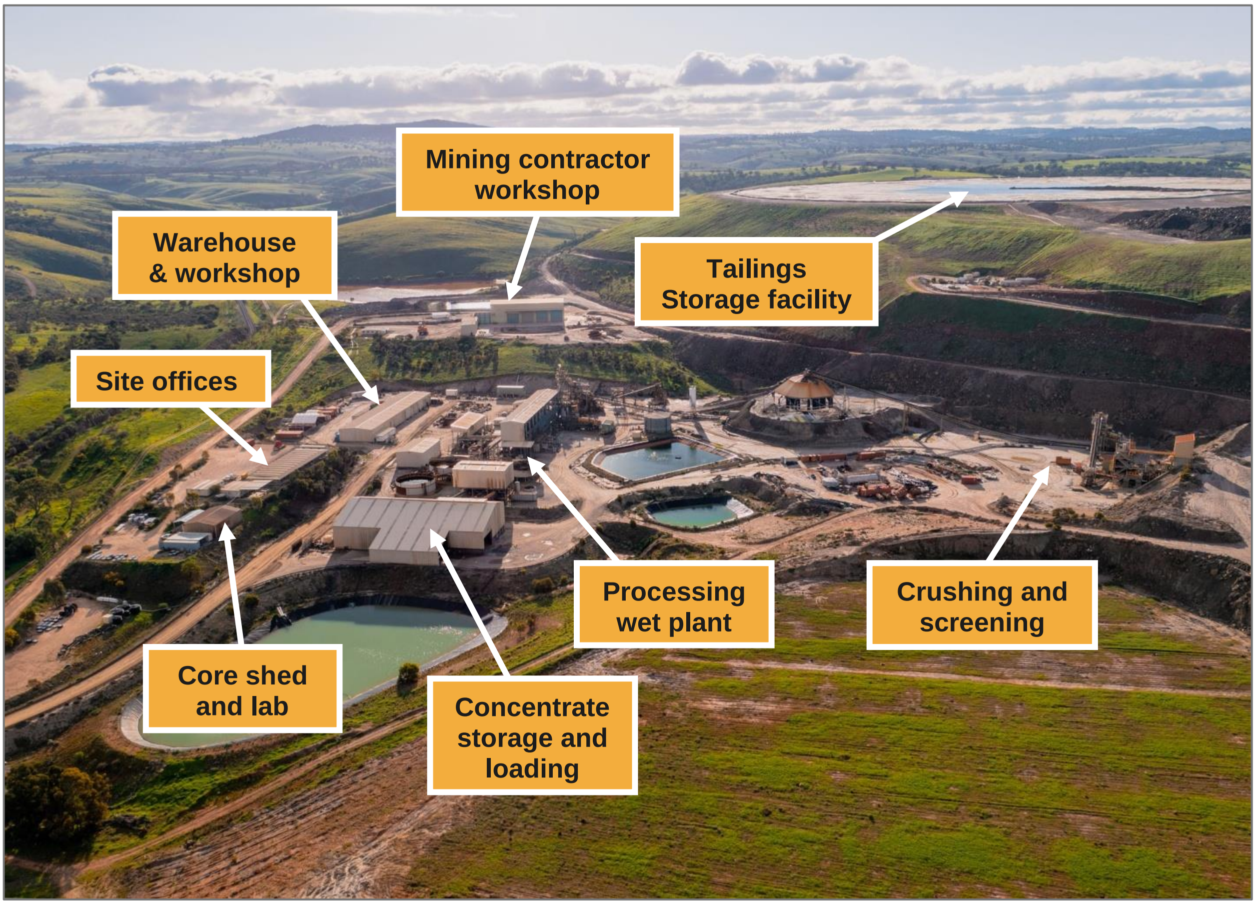

Figure 42: Overhead view of key site infrastructure including processing plant, workshops, warehouses and offices

Additional infrastructure has been installed at the underground portal location at the base of the open pit for the exploration decline. This includes water supply, fuel storage, electrical infrastructure (diesel genset and transformer), secondary ventilation fan, ablution, crib and office facilities.

Figure 43: Infrastructure located at the underground portal

On commencement of Stage 1 Underground, the diesel genset at the portal will be replaced with mains power. This will utilise existing capacity in the 11KV supply to the processing plant through overhead power lines to the open pit crest then down the open pit wall as shown in Figure 44. A preliminary study has estimated budget capital costs of $1.9M for this installation and this will significantly reduce the electricity costs compared to using diesel power generators. Underground electrical infrastructure from the portal is included in the mining unit costs.

Figure 44: Proposed electrical power line route to the portal location

9 Environmental and Regulatory

All the necessary approvals are in place for the underground operation. The most recent Program for Environment Protection and Rehabilitation (PEPR) for the underground operation was approved by the Department of Energy and Mining (DEM) in October 2020.

Progressive rehabilitation of the mine site has been undertaken during the open pit operation and an example of one area of the site is shown in Figure 45. Maintenance of the currently rehabilitated areas will be ongoing and statutory environmental monitoring requirements will be undertaken. However, there are no further major rehabilitation activities required until the cessation of operations at the mine site.

Figure 45: South facing photographs of the IWL in January 2020 (top) and August 2021 (bottom) showing rehabilitation revegetation and landform shaping

Hillgrove has sufficient materials to complete site closure cost effectively when required. These include non-acid forming (NAF) rock, to cap the tailings dam and other disturbed areas of the site, and high-quality topsoil to spread over the NAF rock to be seeded. During the open pit operation, areas were established for harvesting of high quality native seed, including the Seed Propagation Area (SPA) and the Seed Multiplication Area (SMA). These, along with other areas of high-quality revegetation, undertaken by Hillgrove provide low cost native seed annually that is harvested and used for the required revegetation of the site. Figure 46 shows examples of the seed collection activities that provide considerable value to Hillgrove from environmental, community and financial perspectives.

Figure 46: Harvesting of high quality native seed provides a cost effective way for Hillgrove to undertake progressive site rehabilitation

SafeWork SA are not directly involved in project approval; however, they review relevant mining sections of the PEPR on behalf of the DEM. SafeWork SA have been consulted throughout the project assessment phase and have provided feedback on design elements, emergency response capabilities and the Principal Mining Hazard Management plan. The Kanmantoo Underground Mining project will operate under Section 10 of the Work Health and Safety Regulations 2012 (SA), which requires the completion of a Principal Mining Hazard Management Plan (PMHMP) and associated documents.

Hillgrove holds Environmental Protection Agency Licence, which was renewed in July 2020.

Hillgrove has demonstrated outstanding commitment to support the communities of Kanmantoo and Callington adjacent to the Kanmantoo Copper Mine. Through the Kanmantoo-Callington Community Consultative Committee (KCCCC) several projects have been delivered, enhancing these communities. The mine also supports employment of local residents who live in close proximity to the mine, providing mutual benefits. The support and co-operation of the local communities has assisted in Hillgrove maintaining a social acceptance to operate in the area. Hillgrove and the KCCCC have been recognised by the South Australian government for best practice in community consultation.

10 Logistics and Marketing

Hillgrove, along with its life of mine offtake partner, has significant experience in marketing concentrates of varying qualities, including the material which was produced as part of the Kanmantoo open pit between 2011 and 2020. Kanmantoo concentrate is expected to be saleable internationally to various markets and will be via established logistics routes to export ports, with grades expected to be as shown in Table 8.

Table 8: Concentrate product quality

Metric	Unit	Range
Copper Grade	%	22-26
Gold Grade	g/t	1.5-3.0
Silver Grade	g/t	30-60
Bismuth Grade	ppm	300-800

The concentrate product quality is similar to that produced between 2011 and 2020 from the Kanmantoo open pit, which was acceptable to smelters.

Concentrate will be trucked to the Port of Adelaide in specially designed containers previously used for the project. The full containers will be stacked at the port and concentrate from the containers will be loaded onto ships using an onshore crane with a “rotainer” attachment. Hillgrove has been exporting concentrate through Port Adelaide under the same proposed method since 2011. Port Adelaide has permits to handle, store and load copper concentrates and has sufficient infrastructure and capability in place to export Kanmantoo concentrates.

Hillgrove has a life of mine offtake agreement with Freepoint Metals and Concentrates LLC. This agreement contains metal payable levels, treatment charges, and refining charges in line with industry standards.

11 Cost Estimates

The project cost estimates were undertaken by Hillgrove based on input from a range of consultants and reviewed by Mining Plus. Mining costs have been developed from previous tender processes conducted for the Kanmantoo Copper Mine as well as updated costs for key project inputs. Processing costs have been developed from historical operations and adjusted for the significantly lower throughput of the underground operation. Updated consumable costs have been sought from suppliers and included in the cost models.

The pre-production capital cost estimates have been derived based on commercial offers and first principal methodology. Major infrastructure costs are based on budget estimates from external contractors or consultants.

The estimated pre-production capital cost for Kanmantoo is A$26 million and represents the estimated costs of developing the project until it produces first concentrate. A summary of the capital cost for the project is provided in Table 9. Further details of the costs estimates for the various areas of the project are included in subsequent sections.

Table 9: Pre-production capital requirements

Capital Cost Estimate	Description	A$M
Mining	Working capital to develop Underground to first copper production. All-weather ramp pavement, pit dewatering, and geotechnical rockfall controls.	$21
Infrastructure	Overhead electrical power supply to portal Additional light vehicles	$2
Processing	Inventory replacement and minor maintenance	$1
Other	Various items including administration and capital purchases	$2

Operating costs of the mine are estimated to be A$81 per tonne milled with operating cost estimates based on commercial offers and first principal cost estimates. Table 10 provides a summary of the operating cost estimates for each area of the operation.

The low pre-production capital intensity is US$1,550 / tonne (US$0.70 / lb) of annualised copper production over the first three years. This positions Stage 1 of the Kanmantoo Underground as one of the lowest capital intense projects in the world, which typically average around US$16,000 / tonne[2].

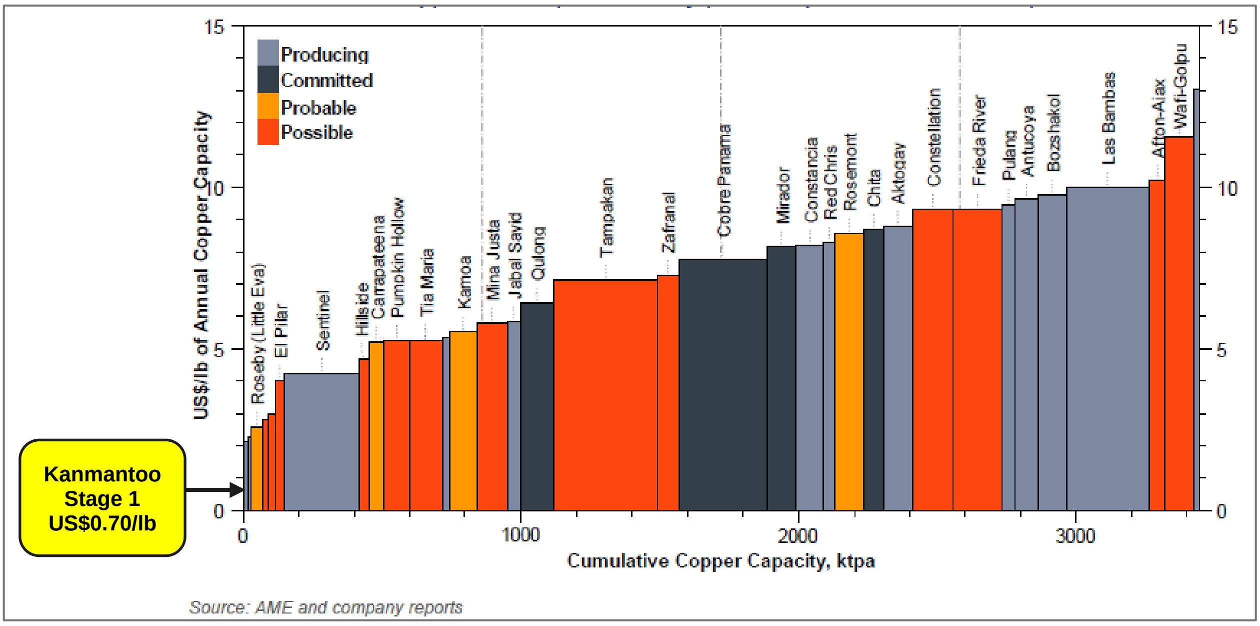

Figure 47: New copper mine capital intensity (mines in production from 2015)

[2] AME, 2017, *Copper - Capital Intensity of New Copper Mines*

Table 10: Operating cost estimates

Operating Costs	Description	A$/t Milled
Mining	Development, drill and blast, load and haul, underground diamond drilling mine services, labour, supervision, and technical support.	$47
Processing	All processing plant costs including, processing, maintenance, tailings management and labour.	Fixed Monthly cost $580k plus $7.50 per tonne variable cost. Average $13 per tonne.
Royalties	State government royalty payments	$7
Offtake Charges	Including treatment and refining charges	$6
Logistics	Land and sea freight. Ship loading.	$5
General and Administration	Administration staff salaries, site supplies and freight, environmental monitoring obligations, rates and licences, site administration, insurance and legal.	$2
Total		**$81**

The all-in sustaining costs (AISC) for the Kanmantoo Underground Stage 1 Project is A$6,991 per tonne of payable copper as per Table 11. This includes the costs associated with mining, processing, road transport to Port Adelaide, shipping to customers, site general and administration, precious metal credits and South Australian Government royalty of 5%.

Table 11: LOM all in sustaining costs (AISC)

Category	A$/tonne Cu
By-product credits	($811)
Mining and Material Handling	$4,477
Processing	$1,230
Royalties	$694
Offtake Charges	$570
Logistics	$526
General and Administration	$215
Tailings Dam	$91
TOTAL	**$6,991**

12 Financial Analysis

12.1 Financial Summary

The key financial aspects for the project are summarised in Table 12.

Table 12: Key financial aspects

Metric	Unit	Amount
Free Cash Flow	A$	$196M
Discount Rate	%	8%
Net Present Value	A$	$166M
Internal Rate of Return	%	389%
Pre-production Capital Requirements	A$	$26M
Project Pay Back After Pre-Production Capital	Months	7
Mine Life	Months	36
Stage 1 Copper Production[3]	Tonnes	36k
Stage 1 Gold Production[4]	Ounces	10k
LOM All In Sustaining Cost	A$/Tonne	$6,991

Under the base case, the project has an estimated free cash flow generation of $196 million, a net present value at a discount rate of 8% of $166 million, with an estimated internal rate of return (IRR) of 389%. It is forecast that these financial metrics can be met with a relatively low working capital requirement of $26 million – enabling a forecast pay back of 7 months post the completion of pre-production works. The project cumulative free cash flow generation profile is highlighted in Figure 48.

[3,4] The Production Target underpinning the financial forecasts included in the Economic Assessment comprises 72% Indicated Resources and 28% Inferred Resources. There is a lower level of geological and grade continuity confidence associated with Inferred Resources and there is no certainty that further exploration work will result in the conversion of Inferred Resource estimates to Indicated Resource estimates or return the same grade and tonnage distribution.

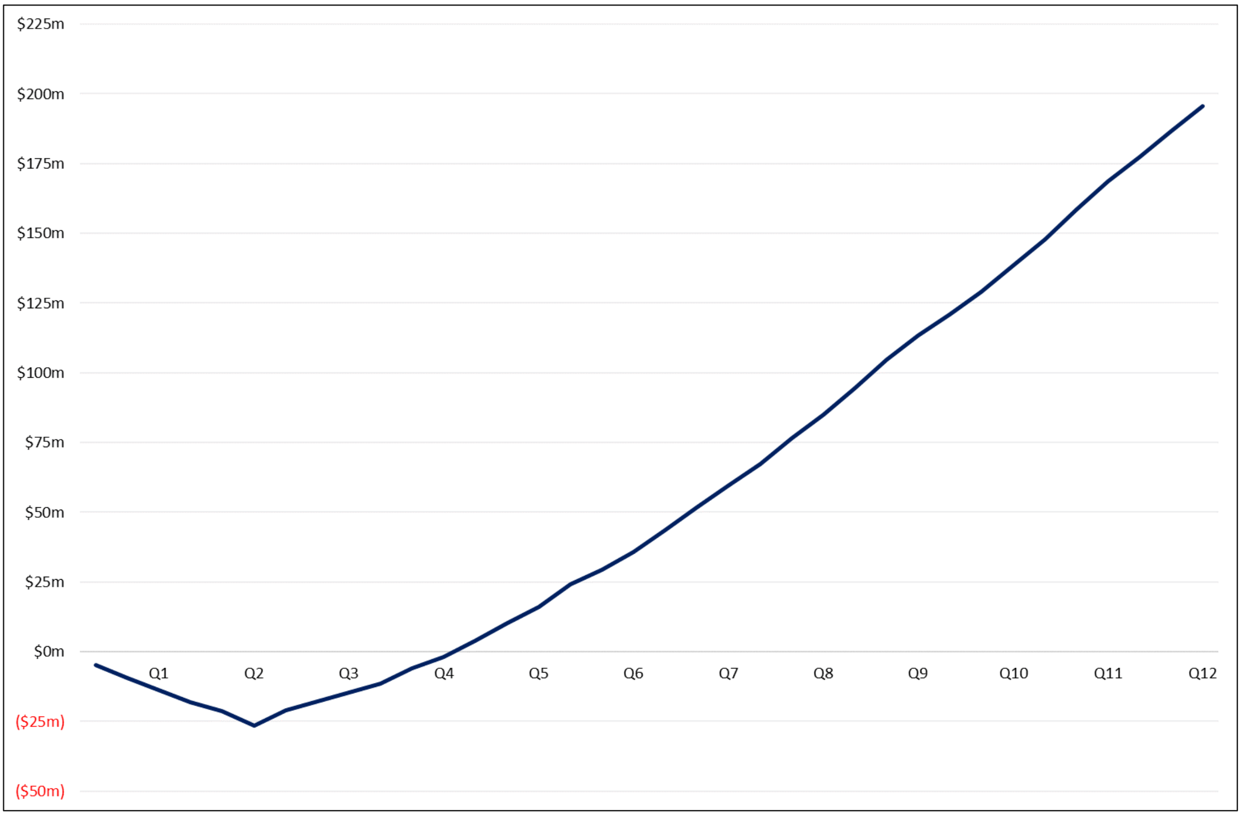

Figure 48: Project free cash flows (A$M cumulative)

12.2 Financial Assumptions

The following financial assumptions have been used for the assessment:

- The revenue estimates for copper, gold, and silver are derived from the sale of concentrates containing an average of 24% copper, 2.1 grams per tonne of gold, and 39.4 grams per tonne of silver.
- Working capital, after the initial pre-production capital of $26 million, is assumed to be self-generated by the project and as such, no separate funding is envisaged.
- With the tax loss position of the company, there is a sufficient tax shield such that income taxes are not payable under the base case of the project.
- The commodity pricing and exchange rate assumptions are shown in Table 13 below.

Table 13: Pricing and foreign exchange assumptions

Metric	Unit	
Copper Price	US$/t	$9,450
Gold Price	US$/oz	$1,750
Silver Price	US$/oz	$22
Exchange Rate	A$:US$	0.70

These prices are in line with pricing at the time of writing. Historically, the company has been prudent with hedging, with due consideration to the price at the time to ensure that free cash flow generation is maximised from future sales.

12.3 Financial Sensitivity

The sensitivity of the project free cash flows to variations in the key project drivers is provided in Figure 49.

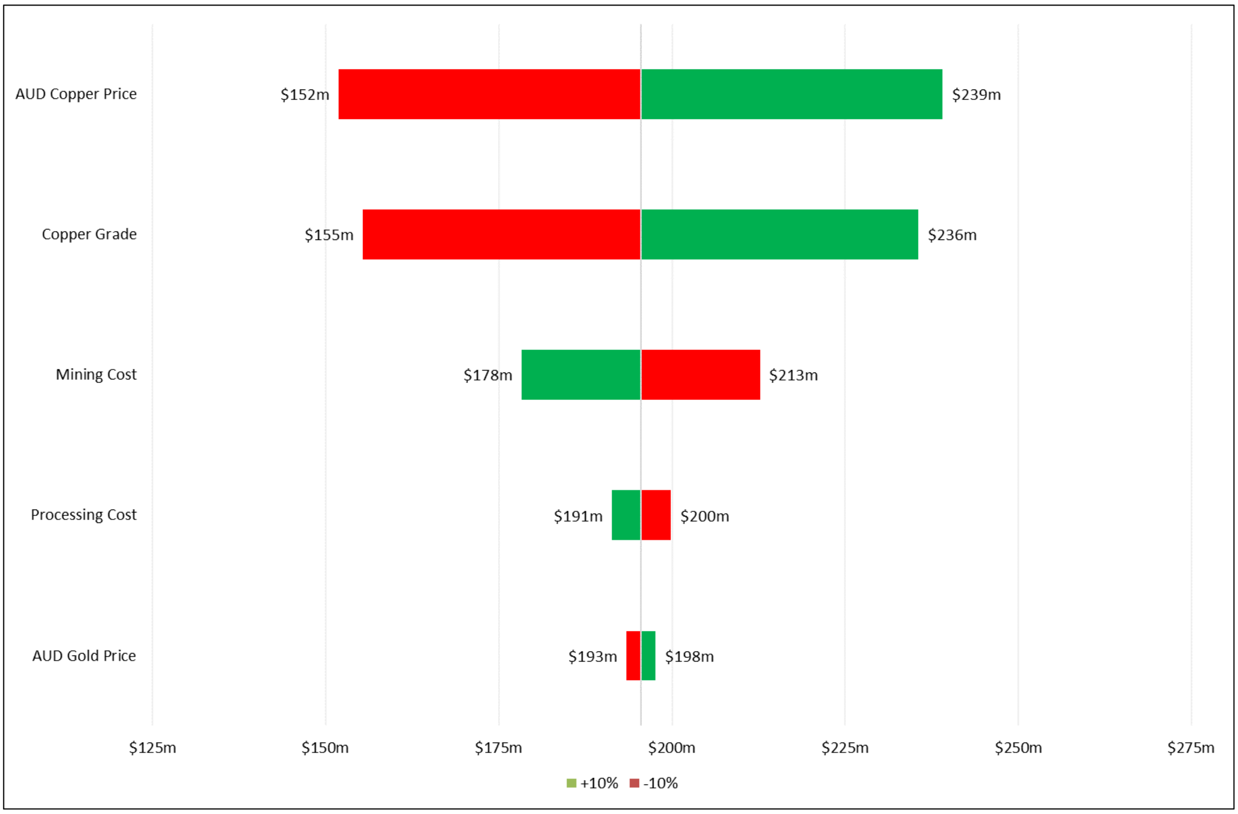

Figure 49: Project economic sensitivities – free cash flow (A$M)

13 Project Funding

The basis of the funding will be to minimise associated costs with due consideration to the financial risks. Whilst the debt-to-equity funding mix has not been finalised, if Inferred Resources within the mining inventory are converted to higher confidence level with further drilling, it is expected that the typical credit metrics for facilities of this type will be met, even under stress testing level commodity pricing, and as such the project is expected to be suitable for a standalone project financing facility pending successful drilling.

Please note, there is a lower level of geological and grade continuity confidence associated with Inferred Resources and there is no certainty that further exploration work will result in the conversion of Inferred Resource estimates to Indicated Resource estimates or return the same grade and tonnage distribution.

14 Project Execution

Month 0 in the schedule is when the Final Investment Decision (FID) is reached with month 1 the start of development from the exploration decline. It is assumed that at FID, the project funding has been secured and the 500m exploration decline complete.

14.1 Production Schedule

Mine development is forecast to ramp up to full rates of 750m per month (25m per day) by Q3 of the schedule with first stope material being mined towards the end of Q1. Production ramps up to 120k tonnes per month by Q6 as shown in Figure 50.

Processing operations are scheduled to commence in Q3 when sufficient material is stockpiled and a sustainable mining production profile is achieved to accommodate monthly processing. Processing rates ramp up to 120k tonnes per month by Q6 as shown in Figure 51.

Feed grades range between 1.0% and 1.3% copper. Monthly copper production is expected to range from 800 tonnes to 1,600 tonnes. Copper feed grade, copper production and gold production are shown in Figure 52.

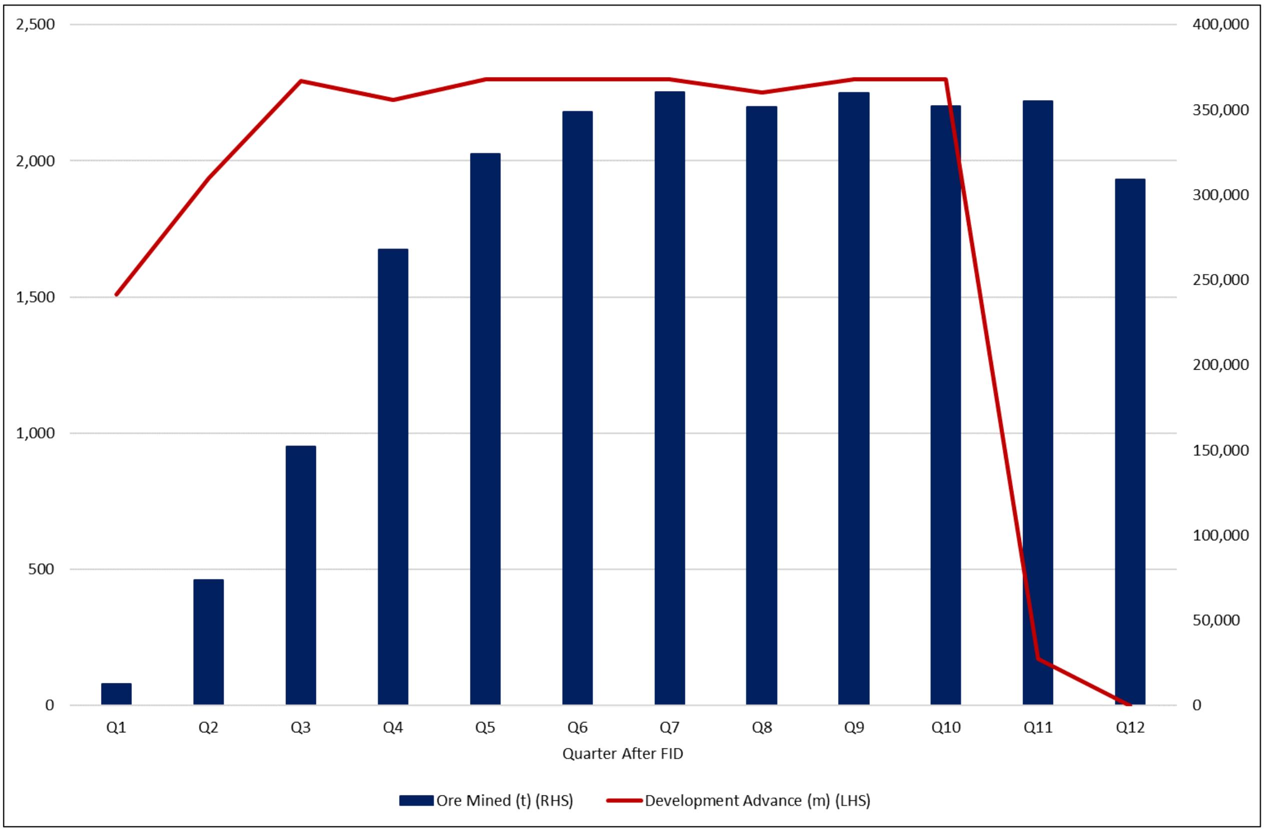

Figure 50: Quarterly mine development advance and material mined

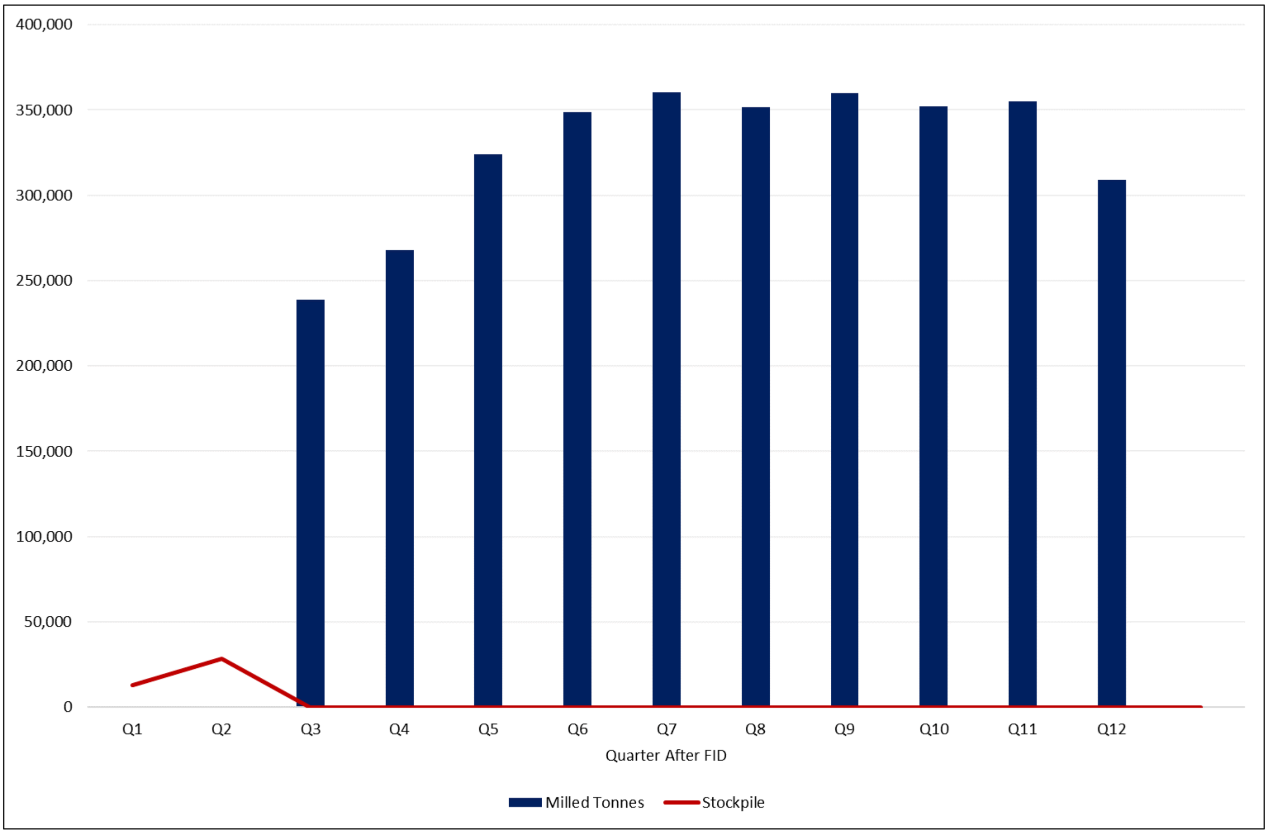

Figure 51: Quarterly stockpile levels and ore processed

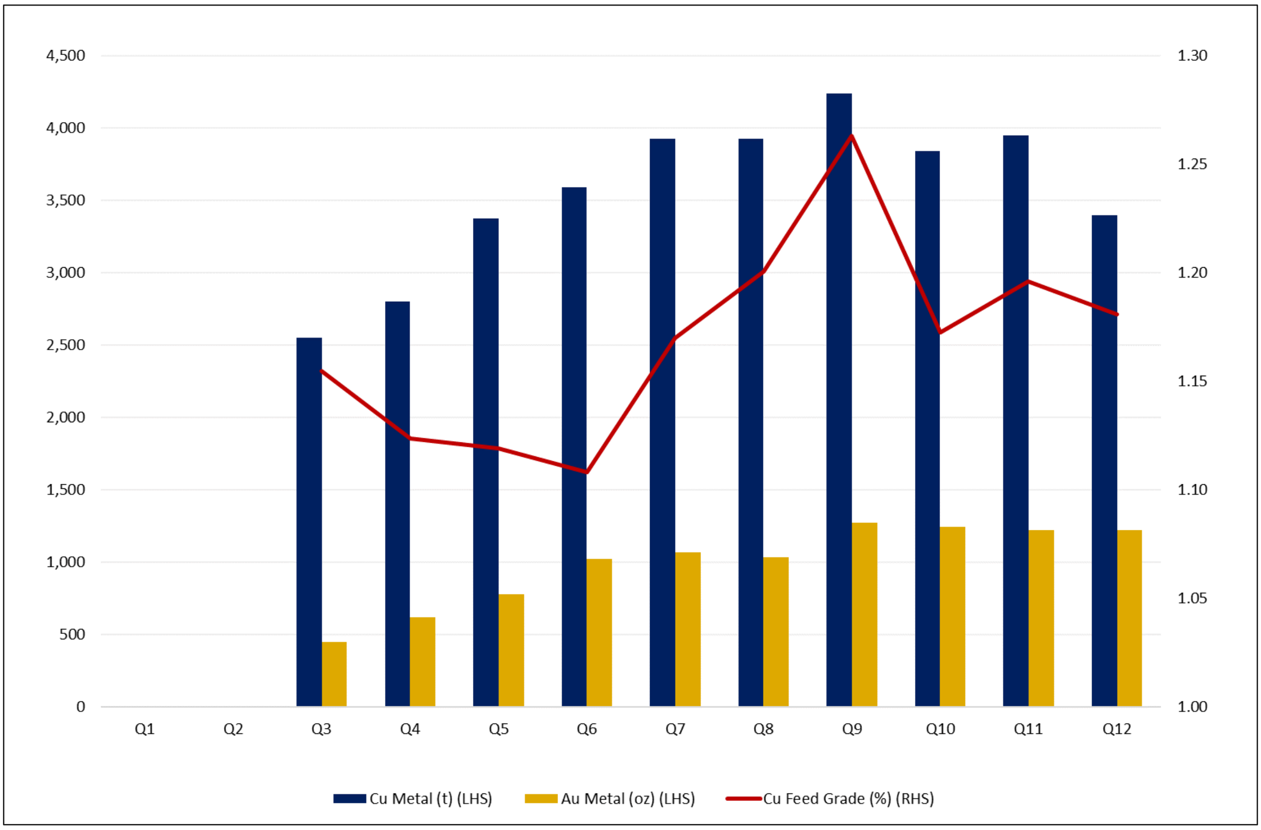

Figure 52: Quarterly copper production, gold production and copper feed grade

Table 14 provides the annual profile of production metrics for the project.

Table 14: Annual production forecasts

Metric	Year 1 (ramp up)	Year 2	Year 3
Processed (MT)	0.5 MT	1.4 MT	1.4 MT
Feed Grade (%)	1.1%	1.2%	1.2%
Copper recovery (%)	93%	93%	93%
Copper Produced (kt)	5	15	15
Gold Produced (koz)	1	4	5

(note: figures may not sum due to rounding)

15 References

All exploration drill results, exploration information and Mineral Resource Estimates have previously been reported to the ASX by Competent Person at the time. The results reported herein are reported in the form and context of the original ASX releases.

Refer http://www.hillgroveresources.com.au/announcements

- 10 Oct 2019 Excellent Drill Results from Kanmantoo Cu-Au Deposit
- 5 Nov 2019 Additional Information to Maiden Kavanagh Underground
- 3 Sep 2020 Drilling Expands Cu-Au Footprint at Kanmantoo Underground
- 7 Dec 2020 Updated Kanmantoo Underground Mineral Resource Estimates
- 23 Feb 2021 Kanmantoo Underground Exploration Target Update
- 3 May 2021 Drilling Confirms Down-Dip Cu-Au Mineralisation at Kanmantoo
- 6 May 2021 Hillgrove Hits 170m of Copper Mineralisation at Kanmantoo
- 24 Jun 2021 Drilling Results Update at Kanmantoo
- 31 Aug 2021 Hillgrove Awarded $2m Grant to Commence UG Decline
- 1 Sep 2021 Hillgrove Hits 166m of Copper Mineralisation at Kanmantoo
- 22 Sep 2021 $12m Raising for Drilling and Development Kanmantoo Copper
- 27 Oct 2021 Next Major Drilling Program Underway at Kanmantoo
- 28 Oct 2021 Hillgrove receives Overwhelming Support for SPP
- 1 Nov 2021 Portal Cut for Kanmantoo Decline Commences
- 14 Dec 2021 Updated Kavanagh Underground Mineral Resource Estimate