Hammer Metals Ltd

ASX RELEASE
8 May 2023

DIRECTORS / MANAGEMENT

Russell Davis
Chairman

Daniel Thomas
Managing Director

Ziggy Lubieniecki
Non-Executive Director

David Church
Non–Executive Director

Mark Pitts
Company Secretary

Mark Whittle
Chief Operating Officer

CAPITAL STRUCTURE

ASX Code: HMX

Share Price (04/05/2023)	$0.078
Shares on Issue	821m
Market Cap	$64m
Options Unlisted	24m
Performance Rights	8m
Cash (31/3/2023)	$2.6m

KALMAN RESOURCE UPGRADE DELIVERS: COPPER EQUIVALENT INVENTORY NOW EXCEEDS 530,000T

39% increase in contained metal confirms Kalman as one of the largest undeveloped mineral deposits in the Mount Isa region.

- Updated Mineral Resource Estimate (MRE) completed for the **100%-owned Kalman copper-gold-silver-molybdenum-rhenium deposit**:
    - **39.2Mt at 1.07% Recovered Copper Equivalent ("CuEq Rec") at 0.53% Cu, 0.27g/t Au, 0.10% Mo, 1.5g/t Ag and 2.1g/t Re.**
    - **This equates to ~500,000t of contained copper equivalent metal.**
- **New MRE represents a ~39% increase in the contained metal** within the deposit, compared with the Mineral Resource reported on 27 September 2016 of 20Mt at 1.8% copper equivalent.
- **Open pit material represents 71% of the MRE** (27.7Mt at 0.89% Cu Eq Rec)*.
- **Recent drilling has delivered an additional 10Mt of material to the Indicated categorisation within the MRE (a 141% increase on the 2016 MRE)**. The overall proportion of Indicated to Inferred material has improved by ~25%.
- **High-grade component within MRE of 10.5Mt at 1.98% Cu Eq Rec** (at a 1.5% Cu Equivalent Cut-Off) at 0.83% Cu, 0.45g/t Au, 0.22% Mo, 2.5g/t Ag and 4.8g/t Re.
- The Kalman MRE **contains 208,400t of copper, 343,200 oz of gold, 38,000t of molybdenum, 1.92m oz of silver and 84,100 kg of rhenium**.
- **The significant increase in Hammer's mineral inventory in the Mount Isa area is considered a highly encouraging development.** Hammer will assess the potential to initiate a formal Scoping Study and financial evaluation incorporating the Kalman deposit together with its other satellite copper deposits at Elaine, Overlander, Jubilee (51%) and Lake View.
- **Recent EM surveys have generated additional exploration targets at Kalman North**. Nearby potential remains lightly explored.

Kalman Deposit - JORC 2012 Mineral Resource Estimate (May 2023)												
Classification	Mining Method	CuEq Cut-off	Tonnes Kt (1)	CuEq Cont. % (3)	CuEq Rec. % (2, 3, 4)	Cu %	Au g/t	Ag g/t	Mo %	Re g/t	Contained Cu Eq Metal (Kt) (1)	Recovered CuEq Metal (Kt) (1)
Indicated	Open Pit	0.4%	17,120	1.04	0.87	0.43	0.22	1.2	0.08	1.7	180	150
Inferred	Open Pit	0.4%	10,540	1.11	0.93	0.40	0.21	1.3	0.10	2.2	120	100
Inferred	Underground	1.0%	11,530	1.78	1.48	0.80	0.41	2.2	0.12	2.7	200	170
Total			**39,190**	**1.27**	**1.07**	**0.53**	**0.27**	**1.5**	**0.10**	**2.1**	**500**	**420**
Note (1)	Rounded to nearest 10kt											
Note (2)	The recovered copper equivalent equation is: CuEq Recovered = 0.86*Cu + (0.74*0.771051*Au) + (0.74*0.008336*Ag) + (0.86*4.857143*Mo) + (0.77*0.023334*Re)											
Note (3)	Copper Equivalent Price assumptions are: Cu: US$7,714/t (US$3.50/lb); Au: US$1,850/oz; Ag: US$20/oz; Mo: US$37,468/t (or US$17/lb); and Re: US$1,800/kg											
Note (4)	Recovery assumptions are: Cu 86%; Au 74%; Ag 74%; Mo 86%; and Re 77%.											
Note (5)	Transition from Open to Underground Mining based on prior optimsiation studies set at 75mRL. Surface RL is approx 425mRL.											

Table 1. *Kalman MRE by JORC Classification and mining method – May 2023*

* Previous pit optimisation studies at Kalman have determined that above the 75m RL level is classed as potentially open-pittable.

Hammer Managing Director Daniel Thomas said: *"This significant upgrade of the mineral inventory at Kalman, following highly successful drilling programs completed late last year targeting northern extensions of the deposit, confirms its status as one of the Mount Isa Inlier's largest undeveloped mineral deposits.*

"Like many other exploration prospects in the Mount Isa region, the potential at Kalman has gone largely unnoticed over the past decade. However, there is an ever-dwindling number of global mineral deposits that can offer copper equivalent grades in excess of 1% from surface, with a substantial inventory of open pit material. Kalman's location in the heart of a Tier-1 mining jurisdiction and close to established mining and transport infrastructure, adds to its attractiveness as a near-term development opportunity.

"The polymetallic nature of the deposit – which hosts a basket of critical and precious metals which are in growing demand due to the global energy transition – has also elevated its status in Hammer's Mount Isa portfolio. With this in mind, our recent exploration at Kalman has focused on enhancing the economics of the deposit with the recent drilling resulting in a significant increase in the near-surface mineral inventory – all of which would be exploited in the early years of a future mining operation.

"We turn our minds to further advancing the Kalman Project while not ignoring the tremendous exploration potential that exists across our 2,600sqkm of tenure in the Mount Isa region. As we've seen, further exploration success can deliver substantial returns to our shareholders.

"At Kalman, we will work to enhance the metallurgical studies, further refining our internal mining scenarios from Kalman and other nearby Hammer JORC Resources to prepare the project for the completion of scoping studies. In parallel, we'll continue exploration; targeting new discoveries and growth in Hammer's metal inventory in the Mount Isa region."

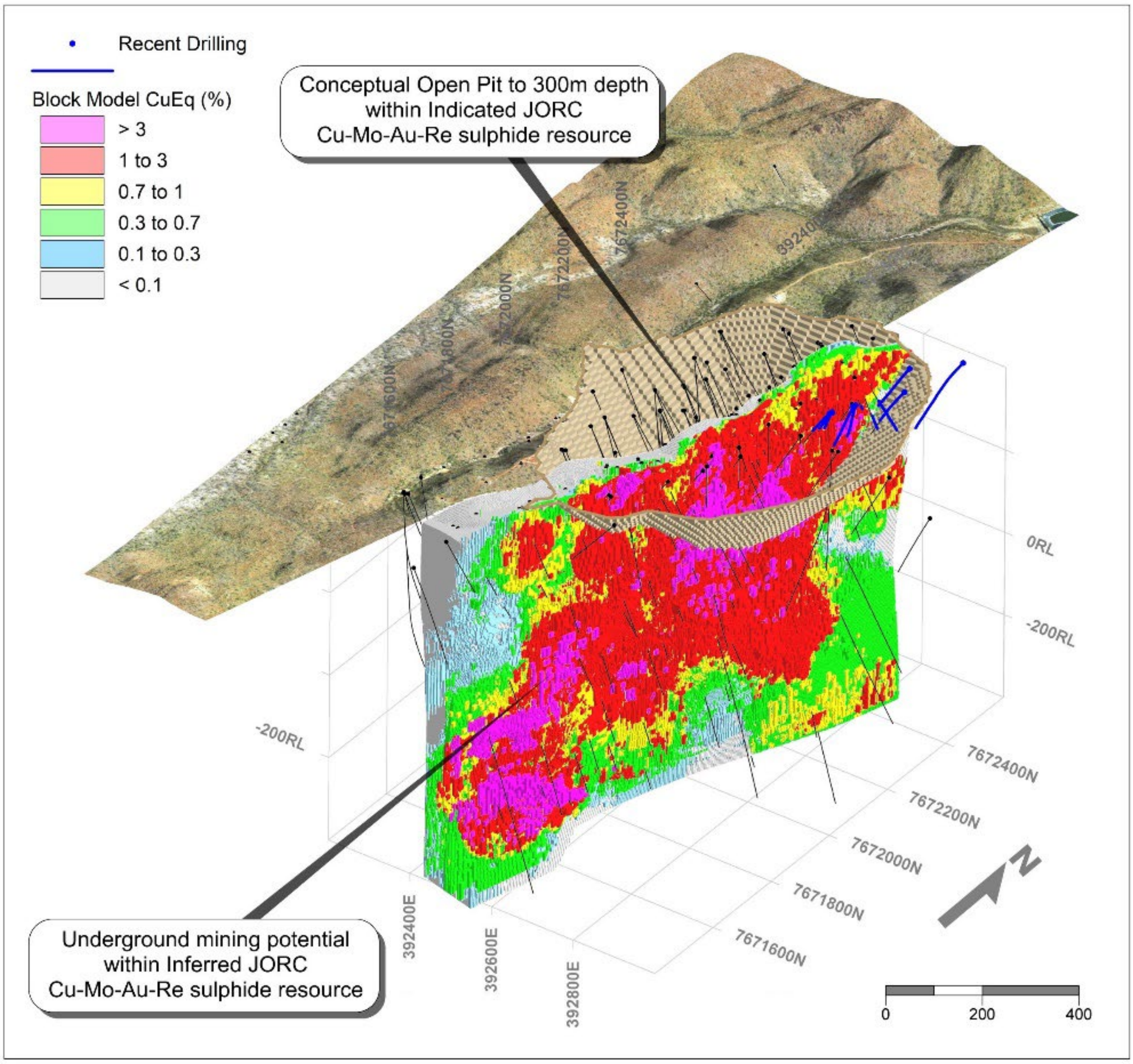

Figure 1. *Kalman Deposit oblique view looking north-west showing Copper Equivalent % blocks.*

Hammer Metals Ltd (**ASX:HMX**) ("**Hammer**" or the "**Company**") is pleased to announce an updated Mineral Resource Estimate (MRE) for its 100%-owned Kalman copper-gold-silver-molybdenum-rhenium deposit in the Mount Isa region of North-West Queensland.

The addition of a significant tonnage of shallow mineralisation to the Kalman MRE following successful extensional drill programs completed last year positions Hammer with one of the largest undeveloped mineral inventories in the Mount Isa region.

Table 2. *Hammer's JORC Resources – May 2023*

Deposit	Tonnes Mt	Contained CuEq %	Recovered CuEq %	Cu %	Au g/t	Co %	Mo %	Re g/t	Fe %	Contained Copper Tonnes	Copper Equivalent Tonnes (1, 2, 3,4)
Kalman (Updated)	39.2	1.27	1.07	0.53	0.27	-	0.10	2.1	-	208,360	417,440
Jubilee (51% HMX)	1.4	-	-	1.41	0.62	-	-	-	-	10,070	10,070
Elaine	9.3	-	-	0.82	0.19	-	-	-	-	76,260	76,260
Overlander	1.8	-	-	1.20	-	0.05	-	-	-	21,120	21,120
Lakeview	0.6	-	-	1.03	0.30					5,950	5,950
Mount Philp	30.5	-	-	-	-	-	-	-	39.00	N/A	N/A
Total										321,760	**530,840**
Note (1)	Includes Kalmans Recovered Copper Equivalent Metal										
Note (2)	Does not include substantial Au or Co by-product credits from Jubilee, Elaine, Overlander or Lakeview										
Note (3)	Where no contribution of metal by-product credits are included, no metallurgical recoveries have been adopted										
Note (4)	Attributable to HMX										

(Refer to ASX Announcements 26 August 2015, 20 December 2018, 21 December 2022 and 9 February 2023).

The MRE update at Kalman follows the release of the Lakeview Mineral Resource in late 2022 as Hammer looks to build upon its sizeable copper inventory in the region.

In addition to Hammer's JORC Resources, the Company continues to advance its early-stage prospects with a number of promising copper-gold prospects set for additional drilling in the coming months. Targets at South Hope, Mascotte, Mascotte Junction and Tourist Zone will be subject to new drilling programs designed to follow up on successful initial drill tests.

A multitude of additional prospects offers further upside to Hammer's growing mineral inventory.

Kalman Cu-Au-Mo-Re Deposit

The 100%-owned Kalman deposit, located 50km south-east of Mt Isa and 25km south of the Barkly Highway, is one of the few polymetallic deposits in Queensland to contain significant molybdenum and rhenium in addition to copper and gold. With open pit and underground mining potential, the deposit remains open at depth and along strike.

The previous Mineral Resource Estimate (MRE) completed for the Kalman deposit, was reported to the ASX on 27 September 2016. The 2016 MRE reported a Contained Copper Equivalent of 360,000 tonnes. The 2023 MRE has reported a 39% increase in contained copper equivalent metal to 500,000 tonnes.

The Kalman MRE has utilised conservative pricing assumptions in the equivalence calculation of US$7,714/t (US$3.50/lb) for copper, US$1,850/oz for gold, US$20/oz for silver, US$37,468/t (or US$17/lb) for molybdenum and US$1,800/kg for rhenium.

The updated MRE contains a significant improvement in the confidence of the mineralisation categorisation, with approximately 25% more ore now categorised as Indicated (see Table 4).

In addition to the improvement in resource categorisation, the open pit resource at Kalman has grown from 13.3Mt to 27.7Mt. The inclusion of additional mineralisation at a shallow depth has the potential to positively impact the economics of the deposit. An update to previous internal mining studies at Kalman will assess the improvement in the economics of the Kalman deposit associated with these zones of shallow mineralisation.

Table 3. *Kalman MRE by JORC Classification – May 2023 vs 2016*

Kalman Deposit - JORC 2012 Mineral Resource Estimate (May, 2023)										
Classification	Tonnes Kt (1)	CuEq Contained % (3, 4)	CuEq Recovered % (2, 3, 4)	Cu %	Au g/t	Ag g/t	Mo %	Re g/t	Contained Cu Eq Metal (Kt) (1)	Recovered CuEq Metal (Kt) (1)
Indicated	17,120	1.04	0.87	0.43	0.22	1.2	0.08	1.7	180	150
Inferred	22,070	1.46	1.22	0.61	0.31	1.7	0.11	2.5	320	270
Total (5)	**39,190**	**1.27**	**1.07**	**0.53**	**0.27**	**1.5**	**0.10**	**2.1**	**500**	**420**
2016 Kalman Resource (6)	20,000	1.80	N/A	0.61	0.34	1.9	0.14	3.7	360	N/A
Change	96%	-29%	N/A	-13%	-20%	-20%	-31%	-42%	39%	N/A
Note (1)	Rounded to nearest 10kt									
Note (2)	The recovered copper equivalent equation is: CuEq Recovered = 0.86*Cu + (0.74*0.771051*Au) + (0.74*0.008336*Ag) + (0.86*4.857143*Mo) + (0.77*0.023334*Re)									
Note (3)	Copper Equivalent Price assumptions are: Cu: US$7,714/t (US$3.50/lb); Au: US$1,850/oz; Ag: US$20/oz; Mo: US$37,468/t (or US$17/lb); and Re: US$1,800/kg									
Note (4)	Recovery assumptions are: Cu 86%; Au 74%; Ag 74%; Mo 86%; and Re 77%									
Note (5)	2016 Cut Off Grades: Open Cut: 0.7% Cu Eq. and Underground 1.2% Cu Eq.									
Note (6)	2023 Cut Off Grades: Open Pit 0.4% Cu Eq. and Underground 1.0% Cu Eq.									

Table 4. *Kalman MRE Categorisation Changes – 2016 to 2023*

Categorisation Kalman Resource	2016 MRE Kt (1)	2023 MRE Kt (2)	% Increase
Indicated	7,100	17,120	**141%**
Inferred	13,200	22,070	**67%**
Proportion of Indicated	35%	44%	**25%**
Proportion of Inferred	65%	56%	**-13%**
Note (1)	2016 Cut Off Grades: Open Cut: 0.7% Cu Eq. and Underground 1.2% Cu Eq.		
Note (2)	2023 Cut Off Grades: Open Pit 0.4% Cu Eq. and Underground 1.0% Cu Eq.		

Further work in 2023 will continue to improve previous study work much of which now is in excess of five years old and based upon the prior resource model. This work will include a revision of historical mining study optimisations with updated metal prices, cost assumptions and incorporate the recent successful ore sorting test results (see ASX Announcement 1 November 2022).

A program to enhance metallurgical work completed in 2010 is expected to be commissioned later this year with a view to improving the historical recoveries for copper and molybdenum. The separation of copper and molybdenum sulphides is a relatively straight forward process and is common practice in many global porphyry deposits such as Cadia (NSW), Sierra Gorda and Spence.

Kalman Cu-Au-Mo-Re Deposit

Ownership

The Kalman Deposit lies within EPM13870 and EPM26775. Both of these exploration permits are held by Mt Dockerell Mining Pty Ltd, a 100%-owned subsidiary of Hammer Metals Limited.

***Figure 2**: Kalman structure looking south.*

Geology and Geological Interpretation

The Kalman Project area is located within the Eastern Fold Belt of the Mount Isa Inlier and straddles the Wonga Sub-Province of the Eastern Succession. The boundaries of the sub-province are mapped as significant strike-slip faults. The Kalman deposit occurs on the Pilgrim Fault Zone which is a major crustal suture transecting the Mount Isa Inlier and separates the Wonga Sub-Province from the Quamby-Malbon Sub-Province.

The Kalman deposit is hosted by calc silicate rocks of the Corella Formation, which is a carbonate-evaporite-pelite sequence, regionally metamorphosed to amphibolite facies. The stratigraphic sequence at Kalman consists of a hanging wall sequence of meta-volcanics, variably altered metasediments and graphitic meta-sediments (MS).

Cross-cutting the meta-volcanics are discontinuous metre and sub-metre zones of tri-modal breccia, which has textural and compositional similarity to the Mount Philp Breccia located to the north. The Mount Philp Breccia is thought to be an explosive "fluidised" breccia related to the intrusion of the granites. A late-stage massive quartz vein (QTZ), exhibiting multiple phases of brecciation and annealing has transgressed the mineralised zone and forms a prominent ridge through the deposit.

The closest felsic intrusion to Kalman is the Overlander Granite, located 5km to the west. It is one of a number of granitic bodies that intrude the core of the Corella Formation. These granite bodies have high radiometric counts suggesting that they would have stayed "hot" for a long period of time, therefore are a possible source for fluid and metal ions which may have ponded in structural traps against the Pilgrim Fault.

Kalman is located in an area of structural complexity. Mineralisation is located adjacent to the intersection of a set of sub-parallel 60º trending widely spaced fractures, and two northerly trending, second- or third-order, brittle-ductile deformation zones immediately adjacent and sub-parallel to the regional scale Pilgrim wrench fault. The northeast trending fracture sets are possible hydrothermal fluid pathways, and the actinolite rich stratigraphic unit within the calc silicate sequence is a receptive host rock, however fluid sources cannot be clearly recognized as there is no proximal major felsic intrusion.

For grade estimation, a mineralisation package was wireframed to constrain the estimate. Within the package high- and low-grade sub-domains were defined by a probability estimate for Cu, Au and Ag and another probability estimate for Mo and Re.

Drilling Techniques

Data from 151 drill holes (51,634.2 metres) were used for the interpretation and estimation. The holes are either Reverse Circulation (RC), 67 holes (44%) or Diamond (DD), 84 holes (56%).

The drill hole spacing throughout the project is approximately 100 to 120m along strike with some 50 to 60m infill drilling. Sample information used in mineral resource estimation was derived from both Diamond and Reverse Circulation drilling. The drill samples have been geologically logged and sub-sampled for lab analysis.

Sampling Techniques and Sample Analysis Methods

Diamond core is cut in half using a core saw with half core submitted for assay. Reverse Circulation drill samples were mostly collected at 1m intervals. The PN series holes were sampled at 2m intervals. Samples were collected at the rig and split with a riffle splitter at the drill site. Samples were predominantly dry.

The assay methods used for all drill samples were fusion fire assay / AAS for gold and Aqua Regia /ICP for base metals. Anomalous Mo zones were re-submitted for assay (Mo and Re) using four acid digestion / ICP methods which give a more reliable assay for higher Mo grades.

Mineral Estimation methodology

Samples were flagged within the mineralisation package and within the high- and low-grade sub-domains and composited to 1m lengths honouring the domain boundaries. Statistical and geostatistical analysis was used to understand the characteristics of the mineralisation. Statistical analysis showed the populations in each domain to have approximately log-normal distribution shapes. Where outlier grades were identified appropriate top-cuts were applied. Top-cuts were generally not severe with relatively few composites affected.

Continuity analysis was performed on the sub-domains for each variable.

The model for Kalman was constructed using a parent block size of 5m E by 10m N by 10m RL with sub-cells of 1.25m E by 1.25m N by 1.25m RL. The parent block size was selected through kriging neighbourhood testing and considering the dimensions of the domains and drill hole spacing.

Ordinary Kriging was used to estimate grades in all domains, with estimation searches and number of samples used determined by iterative testing and validation of the estimates. Dynamic anisotropy was utilised to allow the estimation to follow the geometry of the mineralisation. Hard boundary conditions were applied for grade estimation into each of the mineralised sub-domains so that grade estimation for each sub-domain used only the data that is contained within that domain.

The entire Kalman deposit is considered fresh with density applied as 2.7 t/m3 for mineralised material and 2.8 t/m3 for un-mineralised material. The bulk density was assigned as a dry bulk density.

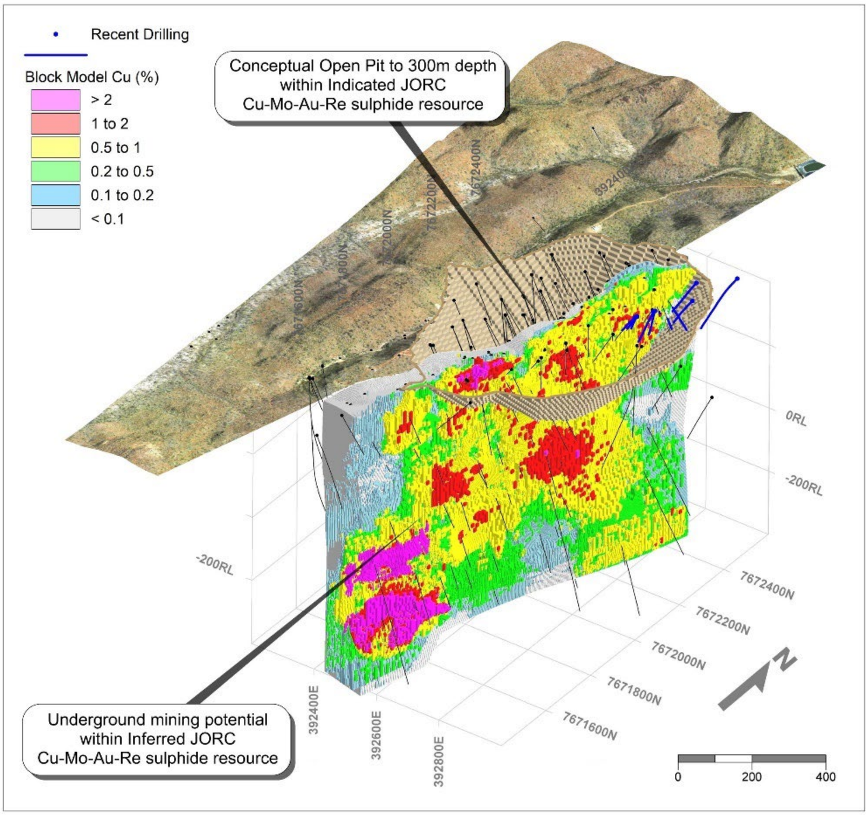

Figure 3. *Kalman oblique view looking northwest Copper % blocks.*

Use of Recovered Metal Equivalents and Cut-off Grades

As a result of recent reviews of the Copper Equivalence equation and applying revised metal prices and high-level economic analyses applying both open cut and underground mining parameters, the Kalman Mineral Resource has been reported to two separate cut-off grades as this is relevant to the long-term expectations of eventual economic extraction. A cut off of 0.4% CuEq for open cut type material above 75m RL and a 1% CuEq for underground material below 75m RL has been applied for reporting Mineral Resources in Table 1.

Recovered Copper equivalent ("CuEq Rec") grades were calculated from downhole assays for Cu, Au, Ag, Mo and Re. The CuEq calculation is based on commodity process and metallurgical recovery assumptions as detailed in this release. Prices utilised by Hammer are a forward estimate of long-term future metal prices as at the time of Hammer embarking on the update of the Kalman resource in April 2023. It is the Company's opinion that all the elements included in the metal equivalents calculation have a reasonable potential to be recovered and sold.

Price assumptions used in the Copper Equivalent Calculations are as follows:

- Cu: US$7,714/t (US$3.50/lb); Au: US$1,850/oz; and Ag: US$20/oz; Mo: US$37,468/t (or US$17/lb); and Re: US$1,800/kg.

Assumed metallurgical recoveries are based on historic metallurgical work at Kalman and are as follows: Cu 86%; Au 74%; Ag 74%; Mo 86%; and Re 77%.

The resulting recovered copper equivalent equation is:

CuEq Recovered = 0.86*Cu + (0.74*0.771*Au) + (0.74*0.0083*Ag) + (0.86*4.86Mo) + (0.77*0.023*Re).

Copper is the dominant metal of the Kalman mineral system and is estimated to generate the highest proportion of revenue from the deposit at the time of the resource estimation. Reporting is conducted for CuEq Recovered, CuEq Contained and for individual component metals.

Mineral Resource Reporting – Classification Criteria

The Mineral Resource has been classified as Indicated and Inferred based on confidence in the geological model, continuity of mineralisation, drilling density, confidence in the underlying database and bulk density information. Most of the mineralisation interpreted and estimated has been classified for reporting. Mineralisation with isolated and/or very few drill hole intercepts remain unclassified until increased confidence in their volume, orientation and grade tenor is established with further drilling.

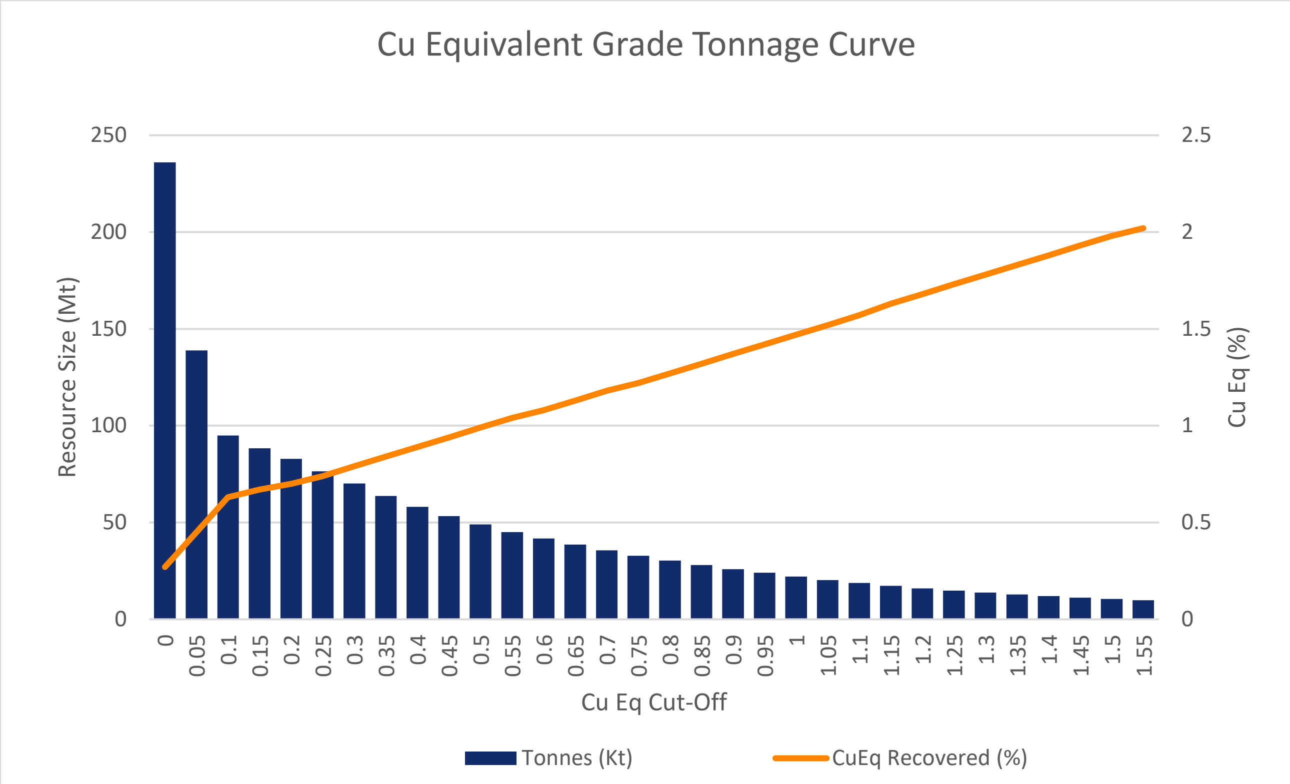

***Figure 4**: Kalman Cu Equivalent Grade Tonnage Curve.*

Mineral Resource Reporting – Reasonable Prospects of Extraction Hurdle

Clause 20 of the JORC Code (2012) requires that all reports of Mineral Resources must have reasonable prospects for eventual economic extraction, regardless of the classification of the resource. The competent person deems that there are reasonable prospects for eventual economic extraction as the Kalman deposit is of sufficient grade and tonnage to be mined from surface.

In 2019 a high-level pit optimisation was carried out on the 2016 Mineral Resource Estimate. This optimisation indicated that open pit mining techniques could be used to a depth of approximately 300m from the surface. Using forward-looking metal price assumptions, the project would have a positive, indicative undiscounted net value. Material below the 300m depth could be extracted using underground mining methods.

This optimised pit shell was utilised to classify the transition between possible open pit and underground extraction.

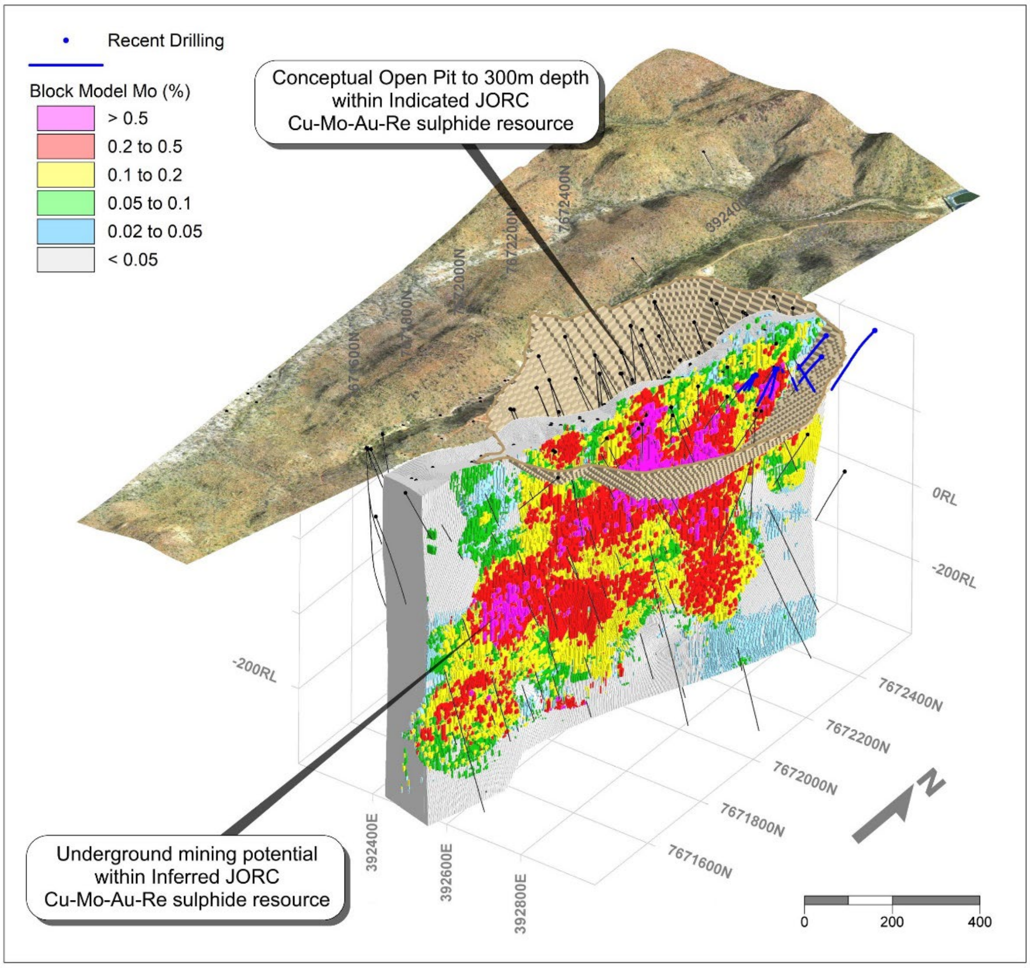

Figure 5. *Kalman oblique view looking northwest showing Molybdenum % blocks.*

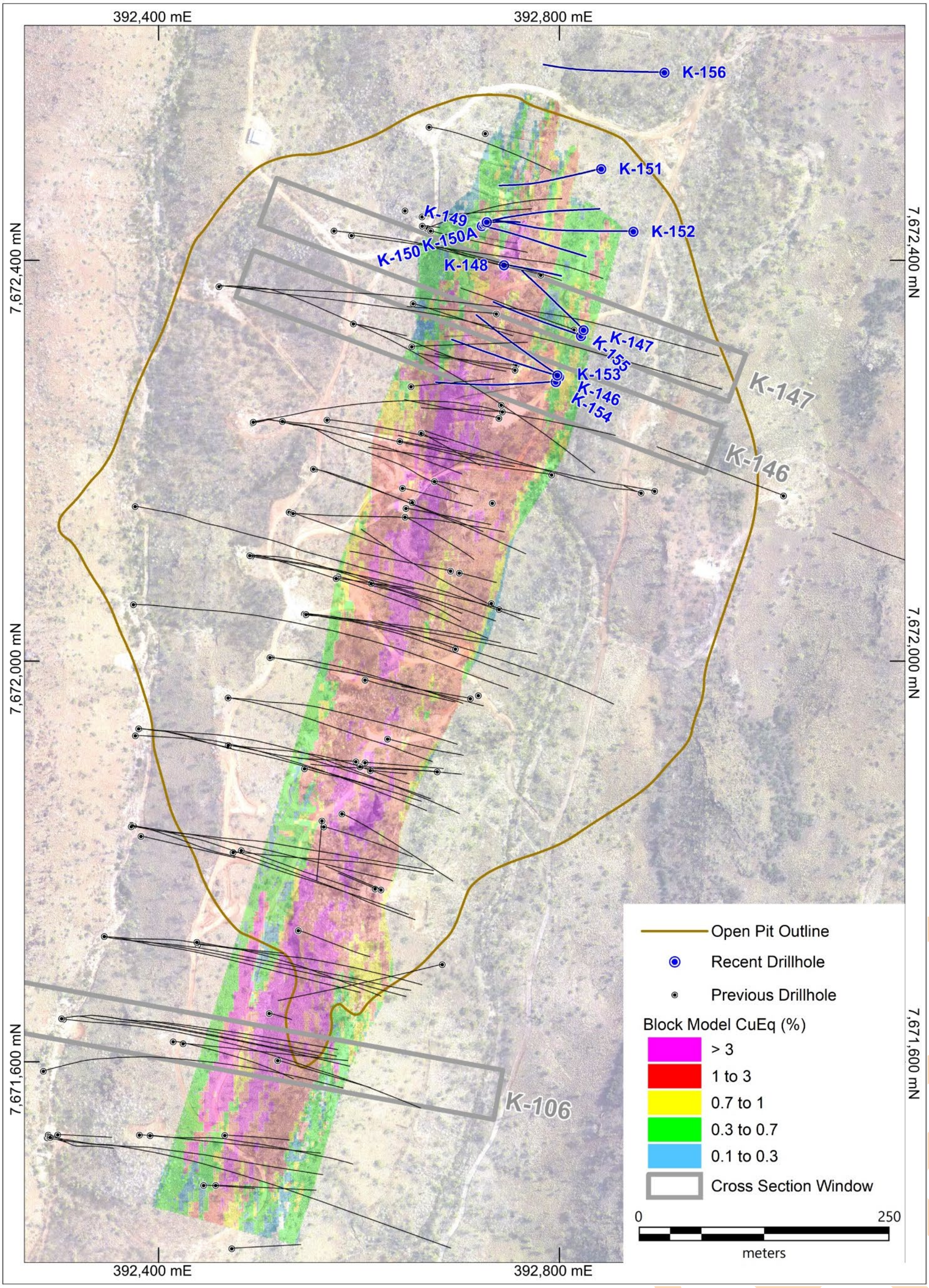

Figure 6. *Plan view of the Kalman Deposit showing the current Resource model.*

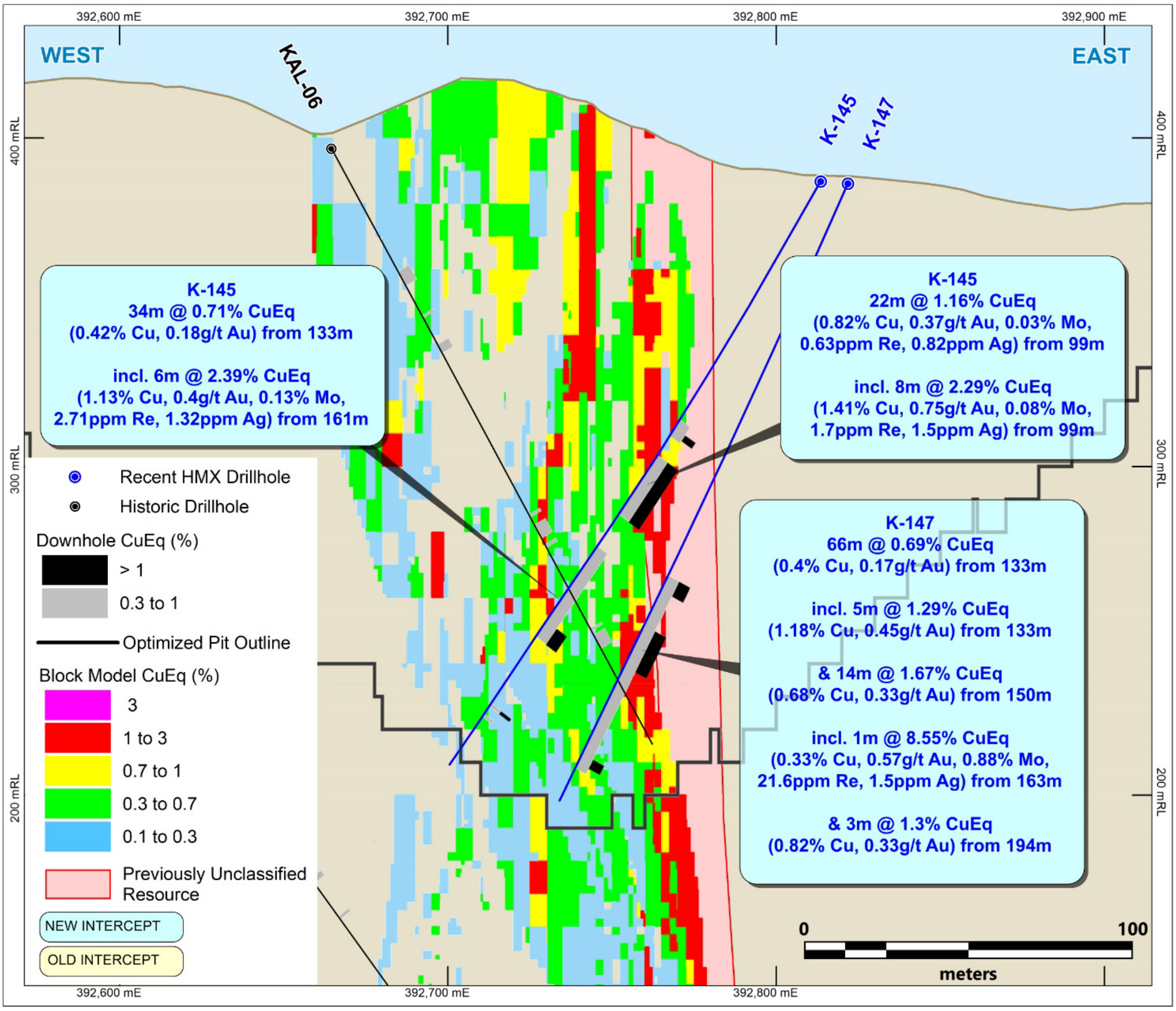

Figure 7. *Oblique Section 7672340mN through recent drilling highlighting the additional mineralisation now incorporated into the Updated MRE. (See ASX Announcement 13 February 2022)*

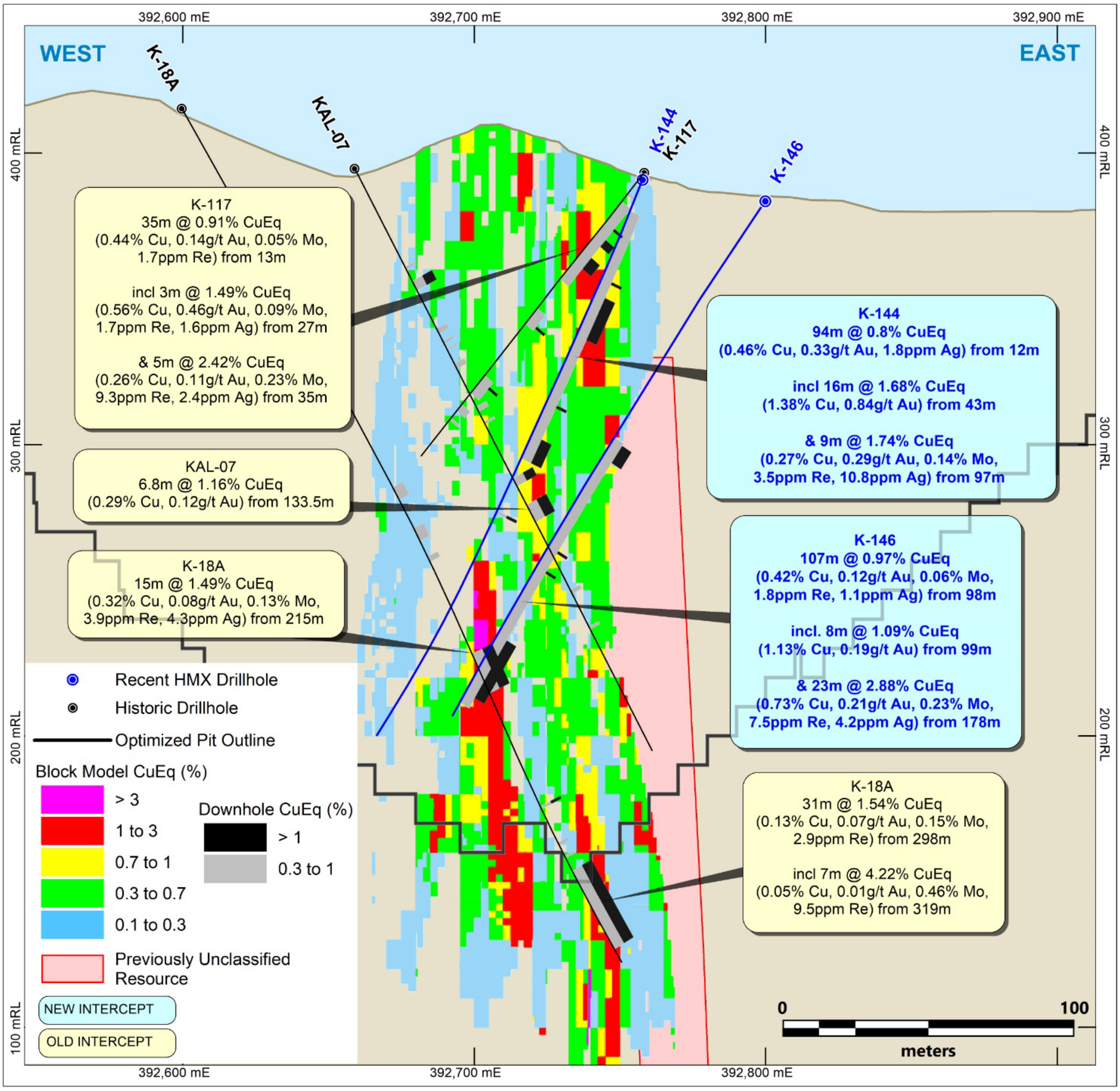

Figure 8. *Oblique Section 7672300mN through recent drilling highlighting the additional mineralisation now incorporated into the Updated MRE. (See ASX Announcement 13 February 2022)*

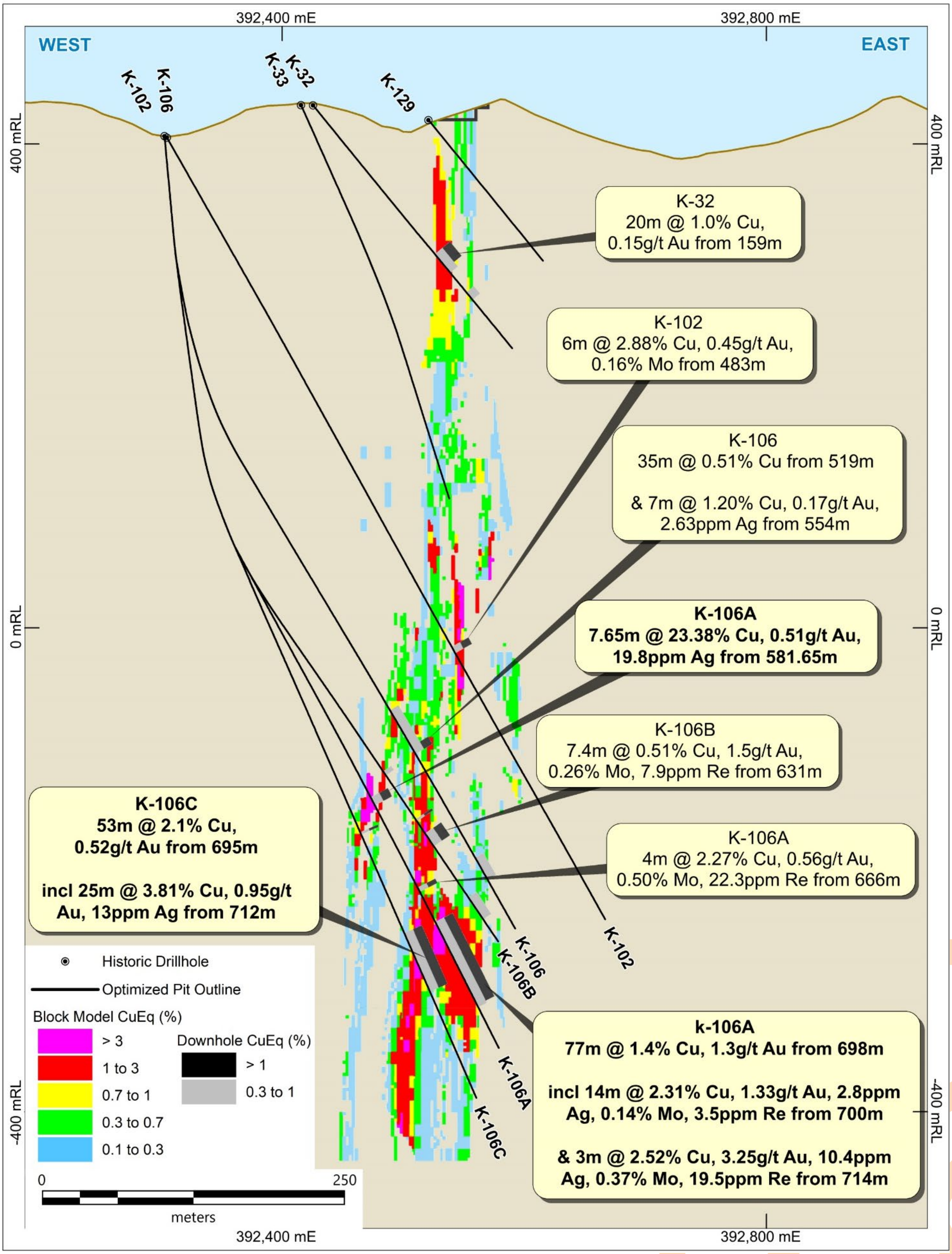

Figure 9. *Oblique Section 7671630mN through K-106 showing drilling, significant intercepts and the updated MRE. (See ASX Announcement 13 February 2022)*

Table 5. *Kalman MRE. Grade Tonnage Report by Contained Copper Equivalent Cut-off*

Grade Tonnage report by Contained Copper Equivalent (CuEq) Cut-off								
CuEq Cut-Off (%)	Tonnes (Kt)	CuEq Recovered (%)	CuEq Contained (%)	Cu (%)	Mo (%)	Au (g/t)	Ag (g/t)	Re (g/t)
1.55	9,838	2.02	2.41	0.85	0.22	0.46	2.5	4.9
1.5	10,460	1.98	2.36	0.83	0.22	0.45	2.5	4.8
1.45	11,200	1.93	2.3	0.81	0.21	0.45	2.4	4.7
1.4	11,965	1.88	2.25	0.8	0.2	0.44	2.4	4.5
1.35	12,879	1.83	2.18	0.78	0.2	0.43	2.3	4.4
1.3	13,809	1.78	2.13	0.76	0.19	0.42	2.3	4.2
1.25	14,890	1.73	2.06	0.74	0.18	0.41	2.2	4.1
1.2	15,980	1.68	2.01	0.73	0.18	0.4	2.2	3.9
1.15	17,301	1.63	1.94	0.71	0.17	0.39	2.1	3.8
1.1	18,742	1.57	1.88	0.7	0.16	0.38	2.1	3.6
1.05	20,334	1.52	1.82	0.68	0.16	0.37	2.0	3.4
1	22,044	1.47	1.76	0.67	0.15	0.36	2.0	3.3
0.95	23,981	1.42	1.69	0.65	0.14	0.35	1.9	3.1
0.9	25,900	1.37	1.64	0.64	0.13	0.34	1.9	3.0
0.85	27,980	1.32	1.58	0.63	0.13	0.33	1.8	2.8
0.8	30,300	1.27	1.52	0.61	0.12	0.32	1.8	2.7
0.75	32,847	1.22	1.46	0.6	0.11	0.31	1.7	2.5
0.7	35,620	1.18	1.41	0.58	0.11	0.3	1.7	2.4
0.65	38,623	1.13	1.35	0.57	0.1	0.29	1.6	2.3
0.6	41,682	1.08	1.3	0.55	0.1	0.28	1.6	2.2
0.55	45,032	1.04	1.24	0.53	0.09	0.27	1.5	2.0
0.5	48,932	0.99	1.19	0.52	0.09	0.25	1.5	1.9
0.45	53,274	0.94	1.13	0.5	0.08	0.24	1.4	1.8
0.4	58,087	0.89	1.07	0.48	0.07	0.23	1.4	1.7
0.35	63,768	0.84	1.01	0.46	0.07	0.22	1.3	1.5
0.3	70,074	0.79	0.95	0.44	0.06	0.2	1.3	1.4
0.25	76,392	0.74	0.89	0.41	0.06	0.19	1.2	1.3
0.2	82,861	0.7	0.84	0.39	0.05	0.18	1.1	1.2
0.15	88,366	0.67	0.8	0.38	0.05	0.17	1.1	1.2
0.1	95,000	0.63	0.75	0.36	0.05	0.16	1.0	1.1
0.05	138,933	0.45	0.53	0.26	0.03	0.11	0.8	0.8
0	236,021	0.27	0.33	0.16	0.02	0.07	0.5	0.5

Expected Newsflow

- **May – Resources Rising Stars Conference Presentation**
- **May – EM results and interpretation**
- **May – Hardway Drilling Results**
- **May – Mount Hope region drilling commencement**
- **June/July– Yandal lithium-nickel-gold air-core drilling program**
- **June/July –South Hope, Mascotte, Mascotte Junction and Stubby drilling results**

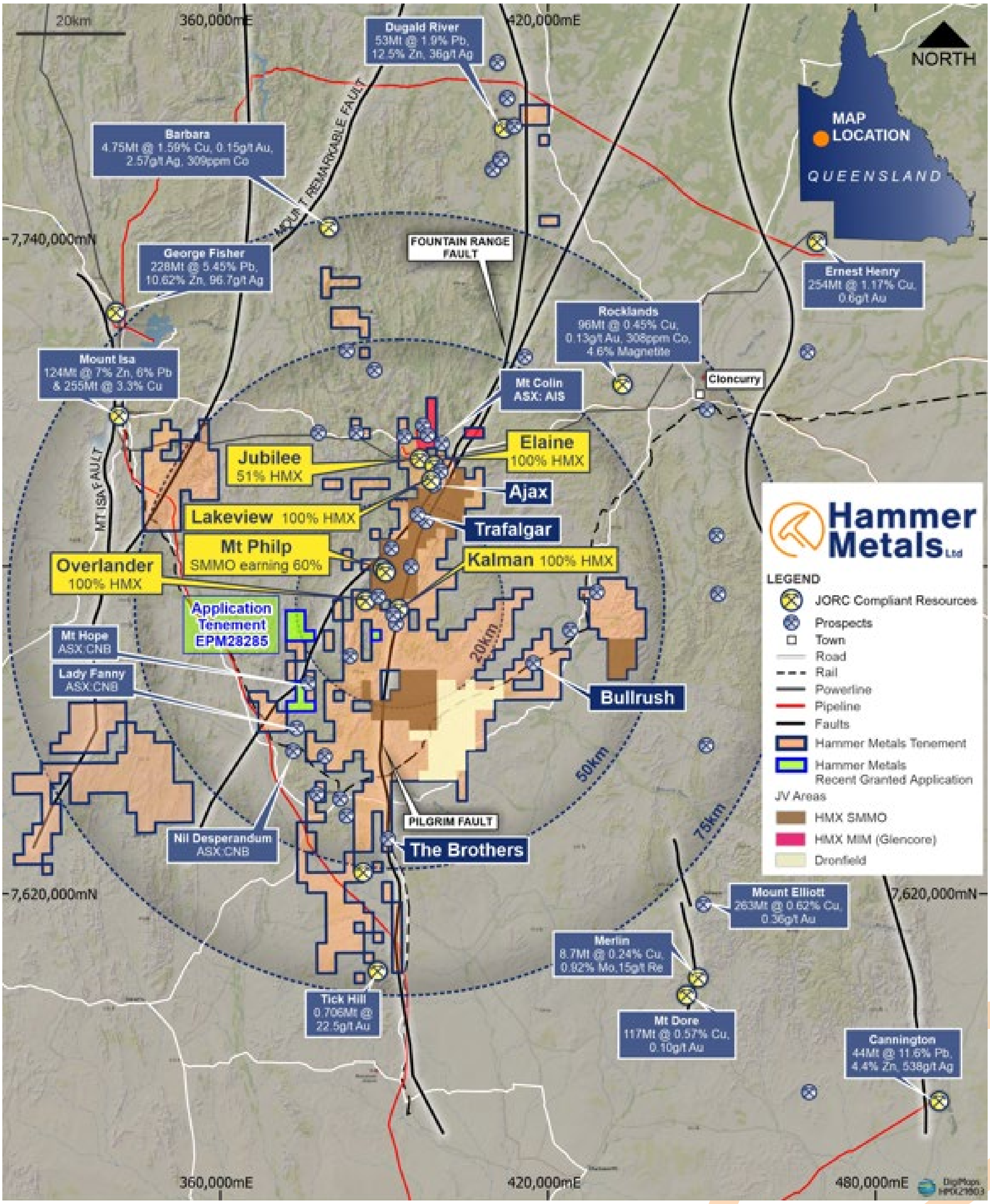

Figure 10. *Mount Isa Project Area.*

This announcement has been authorised for issue by the Board of Hammer Metals Limited in accordance with ASX Listing Rule 15.5.

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About Hammer Metals

Hammer Metals Limited (ASX: HMX) holds a strategic tenement position covering approximately 2,600km^2 within the Mount Isa mining district, with 100% interests in the Kalman (Cu-Au-Mo-Re) deposit, the Overlander North and Overlander South (Cu-Co) deposits and the Elaine (Cu-Au) deposit. Hammer also has a 51% interest in the Jubilee (Cu-Au) deposit. Hammer is an active mineral explorer, focused on discovering large copper-gold deposits of Ernest Henry style and has a range of prospective targets at various stages of testing.

Hammer holds a 100% interest in the Bronzewing South Gold Project located adjacent to the 2.3 million-ounce Bronzewing gold deposit in the highly endowed Yandal Belt of Western Australia.

Competent Person Statements

The information in the release that relates to the Estimation and Reporting of the Kalman Mineral Resources has been compiled and reviewed by Ms Elizabeth Haren of Haren Consulting Pty Ltd ("HC") who is an independent consultant to Hammer Metals Limited and is a current Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy and Member of the Australian Institute of Geoscientists. Ms Haren has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activities undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code of Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code).

The information in this report as it relates to exploration results and geology was compiled by Mr. Mark Whittle, who is a Fellow of the AusIMM and an employee of the Company. Mr. Whittle, who is a shareholder and option-holder, has sufficient experience which is relevant to the styles of mineralisation and types of deposit under consideration and to the activities which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr. Whittle consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

The information in this report that relates to historic exploration results was prepared and first disclosed under a pre-2012 edition of the JORC code. The data has been compiled and validated. It is the opinion of Hammer Metals that the exploration data is reliable. Nothing has come to the attention of Hammer Metals that causes it to question the accuracy or reliability of the historic exploration results. In the case of the pre-2012 JORC Code exploration results, they have not been updated to comply with 2012 JORC Code on the basis that the information has not materially changed since it was last reported.

Notes on Recovered Copper Equivalent Calculation

Copper equivalent (CuEq) grades were calculated from downhole assays for Cu, Au, Ag, Mo and Re. The CuEq calculation is based on commodity process and metallurgical recovery assumptions as detailed in this release. Prices utilised by Hammer reflect the current metal prices as of early April 2023.

Copper Equivalent Price assumptions are: Cu: US$7,714/t (US$3.50/lb); Au: US$1,850/oz; Ag: US$20/oz; Mo: US$37,468/t (or US$17/lb); and Re: US$1,800/kg. Assumed metallurgical recoveries are tabulated below.

The recovered copper equivalent equation is: CuEq Recovered = 0.86*Cu + (0.74*0.771*Au) + (0.74*0.0083*Ag) + (0.86*4.86*Mo) + (0.77*0.023*Re). Copper is the dominant metal of the Kalman mineral system and it generated the highest proportion of revenue from the deposit at the time of the resource estimation.

Assumed Metallurgical Recoveries

Based on the testing completed and the current understanding of the material characteristics it has been assumed that the Kalman material can be processed using a "typical" concentrator process flowsheet. The mass balance and stage metallurgical recovery of the four major elements were based on the metallurgical test results from the molybdenum zone sample and benchmarks. The final overall recovery (table below) was established from the mass balance and benchmarked against other operations and projects.

It is the company's opinion that the metals used in the metal equivalent equation have reasonable potential for recovery and sale based on based on metallurgical recoveries in floatation test work undertaken to date. There are a number of well-established processing routes for copper-molybdenum deposits and the sale of the resulting copper and molybdenum concentrates.

Molybdenum concentrates with rhenium require roasting to capture the rhenium from the process off-gas. There are several offshore facilities that process molybdenum concentrates.

Because of the relatively small market for Re there is limited public information available for the payments of credits for rhenium. Enquiries by the company provides the company with sufficient confidence to believe that a credit for the rhenium content of the molybdenum concentrate can be obtained.

Assumed Metallurgical Recoveries

Process Stage	Molybdenum Recovery (%)	Rhenium Recovery (%)	Copper Recovery (%)	Gold Recovery (%)	Silver Recovery (%) *
Bulk Rougher	95	86	95	82	82
Overall	86	77	86	74	74
* - No Data available for Silver recoveries so they have been assumed similar to Gold recoveries					

JORC Table 1 report – Kalman Mineral Resource Estimate Update

- This table is to accompany an ASX release updating the market with information pertaining to the updated mineral resource estimate for the Kalman Au-Cu-Mo-Re deposit (EPM13870 and EPM26775).
- The estimation was conducted by Haren Consulting.
- Historic exploration data noted in this, and previous releases has been compiled and validated. It is the opinion of Hammer Metals that the exploration data are reliable.
- The previous iteration of the Kalman Resource was reported by Hammer Metals to the ASX on 27 September 2016. Since that time Hammer Metals has undertaken multiple drilling programs over the deposit, the last of which was reported to the ASX on 13 February 2023.

Section 1 Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	*Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc).* *These examples should not be taken as limiting the broad meaning of sampling.* *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* *Aspects of the determination of mineralisation that are Material to the Public Report.* *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	Drilling was conducted utilising a combination of reverse circulation and diamond drilling methods over a period between October 2005 to December 2023. The drilling dataset utilised in the resource update consisted of a total of 151 holes for a total of 51.63km and 33580 assay samples. The average downhole length of these samples was 1.04m with an average weight of 3.66kg All the holes incorporated into this release have been previously released to the market. Samples were dominantly taken at 1m intervals. In unmineralised zones, a riffle split of each metre interval was conducted with the split portions then being combined to produce a composite sample. Where mineralisation was anticipated or encountered, the sample length was reduced to 1m with lab submission of the 1m samples. All samples submitted for assay underwent fine crush with 1kg riffled off for pulverising to 75 microns. Samples were submitted to ALS for: • Fire Assay with AAS finish for gold (30gm or 50gm charge). Method AU-AA22, Au-AA25 or Au-AA26 • The base metal method was in all cases ICP, with samples being analysed via OES or MS. The digest utilised also differed with some samples utilising a 3-acid digest and some a 4-acid digest.

Criteria	JORC Code explanation	Commentary
		With Hammer Metals drilling, Portable XRF analysis was conducted in the field on each 1m interval.
Drilling techniques	*Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	Holes were drilled by multiple drilling companies. Downhole orientation surveys were conducted using a single shot reflex camera through to gyro tools. Each orientation was reconciled with its neighbours before being accepted.
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.* *Measures taken to maximise sample recovery and ensure representative nature of the samples.* *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	Based on experience at the deposit, sample recoveries were generally in excess of 80%. Recoveries are typically low in the first 5m of each hole. For reverse circulation drilling, size differences between primary and duplicate samples were monitored at the rig and remedial action taken immediately. Any size bias in the collected sample was noted at the rig and corrected immediately. Sample size vs grade was analysed and no correlation was seen. Primary and QAQC assays were examined for signs of smearing. None was detected.
Logging	*Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* *The total length and percentage of the relevant intersections logged.*	Of the 51.63km of drilling utilised in this resource update, all drilling was geologically logged by personnel from either Hammer Metals Ltd or Kings Minerals NL.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.* *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* *Measures taken to ensure that the sampling is representative of the insitu material collected, including for instance results for field duplicate/second-half sampling.*	Data from 151 drill holes (51,634.2 metres) were used for the interpretation and estimation. The holes are either Reverse Circulation (RC), 67 holes (44%) or Diamond (DD), 84 holes (56%). **Reverse Circulation method** Samples consist of RC drill chips. Samples from the hole were collected by a three-way splitter with A and B duplicates taken for every sample. Samples were taken at dominantly one metre intervals however where 2 or 4 metre composites were created, samples were composited by riffle splitting material from each one metre sample bag.

Criteria	JORC Code explanation	Commentary
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Where evidence of mineralisation was encountered or anticipated, the sample length was reduced to 1m. The average sample length for the dataset in the MRE averaged at 1m. **Diamond Drilling** For drill core half core was utilised for assay. The average sample interval was approximately 1m. Standard reference samples and blanks were each inserted into the laboratory submissions at a rate of 1 per 25 samples. Duplicate samples were taken at an interval of approximately 1 in 50 samples. QAQC samples were inserted at a rate of 4 samples for every 100 samples analysed. The sample collection methodology and sample size is considered appropriate to the target-style and drill method, and appropriate laboratory analytical methods were employed.
Quality of assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	All samples submitted for assay underwent fine crush with 1kg riffled off for pulverising to 75 microns. Samples were submitted to ALS for: • Fire Assay with AAS finish for gold (30gm or 50gm charge). Method AU-AA22, Au-AA25 or Au-AA26 • The base metal method was in all cases ICP, with samples being analysed via OES or MS. The digest utilised also differed with some samples utilising a 3-acid digest and some a 4-acid digest. For Hammer Metals Drilling, in addition to the Hammer in-house certified reference materials, the assay laboratory maintains a comprehensive QAQC regime, including check samples, duplicates, standard reference samples, blanks and calibration standards. QAQC analysis indicates that in general, the Cu, Au, Mo and Re assay performance is within acceptable limits and shows no systematic bias. In the entire dataset utilised in the resource a total of 1382 QA QC samples were utilised. These samples were all certified reference materials produced either by OREAS or Kings Minerals NL.

Criteria	JORC Code explanation	Commentary
		A range of blank CRMs were employed. All results were low, with Au, Cu, Mo, and Re each reporting one low-grade outlier. Three moderate to ore-grade CRM's (S1, S2, S3) were most commonly employed. These are certified for elements Au, Cu and Mo. Performance limits were set at 3 standard deviations from the mean of the certification dataset. • Lab batches reported in 2008 showed ranges wider than the set limits on all three CRMs. • Au performance was otherwise within limits, with no systematic bias. • Cu performance for S1 and S3 was otherwise acceptable, with no systematic bias. S2 was entirely within limits, with a slightly high bias across the board. • Mo performance was otherwise acceptable. Available field duplicate records show significant variances for all elements, with correlation coefficients of 0.7 (Au), 0.8 (Cu), 0.6 (Mo), and 0.09 (Re). Laboratory duplicates reported good correlations exceeding 0.99, except for Cu with a value of 0.89 due to two outliers reported in 2014. A program of umpire sampling in 2015 involved sending 26 selected samples from ALS Laboratories to Intertek Laboratories for comparable analysis. Cu, Mo and Re all reported good correlations of >0.97. Au showed a poor correlation of 0.46.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.* *The use of twinned holes.* *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* *Discuss any adjustment to assay data.*	Haren Consulting has not independently verified any intervals however two company personnel independently verified analyses and assay intervals. Geological logging was conducted by company personnel from Kings Minerals NL and Hammer Metals Limited. Geologists logged onto ether paper or into computer. Form Hammer Metals Limited geologists logged directly into Excel spreadsheets on a Panasonic Toughbook computer, which were subsequently imported to a Sql Server relational database. The assay data was verified against portable XRF results and sample logs. Assay values below detection were stored in the database as minus the detection limit.

Criteria	JORC Code explanation	Commentary
		Intervals with no samples were recorded in the sample table and excluded from the assay table in the database. Assay files were received electronically from the laboratory.
Location of data points	*Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* *Specification of the grid system used.* *Quality and adequacy of topographic control.*	All drillholes utilised in the resource update have had their collar positions using a cm-accuracy DGPS instrument. Down hole surveys were conducted using gyro or digital down-hole camera. LiDAR survey data was used to create a topographic surface; this was confirmed by independent DGPS drill hole collar locations.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.* *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* *Whether sample compositing has been applied.*	The drill hole spacing throughout the project is approximately 100 to 120m along strike with some 50 to 60m infill drilling. Drill spacing down dip is of similar dimensions. The Kalman deposit shows consistent continuity of mineralisation within well-defined geological constraints which have been largely confirmed by the recent drilling by Hammer. The drill spacing is sufficient to allow the grade intersections to be modelled into coherent wireframes for each domain. For Mineral Resource estimation samples have been composited to 1m lengths using 'best fit' techniques. The mineralised domains have demonstrated sufficient continuity in both geological and grade continuity to support the definition of Indicated and Inferred Mineral Resources, and the classifications applied under the 2012 JORC Code
Orientation of data in relation to geological structure	*Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	Drill holes are orientated predominantly to an azimuth of approximately 90° and drilled at an angle of -60° to the east which is approximately perpendicular to the orientation of the mineralised trends. Some drill hole targeting deeper mineralisation intersections are drilled at steeper angles. Recently drilling conducted in 2023 was oriented at an azimuth of approximately 270° in order to test the eastern side of the orebody at a shallow level. The orientation of the drilling is usually at a high angle to the strike and dip of the mineralisation. No orientation-based sampling bias has been identified in the data.
Sample security	*The measures taken to ensure sample security.*	Diamond half-core and RC samples are packed into poly bags which are stacked on pallets for road transport to the laboratory by

Criteria	JORC Code explanation	Commentary
		company personnel. Bags are individually numbered and addressed. For Hammer RC drilling pre-numbered bags are used and transported by company personnel to the ALS Laboratory in Mount Isa. ALS transports samples to its laboratories in Townsville or Brisbane when required. No information is available regarding security of historical diamond drilling samples.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	All assay data has been reviewed by two company personnel. No external audits have been conducted.

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	*Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	The Mount Isa Project consists of 34 tenements. The Kalman Deposit is located within EPM26775 and EPM13870. Based on the 2016 MRE approximately 63% of the metal tonnes are located on EPM13870 and the remainder on EPM26775. Both tenements are held by Mt Dockerell Mining Pty Ltd, a 100% owned subsidiary of Hammer Metals Limited.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	Previous exploration over the tenement area has been conducted by a number of parties since 1969, including Texins, Pimex, MIM, Kings Minerals, Cerro Resources and SMD. Midas Resources Ltd (now Hammer) acquired the project area in 2013. Where available the historical data has been appraised and is of acceptable quality.
Geology	*Deposit type, geological setting and style of mineralisation.*	The Kalman Deposit is located within the Eastern Succession of the Mount Isa Inlier. It occurs adjacent to the Pilgrim Fault Zone, a major crustal suture transecting the Mount Isa Inlier that separates the Wonga Sub-Province from the Ewan-Malbon Sub-Province. In the vicinity of Kalman the fault abuts the Corella Formation against Overhang Jaspillite. The project area is principally underlain by the Palaeoproterozoic Corella Formation. This is described as a sequence of mixed siliclastic/carbonate rocks possibly deposited as fine grain pelites and evaporates in an ephemeral playa lake. Local accumulations of basic volcanics are present within the Corella Formation as both fine grained lavas with inter-mixed volcaniclastics and medium grained porphyritic high level intrusives. These

Criteria	JORC Code explanation	Commentary
		sediments and volcanics have been regionally metamorphosed to amphibolite facies. Kalman represents an intrusion-related style of hydrothermal Mo-Re-Cu-Au mineralisation hosted by calc-silicate rocks originally comprised dominantly of alkali feldspar with lesser tremolite, apatite, biotite and sphene.
Drill hole Information	*A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: easting and northing of the drill hole collar elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar dip and azimuth of the hole down hole length and interception depth hole length.* *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	KAL-prefix holes from the 1980s were used to guide mineralisation interpretation but were excluded from the Kalman estimate. This reflected the historical nature of the data, assay quality concerns and the uncertain location of the samples.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* *Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	Exploration results are not being reported.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.* *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	Exploration Results are not discussed in this report. Drill holes were orientated predominantly to an azimuth of approximately 90° and angled to a dip of -60°, which is approximately perpendicular to the orientation of the mineralised trends. As the mineralization generally dips vertical to steeply west the true width is approximately 50% of the quoted drill intersections. Diamond drill holes generally intersected the mineralization with dips of 50 to 60°. True widths are therefore between 64 and

Criteria	JORC Code explanation	Commentary
		50% of the quoted drill intercept. Holes are inclined at 55 to 60° from horizontal to intersect the steeply dipping (~70° to 90°) mineralised structure.
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Appropriate figures are in the body of this report.
Balanced reporting	*Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced avoiding misleading reporting of Exploration Results.*	Exploration results are not being reported.
Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	The MRE being reported herein builds upon a previously reported MRE (see ASX announcement dated 27/9/2016).
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Hammer Metals Limited aims to undertake updated Open Pit optimisation and ore sorting studies. Planning is underway for further infill drilling to progressively update the confidence in the Kalman MRE.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	JORC Code explanation	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* *Data validation procedures used.*	Drill logging data and assay results are generated digitally, compiled and validated prior to import to a central database. Assay results are not compiled for import until final QAQC data and certification has been received from the analytical laboratory. A suite of validation routines are carried out across the database on a regular basis. HC understands that Hammer have undertaken detailed and systematic cross checking of historical data to ensure maximum integrity in the data used for Mineral Resource estimation.

Criteria	JORC Code explanation	Commentary
		HC also performed general data audits and checks on the supplied data. No errors were found.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* *If no site visits have been undertaken indicate why this is the case.*	No site visit has been undertaken by HC due to financial constraints
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* *Nature of the data used and of any assumptions made.* *The effect, if any, of alternative interpretations on Mineral Resource estimation.* *The use of geology in guiding and controlling Mineral Resource estimation.* *The factors affecting continuity both of grade and geology.*	The interpretations are guided by the broader regional geological setting and local field observations. The gross geology of the Kalman deposit is well understood. Drill hole logging by geologists, through direct observation of drill core and percussion samples have been used to interpret the geological setting. The continuity of the main mineralised lodes is clearly observed by relevant grades within the drill holes. The drilling and trench sampling suggest the current interpretation is robust. The nature of the domains would indicate that alternate interpretations are possible as the higher-grade mineralisation is thin however this would have little impact on the overall Mineral Resource estimation as the complete package across strike extent is well defined. Weathering and lithology were not used in the generation of the wireframes for the Mineral Resource estimation as the mineralisation was restricted to the fresh (unweathered) portion of the calc-silicate host rocks. Wireframes were based on the chemical analyses for Cu and Mo. The confidence in the geological interpretation is considered to be good. The deposit is similar in style to many polymetallic deposits in Mount Isa Inlier. The geological logging and the results of the geostatistical analyses have been useful in predicting the continuity of the mineralisation for the Mineral Resource estimation.
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	The interpreted Kalman Mineral Resource mineralisation is interpreted to extend over a strike length of 1060m and from surface to approximately 780m below surface.
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation*	The mineralisation 1 m composites exhibit approximately log-normal distributions within each sub-domain which is suitable for estimation by ordinary kriging. Ordinary

Criteria	JORC Code explanation	Commentary
	parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource Estimate takes appropriate account of such data.* *The assumptions made regarding recovery of by-products.* *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* *Any assumptions behind modelling of selective mining units.* *Any assumptions about correlation between variables.* *Description of how the geological interpretation was used to control the resource estimates.* *Discussion of basis for using or not using grade cutting or capping.* *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	Kriging ("OK") interpolation with dynamic anisotropy oriented 'ellipsoid' searches were used for the estimate. A mineralisation package was wireframed to constrain the estimate. Within the package high- and low-grade sub-domains were defined by a probability estimate for Cu, Au and Ag and another probability estimate for Mo and Re. Sample data was composited to 1 m down hole lengths using the 'best fit' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CVs, and summary multi-variate and bi-variate statistics) using Supervisor software. The maximum distance of extrapolation from data points for reportable Mineral Resources was around 50m. The current HC estimate is an update of the reported 2016 Mineral Resource estimate for the Kalman deposit. No mining has occurred in the area. HC has assumed that the deposit will be mined, and the ore processed a suite of elements including Cu, Mo, Au, Ag and Re. The Mineral Resource reporting has assumed forward-looking prices for these elements and a Copper Equivalent ("CuEq") value has been calculated for each block. The Mineral Resource reporting used the CuEq value for reporting cut-off purposes. No assumptions have been made regarding recovery of by-products. No non-grade elements have been estimated. The parent block dimensions used were 5m E by 10m N by 10m RL with sub-cells of 1.25m E by 1.25m N by 1.25m RL. The parent block size was selected through kriging neighbourhood testing and considering the dimensions of the domains and drill hole spacing. Selective mining units were not modelled. There are some correlations between Cu, Au and Ag and good correlations between Re and Mo. In these cases, the variogram models and estimation parameters were similar to attempt to preserve correlation

Criteria	JORC Code explanation	Commentary
		however each variable was estimated independently. Top-cuts were required for some elements in some domains as there were extreme grades which would result in overestimation using ordinary kriging if not addressed. To assist in the selection of appropriate top-cuts, log-probability plots and histograms were generated. Validation of grade estimates was completed using a three-stage process. The first is a global comparison of declustered and top-cut (where required) composites key statistics to the block model estimates for the first search pass as well as subsequent search passes. The second is a trend analysis where the declustered and top-cut (where required) composites are sliced into windows in multiple directions and compared. The third is careful local validation of composite grades to estimated grade in multiple orientations to ensure expected grade trends are reproduced and the estimates are a good reflection of the input composites and estimation parameters. Where required, parameters were adjusted in an iterative process to ensure a robust estimation. Validation results showed good correlation between the sample grades and the block model grades. Datamine version 1.13.202.0 was used for block modelling, estimation, and reporting. Supervisor version 8.15.0.3 was used for statistical and geostatistical analysis.
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis. No moisture values were reviewed.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	Analysis applying both Open Cut and Underground mining parameters have indicated that it is appropriate to report the Kalman Mineral Resource using two cut-off grades as this is more relevant to the longer-term expectations of eventual economic extraction. A cut-off of 0.4% CuEq for Open Cut type material above 75mRL and 1.0% CuEq for Underground material below 75mRL has been applied for reporting Mineral Resources.
Mining factors and assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the*	The results of the high-level estimate of Open Cut Ore Reserves indicate that the deposit could potentially be mined using small-scale open pit techniques. In 2019 a

Criteria	JORC Code explanation	Commentary
	process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	high-level pit optimisation was carried out which indicated that open pit mining techniques could be used to a depth of approximately 300m from the surface. Using forward-looking metal price assumptions, the project would have a positive, indicative undiscounted net value. Material below the 300m depth could be extracted using underground mining methods.
Metallurgical factors and assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	A metallurgical test program was completed on ten samples from the molybdenum zone of the Kalman Deposit. Sighter flotation tests conducted on the molybdenum composite sample indicated that a primary grind between P80 150 µm and 180 µm and a collector combination of SIPX and diesel generated good recovery of pay metals to the rougher concentrate.
Environmental factors and assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	No assumptions have been made by HC regarding possible waste and process residue disposal options. It is assumed that no environmental factors exist that could prohibit any potential mining development at the deposit.
Density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	Bulk density is applied based on data collected from the fresh material. The entire Kalman deposit is considered fresh. 1,074 bulk density values were used to determine an average bulk density of 2.7 t/m^3 for mineralised material with 4,359 values for un-mineralised material having an average of 2.8 t/m^3. The bulk density was assigned as a dry bulk density.
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.* *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and*	Mineral Resources were classified in accordance with the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC, 2012 Edition). The deposit has been tested with high quality drilling, sampling and assaying.

Criteria	JORC Code explanation	Commentary
	metal values, quality, quantity and distribution of the data). *Whether the result appropriately reflects the Competent Person's view of the deposit.*	Geological logging has defined structural and lithological controls that provide confidence in the interpretation of mineralisation boundaries. HC considers that geological and mineralisation continuity has been demonstrated with sufficient confidence to allow the Kalman deposit to be classified as Indicated and Inferred Mineral Resources. The classification is in line with previous estimates and reflects the addition of new drilling and exclusion of historical drilling and trenching information at the estimation stage. The Mineral Resource Estimate appropriately reflects the view of the Competent Person.
Audits and reviews	*The results of any audits or reviews of Mineral Resource Estimates.*	No external reviews or audits have been completed, internal audits have been completed which verified the technical inputs, methodology, parameters and results of the estimate.
Discussion of relative accuracy / confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource Estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	A quantitative procedure for assessing relative accuracy and precision has not been deemed appropriate by the Competent Person for the estimation of gold grade at this stage. The Kalman Mineral Resource estimates have been reported with degree of confidence commensurate with Indicated and Inferred Mineral Resources. The data quality is good and the drill holes have detailed logs produced by qualified geologists for all recent drilling. A recognised laboratory has been used for all analyses. The Mineral Resource statement relates to global estimates of tonnes and grade. No mining has occurred at the deposit.