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2022 Mineral Resource and Reserve Estimate for the Plutonic Gold Operations

Plutonic Gold Mine
Superior Gold Inc

Plutonic Gold Mine, Western Australia, Australia

NI 43-101 Report

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Important information about this report

Forward Looking Information

This report contains "forward-looking information" within the meaning of applicable securities laws that is intended to be covered by the safe harbours created by those laws. All statements, other than historical fact regarding Superior Gold Inc. ("**Superior**" or the "**Company**"), Billabong Gold Pty Ltd ("**Billabong**") and the Plutonic Gold Operations, Western Australia ("**Plutonic**"), are forward looking statements. "Forward-looking information" includes statements that use forward-looking terminology such as "may", "will", "expect", "anticipate", "believe", "continue", "potential" or the negative thereof or other variations thereof or comparable terminology.

Forward-looking information is not a guarantee of future performance and is based upon a number of estimates and assumptions of management at the date the statements are made. Furthermore, such forward-looking information involves a variety of known and unknown risks, uncertainties and other factors which may cause the actual plans, intentions, activities, results, performance or achievements of the Company to be materially different from any future plans, intentions, activities, results, performance or achievements expressed or implied by such forward-looking information. See "Risks and Uncertainties" in the Company's most recent Annual Information Form filed on SEDAR at www.sedar.com for a discussion of these risks.

The Company cautions that there can be no assurance that forward-looking information will prove to be accurate, as actual results and future events could differ materially from those anticipated in such information. Accordingly, investors should not place undue reliance on forward-looking information. Except as required by law, the Company and the Qualified Persons (as such term is defined in section 1.1 of NI 43-101) who authorise this report does not assume any obligation to release publicly any revisions to forward-looking information contained in this report to reflect events or circumstances after the date hereof.

Neither the TSX Venture Exchange (the "**Exchange**") nor its Regulation Services Provider (as such term is defined in the policies of the Exchange) accepts responsibility for the adequacy or accuracy of this report.

Information Risk

This report was prepared by Qualified Persons of Superior. In the preparation of the report, Superior has utilised information relating to operational methods and expectations provided to them by various sources. Where possible, Superior has verified this information from independent sources after making due enquiry of all material issues that are required in order to comply with the requirements of National Instrument 43-101 – Standards of Disclosure for Mineral Project ("**NI 43-101**"), of the Canadian Securities Administrators ("**CSA**") reporting instrument codes.

Operational Risk

The exploration for gold and subsequent mineralization definition, mine development and production by their nature contain significant uncertainties and operational risks. It therefore depends upon, amongst other things successful exploration and development drilling programmes and competent management. Profitability and asset values can be affected by unforeseen changes in operating circumstances and technical issues.

Political and Economic Risk

Factors such as local political or industrial disruption, gold price, currency fluctuation and interest rates could have an impact on future operations and potential revenue streams can also be affected by these factors. Most of these factors are usually beyond the control of any operating entity.

1 Summary

Billabong, a wholly-owned subsidiary of Canadian based Superior, is an Australian corporation that acquired Plutonic from Northern Star Resources Ltd. ("**Northern Star**") on October 11, 2016. The purpose of this report is to present Mineral Resources[1] and Mineral Reserves[2] for Plutonic for public disclosure by Superior. Data presented in this report is dated as at December 31, 2021.

Plutonic consist of underground mine (the "**Plutonic Underground**") and open pit operations (the "**Plutonic Open Pit**", and collectively, the "**Plutonic Gold Mine**" or the "**Project**") at Plutonic, open pits at the Hermes project area (the "**Hermes Gold Mine**"), an interest in the Bryah Basin Joint Venture ("**BBJV**") and a milling operation located at the Plutonic Gold Mine. Plutonic currently produces gold from a large underground operation and open pit operations, which re-started in 2021, through a traditional crushing, grinding and carbon-in-leach ("**CIL**") circuit. Historically, numerous open pits were mined at the Plutonic Gold Mine area between 1990 and 2005 while underground mining commenced in 1995. Underground mining is currently conducted from eight underground geological 'Fault Block' domain zones at an average rate of approximately 0.8 -1.0 Mtpa. The Hermes Gold Mine, which lies approximately 60 km southwest of the Plutonic Gold Mine, operated from 2017 to 2019. The Wilgeena deposit prospect project area ("**Hermes South**"), lies approximately 25 km south of the Hermes Gold Mine and is part of the BBJV.

The Mineral Resources reported from all these areas represent the consolidated Global Mineral Resource which also incorporates historic intersections encountered outside of the main underground working areas. These zones which have not previously been interpreted and are considered a significant indicator of the future of Plutonic and is supporting evidence that the Plutonic Gold Mine is a large mineralized system with long term potential.

The new program of Mineral Resource Estimation was part of a larger program of re-examining the geological modelling of the gold mineralization at the Plutonic Gold Mine. Historically, the Plutonic Underground has not mined to Mineral Reserve grade, and one of the primary goals of this latest Mineral Resource and Reserve estimation was to allow for more predictive planning and improved production forecasts.

Prior Mineral Resource estimations utilized open block models inherited by the Company that required further evaluation and definition. Experience with the Plutonic Gold Mine has demonstrated that open block models are not the most optimal method to identify the distribution of all mineralization, and in unconstrained high-grade areas may tend to overestimate or underestimate grades locally.

In consideration of this, the latest estimates have utilized geologically informed, form interpolant dynamic anisotropic controlled grade constrained models generated by sophisticated modern software after inputting detailed structural and lithological information and are expected to better demonstrate the grade and distribution of the mineralization. As a result, the Mineral Resource and Reserve grade has declined, but the confidence in the distribution of the mineralization, and the ability to mine to Reserve grade is expected to increase. Since Superior acquired Plutonic, the focus has been on better understanding the mineralization through the upgrading of pre-existing Inferred Mineral Resources to Measured and Indicated Mineral Resources and by adding Inferred Mineral Resources outside of that to demonstrate that the Plutonic Underground deposit remains open in multiple directions including at depth and there continues to be considerable progress in this respect.

A continuing aggressive program of underground drilling is underway to further upgrade Inferred Mineral Resources to Measured and Indicated Mineral Resources and also outline new areas of mineralization. Particular focus is given to better defining and expanding the high-grade mineralization at the Western Mining Front (i.e. Baltic West and Indian), Baltic Gap, Indian Access and Eastern Mining Front.

Given the increase in overall Mineral Resources and Mineral Reserves, and favourable economic conditions, re-examination of the potential to increase the rate of underground production is also underway. As part of the Mineral Resources and Mineral Reserves revision process, including the use or a lower reporting reserve cut-off grade, the underground grade has declined relative to the year end 2019 Reserves. This is also partly a

[1] As defined by CIM Standards on Mineral Resources and Mineral Reserves (November 2019) as required by NI 43-101.

[2] As defined by CIM Standards on Mineral Resources and Mineral Reserves (November 2019) as required by NI 43-101.

result of the change from the prior use of open block models to those based on geological interpretations using all available structural information.

Mineral Reserves as at December 31, 2021 were estimated using a long-term gold price of A$1,950 per ounce ($1,462 per ounce). Cut off grades for the Mineral Reserves for Plutonic Underground averaged 1.8 g Au/t (depending on stoping area), and 0.5 g Au/t for the open pit areas. Variable dilution rates averaging 20% was factored into the estimation of underground Mineral Reserves. Mineral Resources as at December 31, 2021 were estimated using a long-term gold price of A$2,150 per ounce ($1,612 per ounce). Cut off grades for the Mineral Resource estimates were 1.7 g Au/t for underground and 0.40 g Au/t for open pit within a 40 km radius from the Plutonic mill.

Development work is also being directed towards better defining further Open Pit Mineral Resources namely, Workshop, Salmon and Trout and Plutonic East.

A Preliminary Economic Assessment ("**PEA**") study for the Plutonic main pit area (the "**Main Pit**") was completed in December 2020 and reported in Superior's previous NI 43-101 technical report dated December 30, 2020. Superior initiated this study with technical input from RPM Global Consultants in September 2020 to assess the viability of a significant pit 'push-back' which was deemed appropriate with respect to better utilizing the existing Plutonic infrastructure and in consideration of a favourable gold price. Further engineering was completed and a Mineral Reserve in the Main Pit deeps is reported herein.

The Plutonic Main Pit historically produced approximately 2.5 million ounces and ceased operation in 2005.

Mineral Resources as at December 31, 2021 are summarised in Table 1-1. Mineral Resources are inclusive of those Mineral Resources converted to Mineral Reserves as presented in this document. Mineral Reserves as of December 31, 2021 are summarised in Table 1-2.

Table 1-1 ***Summary of Mineral Resources as at December 31 2021***

Category	**Measured**			**Indicated**			**Measured + Indicated**			**Inferred**		
	Tonnes (000's)	**Gold grade (Au g/t)**	**Cont. gold (koz)**	**Tonnes (000's)**	**Gold grade (Au g/t)**	**Cont. gold (koz)**	**Tonnes (000's)**	**Gold grade (Au g/t)**	**Cont. gold (koz)**	**Tonnes (000's)**	**Gold grade (Au g/t)**	**Cont. gold (koz)**
Underground												
Plutonic Main	4,567	4.8	705	4,294	4.4	610	8,860	4.6	1,315	16,810	5.2	2,830
Plutonic East	112	6.4	23	180	5.1	30	292	5.6	53	3,626	4.0	469
Plutonic West	-	-	-	-	-	-	-	-	-	393	2.8	35
All Underground Sub-total	**4,679**	**4.8**	**728**	**4,473**	**4.4**	**640**	**9,152**	**4.6**	**1,368**	**20,829**	**5.0**	**3,334**
Hermes Open Pit Complex												
Hermes	-	-	-	1,990	1.4	87	1,990	1.4	87	3,868	1.3	156
Hermes South (80% JV)	-	-	-	698	1.6	36	698	1.6	36	198	1.1	7
Plutonic Open Pit Areas												
Area 4	36	0.8	1	-	-	-	36	0.8	1	-	-	-
Perch	40	1.4	2	4	1.0	0.1	44	1.4	2	-	-	-
Plutonic Main Pit	1,575	3.7	187	3,718	2.0	243	5,293	2.5	430	7,408	2.0	476
All Open Pit Sub-total	**1,652**	**3.6**	**190**	**6,410**	**1.8**	**366**	**8,062**	**2.1**	**556**	**11,476**	**1.7**	**639**
Total	**6,331**	**4.5**	**918**	**10,884**	**2.9**	**1,005**	**17,214**	**3.5**	**1,924**	**32,304**	**3.8**	**3,973**

Notes:

1. Mineral Resources are quoted inclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
2. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages. Numbers may not add correctly.
3. 'Plutonic Underground Resources based on Deswik Mining Stope Optimizations ("DSO") using generalized Reserve DSO input parameters and / or restricted 'grade shell' reported Resources. Open Pit Resources based on simplified pit optimization parameters.
4. Mineral Resources are estimated using an average gold price of A$2,150 per troy ounce ($1,612 per ounce)
5. Mineral Resources are estimated at a cut-off grade of 1.7 g/t Au for the Plutonic Underground Gold Mine.
6. Mineral Resources are estimated at a cut-off grade of 0.40 g/t Au for Open Pits.

Table 1-2 Summary of Plutonic Mineral Reserves as of December 31, 2021.

Category	**Proven**			**Probable**			**Total Reserves**		
	Tonnes (000's)	**Gold grade (Au g/t)**	**Cont. gold (koz)**	**Tonnes (000's)**	**Gold grade (Au g/t)**	**Cont. gold (koz)**	**Tonnes (000's)**	**Gold grade (Au g/t)**	**Cont. gold (koz)**
Hermes Open Pit Complex									
Hermes									
Hermes South (80% BBJV)									
Area 4 & Perch	**65**	**1.1**	**2**	**4**	**0.9**	**0**	**69**	**1.1**	**3**
Main Pit	**159**	**2.0**	**10**	**175**	**1.6**	**9**	**334**	**1.8**	**20**
Open Pit Sub-total	**225**	**1.8**	**13**	**179**	**1.6**	**9**	**403**	**1.7**	**22**
Underground									
Plutonic East and Area 4	0	0	0	0	0	0	0	0	0
Plutonic	2,489	3.8	307	2,660	3.5	301	5,148	3.7	608
Underground Sub-total	**2,489**	**3.8**	**307**	**2,660**	**3.5**	**301**	**5,148**	**3.7**	**608**
Total	**2,713**	**3.7**	**320**	**2,839**	**3.4**	**310**	**5,552**	**3.5**	**630**

Notes:

1. Open Pit Mineral Reserves are estimated at a cut-off grade of 0.5 g/t Au.
2. Underground Mineral Reserves are estimated at a stoping cut-off grade averaging 1.8 g/t Au dependent on mining area.
3. Mineral Reserve economics are estimated using an average long term gold price of A$1,950 per ounce ($1,462).
4. Underground and Main Pit fresh rock bulk density defined as 2.9 t/m3.
5. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages.
6. All figures are rounded and use significant figures and numbers may not add correctly

1.1 Technical Summary

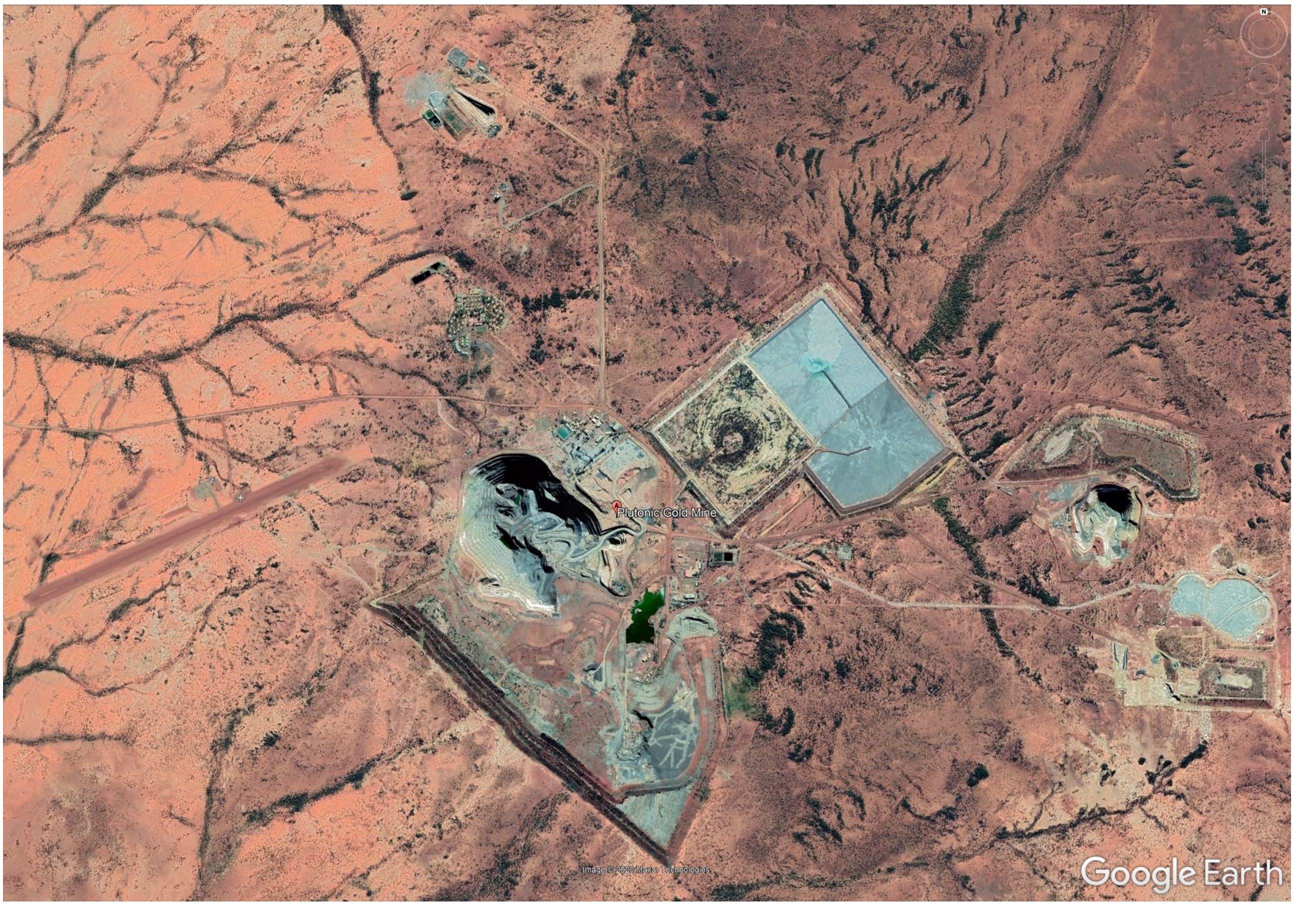
1.1.1 Property description and location

The Plutonic Gold Mine is located at latitude 26°15'S longitude 119°36'E in the Peak Hill Mineral Field of the eastern Gascoyne Region of central Western Australia. It lies 175 km northeast of the township of Meekatharra and 800 km northeast of Perth. The mine is located approximately 10 km east of the Great Northern Highway, within the Three Rivers Station.

An airstrip is adjacent to the site and is a 2,000 m long runway. From Perth, the flight time is approximately 1½ to 2 hours.

The Plutonic Gold Mine is isolated from major towns and cities and operates on a self-sufficient basis with material and goods shipped in via the Great Northern Highway. Mine personnel work on a fly-in/fly-out basis out of Perth. There are a number of Aboriginal settlements nearby. Figure 1-1 is an aerial view of Plutonic Gold Mine (General Site Image)

Figure 1-1 Plutonic Gold Mine – General Site Image – (Includes Main Open Pit – Centre).



(Image source Google Earth Pro – Accessed: - October 12, 2020 – Geographic North towards top of page).

1.1.2 Land tenure

The total Plutonic area is comprised of 76 granted tenements divided into three groups, namely the Plutonic Gold Mine, the Hermes Gold Mine and the BBJV. The project area is centred around two mining areas, 60 km apart — one around the Plutonic Gold Mine in the northeast, and one at the Hermes Gold Mine in the southwest. The Plutonic Gold Mine group includes 28 granted exploration and mining tenements, covering approximately 355.8 km^2 and 10 Miscellaneous Licences (as such term is defined in the (Western Australian) Mining Act 1978 (the "**Mining Act**")). A wholly-owned tenement south of the Plutonic Gold Mine covers an area of 5.6 km^2. One prospecting licence was granted in January 2022 and will be added to the Plutonic Gold Mine.

The Hermes Gold Mine comprises 8 granted exploration and mining tenements with an area of approximately 138.9 km^2. One general purpose lease and 8 Miscellaneous Licences are associated with the project. The Three Rivers project (the "**Three Rivers Project**") tenement group comprises 32 granted exploration or mining tenements with an area of approximately 359.8 km^2; however, of the BBJV tenement holdings only about 227.2 km^2, in 16 tenements, is held under the farm-in and joint venture agreement, including a wholly-owned Exploration Licence (as such term is defined in the Mining Act) covering 11.2 km^2. Three (3) granted Miscellaneous Licences are associated with the project. The total exploration and mining tenure held by Billabong, or as part of a joint venture, is approximately 722 km^2 or 72,189 hectares.

1.1.3 Royalties

Royalties are payable in the following circumstances:

- Plutonic Gold Mine tenements:
  - Western Australian state government 2.5% of all gold metal production above 2,500 Au oz. The royalty value of gold metal produced is calculated for each month in the relevant quarter by multiplying the total gold metal produced during that month by the average of the gold spot prices for that month.
  - Plutonic Grange tenement royalty agreement (for tenements M52/295, M52/296, M52/300 and M52/301) is a sliding scale royalty based on ore feed type and head grade of the mill feed. An example for underground ore is included in part in Table 1-3. No quoted Mineral Resources held by Billabong are currently affected by this royalty agreement.

Table 1-3 Grange royalty agreement - underground ore

Head grade range of mill feed (g Au/t)	Royalty payable (US$/t)	Royalty payable (A$/t)
<1.5	Nil	Nil
1.5–2.99	0.39	0.50
3.0–3.99	0.62	0.80
4.0–4.99	0.78	1.00
5.0–5.99	0.94	1.20
6.0–6.99	1.68	2.15
7.0–7.99	3.51	4.50
8.0–8.99	4.29	5.50

- Hermes and BBJV tenements:
  - Western Australian state government 2.5% of all gold metal production above 2,500 Au oz.
  - 1% royalty on net smelter return to Alchemy Resources (Three Rivers) Pty Ltd for tenements E52/2361, M52/685, M52/753, M52/796, M52/797, L52/116, L52/117, L52/118 where gold production from the tenements is between 70,000 and 90,000 oz of gold only.
  - Troy Royalty – 1% royalty on net smelter return to Troy Resources NL ("**Troy**") on gold production from 50,000 ounces to 70,000 ounces for tenements to M52/685, M52/753, M52/796, M52/797, P52/1569 and P52/1570 at Hermes and E52/2362, M52/722, M52/723, M52/795, M52/1049 and P52/1577 as well as parts of tenements E52/1723, E52/1730 and E52/3405, formerly held as P52/1316, P52/1321, P52/1322 and P52/1327.
  - Carey Royalty – A$1.00 Royalty to the Wongatha Education Trust for every ounce of Au mined and sold for tenements M52/685, M52/753, M52/796, M52/797, P52/1569 and P52/1570 at Hermes and E52/2362, M52/722, M52/723, M52/795, M52/1049 and P52/1577 as well as those

parts of tenements E52/1723, E52/1730 and E52/3405, formerly held as P52/1316, P52/1321, P52/1322 and P52/1327.

— Jidi Jidi Aboriginal Corporation ("**Jidi Jidi**"), the Registered Native Title Body Corporate (the "**RNTBC**") for the Nharnuwangga, Wajarri and Ngarlawangga People (the "**NWN People**") hold a royalty for gold metal produced from specified Hermes tenements for production up to 100,000 Au oz and a lower royalty for production over 100,000 Au oz, which is payable for the duration of any productive mining (being the period during which Billabong is required to pay the State royalty). The royalty values are confidential between Billabong and Jidi Jidi.

1.1.4 History

A brief summary of the ownership and production history is as follows:

- In the 1970s, International Nickel Company ("**Inco**") undertook nickel exploration over the Archaean Plutonic Marymia Greenstone Belt (the "**Belt**") and abandoned the area in 1976 after failing to identify an economic nickel deposit.
- In 1986, Redross Consultants Pty Ltd ("**Redross**") was granted an Exploration Licence over the southern portion of the Plutonic mining lease. Titan Resources NL ("**Titan**") commenced exploration in the area surrounding Marymia Hill.
- In 1987 Redross optioned the Plutonic Exploration Lease to Great Central Mines Limited ("**GCM**"). Resolute Resources Ltd ("**Resolute**") and Titan entered into a joint venture over the Marymia Hill leases. Battle Mountain Australia ("**BMA**") commenced exploration in the Plutonic Bore area. Stockdale Prospecting Ltd conducted a regional sampling program in the vicinity of Marymia Dome.
- In 1989, GCM sold the Plutonic Gold Mine lease to Pioneer Minerals Exploration who changed their name to Plutonic Resources Limited.
- Plutonic Gold Mine opened, with open-pit production from the Main Pit, in 1990.
- In 1991, Plutonic Resources and GCM purchased the adjacent "Freshwater" property from Horseshoe Gold Mine Pty Ltd and commenced reverse circulation ("**RC**") drilling of previously identified targets and a regional geochemical program.
- In 1992, mining started in the Marymia K1 and K2 open pits.
- Marymia Triple P open-pit production started in 1993 with treatment at the Marymia Plant.
- Plutonic Underground started in 1995.
- In 1998, Homestake Mining Company acquired Plutonic Resources, and Homestake Gold of Australia Limited bought all of the Marymia property and assets from Resolute.
- Homestake Mining (USA) merged with Barrick Gold Corp. ("**Barrick**") in 2002.
- Open pit mining commenced at Triple P, B Zone, in August 2002, and was completed in August 2003.
- The Main Pit closed in 2005.
- Barrick divested much of the Marymia tenement holding in August 2010 which was purchased by Dampier Gold
- Plutonic was sold by Barrick to Northern Star in February 2014.
- Hermes and the BBJV earn-in interest in the Bryah Basin tenements were acquired by Northern Star in February 2015 from Alchemy Resources Ltd.
- Plutonic tenements and operations were sold by Northern Star to Billabong in October 2016.
- Mining at Hermes open pit commenced in December 2017 and ended in 2019.
- In December 2020, Superior exercised its option to repurchase the Northern Star Royalty.
- Mining at Area 4 began in April 2021 followed by Perch in September 2021.

1.1.5 Regional Geology

Plutonic Gold Operations is located within the Belt, an elongate, northeast trending belt within the Marymia Inlier. The Marymia Inlier is an Archaean basement remnant within the Proterozoic Capricorn Orogen comprising two mineralised greenstone belts (Plutonic Well and Baumgarten), with surrounding granite and gneissic complexes. The Capricorn Orogen is situated between the Pilbara and Yilgarn Cratons and is possibly the result of oblique collision of the two Archaean cratons in the early Proterozoic.

The northeast trending Belt extends over an 80 km strike length and is up to 10 km in width. The Belt is subdivided into two volcano-sedimentary sequences, consisting of mafic and ultramafic units which are overlain by predominately felsic volcaniclastic and sedimentary rocks. These units have been subject to greenschist and amphibolite facies metamorphism, deformed by polyphase folding, shearing and faulting, and intruded by felsic porphyry and granitoid bodies. This has resulted in a strong northeast trending fabric parallel to multiple low-angle thrust faults. These thrust faults occur throughout the Belt and are intimately associated with the known gold mineralisation.

The Belt has been shaped by three major structural events — D1, north-directed, low-angle thrusting emplacing mafic and ultramafic units above sediments, followed by granite sheet intrusion and subsequent granite thrusting along the western portion of the Belt during D2. This was followed by D3 high-angle thrusting towards the southeast, open folding of earlier structures and reactivation of D2-thrusts. Gold mineralisation is thought to be associated with the earliest structural event (D1) within regional-scale thrust duplexes controlled by deep-seated east-west trending lineaments.

The historical Plutonic Gold Mine area comprises 39 known gold deposits mined throughout the history of the mine, including in areas of the Marymia Dome.

Gold mineralisation occurs in a large number of deposits and prospects in the Belt, with the main deposit at the Plutonic Gold Mine. Mineralisation regularly occurs as shallowly dipping, layer parallel lodes, although steep lodes and minor quartz-vein-hosted deposits also occur. Regionally within the greenstone belt, mineralised host rocks vary from amphibolites to ultramafics and banded iron formation (BIF). Lateritic and supergene enrichment are common throughout the Belt and has been mined locally. Biotite, arsenopyrite, and lesser pyrite/pyrrhotite are common minerals generally accepted to be associated with gold mineralisation.

1.1.6 Local Geology and Mineralisation

Mineralisation at Plutonic Gold Mine is characterised by a series of steep to flat-lying, stacked replacement-style lodes, individually up to five metres wide that are hosted within ductile shear zones oriented slightly oblique to stratigraphy. Lodes are preferentially restricted within the top half of the Mine Mafic, which is a sequence of upper-greenschist to lower amphibolite grade basaltic flows of variable thickness sandwiched between the hanging wall and footwall ultramafic units. Lodes are characterised by intense banding, defined by crude mineral segregation and mineral alignment. Gold where visible, is commonly associated with grey quartz veins and fine-grained arsenopyrite and pyrrhotite.

Mineralisation at Plutonic Gold Mine is separated into four distinct styles:

- Replacement - brown or Plutonic lodes (which contain the bulk of the gold)
- Replacement - green lodes
- Plutonic - hard to see lodes
- Dilatational high angle quartz veins

At the Hermes Gold Mine, the lodes are hosted in biotite schist and extend into a mafic footwall unit. The mineralization occurs in stacked lodes from 1-10 m wide in 6 distinct zones. The lode strike north east, dip from 50 to 80 degrees to the north-west with a shallow northerly plunge.

At Hermes South, the lodes are positioned with the highly weathered Naracoota Volcanics. The lodes are between 1-8 m wide, dip 65 degrees south and plunge gently to the south east.

1.1.7 Exploration status

Billabong has current and planned exploration programmes to cover the current life of mine (the "**LOM**"). The primary aim is to increase the Mineral Resource base and convert mining Mineral Resources to Mineral Reserves by targeting areas from both underground and from the surface.

An expenditure for exploration of approximately $7-10M is envisaged for 2022. Subject to results, this amount may be varied as required.

The exploration budget will be used for increasing Inferred Mineral Resources (extensions to known Mineral Resources distal to the current mine area), capitalised drilling and development projects proximal to the current underground working areas, advancing prospective targets on surface including those on the BBVJ tenements.

1.1.8 Mineral Resources

The Mineral Resource estimate for Plutonic, inclusive of Mineral Reserves, as of December 31, 2021 is summarised above in Table 1-1. The Mineral Resources are based on a gold price of A$2,150 per ounce.

In 2021, Superior commenced a large program to revamp Mineral Resource estimates for Plutonic and more particularly, for the Plutonic Gold Mine. Historically, resource modelling was based on manual wireframing to create a mineralisation envelope, inverse distance squared ("**ID2**") estimation was used with static search parameters and automatic resource classification. Such a process was found heavily biased by individual understanding of the mineralisation controls, resource classification deficiency was found to cause misallocation of the material categories, and the process constantly became a bottleneck for mine production. In particular, estimated grades were vastly different from resource models with approximately 90% ore materials mined outside reserve designs.

To overcome human bias on geological interpretation and mineralisation wireframing, remove the production bottleneck, and improve long term and short-term planning accuracy and efficiency, an automated resource modelling process was developed and tested during the period between March 2021 and June 2021. The system was put into production in July 2021. More than 250 block models were generated between July 2021 and October 2021. Subsequent changes were introduced, and large numbers of models were re-run to create consistent block models for the entire mine between November 2021 and January 2022. The block models generated form the basis for the current Mineral Resource estimate.

The new automated modelling process for vein type gold deposits is directed towards standardizing all current and future resource estimation processes for all deposit areas within the project.

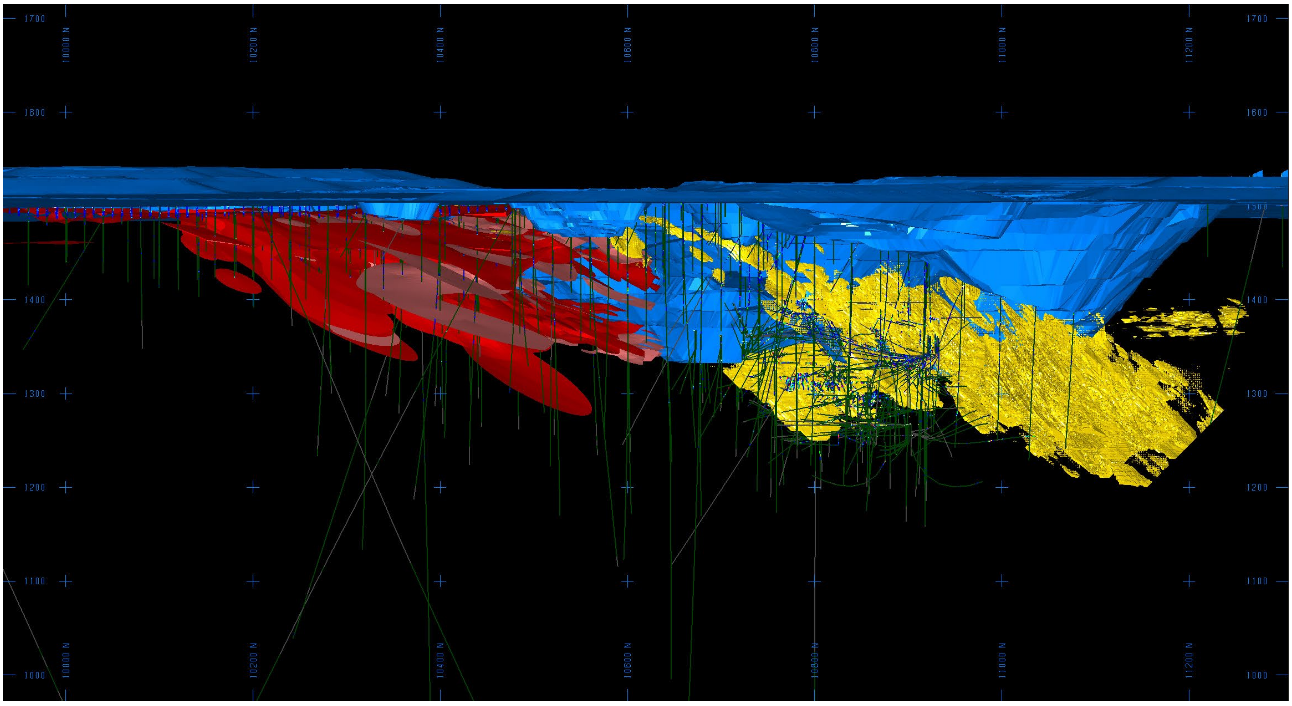
When comparing Mineral Resources Estimation in December 2019 to the new estimates in December 2021, the major change has been the implementation of a standardized automated 'wire-frame constrained' Mineral Resource block models which take advantage of the vast number of structural measures previously ignored in manually generated wireframes. This automated process means that modelling is now strictly guided by the structural measurements, and restricted to similar grade wireframes, lithology, and fault boundaries.

Open pit Mineral Resources were constrained in pit designs with varying gold prices. 0.44 g/t Au cut off, estimated from gold metal price at A$2150 per ounce, was applied to pits within 40km radius of the mill, while remaining open pit Mineral Resources used cut-off grade of 0.4 g/t Au for all pits.

In December 2020, a review of the Main Pit area was completed to assess current economic value. The Plutonic Main Pit was first put into production in 1990 and produced 2.5 million ounces of gold, along with other satellite pits, between 1990 and 2005. The Main Pit is situated directly above the existing underground operations and located directly adjacent to the Company's milling facilities which consist of a 1.8 million tonne per annum ("**Mtpa**") primary processing plant ("**PP1**") and a 1.2 Mtpa secondary processing plant (PP2) which is currently on care and maintenance. Existing tonnage from the underground mine supplies approximately 800,000 tonnes per annum to PP1, therefore PP1 has capacity for open pit sources of ore. A significant expansion of the Plutonic Main Pit is envisaged utilizing contractor operated conventional open pit mining methods. Drill and blasting are planned for fresh mineralized material, followed by conventional truck and shovel operations within the open pit for the movement of mineralized material and waste with on-site treatment of mine material by conventional milling and gravity recovery through PP1.

Figure 1-2 below is a general schematic view showing approximate gold mineralization in the proximity of the Plutonic Main Pit. Mineralisation shown is the Workshop model resource mineralization lodes (red) and the Caribbean, Caspian and Indian Model areas mineralization (yellow).

Figure 1-2 **General View Schematic – Plutonic Main Pit Mineralization Distribution**



Previously reported open pit Mineral Resources (external to the Plutonic Main Pit area) at the Hermes Gold Mine and Hermes South areas remain unchanged. Mineral Resource block models for these areas were generated by Billabong in July 2018 and March 2019 respectively.

Plutonic Gold Mine and nearby areas was divided into 200x200x200 m blocks with a block size of 1x1x1 m to accommodate the mineralisation style at Plutonic Gold Mine. The original resource zones are still kept, the boundaries however are not consistent with the historical Mineral Resource zone boundaries (Figure 14-6).

All modelling and estimation work is done in either Leapfrog™ and/or Vulcan™ software.

Deswik Stope Optimisation ("**DSO**") shapes were generated for Mineral Resource reporting using the assumptions discussed in Section 15 Mineral Reserve estimates, except gold price adjusted to A$2150. Materials at Au >=1.66 g/t Au was used for reporting Measured / Indicated categories for underground Mineral Resources.

Grade shells with Au at 1.5 g/t cut off were generated using the block models. Inferred Mineral Resource category of materials within the DSOs, and all materials of Inferred Mineral Resource or better categories at 1.66 g/t Au cut-off within the grade shells but outside the DSOs were combined and reported as Inferred Mineral Resource category.

Mineral Resource estimates have been prepared utilising industry accepted estimation methodologies. The classification of Measured, Indicated and Inferred Resources conform to Canadian Institute of Mining, Metallurgy and Petroleum ("**CIM**") Standards on Mineral Resources and Mineral Reserves (November 2019) definitions. Both drill hole sample data and underground face sample data have been used as part of the Mineral Resource modelling process for better mineralization geometry definition and therefore better Mineral Resource estimation.

All Mineral Resources are shown on a 100% ownership basis, except the BBJV portion in open pits which were stated at 80% ownership.

Superior is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other issues that could materially affect the Mineral Resource estimates.

1.1.9 Mineral Reserves

The Mineral Reserve estimate for Plutonic as at December 31, 2021 is shown in Table 1-2. The estimate is based upon the Mineral Reserve estimate prepared for and depleted to December 31, 2021. The estimate includes modifications to account for un-mineable material and dilution within the mining shapes. Mineral Reserves are based on a gold price of A$1,950 ($1,462/oz).

Recovery and cost estimates are based on actual site operating data and engineering estimates.

The Mineral Reserves estimates have been prepared using industry accepted methodologies and the classification of Proven and Probable Mineral Reserves conform to CIM Standards on Mineral Resources and Mineral Reserves (November 2019) definitions.

The Plutonic Gold Mine has a long history of mining outside of Mineral Reserves. This is reflected in the nature and style of mineralisation where gold and mineralisation may be identified through drilling and development and mined out prior to the next Mineral Reserve reporting date.

All Mineral Reserves are shown on a 100% ownership basis.

1.1.10 Mining Method

Plutonic has been in continuous production since 1990. Historically, Plutonic's mill has been fed from three sources of ore:

- A series of open pits close to the mill. The pits started production in 1990, the Main Pit finished in 2005, and a series of smaller pits continued to provide ore for a number of years. All pits close to the mill were completed a number of years ago.
- An underground operation. The underground operation, Plutonic Underground, has been in continuous production since 1995 and remains in production.
- Low grade stockpiles. Low grade stockpiles were from open pit and underground development operations. The low-grade stockpile from underground development operations remains in production and certain low-grade stockpiles from historical open pit operations may supplement feed to the mill.

Ore feed to the mill during 2021 was from mining operations at the Plutonic Underground, Area 4 and Perch open pit operations and mineralized waste stockpiles. The LOM plan anticipates continued ore feed from these and other open pit sources from the Plutonic Gold Mine, the Hermes Gold Mine and the BBJV.

There is substantial site history and experience with the underground mining methods employed and this is considered a low risk for the operation.

Open pit mining is based on industry standard practices with contract mining being utilized.

1.1.11 Mineral processing

The Plutonic Gold Mine has been in operation since 1990. The original process plant ("**PP1**") consisted of an open circuit jaw crusher, coarse ore stockpile, semi-autogenous grinding ("**SAG**") mill and ball mills, two leach tanks, and six carbon adsorption tanks. A three-stage hard rock crushing circuit was incorporated in 1994 which included a fine ore bin and an additional ball mill. A second process plant ("**PP2**") was added in 1996 utilising the original PP1 jaw crusher and coarse ore stockpile and adding SAG and ball mills, two additional leach tanks and six additional carbon adsorption tanks. A 16 MW gas power station was added in 1997 and upgraded with new sets in 2014 and 2020 respectively.

PP1 was designed for the treatment of primary ore while PP2 was designed to process oxide ore. At the end of June 2004, oxide ore sources were exhausted and the crushing and milling components of PP2 were shutdown. However, the leach and carbon adsorption circuit of PP2 was run in parallel with the PP1 leach/adsorption circuit. In April 2008 the PP2 leach and carbon adsorption circuit was emptied, cleaned, and placed into care and maintenance as part of a strategy to reduce the site power load and power consumption due to power restrictions caused by the June 2008 gas supply crisis. The four tanks in the PP2 leach and carbon adsorption circuit that were re-commissioned in June 2010 were shut down in 2012.

The primary sections of the processing plant that are currently in use are:

- Crushing and conveying
- Ore reclaim and grinding
- Leaching and carbon adsorption
- Carbon stripping, electro winning, refining and carbon regeneration
- Tailings thickening
- Tailings deposition and storage
- Reagent mixing and handling
- Plant services

Plant performance for the past four years indicates reasonable performance, with recoveries ranging from 76% to 90%, and an average recovery in 2021 of 87%.

Metallurgical test work has been completed on Hermes ore. The test work recommended a mill recovery of 95% for all the ore types (oxides, transitional and weathered) for the pit optimisation and economic modelling. The current plant design criteria have been evaluated in comparison with test work results for the Hermes deposit. The review did not reveal any significant issues and it is expected that the plant will continue to perform reasonably well when processing the Hermes ore.

Metallurgical test work for Hermes South was carried out in 2019 confirming that 3 out of the 4 samples tested reporting above 95% recovery in the normal cyanide leaching conditions. Together with an updated Mineral Resource model and geotechnical review, Hermes South is currently being evaluated as an open pit mining option for Superior.

1.1.12 General site infrastructure

The Plutonic Gold Mine is a well-established mine which has services and infrastructure consistent with an operating mine in an isolated area.

- The mine can be accessed by aircraft or by road. The airstrip is adjacent to the site and there is an aircraft fuel tank and fuelling facility at the airstrip which is currently not being used.
- Freight is brought to site by transport trucks using the all-weather gazetted Great Northern Highway.
- Electricity is generated on-site by means of a gas-powered generating station (six units) which supplies all power requirements within the vicinity of the camp and processing plant. A backup diesel power station is also maintained.
- Water requirements for dust suppression and road maintenance during mining activities are supplied from water sources in the existing Salmon pit, the Main Pit or main borefield supply line.
- Potable water requirements are provided on-site using a reverse osmosis system installed at the processing plant.
- Plutonic operates as a fly-in/fly-out operation and maintains a camp on site for the employees and contractors.
- All buildings and facilities required for extraction of the Mineral Reserves are in place and operational.
- The mine site has a communication network of mobile telephones and licensed UHF radio repeaters within the Main Pit mining area and village facilities. Outside these areas, communication is by means of radio or satellite phone only.

1.1.13 Environmental Regulatory considerations

Environmental protection in Western Australia is governed by both State and Commonwealth legislation. Project approvals contain conditions that must be satisfied prior to the commencement and throughout the construction and the operation of the Project. Non-compliance with these conditions could result in fines or penalties being levied against individuals or companies, or even termination of the approval and licence to operate.

Construction of the Plutonic Gold Mine site commenced following the submission of a Notice of Intent ("**NoI**") in 1989 to the Department of Mines and Petroleum ("**DMP**"), which is now the Department of Mines, Industry Regulation and Safety ("**DMIRS**"). DMIRS administers and regulates the activities of the mining industry under the provisions of the Mining Act. NoI documents, now known as mining proposal(s) ("**MP**"), detail the environmental impacts associated with the Project and provide a list of environmental commitments made to manage those impacts in a responsible manner. DMIRS assesses, approves, and manages MP applications, including the associated mine closure plan ("**MCP**") requirements. There have been several MPs that have been approved to date. The key Plutonic MPs that have been granted for Superior are:

- (Reg. ID 81643) "Mining Proposal, Plutonic Gold Mine, Tailings Storage Facility 4 and 5 (M52/148 and M52/170)", dated August 6, 2019.
- "Mining Proposal, Plutonic Gold Mine, Area 4 and Perch Pit Expansions (M52/148, M52/149, M52/170, M52/295 and M52/301)", dated December 6, 2019.
- "Mining Proposal, Plutonic Gold Mine, Area 4 and Perch Pit Expansions (M52/148, M52/149, M52/170, M52/295 and M52/301)", dated March 12, 2020.

The original Hermes MP was approved by DMP, now DMIRS, in December 2016 (Registration ID: 60472). The MP was revised in relation to updated tenure for the haul road in May 2017, with approval by the DMP in June 2017 (Registration ID: 64986). The key Hermes MP that has been granted for Superior is:

- "Mining Proposal, Hermes Gold Project – Mine Expansion (M52/685 and M52/797)", dated February 28, 2019.

The Department of Water and Environmental Regulation (the "**DWER**") licenses water abstraction and pollution discharge activities. Plutonic operates in accordance with Part V of the Western Australian *Environmental Protection Act 1986* (the "**EP Act**") under Operating Licence L6868/1989/12, first issued by the DWER predecessor, the Department of Environment Regulation (the "**DER**") in September 2014. Plutonic has obtained and maintained requirements under Operating Licence L6868/1989/12 for the following prescribed premises to date:

- Category 5 – Processing or beneficiation of metallic ore
- Category 6 – Mine dewatering
- Category 52 – Electric power generation
- Category 54 – Sewage facility
- Category 57 – Used tyre storage (general)
- Category 89 – Putrescible landfill site.

A Native Vegetation Clearing Permit ("**NVCP**") under Part V of the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 is required to be obtained prior to the commencement of any native vegetation clearing, together with a MP approval from DMIRS. The Project has obtained a number of historic clearing permits to date. The current and most relevant approved NVCPs are:

- CPS 7555 in relation to clearing for Hermes.
- CPS 8616 in relation to clearing for TSF4/5.
- CPS 8651 in relation to clearing for Area 4.

The abstraction of groundwater for water supply and/or mine dewatering purposes requires licences to be issued by the DWER (Water Section) under section 5C of the *Rights in Water and Irrigation Act 1914* (the "**RIWI Act**"). Plutonic conducts dewatering from open pits and underground, and abstracts production and potable water from Borefields 1 and 2 which are located 30 km and 15 km west of the Plutonic plant. The Project has obtained water licences under the RIWI Act as follows:

- GWL151450 – Plutonic Mine water supply and dewatering.
- GWL182889 - Hermes Haul Road water supply.
- GWL183063 Hermes Mine water supply and dewatering (now expired).

Activities undertaken onsite are required to be undertaken in accordance with the above environmental approvals. Monitoring programs are conducted to ensure that key approval and licence requirements are complied with.

1.1.14 Native title

The Commonwealth *Native Title Act 1993* (CTH) (the "**NTA**") provides for the protection of Aboriginal interest on land other than Aboriginal Freehold land (e.g. Pastoral Leases, Crown Land). The Act covers past and future acts that may affect native title and determines whether native title exists. The NTA also provides a mechanism by which traditional owners can negotiate compensation for acts affecting native title interests.

A number of the Plutonic leases are the subject of the Gingirana native title application (the "**Gingirana Native Title Claim**") lodged with the Western Australian Government in 2003.

In November 2017, Billabong negotiated a Memorandum of Understanding ("**MOU**") with the Gingirana Native Title Claim group that governs the delivery of environmental, natural and cultural resource management services to Billabong. It does not cover the potential requirements to conduct cultural heritage surveys for the purposes of exploration or mining activities.

On December 7, 2017, the Federal Court determined that native title exists and the determination of native title was entered on the National Native Title Register on December 19, 2017.

In April 2021, Superior executed a Negotiation Protocol with the Marputu Aboriginal Corporation, the RNTBC for the Gingirana People, and is currently negotiating a heritage agreement.

The Hermes and BBJV tenure lies wholly within the consent determination area of the Nharnuwangga, Wajarri and Ngarlawangga Indigenous Land Use (the "**NWN ILUA**") agreement between the common law holders of native title, the NWN People and the State of Western Australia, registered with the National Native Title Tribunal on 5 July, 2001. Tenements within these project areas are subject to conditions imposed by the NWN ILUA. There are internal boundary exclusions within the NWN consent determination area.

The former owner, Northern Star, and the NWN People agreed to terms that would form a productive mining agreement and a separate heritage protection agreement for tenements in the Hermes Gold Mine. These agreements were executed by both parties on 22 June 2016 and were assigned to Billabong under a deed of consent, assignment and assumption, dated 11 October 2016. A deed of variation – heritage deed was negotiated between Billabong and Jidi Jidi in 2019, enabling the terms of the heritage deed to apply to all tenements in which Billabong has a beneficial interest, including the BBJV tenure. The deed of variation provides for the negotiation of a further productive mining agreement for any deposits discovered within the BBJV tenure.

1.1.15 Mine closure

The objective of the Plutonic rehabilitation program is to return sites affected by mining to a stable, non-eroding, and safe condition. Rehabilitation of disturbed areas will be conducted in accordance with current DMIRS Guidelines and in accordance with the current MCPs approved by DMIRS:

- "Mine Closure Plan, Plutonic Gold Mine (M52/148, M52/149, M52/150, M52/170, M52/171, M52/295, M52/296, M52/300, M52/301, M52/308, M52/309, L52/40, L52/41, L52/48, L52/52, L52/54, L52/55, L52/56, L52/70, L52/71 and L52/74)", dated February 14, 2020.
- "Mine Closure Plan, Hermes Gold Mine (M52/685, M52/797, L52/116, L52/164, L52/165, L52/166, M52/309, M52/150 & M52/149)", February, 14 2020.

The mine closure provision at year end 2021 for Plutonic, including Hermes, was estimated at $27.4 million, with a relinquishment date of 10 years from the date of closure.

1.1.16 Economic Analysis

As Superior is a producing issuer, it has excluded information required by Item 22 of Form 43-101F1 as there has not been and there is no planned material expansion of current production.

1.1.17 Recommendations

The following recommendations are made:

- Evaluate Plutonic Underground Mineral Resources for step change production increase consistent with the size of the Mineral Resource;
- Continue to explore outside remnant areas to develop new mining fronts;
- Evaluation of Hermes South for a new open pit mining option associated with the Hermes mining complex; and
- Evaluate other open pit options on the property in proximity of the Plutonic mill and estimate Mineral Resources and Mineral Reserves.

The PEA completed in 2020 indicates that the proposed Plutonic Main Pit is potentially economically viable and further technical investigations are warranted including the preparation of a pre-feasibility study into this development.

Contents

Tables

Figures

2 Introduction

This technical report (the "**Technical Report**") on Plutonic has been prepared by Superior in accordance with the requirements of NI 43-101 for lodgement on CSA's "System for Electronic Document Analysis and Retrieval" ("**SEDAR**"). Superior is a Canadian-based gold producer publicly listed on the TSX Venture Exchange. Superior owns 100% of Plutonic located in Western Australia and the Company is focused on expanding production at Plutonic and building the Company into an intermediate gold producer.

This Technical Report was prepared by Superior to support the disclosure of an updated Mineral Reserve and Mineral Resource for Plutonic.

The names and details of persons who prepared or contributed to this Technical Report are listed in Table 2-1.

Table 2-1 Persons who prepared or contributed to this Technical Report

Qualified Person	Position	Employer	Independent of Billabong	Date of site visit	Professional designation	Sections of report
Qualified Persons responsible for the preparation and signing of this Technical Report						
Ettienne du Plessis	Chief Geologist	Billabong	No	Works on site	BSc (Geology), MBA, MAIG	Responsible for all Sections of the Technical Report, other than Sections 15, 16 and 18 and the open pit and underground contributions to Sections 25 and 26 for which the other two Qualified Persons are responsible for.
Karel Steyn	Manager Technical Services	Billabong	No	Works on site	AEng, MAusIMM	Sections 15, 16, 18, and underground contributions to Sections 25 and 26.
Russell Cole	Vice-President and General Manager	Billabong	No	Works on site	B. App. Sc (Mining Engineering), FAusIMM	Sections 15, 16, 18 and open pit contributions to Sections 25 and 26.

The scope of the personal inspection of the property undertaken by the respective Qualified Persons covered responsibilities within their position descriptions. The following is a general list of tasks the Qualified Persons performed in meeting their responsibilities:

- Interviews on and off site with key Superior and Billabong personnel and Joint Venture party;
- Inspection of site and a large amount of operating and information collection procedures for Exploration, and active underground exploration, development and working areas;
- On-site examination of Drill-hole locations and related survey data as well as rock and mineral samples, Drill samples (RC and diamond core). Examined sample submission, transport and security procedures. Also examined plans, cross sections, photographs, and other computer-generated statistical analysis information and block model information.
- Reviewed Mineral Resource estimation procedures and assumptions, Block Model generation processes, Mineral Resource reporting modifying factors and Mineral Resource - Mineral Reserve reconciliation processes.
- Interviews on site with key Superior and Billabong personnel;
- Inspection of underground working areas and active stopes;
- On-site examination of plans, cross sections, photographs, and other diagrams, and
- Review of mining assumptions, mine design process, drill and blast and performance criteria.

A staff list of the major contributors (authors) is given in Section 2.1 – References and sources of information are provided in the following section. By and large, processing, mining and geological practices in respect of geological interpretation, mining performances and metal recovery have remained the same despite a change of mine ownership[3].

[3] In this report, references to Plutonic, Barrick or Northern Star on-site practices and procedures can also be read to be references to Billabong practices and procedures.

2.1 Sources of information

This report was compiled based on information and work produced by the following personnel:

- Mr. Ettienne Du Plessis, Chief Geologist, Billabong
- Mr. Klasie Smit, Quarry Manager, Billabong
- Mr. Russell Cole, Vice-President and General Manager, Billabong
- Mr. Karel Steyn, Manager Technical Services, Billabong
- Mr. Dylan Coles, Underground Manager, Billabong
- Mr. Marcus Neville, Process Manager, Billabong
- Mr. Zhen Hua (Martyn) Zhu, Senior Resource Geologist, Billabong
- Mr. Amandus Bagayana, Project Resource Geologist, Billabong
- Mr. Kevin Selingue, Senior Minex / Exploration Geologist, Billabong
- Ms. Erica Bonsall, Tenement Manager, Billabong
- Mr. Dave Richards, Principal Consultant, Bluebrook Consultancy Services

Additional source reports include:

- Superior Gold Inc. 2018: National Instrument 43-101 Report on Plutonic Gold Mine, Western Australia, Australia, May 17, 2018
- Superior Gold Inc. 2019: National Instrument 43-101 Report on Mineral Resource and Reserve Estimate for the Plutonic Gold Operations, Plutonic Gold Mine, Western Australia, Australia, June 20, 2019
- Superior Gold Inc. 2020: National Instrument 43-101 Report on Mineral Resource and Reserve Estimate for the Plutonic Gold Operations, Plutonic Gold Mine, Western Australia, Australia, August 7, 2020
- Superior Gold Inc. 2020: National Instrument 43-101 Report on Mineral Resource and Reserve Estimate for the Plutonic Gold Operations Including Main Open Cut Pit Area, Plutonic Gold Mine, Western Australia, Australia, December 30, 2020
- Entech Pty Ltd, 2018: Summary pit shell optimisations for Wilgeena and Winchester
- Entech Pty Ltd, 2019: Plutonic Gold Mine 2019 Reportable Design (Summary of works on 2019 reportable Ore Reserve)

Other sources of information are listed at the end of this report in Section 27.

2.2 List of abbreviations

Units of measurement used in this report conform to the decimal system. All currency in this report is US dollars ($) unless otherwise noted. The assumed exchange rate for conversion is 0.75 A$ to the $. Prices of gold are stated in $ per troy ounce ($/oz).

A list of the common abbreviations is included in Table 2-2.

Table 2-2 List of abbreviations

µm	micron	km^2	square kilometre
°C	degree Celsius	kPa	kilopascal
°F	degree Fahrenheit	kVA	kilovolt-amperes
µg	microgram	kW	kilowatt
A	ampere	kWh	kilowatt-hour
a	annum	L	litre
A$	Australian dollar	L/s	litres per second
bbl	barrels	m	metre
Btu	British thermal units	M	mega (million)
C$	Canadian dollars	m^2	square metre
cal	calorie	m^3	cubic metre
cfm	cubic feet per minute	min	minute
cm	centimetre	MASL	metres above sea level
cm^2	square centimetre	Mm	millimetre
d	day	Mph	miles per hour
dia.	diameter	MVA	megavolt-amperes
dmt	dry metric tonne	MW	megawatt
dwt	dead-weight ton	MWh	megawatt-hour
ft	foot	m^3/h	cubic metres per hour
ft/s	foot per second	opt, oz/st	ounce per short ton
ft^2	square foot	oz	Troy ounce (31.1035g)
ft^3	cubic foot	ppm	part per million
g	gram	Psia	pound per square inch absolute
G	giga (billion)	Psig	pound per square inch gauge
Gal	Imperial gallon	RL	relative elevation
g/L	gram per litre	S	second
g/t	gram per tonne	St	short ton
gpm	Imperial gallons per minute	Stpa	short ton per year
gr/ft^3	grain per cubic foot	Stpd	short ton per day
gr/m^3	grain per cubic metre	T	metric tonne
hr	hour	tpa	metric tonne per year
ha	hectare	tpd	metric tonne per day
hp	horsepower	US$	United States dollar
in	inch	USg	United States gallon
in^2	square inch	USgpm	US gallon per minute
J	joule	V	volt
k	kilo (thousand)	W	watt
kcal	kilocalorie	Wmt	wet metric tonne
kg	kilogram	yd^3	cubic yard
km	kilometre	Yr	year
km/h	kilometre per hour		

3 Reliance on other experts

This report has been prepared by Billabong using information produced by Billabong employees and information provided by external contractors. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available at the time of preparation of this report.
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4 Property description and location

The Plutonic project area (which includes the operating Plutonic Underground gold mine, the Hermes open pit gold mine and the BBJV) is located at latitude 26°15'S longitude 119°36'E in the Peak Hill Mineral Field of the eastern Gascoyne Region of central Western Australia. The project lies 175 km northeast of the township of Meekatharra and 800 km northeast of Perth (Figure 4-1).

Billabong acquired 100% legal and beneficial interest in the Plutonic Gold Mine, the Hermes Gold Mine and rights to earn-in to the BBJV tenements, under a sale and purchase agreement between Billabong, Northern Star Mining Services Pty Ltd and Northern Star dated August 12, 2016.

The transfer of tenements from Northern Star to Billabong in connection with the acquisition has been finalised. The transfers of title were lodged with DMIRS for registration on May 12, 2020.

The sale of pastoral leases covering the majority of the tenements held by the Company was completed in late 2020. Concurrent with the sale, the Company entered into an access agreement with the new holder of the pastoral leases to ensure the Company has continued access on the pastoral leases for mining and exploration activities.

The Plutonic project area is located in parts of the Marymia, Three Rivers, Bryah and Mt Padbury pastoral leases, and the Doolgunna-Mooloogool conservation reserve.

The total Plutonic area is comprised of 76 granted tenements divided into three groups, namely the Plutonic Gold Mine, the Hermes Gold Mine and the BBJV. The project area is centred around two mining areas, 60 km apart — one around the Plutonic Gold Mine in the northeast, and one at the Hermes Gold Mine in the southwest. The Plutonic Gold Mine group includes 28 granted exploration and mining tenements, covering approximately 355.8 km^2 and 10 Miscellaneous Licences. A wholly-owned tenement south of the Plutonic Gold Mine covers an area of 5.6 km^2. One prospecting licence was granted in January 2022 and will be added to the Plutonic Gold Mine.

The Hermes Gold Mine comprises 8 granted exploration and mining tenements with an area of approximately 138.9 km^2 (including one general purpose lease). There are eight Miscellaneous Licences associated with the project. The Three Rivers Project tenement group comprises 32 granted exploration or mining tenements with an area of approximately 359.8 km^2; however, of the BBJV tenement holdings only about 227.2 km^2, in 16 tenements, is held under the farm-in and joint venture agreement, including a wholly-owned Exploration Licence covering 11.2 km^2. Three granted Miscellaneous Licences are associated with the project. The total exploration and mining tenure held by Billabong, or as part of the BBJV, is approximately 722 km^2 or 72,189 hectares.

The Plutonic Gold Mine Local Grid ("**POL**") for surface drilling is rotated about 3 degrees west of the Map Grid of Australia ("**MGA**") based on Geocentric Datum of Australia 1994 (GDA94) and the historical Australian Map Grid ("**AMG**") based on the Australian Geodetic Datum 1984 (AGD84). GDA94 is the current standard datum in Australia. The POL grid can be transformed using the following two point transformation coordinates (Table 4-1).

Table 4-1 Grid transformation POL to MGA or AMG

Convert	Local N1	Local E1	Local N2	Local E2	MGA N1	MGA E1	MGA N2	MGA E2	Angle
POL2MGA	10850.28	4122.20	11594.56	4899.96	7197813.766	745674.1	7198515.603	746490.735	356°56'01"
POL2AMG	10850.28	4122.20	11594.56	4899.96	7197660.681	745533.6	7198362.518	746350.229	356°56'01"

The Hermes Gold Mine currently utilises MGA Zone 50 coordinates, however historical drilling utilised a local grid called Three Rivers and the conversion to AMG is shown in Table 4-2.

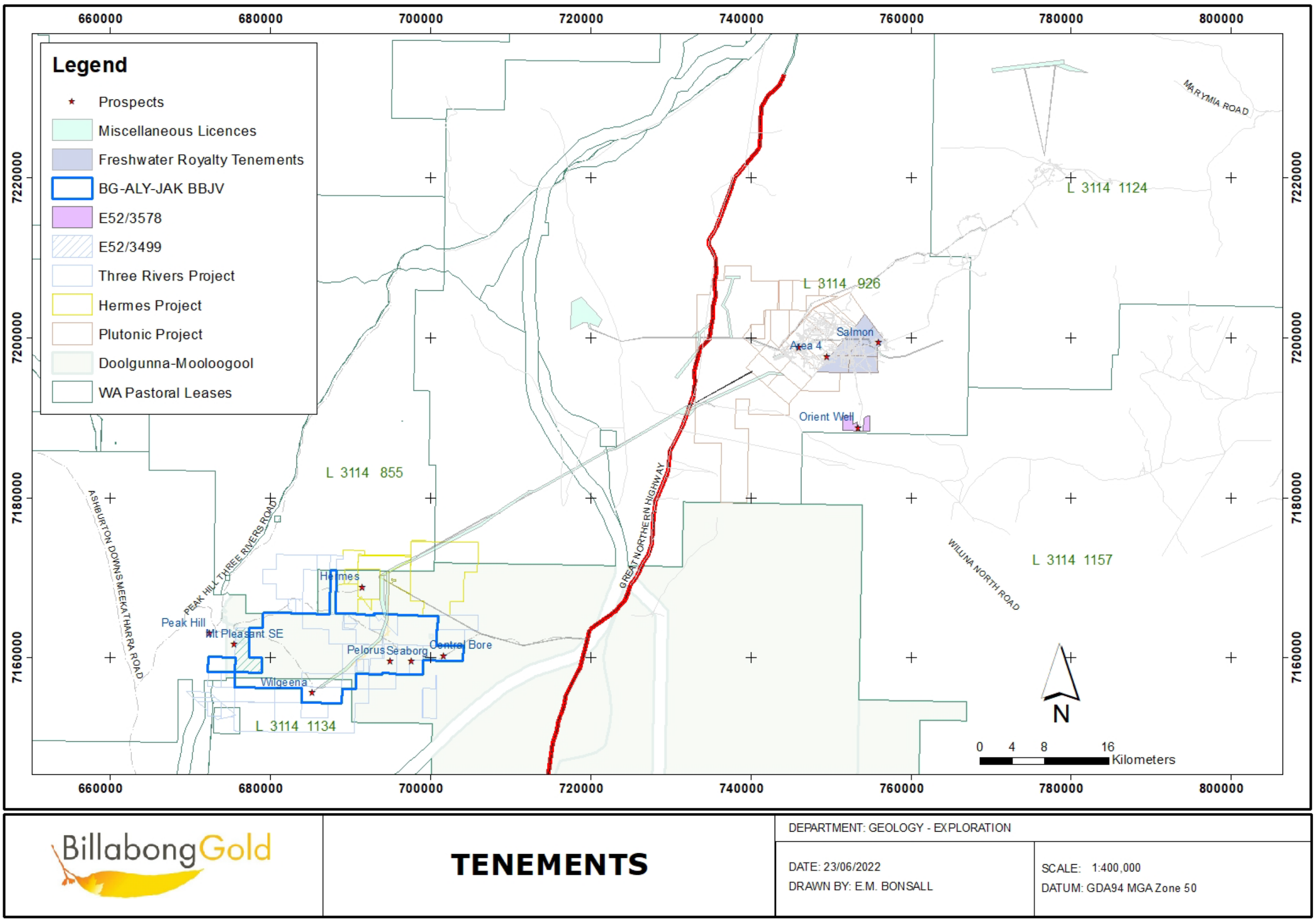
Table 4-2 Grid transformation Three Rivers to AMG

Convert	Local N1	Local E1	Local N2	Local E2	MGA N1	MGA E1	MGA N2	MGA E2
3RV2AMG	8670.70	14702.50	11003.76	15000.00	7168202.88	690358.60	7169623.29	692233.08

The tenements in the project area are illustrated in Figure 4-2.

Figure 4-1 Location map

Figure 4-2 Plutonic, Hermes, Three Rivers and Bryah Basin JV project areas showing pastoral and tenement boundaries



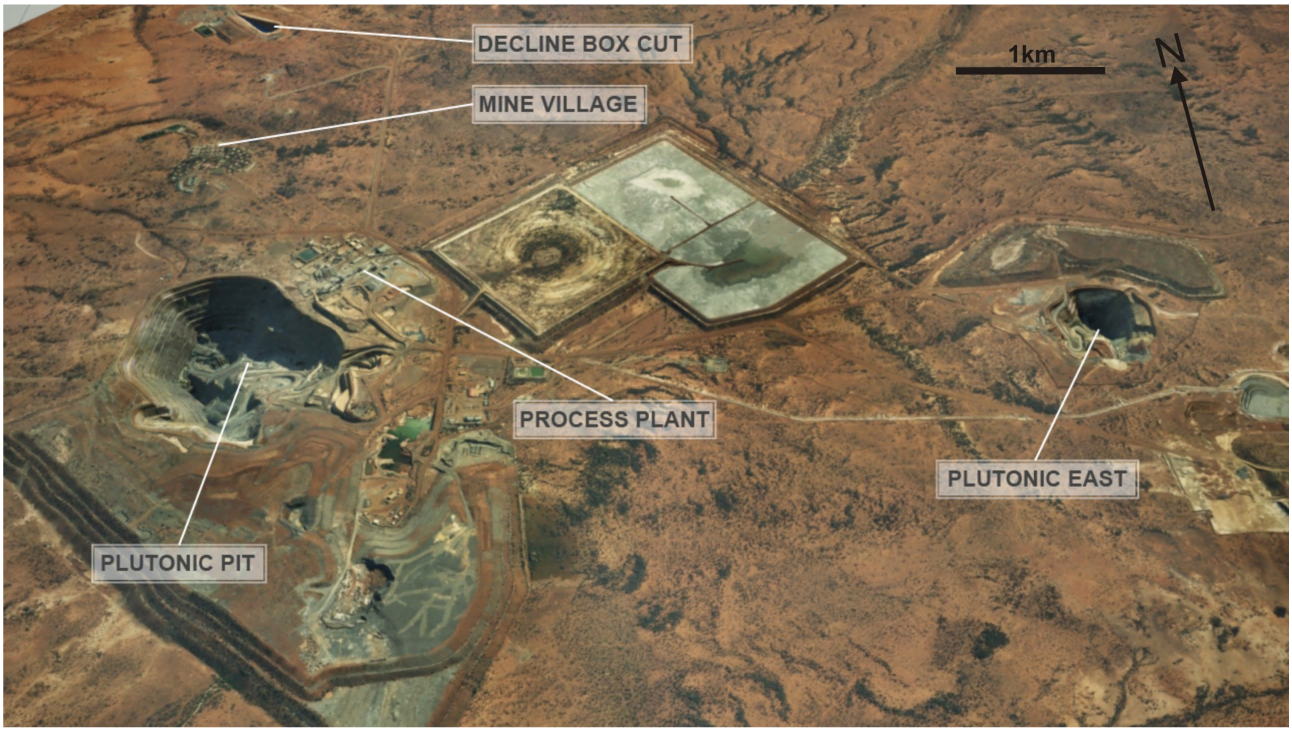
4.1 Plutonic Gold Mine group

The Plutonic Gold Mine, historic Plutonic Main Pit, office and accommodation complex are located in the centre of the Plutonic project area (Figure 4-3). Several past producing open pits also lie within the Plutonic Gold Mine area including the Area 4, Perch, Trout, Catfish, Dogfish and Salmon pits.

Plutonic Underground mining operations are currently divided into a number of areas including:

- Indian and Caspian
- Baltic
- Caribbean
- Area 134 and Cortez
- Timor and Pacific

Figure 4-3 Oblique aerial photographs of Plutonic Gold Mine area



Royalties relevant to the project include the Western Australian state government gold royalty and the 'Grange' royalty.

The Western Australian state government gold royalty payments are charged as follows:

- 2.5% of gold production above 2,500 oz
- The royalty value of gold metal produced is calculated for each month in the relevant quarter by multiplying the total gold metal produced during that month by the average of the gold spot prices for that month.

Plutonic Grange tenement royalty agreement (M52/295, M52/296, M52/300 and M52/301) is a sliding scale royalty based on ore feed type and head grade of the mill feed. An example for underground ore is included, in part in Table 1-3.

Table 4-3 Plutonic group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Tenement note
E52/3189	Billabong	18,480 (66 Blocks)	07/04/16	06/04/26	$132,000	
L52/40	Billabong	58.17	27/09/89	26/09/24	Nil	P7
L52/41	Billabong	1,194	27/09/89	26/09/24	Nil	P7, P11
L52/48	Billabong	472	10/09/91	09/09/21	Nil	P7, P8
L52/52	Billabong	210	16/01/92	15/01/22	Nil	P7, P8
L52/54	Billabong	110	13/05/92	12/05/22	Nil	P7
L52/55	Billabong	234.5	15/04/92	14/04/22	Nil	P7, P9
L52/56	Billabong	31.54	13/05/92	12/05/22	Nil	P7, P11
L52/70	Billabong	292	31/01/97	30/01/22	Nil	P7
L52/71	Billabong	191	23/06/97	22/06/22	Nil	P7, P12
L52/74	Billabong	20.6	16/09/99	15/09/24	Nil	P7
L52/203	Billabong	22.2288	Pending			
M52/148	Billabong	448.05	14/03/89	13/03/31	$44,900	P7
M52/149	Billabong	449.9	14/03/89	13/03/31	$45,000	P7
M52/150	Billabong	567.3	14/03/89	13/03/31	$56,800	P7
M52/170	Billabong	540.6	9/10/89	08/10/31	$54,100	P7
M52/171	Billabong	777.4	9/10/89	08/10/31	$77,800	P7
M52/222	Billabong	621.9	4/02/91	03/02/33	$62,200	P7
M52/223	Billabong	840.45	4/02/91	03/02/33	$84,100	P7
M52/253	Billabong	840.7	11/09/91	10/09/33	$84,100	
M52/263	Billabong	360.2	4/11/91	03/11/33	$36,100	P7
M52/264	Billabong	816.3	4/11/91	03/11/33	$81,700	P7
M52/289	Billabong	919.45	20/03/92	19/03/34	$92,000	P7
M52/295	Billabong	647.8	17/03/92	16/03/34	$64,800	P1, P7, P14, P15
M52/296	Billabong	732.6	17/03/92	16/03/34	$73,300	P1, P7, P14, P15
M52/300	Billabong	928.15	17/03/92	16/03/34	$92,900	P1, P7, P14, P15
M52/301	Billabong	991	17/03/92	16/03/34	$99,100	P1, P7, P14, P15
M52/308	Billabong	725.05	3/09/92	02/09/34	$72,600	P7
M52/309	Billabong	701.95	3/09/92	02/09/34	$70,200	P7
M52/395	Billabong	840.1	10/08/93	09/08/35	$84,100	
M52/590	Billabong	626.55	27/09/96	26/09/38	$62,700	
M52/591	Billabong	950.1	27/09/96	26/09/38	$95,100	P7
M52/592	Billabong	836.45	27/09/96	26/09/38	$83,700	P7
M52/670	Billabong	309.20	03/07/98	02/07/40	$31,000	
M52/671	Billabong	621.60	03/07/98	02/07/40	$62,200	
M52/672	Billabong	934.80	03/07/98	02/07/40	$93,500	
P52/1560	Billabong	3.67598	06/03/20	05/03/24	$2,000	
P52/1561	Billabong	23.6573	06/03/20	05/03/24	$2,000	
P52/1562	Billabong	48.84971	06/03/20	05/03/24	$2,000	
P52/1606	Billabong	97.84656	13/01/22	12/01/26	$3,920	P7

Table 4-4 Plutonic group tenement list notes

Note	Project	Comment
P1	Plutonic	This tenement is the subject of a royalty obligation in favour of GCM (ACN 007 066 766) created under the freshwater royalty agreement dated December 5, 1991 between Plutonic Gold Pty Ltd (ACN 006 697 418) and GCM (the "**Freshwater Royalty Agreement**"). The royalty obligation relates to the first 150,000 ounces of gold produced from certain tenements including this tenement. The relevant tenements, to which the royalty obligation applies, are listed in Schedule 1 to the Deed dated June 17, 1996 between Plutonic Gold Pty Ltd, GCM and Astro Mining NL. Billabong does not know if its predecessor in title to those tenements, Plutonic Gold Pty Ltd, has satisfied the royalty obligation but considers it is very likely given the size of the pits on those tenements from which the Barrick entities produced gold. Billabong has not produced any gold from the tenements the subject of this sale of Plutonic operations to which the royalty obligation applies (M52/295, 296, 300 and 301). The royalty percentage and any other details about this royalty obligation are unknown because Billabong does not have a copy of the Freshwater Royalty Agreement. The royalty obligation is disclosed and confirmed in the agreement dated November 13, 1992 between the same parties, under which Plutonic Gold acquires all the 49% interest of GCM in the freshwater joint venture agreement dated December 5, 1991 between the same parties subject to this royalty obligation retained by GCM. Under clause 8 of the agreement dated November 13, 1992, Billabong requires the consent of GCM to assign its interest in this tenement the subject of the royalty obligation. GCM is now called Newmont Yandal Operations Pty Ltd.
P7	Plutonic	Northern Star acquired 100% legal and beneficial interest in this tenement under a sale and purchase agreement between Northern Star and Barrick (Australia Pacific) Limited dated December 21, 2013. Billabong acquired 100% of the Northern Star interest through a sale and purchase agreement dated August 12, 2016. A 1% net smelter return royalty is payable on the refined gold derived from the Tenements (as such term is defined in the sale agreement) in excess of 70,000 ounces and up to 90,000 ounces.
P8	Plutonic	Access Deed between Barrick (Plutonic) Ltd and Cosmopolitan Minerals Ltd for E52/2944 and E52/2945 over existing L52/48 and L52/52 dated on or about November 2013.
P9	Plutonic	Access Deed between Northern Star and Cosmopolitan Minerals Ltd for E52/3190 over existing L52/55 dated March 8, 2016.
P11	Plutonic	Access Deed between Northern Star and Cosmopolitan Minerals Ltd affecting application for E52/3087 over existing L52/41 and L52/56 dated March 8, 2016.
P12	Plutonic	Access Deed between Northern Star and Cosmopolitan Minerals Ltd affecting application for E52/3346 over existing L52/71 dated March 8, 2016.
P14	Plutonic	This tenement is the subject of the Freshwater Diamond Rights in favour of Astro Mining NL (A.C.N. 007 090 904) which were originally created by an agreement dated November 13, 1992 between Plutonic Gold Pty Ltd (ACN 006 697 418) and GCM (A.C.N. 007 066 766). The Freshwater Diamond Rights are detailed in the Schedule to that agreement. Clause 8.2 of that agreement also requires that the prior consent of Astro Mining NL be obtained for any sale of this tenement other than to an affiliate of Plutonic Gold Pty Ltd. Astro Resources NL also has a right of first refusal to acquire the tenement prior to any surrender by Plutonic Gold Pty Ltd. Astro Resources NL (ASX:ARO) and its 2015 Annual Report and latest Quarterly Activities Report do not disclose any interest in this tenement or the diamond rights generally in the Plutonic Region; it is undergoing a recompliance listing to become a technology focussed company and assuming that recompliance process announced in 2015 is successful, it is most unlikely that Astro Resources NL will seek to exploit its diamond rights on this tenement.
P15	Plutonic	This tenement is the subject of a royalty obligation in favour of Horseshoe Gold Mine Pty Ltd (A.C.N. 008 921 211) under the freshwater tenements royalty agreement dated July 1, 1997 between Horseshoe Gold Mine Pty Ltd and Plutonic Gold Pty Ltd. The royalty is derived on a per tonne basis of ore produced which is variable with head grade, detailed in Schedule 1 of that agreement. No consent to assign the tenement is required from Horseshoe Gold Mine Pty Ltd; a deed of covenant is required.

4.2 Hermes group

The Hermes group of tenements are 100% owned by Billabong and are shown in Figure 4-4 with details listed in Table 4-5 and related notes in Table 4-6.

Commercial production for the Hermes open pit mine was achieved and announced in March 2018. Ore from Hermes was transported via road train and treated at the Plutonic processing plant. Hermes production ended in May 2019 with the last stockpiled ore processed in November 2019.

The Hermes group of tenements are subject to the Western Australian state government royalty of 2.5% for gold revenues.

The Troy Royalty – 1% royalty on net smelter return is payable on gold production from 50,000 ounces to 70,000 ounces to Troy and is applicable to M52/685, M52753, M52/796, M52/797, P52/1569 and P52/1570.

The Carey Royalty – A$1.00 Royalty is payable to the Wongatha Education Trust for every ounce of Au mined and sold for tenements M52/685, M52753, M52/796, M52/797, P52/1569 and P52/1570.

Jidi Jidi holds a royalty for gold metal produced from specified Hermes tenements for production up to 100,000 Au oz and a lower royalty for production over 100,000 Au oz, which is payable for the duration of any productive mining (i.e. the period during which Billabong is required to pay the State royalty). The royalty values are confidential between Billabong and Jidi Jidi.

Figure 4-4 Hermes and Three Rivers Projects and Bryah Basin JV

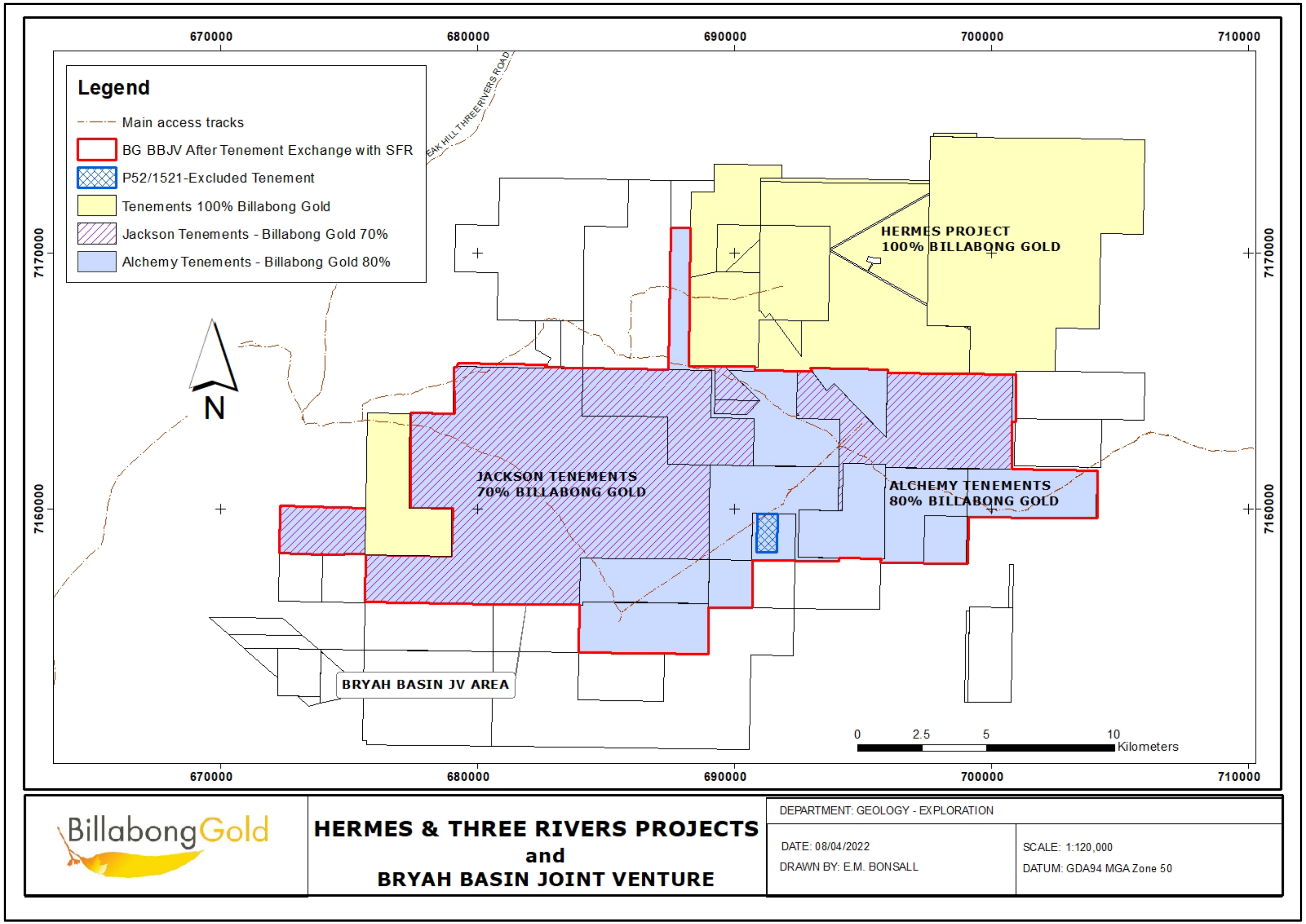


Table 4-5 Hermes group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Notes
E52/2361	Billabong	5,320 (19 Blocks)	17/04/09	16/04/2023	$70,000	P6
E52/3322	Billabong	5,600(20 Blocks)	14/11/17	13/11/22	$30,000	
G52/291	Billabong	85.69	16/09/16	15/09/37	Nil	
L52/116	Billabong	253	09/07/10	08/07/31	Nil	P6, P13
L52/117	Billabong	53	09/07/10	08/07/31	Nil	P6, P13
L52/118	Billabong	159	09/07/10	08/07/31	Nil	P6
L52/164	Billabong	1,336	18/07/16	17/07/37	Nil	P10
L52/165	Billabong	387.884	31/03/17	30/03/38	Nil	P10
L52/166	Billabong	167.9	31/03/17	30/03/38	Nil	
L52/201	Billabong	13.7975	06/08/19	05/08/40	Nil	
L52/204	Billabong	14.281	06/08/19	05/08/40	Nil	
M52/685	Billabong	988.7	12/01/09	11/01/30	$98,900	P6
M52/753	Billabong	73.04	13/01/09	12/01/30	$10,000	P6
M52/796	Billabong	788.2	13/01/09	12/01/30	$78,900	P6
M52/797	Billabong	999.65	13/01/09	12/01/30	$100,000	P6
P52/1569	Billabong	95.2	28/02/2018	27/02/2026	$3,840	P6
P52/1570	Billabong	24.317	28/02/2018	27/02/2026	$2,000	P6

Table 4-6 Hermes group tenement list notes

Note	Project	Comment
P6	Hermes	Northern Star acquired a 100% legal and beneficial interest in this tenement under the Hermes Gold Mine sale and purchase agreement between Northern Star and Alchemy Resources (Three Rivers) Pty Limited dated February 23, 2015. The OSR have assessed duty of $92,000 which was paid by the due date of February 23, 2016.
P10	Hermes	Access Deed between Northern Star and Cosmopolitan Minerals Ltd affecting applications for L52/164 and L52/165 over existing E52/3190 dated March 8, 2016.
P13	Hermes	Access Deed between Northern Star and Cosmopolitan Minerals Ltd affecting application for E52/3190 over existing L52/116 and L52/117 dated March 8, 2016.

4.3 Bryah Basin Joint Venture

The BBJV between Billabong and Alchemy Resources (Three Rivers) Pty Ltd, a wholly-owned subsidiary of Alchemy Resources Limited ("**ALY**") is composed of two parts:

- The right by Billabong to earn an 80% equity interest in all minerals in those tenements 100% held by ALY and in certain blocks of 100% ALY tenements and

- The right by Billabong to earn a 70% interest in all minerals in tenements that Jackson Minerals Pty Ltd (Jackson) holds 20% registered interest and title to (currently ALY 80%: Jackson 20%) and in certain blocks of 80% ALY tenements:

A fully executed joint venture agreement to reflect Billabong's interest in the BBJV tenements was concluded in December 2020 following the completion of the earn-in period.

Day to day tenement management and compliance, under the Acts and Regulations of Western Australia, are managed by Billabong for 100% ALY tenements and the Joint Tenements where Billabong's farm-in interest forms the greater part of the area. The Three Rivers combined annual mineral exploration report (C183/2009) has been compiled by Billabong and submitted to DMIRS.

Exploration activity within the former Doolgunna pastoral lease, managed by the Department of Biodiversity, Conservation and Attractions' ("**DBCA**", formerly the Department of Parks and Wildlife "**DPaW**"), requires that Billabong:

- Comply with the Company's *Exploration Activity: Environment & Conservation Management Plan (ECMP), March 2017* submitted to the relevant Government departments (formerly DPaW and the former DER) in March 2017.
- Notify DBCA in Geraldton prior to any on-ground work and provide the DBCA with Billabong's programmes of work.

The Troy Royalty – 1% royalty on net smelter return is payable on gold production from 50,000 ounces to 70,000 ounces to Troy and is applicable to E52/2362, M52/722, M52/723, M52/795, M52/1049 and P52/1577, as well as parts of E52/1723, E52/1730 and E52/3405, formerly held as P52/1316, P52/1321, P52/1322 and P52/1327.

The Carey Royalty – A$1.00 Royalty is payable to the Wongatha Education Trust for every ounce of Au mined and sold for tenements E52/2362, M52/722, M52/723, M52/795, M52/1049 and P52/1577 as well as parts of E52/1723, E52/1730 and E52/3405, formerly held as P52/1316, P52/1321, P52/1322 and P52/1327. .

Locations of the BBJV tenements area are shown on Figure 4-4 and detailed in

Table 4-7 Bryah Basin JV group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Notes
E52/1668	ALY 80% JAK 20%	11,480 (41 Blocks)	23/02/04	22/02/2023	$123,000	P2, P4
E52/1678	ALY 80% JAK 20%	3,360 (12 Blocks)	23/02/04	22/02/2023	$70,000	P2, P4
E52/1723	ALY 100%	2,240 (8Blocks)	01/12/04	30/11/2022	$70,000	P3, P4, P5
E52/1730	ALY 80% JAK 20%	3,640 (13 Blocks)	01/12/04	30/11/2022	$70,000	P2, P4
E52/1731	ALY 100%	1,400 (5 Blocks)	30/01/09	29/01/2023	$50,000	P3, P4
E52/1852	ALY 100%	1,120 (4 Blocks)	14/06/05	13/06/22	$50,000	P3
E52/2362	ALY 100%	1,120 (4 Blocks)	17/04/09	16/04/23	$50,000	P3, P4
E52/3406	ALY 100%	840 (3 Blocks)	22/04/16	21/04/26	$30,000	P20
E52/3408	ALY 100%	560 (2 Blocks)	22/04/16	21/04/26	$30,000	P18
L52/208	Billabong 100%	554.48	23/08/19	22/08/40	Nil	
L52/231	Billabong 100%	265.80239	9/02/21	8/02/42	Nil	
L52/235	Billabong 100%	8.59378	27/01/22	26/01/43	Nil	
M52/1049	ALY 100%	997.65	23/09/10	22/09/31	$99,800	P3
M52/737	ALY 100%	382.9	16/01/09	15/01/30	$38,300	P3
M52/795	ALY 100%	928.4	13/01/09	12/01/30	$92,900	P3, P4
P52/1538	ALY 80% JAK 20%	139.985	27/04/17	26/04/25	$5,600	P2, P3
P52/1539	ALY 80% JAK 20%	81.9411	01/05/17	30/0425	$3,280	P2, P3
P52/1577	ALY 100%	25.6434	19/07/18	18/07/22	$2,000	P3

Table 4-8 Bryah Basin JV group tenement list notes

Note	Project	Comment
P2	Bryah Basin JV	Northern Star acquired a right to earn a 70% legal and beneficial interest in certain blocks within this tenement as detailed in Schedule 1 under the Bryah Basin Farm-in Agreement dated February 23, 2015 between Northern Star and Alchemy Resources Limited (Three Rivers) Pty Limited (the "**Farm-in Agreement**") which holds an 80% interest in this tenement, Jackson Minerals Limited holds a 20% interest in this tenement. No interest can be assigned in the tenement without observing the other party's right of first refusal. Encumbrances are permitted provided the financier executes a deed of covenant. Third party rights apply, described in Schedule 1 of the Farm-in Agreement. Billabong acquired all of Northern Star rights in August 2016.
P3	Bryah Basin JV	Northern Star acquired a right to earn an 80% legal and beneficial interest in certain blocks within this tenement as detailed in Schedule 1 under the Farm-in Agreement. No interest can be assigned in the tenement without observing the other party's right of first refusal. Encumbrances are permitted provided the financier executes a deed of covenant. Carey and Troy Third party rights apply, described in Schedule 1 of the Farm-in Agreement. Billabong acquired all of Northern Star rights in August 2016.
P4	Bryah Basin JV	Under an agreement between Independence Group NL and ALY, Independence Group NL is earning an interest in certain blocks within this tenement, which are exclusive of the blocks within the tenement in which Northern Star is earning an interest under either note P2 or P3. The relevant blocks are also detailed in Schedule 1 under the Farm-in Agreement dated February 23, 2015 between Northern Star and ALY, Billabong acquired all of Northern Star rights in August 2016. Sandfire Resources NL purchased Independence Group NL's rights and interests under a Deed of Sale, dated May 2, 2018.
P5	Bryah Basin JV	Under a Deed Relating to Transfer of an Interest in Exploration Licence 52/1723-I between Alchemy Resources (Three Rivers) Pty Ltd, PepinNini Robinson Range Pty Ltd, PepinNini Minerals Ltd, Grosvenor Gold Pty Ltd and Northern Star dated March 29, 2016, PepinNini Robinson Range Pty Limited agreed to transfer their 50% registered legal interest to Alchemy Resources (Three Rivers) Pty Limited, and to relinquish the iron ore mineral rights held in this tenement. An iron ore royalty applies in favour of PepinNini Robinson Range Pty Limited payable by Alchemy Resources (Three Rivers) Pty Ltd. The transfer was registered with DMIRS on August 31, 2018
P18	Bryah Basin JV	E52/3408 is a tenement forming part of the Farm-In Agreement tenements, in substitution for part of E52/2360.
P20	Bryah Basin JV	E52/3406 is a tenement forming part of the Farm-In Agreement tenements, in substitution for part of E52/2362.

A stand-alone tenement adjacent to the BBJV, Exploration Licence E52/3499, is held by Billabong (100%) and has been included in the Three Rivers Combined Reporting Project (C183/2009). The tenement consists of 4 blocks (1,120 ha) and was granted on March 7, 2017.

A tenement exchange deed executed between Sandfire Resources NL and Billabong has resulted in Billabong obtaining an 80% share in the whole of M5/795 and E52/3406 and an additional portion of E52/2362 while Sandfire acquired an 80% share in the whole of M52/722, M52/723 and E52/3405. The *Deed – Bryah Basin Tenements* was executed on November 9, 2021. Sandfire subsequently surrendered E52/3405, E52/3407 and its remaining portion of E52/2362 in late November 2021. E52/2360 and E52/3409 were surrendered in March 2022.The surrenders have no material effect on Billabong's tenement holding.

5 Accessibility, climate, local resources, infrastructure, and physiography

5.1 Accessibility

Vehicular access to Plutonic Gold Mine is via a 12 km unsealed road leading off the Great Northern Highway. The Great Northern Highway connects Perth and Wyndham, the northernmost port in Western Australia. An airstrip adjacent to the mine site is used for charter aircraft to move crews between the site and Perth.

Access to the Hermes site is via the well-maintained unsealed Ashburton Downs road which connects with the Great Northern Highway approximately 70 km north of Meekatharra, and then via the Peak Hill Road, with access beyond the old Peak Hill town site off the Peak Hill-Doolgunna Road and un-serviced station tracks. A direct private haul road approximately 65 km in length to the Plutonic Gold Mine has been established.

The sale of pastoral leases covering the majority of the tenements held by the Company was completed in late 2020. Concurrent with the sale, the Company entered into an access agreement with the new holder of the pastoral leases to ensure the Company has continued access on the pastoral leases for mining and exploration activities.

5.2 Climatic conditions

The project area is located in the Gascoyne bioregion and is described as having an arid climate with predominantly winter rainfall in the west, and summer rainfall in the east.

The project area receives, on average, a total of 238.4 mm of rainfall per year, with most rainfall occurring during the months of January, February and March (35.6 mm, 49.7 mm and 35.7 mm respectively - Neds Creek weather station No.7103).

The rainfall intensity - frequency - duration table for the project area, as generated by the Commonwealth of Australia Bureau of Meteorology, indicates that a 1 in 100 year average recurrence interval, 72-hour duration storm event can be expected to generate 254.2 mm of rainfall.

Three Rivers' Station is on the boundary of summer dominant rainfall to the north, and winter dominant rainfall to the south. Based on long-term records, approximately 77% of the annual rainfall is experienced between the months January and June. Summer and autumn rainfall is typically associated with summer cyclonic activity, while winter falls are the result of northward straying depressions which originate off the south coast. Summer rains are usually of higher intensity and shorter duration, contributing to an erratic annual range. In comparison, winter falls are more reliable but of lower intensity.

Diurnal maximum temperatures frequently exceed 40°C between December and March. Average January maximum and minimum temperatures for Three Rivers Station are 39.3°C and 23.9°C respectively. The July average range is 20.9°C to 5.0°C, with nocturnal winter minimum temperature averaging 6°C.

The mean annual pan evaporation rate as measured by a class A pan at Meekatharra is 4,068 mm. Comparing the average rainfall rates to the average evaporation rates at Meekatharra, average evaporation exceeds average rainfall for every month of the year and annual average evaporation exceeds annual average rainfall by about 3,500 mm.

5.3 Topography

The region is predominantly flat with minimal elevation variability from approximately 560 m above sea level. Several creeks and alluvial washes are present. The Plutonic area is relatively flat with gentle slopes of approximately 1:290, generally to the north-east. The topography of the project area is considered to be flat to moderately undulating, bounded to the south and west by the Robinson Ranges, and by the Horseshoe Range to the north. The area is characterised by undulating areas of sand plain and granite outcrop.

5.4 Geology

The Plutonic area is located towards the south western end of the northeast-southwest Plutonic Greenstone Belt, occurring in the central portion of the Marymia Inlier. The Plutonic Greenstone Belt is interpreted as a regional-scale fold-thrust belt. The generalised stratigraphic column of the Plutonic Greenstone Belt consists of mafic-ultramafic-BIF dominated sequence at the base, passing into mafic dominated and finally clastic sediments at the top.

Rocks of the Marymia Inlier consist mainly of granite and gneiss with enclaves of meta-greenstone (including mafic and ultramafic igneous rocks, BIF and sedimentary rock precursors) metamorphosed at upper amphibolite to granulite facies. The meta-greenstones may represent high grade metamorphic equivalents of the Plutonic Greenstone Belt to the north-east. Rocks of the Peak Hill Schist area include quartz-sericite schist, quartz-muscovite schist and quartz-muscovite-biotite-chlorite schist, which have been variously deformed and contain a range of mylonitic textures and discrete mylonitic units.

Soils typically comprise thin colluvium / alluvium over laterite (ferricrete) caprock. Based on the geotechnical investigation, sub-surface conditions of the site comprises clayey sand / sandy clay, clayey gravel, sandy clayey gravel and gravelly clayey sand extending to the maximum investigated depth of 1.1 m. Open mulga woodlands occur on shallow earthy loams over hardpan on the plains, with mulga scrub and Eremophila shrublands on the shallow stony loams of the ranges. The Carnegie Salient to the east is characterised by extensive salt lake features supporting succulent steppes.

5.5 Surface water

The area features low-relief alluvial plains with minor ephemeral watercourses. These watercourses drain to the north, towards the middle branches of the Gascoyne River located approximately 5 km north of the site. Surface water drainage in the area generally trends north-west from the Robinson Ranges through the site towards Coodewa Creek, and then into the Gascoyne River 40 km north. The local creeks are shallow drainage lines and ephemeral. Sheet flow rapidly feeds into the creeks during storm events, but creek flow ceases soon after rainfall events. Where pools do occur within the creek system these generally do not persist for long, even where fed by shallow subsurface seepage in surficial sands.

Undisturbed parts of the mine site are overlain with a matrix of gravel sized and smaller particles that appear to provide a good degree of armouring and protection to the underlying residual soils.

5.6 Groundwater

The following have been identified as the main aquifers within the site area:

- Shallow alluvial aquifer, located within the sandy alluvium, lacustrine or Aeolian sediments, calcrete or palaeochannel sands.
- Fractured rock aquifer, formed within the fractured to slightly weathered bedrock.

Shallow alluvial aquifers might be found along creek lines and are recharged directly by direct infiltration of rainfall or by infiltration of surface water during periodic stream flows. These aquifers, where found, are not extensive due to a general lack of well-defined drainage systems within the mine area. Aquifers in basement rock are generally associated with the geological structures that are linked to the orebodies and tend to have narrow, elongated geometry limiting their storage capacity. Recharge to this type of aquifer occurs predominantly as leakage from any overlying alluvial systems.

Regional groundwater flow within the shallow alluvial aquifer has been observed to be in a north-westerly direction and discharges to the Gascoyne River. Groundwater flow within the fractured rock aquifer is dependent on the orientation of the fracturing and faulting. Groundwater level data collected from bores installed and screened within the fractured rock aquifer indicate a drainage gradient towards the south (i.e. groundwater flow from the north).

Regional groundwater level within the alluvial aquifer is approximately 5 m below ground level (mbgl), and ranges from approximately 20 to 30 mbgl for the fractured rock aquifer.

Groundwater within the shallow alluvial aquifer is slightly brackish (total dissolved solids ("**TDS**") is approximately 1,500 mg/L). Groundwater from the fractured rock aquifer shows a similar hydrochemistry to the alluvial / calcrete aquifer in that it can be fresh to slightly brackish (TDS between 700 and 1,200 mg/L), though some areas have been found to be more saline (19,000 mg/L TDS).

Groundwater is mildly alkaline, and of a sodium chloride/sulphate type, with high magnesium, bicarbonate and nitrate concentrations, and high hardness. It generally has very low metal concentrations, but there are commonly elevated arsenic levels. Nitrate and arsenic concentrations in groundwater at Plutonic, and in the Murchison and Gascoyne regions in general, commonly exceed drinking water Guideline Values of 50 mg/L for nitrate, and 7µg/L for arsenic, and are close to or can exceed Trigger values for livestock (400 mg/L NO_3 and 500 µg/L arsenic).

Plutonic borefields and mine dewatering activities are licensed by the DWER (GWL151450). Local groundwater resources constitute the only source of raw water supply to the mine. Process water and camp water supplies for the Plutonic operations has been sourced from Borefield No.1 since 1990. It is located approximately 30 km west of the Plutonic plant.

Borefield 1 is located in the south-eastern part of the Bangemall Basin and initially sourced water from five bores within a shallow calcrete aquifer associated with the Gascoyne River drainage system. The production bores intersect up to 13 m of calcrete which is cavernous in places. The calcrete aquifer is recharged by rainfall and stream flow in the Gascoyne River in times of flood. Groundwater is fresh to slightly brackish (<1,500 mg/L TDS). This calcrete aquifer was largely depleted by 1992, and a new aquifer sought and found approximately 12 km west of the mine site. Since this time, increased rainfall and reduced pumping rates have allowed this aquifer to recharge, and pumping continues at a sustainable rate. Process Borefield No.1 originally comprised five production bores, PB1 to PB5 and associated monitoring bores MB1 to MB6. Production bores PB1 and PB4 were decommissioned in 1993. This was the sole process water supply source until Process Borefield No.2 was commissioned in 1992.

Borefield 2 is located approximately 12 km west of the plant site. The borefield is located in regionally extensive fractured bedrock aquifer. It is associated with fractured and brecciated chert in the roughly north-south trending faulted contact zone between the Bangemall Group and the granitoids of the Marymia Dome. The borefield develops groundwater resources over a 24 km length of this contact fault zone which extends over a length in excess of 100 km. The main aquifer is cut and offset by a number of north-easterly trending faults, which may restrict hydraulic continuity along the main axis of the aquifer. The main fractured rock aquifer is overlain by a thick sequence of variably weathered shales, which form a confining layer to the main aquifer zone. None of the production bores recorded any significant water strikes within the unit, although historical monitoring data indicate that the shales do provide significant water to the main aquifer as pumping induced leakage. The shales are overlain by up to 32 m of low permeability / low storage alluvium and colluvium. Recharge to the main aquifer occurs via leakage from overlying shales and surrounding basement rocks. Throughflow occurs along the main aquifer zone, although this may be somewhat restricted by the cross cutting faults. Groundwater is fresh to slightly brackish (1000- 1500 mg/L TDS).

Process Borefield No.2, installed in April 1992, originally comprised four production bores, PB6 to PB9, and associated monitoring bores GM1 to GM3 and EX3. In 1994, three new monitoring bores (EX14 to EX16) were installed as part of a borefield expansion investigation. Seven new production bores were installed in September 1996 (PB10 to PB16).

The Plutonic Gold Mine comprises numerous open pits and underground operations. The majority of the pits have required dewatering by in-pit sumps. Groundwater sourced from mine dewatering is used for both dust suppression throughout the mine site and for mining services. Since July 2007 when surface (open pit) operations ceased, dewatering has only been conducted at active underground operations, Main Lode and Pluto East. The volumes abstracted are pumped to Laterite Pit, a surface holding dam where the water is de-silted and reused underground for mining services. Dewatering production remains in a closed loop and recycled water used underground for mining services is recovered during the dewatering process. Any surplus water is used for dust suppression.

5.7 Flora

A number or vegetation and flora surveys have been conducted at Plutonic over the last ~30 years. The initial baseline study was carried out in February 1989, with the representative plant families found to be Mimosaceae (mulga, kurara, and gidgee), Chenopodiaceae (bluebushes), Myoporaceae (poverty and turpentine bushes), Amaranthaceae (mulla mulla) and Caesalpiniaceae (daises). None of the species identified were of conservation significance, and it was reported that the vegetation was floristically and structurally similar to that found over large areas north of Meekatharra.

Subsequent vegetation and flora surveys were conducted prior to any proposed land disturbance. These surveys typically included a desktop study of aerial photography, followed up by on the ground field surveys. Between 70 and 120 plant species, and 4-8 vegetation communities were identified in each of the surveys completed from 1993 to date.

The priority flora species, *Eremophila lanata ms*, was identified within Plutonic's leases. The species are protected under the Biodiversity Conservation Act 2016 and are listed in the Declared Rare and Priority Flora List for Western Australia. *E. lanata ms* was identified during vegetation and flora surveys conducted at a number of areas including Trout, Piranha, Callop and the Plutonic aerodrome. Initially *E. lanata ms* was classified as a Priority 1 protected species, however through expansion of mining and exploration operations at Plutonic since 1997, a progressively higher number of *E. lananta ms* populations have been encountered. As a result, the category was downgraded from Priority 1 to Priority 3. (Plutonic 2004 aerodrome NOI). Targeted rare flora surveys have been conducted by Osborne & Abercrombie (2001), Onshore Environmental Consultants (OEC, 2006) and Worley Parsons (2012) for *E. lanata ms*. Additional targeted surveys were conducted for *E. micrantha* by Brearly & Osbourne (1997), OEC (2006) and Worley Parsons (2012), though this has since been downgraded from priority species status.

A detailed flora survey of the proposed TSF4 and TSF5 disturbance footprint area was completed by Eco Logical Australia Pty Ltd in April 2019. A total of 43 taxa from 26 genera and 17 families were recorded from 10 quadrats established across the survey area. Average native perennial species richness per quadrat was 14.2, ranging from a low of 9 to a high of 18. The majority of taxa recorded were representative of the Fabaceae (11 taxa) and Scrophulariaceae (5 taxa) families. Acacia and Eremophila were the best represented genera throughout the survey area with 8 and 5 taxa recorded, respectively. No Threatened flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the "**EPBC Act**") or the State *Biodiversity Conservation Act 2016* were recorded from within the survey area. One Priority 3 flora species, *Sida picklesiana*, was recorded with a population totalling 251 individuals.

One introduced (weed) flora species, *Bidens bipinnata*, was recorded within the survey area. This species is not listed as a Declared Pest listed under the State *Biosecurity and Agriculture Management Act 2007* or as a Weed of National Significance.

Three intact vegetation communities were delineated and mapped within the survey area, covering a total area of 90.1 hectares (85% of the total area surveyed). Tracks, cleared areas and cleared areas with regrowth covered the remaining 15.9 hectares (15% of the total area surveyed). No vegetation communities delineated within the current survey area were inferred to represent any known or potential conservation significant communities listed under the EPBC Act, the State *Biodiversity Conservation Act 2016* or by the DBCA.

Vegetation condition within the survey area ranged from Degraded to Good based on the vegetation condition scale adapted from Keighery and Trudgen provided in the EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment.* Vegetation was observed to mostly be in Good condition (58.2 hectares; 54.9%). Vegetation of Poor and Degraded condition mostly occurred in pockets of mulga woodland associated with minor drainage areas. Primary disturbances present within the survey area were associated with grazing and trampling of vegetation by cattle and camels. Other disturbances observed included numerous mustering/vehicle tracks, cattle and rabbit scats and weeds.

5.8 Fauna

A number of desktop surveys and opportunistic field surveys have been conducted for fauna species at Plutonic over the past ~30 years. None of these have identified any species of protection status within the mining lease or within close proximity.

It was identified that habitats present on the lease are very common (Plutonic NOI, 1989). Introduced fauna species identified at Plutonic include cattle, rabbits, camels, cats and dogs. The control of feral cats is recognised as an important conservation issue throughout Australia. The impact of feral cats on native fauna is acknowledged by Commonwealth legislation, as outlined in Schedule 3 of the Endangered Species Protection Act 1992. Plutonic has undertaken feral animal trapping programs which focuses on the landfill sites, the camp and pastoral lease.

A detailed fauna survey of the proposed TSF4 and TSF5 disturbance footprint area was completed by Eco Logical Australia Pty Ltd in April 2019. A total of 22 fauna species were recorded within the survey area, comprising 16 birds, four mammals and two reptiles. Introduced fauna species recorded included Cattle (*Bos taurus*), Australian Feral Camel (*Camelus dromedarius*) and European Rabbit (*Oryctolagus cuniculus*).

No Threatened or Priority fauna species listed under the EPBC Act, the State *Biodiversity Conservation Act 2016* or by the DBCA were recorded from within the survey area.

Two fauna habitats were delineated and mapped within the survey area, namely 'open mulga woodland on sheet plain wash' and 'mulga woodland on minor drainage'. Open mulga woodland on sheet plain wash was the most commonly occurring fauna habitat, covering 77.0 hectares (72.7%) of the survey area. The mulga woodland on minor drainage fauna habitat covered 13.1 hectares (12.4%) of the survey area, and was associated with a north-south orientated minor drainage line.

5.9 Cultural heritage

No items considered to be of important European heritage have been found in the vicinity of the Plutonic project area.

The Site Register at the Department of Aboriginal Sites revealed that no sites of significance have previously been recorded on or near the Plutonic project area.

A number of archaeological and ethnographic surveys have been conducted in the project area, including:

- R.O'Connor and G. Quartermaine, March 1989. Report on a Survey for Aboriginal Sites at the Proposed Plutonic Project Area, Meekatharra. Part One: Ethnography – Rory O'Connor; Part Two: Archaeology – G. Quartermaine. Survey on Mining Leases M52/148 M52/149 and M52/150 and Exploration Licence E52/157. Commissioned by Australian Groundwater Consultants on behalf of GCM.
- Quartermaine Consultants, August 1992. Archaeological Survey Freshwater Project Area, North Meekatharra. Prepared for Plutonic Operations Limited.
- C.J. Mattner and G.S. Quartermaine, August 1992. Addendum to Report on the Archaeological Survey at Freshwater Project Area, North of Meekatharra.
- K. Macintyre and B. Dobson, September, 1992. Report on an Ethnographic Survey for Aboriginal Sites at 530 Freshwater Project, Three Rivers. Prepared for Plutonic Operations Limited.
- Quartermaine Consultants – K. Macintyre and Dr B. Dobson, June 1993. Report on A Survey for Aboriginal Sites at Triple P Project Area, North of Meekatharra. Prepared for Resolute Resources Ltd.
- Macintyre, Dobson & Associates, and Jacqueline Harris, May 1996. Report on an Aboriginal Site Survey of Zone 550, Plutonic Gold Mine, Three Rivers. Prepared for Plutonic Operations Limited.
- Quartermaine Consultants – G. Quartermaine, October 2000, Report on an Archaeological Investigation for Aboriginal Sites Salmon to Trident Haul Road Route. Prepared for Plutonic Operations Limited.
- R. O'Connor, November 2000. Report on an Ethnographic Survey of the proposed Salmon to Trident Haul Road Route. Prepared for Plutonic Operations Limited.
- R. O'Connor and members of the Naganawongka Wadjari and Ngarla native title group as commissioned by Barrick Gold of Australia, July 2003.
- R. & E. O'Connor Pty Ltd, November 2004. Report on an Ethnographic Survey of a Proposed New Airstrip at Plutonic Mine. Produced for Barrick Gold of Australia Limited.
- W. Glendenning and C, Somerville, January 2011. Report of an Ethnographic Survey of a Proposed Mineral Exploration Program at Plutonic. Produced for Barrick (Plutonic) Ltd.
- W. Glendenning and C, Somerville, February 2011. Report of an Archaeological Survey of a Proposed Mineral Exploration Program at Plutonic. Produced for Barrick (Plutonic) Ltd.

Archaeological sites can be classified into three broad categories:

- Important sites that should be preserved;
- Moderately important sites from which more information may be obtained, and
- Sites of low importance with limited potential to yield further information.

Human interference with Aboriginal sites is an offence, unless authorised, under section 17 of the Western Australian *Aboriginal Heritage Act 1972*. If company personnel locate any additional archaeological sites, the information will be reported to the Western Australian Museum. All areas of significance identified during field surveys have been lodged with the Department of Indigenous Affairs. A record of all registered sites is maintained within the GIS database at Plutonic Gold Mine.

Site identification and work program clearance heritage surveys were completed by Terra Rosa Consulting for Northern Star at the Hermes Gold Mine area in 2016 (Kimber and Gonda, 2016). No sites of significant cultural heritage value were identified in the priority drilling areas.

An ethnographic and archaeological work area survey of the Timor and Hermes Haul Road work areas was conducted within tenements L52/165, L52/166, M52/149, M52/150, M52/171, M52/309, M52/591, M52/592 and former P52/1394, now held as P52/1606 within the Gingirana Native Title Claim area under a letter agreement and deed of agreement with the Gingirana People (Maling and Marrell, 2017). The Hermes Haul Road Work Area and Timor Area were deemed 'cleared'.

The site register at the Department of Aboriginal Sites revealed that no sites of significance have previously been recorded on or near the Plutonic project area.

In addition, an ethnographic work area survey within the Gingirana Native Title Claim area was carried out for a proposed extension to the existing Main Pit at Plutonic within mining tenements M52/149, M52/150 and M52/171 (Maling, 2017). The survey did not include an archaeological component due to time constraints.

Two ethnographic sites were identified on the northwest side of the Plutonic Main Pit and deemed to be 'not cleared'. These have been demarcated to prevent disturbance. 'Not cleared' area 1, is in the centre of the proposed work area and adjacent to the existing pit; and 'not cleared' area 2, is at the south-eastern corner of the proposed work area and adjacent to the existing pit. Gingirana Rangers were engaged to install fencing along the boundaries of the "not cleared areas". The remainder of the proposed work area was cleared, subject to an archaeological survey (Maling, 2017). All personnel and contractors are prohibited from accessing the not cleared areas.

Heritage surveys of the Hermes to Hermes South proposed haul road, Hermes South proposed mining footprint and Central Bore, Seaborg and Pelorus drilling areas were completed in 2021 (Keiller and Butcher, 2021 and Butcher and Keiller, 2021). A number of heritage sites were identified and have been delineated with heritage markers and signage to prevent inadvertent access by personnel and contractors.

The Plutonic project area spans into the 377,000 ha Three Rivers pastoral lease that was owned by BG along with the neighbouring 134,000 ha Bryah pastoral lease. The Three Rivers Pastoral Station was sold in late 2020. The pastoral station maintains traditional beef cattle farming which has historically been carried out in the region.

Three Rivers and Bryah pastoral stations were originally settled prior to 1898 and gradually were established to contain the areas covered by each as at 2003. The original livestock grazed were cattle and horses. Sheep were introduced to Three Rivers in 1921 and to Bryah in 1924, firstly as shepherded flocks (the remnants of old shepherd yards are still visible today) and then gradually as fences and man-made wells were installed, so a more permanent system of management evolved. In 1973 and 1984, Bryah and Three Rivers stations were de-stocked of sheep, and cattle became the sole focus of the stations.

In December 1988, the first serious exploration for gold commenced on Three Rivers pastoral lease, which was previously of no interest for mining. The success of this exploration led to ongoing intense exploration over the station and subsequent establishment of Plutonic Gold Mine in 1989 and other satellite mines on the Greenstone Belt within Three Rivers and the adjoining Marymia pastoral leases.

Two key organisations manage cultural heritage in Western Australia; the National Trust of Australia (Western Australia) and the Heritage Council of Western Australia. The Heritage Council of Western Australia has a State register with heritage listings, and a search of the database has shown no results in the mine area. At this stage no items/landforms have been identified on the Plutonic leases that could be considered of mining heritage value and therefore possibly need inclusion in the goldfields mine heritage trail.

The Plutonic project area is thus proposed to return to being part of Three Rivers Pastoral Station, reverting to supporting beef cattle again. It can be anticipated that while pastoral land use will be the primary post-closure objective, further mining and mineral exploration could take place.

6 History

The eastern Gascoyne region was one of the last areas to be settled by Europeans in Western Australia. In the 1880s, pastoralists began the settlement of the area with stations being pegged out around Murchison and Gascoyne between 1870 and 1884. Prospectors later found this area of interest when gold was found at Peak Hill in 1892, approximately 100 km southwest of Plutonic. Many Europeans travelled to the region establishing small towns and communication routes. The Peak Hill goldfields lasted from 1892 until 1908.

6.1 Ownership history

The significant historical events of the Plutonic project are summarised as follows:

- In the 1970s, Inco undertook nickel exploration over the Belt and abandoned the area in 1976 after failing to identify an economic nickel deposit.
- In 1986, Redross was granted an Exploration Licence over the southern portion of the Plutonic mining lease. Titan commenced exploration in the area surrounding Marymia Hill.
- In 1987 Redross optioned the Plutonic Exploration Lease to GCM. Resolute and Titan entered into a joint venture over the Marymia Hill leases. BMA commenced exploration in the Plutonic Bore area. Stockdale Prospecting Ltd conducted a regional sampling program in the vicinity of Marymia Dome.
- In 1989, GCM sold the Plutonic lease to Pioneer Minerals Exploration who changed their name to Plutonic Resources Ltd.
- Plutonic Gold Mine opened, with open-pit production from the Plutonic Main Pit, in 1990.
- In 1991, Plutonic Resources Ltd and GCM purchased the adjacent "Freshwater" property from Horseshoe Gold Mine Pty Ltd and commenced RC drilling of previously identified targets and a regional geochemical program.
- In 1992, mining started in Marymia K1 and K2 open pits.
- Joint venture partners Resolute and Titan purchased mining leases from BMA in 1993.
- Marymia Triple P open-pit production started in 1993 with treatment at the Marymia Plant.
- Plutonic Gold Mine underground development started in 1995 with production commencing in 1997.
- In 1998, Homestake Mining Company acquired Plutonic Resources Ltd, and Homestake Gold of Australia Ltd bought all of the Marymia property and assets from Resolute Samantha.
- Homestake Mining Company (USA) merged with Barrick Gold Corp. in 2001.
- In August 2002, open pit mining at Triple P - B Zone commenced in August 2002 and completed by August 2003.
- The Main Pit closed in 2005.
- Plutonic was sold by Barrick to Northern Star in February 2014.
- Hermes and the earn-in interest in the Bryah Basin tenements were acquired by Northern Star in February 2015 from ALY.
- Plutonic tenements and operations was sold by Northern Star to Billabong in October 2016.
- Billabong commenced mining of the Hermes pits in December 2017 until May 2019.
- Billabong earned its interest in the BBJV 2018 and concluded a formal joint venture agreement in December 2020.
- Billabong, through the BBJV swapped tenements with Sandfire in 2021.
- Open pit mining at Plutonic re-commenced in 2021 with Area 4 and Perch deposits.

6.2 Production history

A total of 2.1 Moz of contained gold has been mined from 36 open pits and surface stockpiles as summarised in Table 6-1. The underground development, which is accessed via portals in the open pit, was commissioned in December 1995. To December 2021 approximately 3.4 Moz of contained Au has been mined from the Plutonic Underground as summarised in Table 6-1. In total over 5.5 Moz of contained Au has been mined from Plutonic over 30 years with an average recovery of approximately 86% achieved, resulting in approximately 4.7 Moz of Au produced. Note that the Plutonic mill processed surface ore from the Marymia Dome area for Resolute on a toll treatment basis. The production commenced in 2006 and was completed in 2013.

Table 6-1 Mining production from Plutonic Gold Mine

Year	Surface Mining production			Underground Mining production		
	Tonnes (t)	Head grade (g/t Au)	Contained Au (oz)	Tonnes (t)	Head grade (g/t Au)	Contained Au (oz)
1990	516,567	7.53	125,036	–	–	–
1991	1,649,953	3.54	187,648	–	–	–
1992	1,674,961	3.09	166,576	–	–	–
1993	1,761,261	3.16	179,003	–	–	–
1994	1,832,896	2.94	173,252	–	–	–
1995	1,830,931	2.74	161,520	40,514	4.04	4,416
1996	1,751,989	2.57	144,529	263,319	5.80	39,159
1997	2,583,935	2.45	203,775	496,496	5.31	70,832
1998	2,428,846	2.00	156,060	581,632	6.50	104,059
1999	2,289,757	1.24	91,024	743,977	7.31	145,414
2000	2,232,798	1.42	101,885	802,500	6.75	151,934
2001	2,445,061	1.48	116,149	726,186	7.41	173,035
2002	2,213,503	1.29	91,701	977,298	6.86	215,688
2003	1,520,512	1.59	77,713	1,173,103	7.63	256,222
2004	1,055,829	1.50	50,863	1,358,991	6.44	253,542
2005	533,563	1.48	25,321	1,284,013	6.08	225,474
2006	–	–	–	1,331,250	5.83	249,528
2007	–	–	–	1,381,507	4.65	206,556
2008	–	–	–	970,170	4.39	136,983
2009	–	–	–	938,708	4.83	145,772
2010	–	–	–	887,312	4.65	132,793
2011	–	–	–	772,086	4.59	113,819
2012	–	–	–	747,622	4.68	112,484
2013	–	–	–	1,397,443	2.92	113,950
2014	–	–	–	938,704	3.60	89,494
2015	–	–	–	781,011	3.60	71,676
2016	–	–	–	1,047,773	2.11	57,262
2017*	13,013	1.62	676	808,144	3.49	90,806
2018#	984,095	1.36	43,147	808,601	2.53	65,745
2019#	892,588	1.00	28,563	793,727	2.63	67.090
2020*	681,228	0.31	6,757	824,123	2.62	69,474
2021^	753,371	0.63	15,150	835,291	2.79	75,022
Total	**31,646,657**	**2.11**	**2,146,348**	**23,711,501**	**4.42**	**3,371,206**

* Surface stockpiles # Hermes open pits + surface stockpiles ^ A4 and Perch open pits + surface stockpiles

6.3 Exploration history

Inco conducted nickel exploration in the "Crows Nest Well" Project between 1969 and 1976 using soil geochemistry, geophysics, costeaning, rotary air blast ("**RAB**"), and RC drilling. Inco identified and recorded the greenstone rocks within the Belt in 1976. No economic nickel was found.

BMA carried out exploration between 1987 and 1993 and in 1992 discovered the Triple P deposit as a result of regional mapping, bulk leach extractable gold soil sampling, and RAB drilling.

BMA followed up with RAB drilling in 1992 and discovered three deposits; Pelican, Albatross and Flamingo. Further RAB, air core ("**AC**"), RC, and diamond drilling programs were conducted to define the deposits. Seven phases of drilling were undertaken including five RAB phases, one diamond drill phase and one RC phase and further defined A, B, and C zones.

Plutonic Resources Ltd Exploration Division undertook a significant amount of exploration including geochemical soil sampling, RAB drilling, RC drilling, diamond drilling between 1989 and 1993.

In 2000, the Homestake Exploration group carried out induced polarisation and moving loop electro-magnetic geophysical surveys on the Plutonic trend. A total of ten deep RC holes for 2,515 m were drilled to test the geophysical anomalies and the down dip extension of mineralisation. Two holes intersected semi-massive sulphide mineralisation at depth.

Exploration efforts focused on the Triple P open pit in 2002, but all open pit mining ceased at Plutonic in 2005. Plutonic Resources Ltd then focused on underground targets for the expansion of Mineral Resources in the Plutonic Underground. Deep targets required a move away from surface drilling to underground diamond drilling.

Northern Star purchased the Plutonic property from Barrick Gold Corp. in 2014 and the Hermes properties from Alchemy Resources Ltd in 2015 and in 2016 the project was sold to Billabong. Since 2016, exploration at Plutonic continues to focus on extending and expanding underground Resources including the Caribbean, Timor, Baltic and Baltic extended areas.

At the Hermes Gold Mine area exploration success commenced with joint venture owners Troy and North Star Resources NL, who in September 1995 drilled the Hawkeye and Trapper prospects following up geochemical surveys (stream sediment, followed by grid soil sampling) (RAB 954 holes 47,624 m). Encouraging results from this drilling convinced the joint venture to undertake a series of RAB and RC drilling programs during 1996. This early drilling at the Hawkeye deposit intersected 15 m at 9.76 g/t gold (Alchemy Resources, 2009). The RC (233 holes for 23,274.5 m) and diamond (HQ3) drilling (4 holes for 521.0 m) further defined the mineralisation trends.

Between 1997 and 2003, a series of exploration drilling programs were undertaken regionally across the tenements. In 2003, Barrick Mining Ltd. reviewed the Trapper & Hawkeye mineralisation, and undertook investigations (Sebbag, 2003), as part of an acquisition/offtake review study, concluding that the mineralisation was uneconomic at the time.

Between 2004 and mid 2008 Plutonic Operations Limited managed exploration under a joint venture agreement with Troy.

Alchemy Resources Ltd then acquired the project in 2009, and undertook a number of drilling programs in 2009, 2010 and 2011, where a total of 100 RC holes for 10,274 m were drilled and a total of 10 Diamond (HQ3) tails for 1,080 m were drilled targeting and testing the deposits to a vertical depth of approximately 150 m. An additional 133 aircore holes were drilled for 5,473 m for sterilisation purposes. In February 2015, Northern Star purchased the Hermes and Bryah Basin JV Project from Alchemy Resources Ltd. Northern Star then completed two major phases of detailed in-fill RC drilling at the Hermes Gold Mine to define a new open pit resources in the Hawkeye, Trapper and Klinger areas (announced in June 2016 by Northern Star) and is defined in this report.

Following the purchase of the project from Northern Star in 2016, Billabong has conducted a number of exploration campaigns at Plutonic and both Hermes and the Hermes South project areas.

7 Geological setting and mineralisation

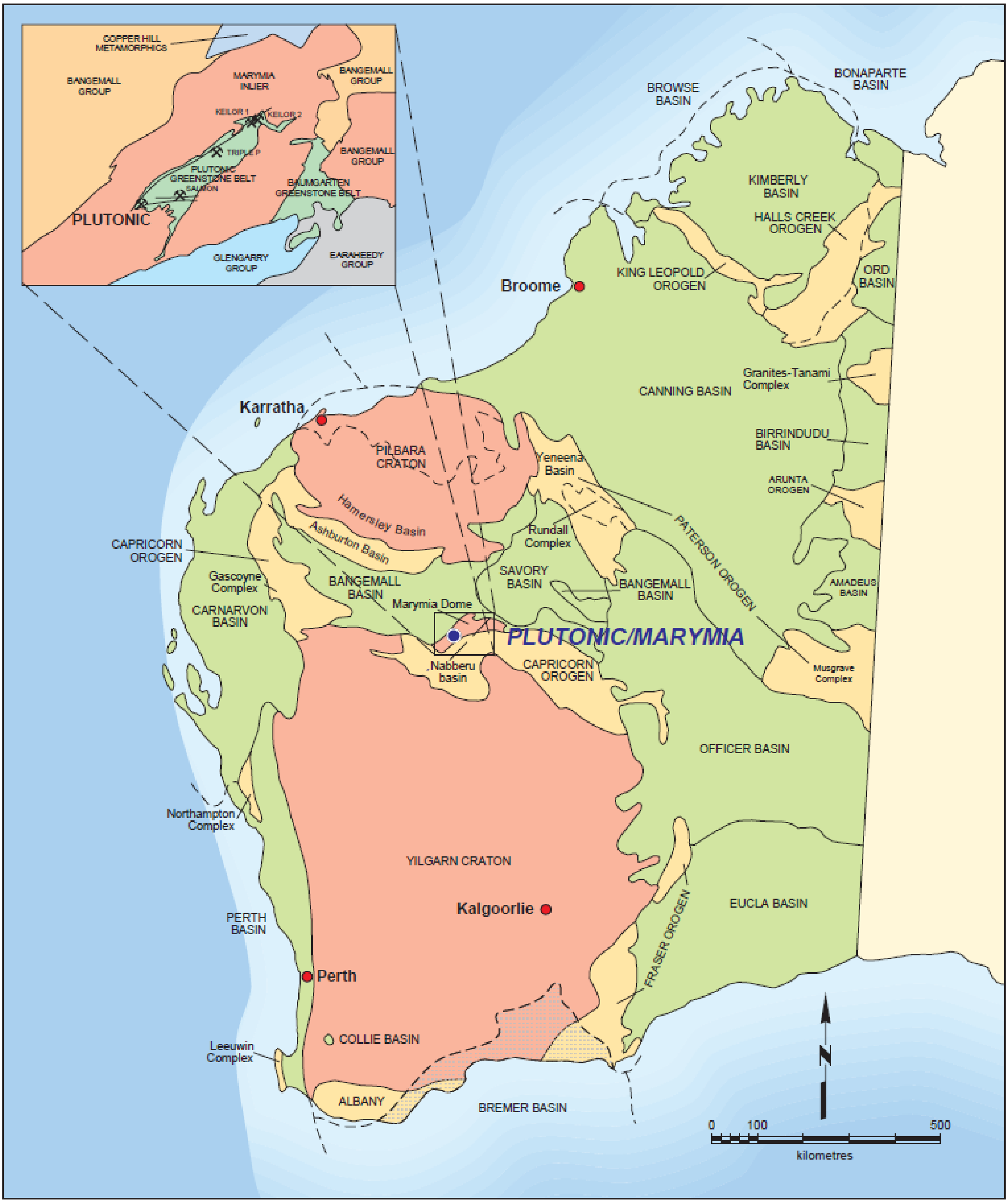
7.1 Regional geology

Plutonic Gold Mine is located within the Belt, an elongated northeast trending belt within the Marymia Inlier. The Marymia Inlier is an Archaean basement remnant within the Proterozoic Capricorn Orogen comprising two mineralised greenstone belts (Plutonic Well and Baumgarten), with surrounding granite and gneissic complexes. The Capricorn Orogen is situated between the Pilbara and Yilgarn Cratons and is possibly the result of the oblique collision of the two Archaean cratons in the early Proterozoic, see Figure 7-1.

Dating thus far indicates a Yilgarn-type age. McMillan,1996 interpreted ages of 2.72 Ga and 2.69 Ga of surrounding granitoids and porphyry intrusions within the greenstones in the Marymia District and Pb isotopic compositions of galena in mineralised zones at the Marymia and Triple P deposits consistent with the circa 2.63 Ga mineralising event in the Yilgarn Craton. Previous workers have attempted to correlate the Marymia Inlier to the West Yilgarn, Southern Cross, and Eastern Goldfield super-terranes, however, large discrepancies exist with all three, including age differences with the Eastern Goldfields and stratigraphic contrasts with the West Yilgarn and Southern Cross super-terranes.

Hermes to the southwest lies within the Marymia Inlier which consists mainly of granite and gneiss with enclaves of meta-greenstone (including mafic and ultramafic igneous rocks, BIF and sedimentary rock precursors) metamorphosed at upper amphibolite to granulite facies.

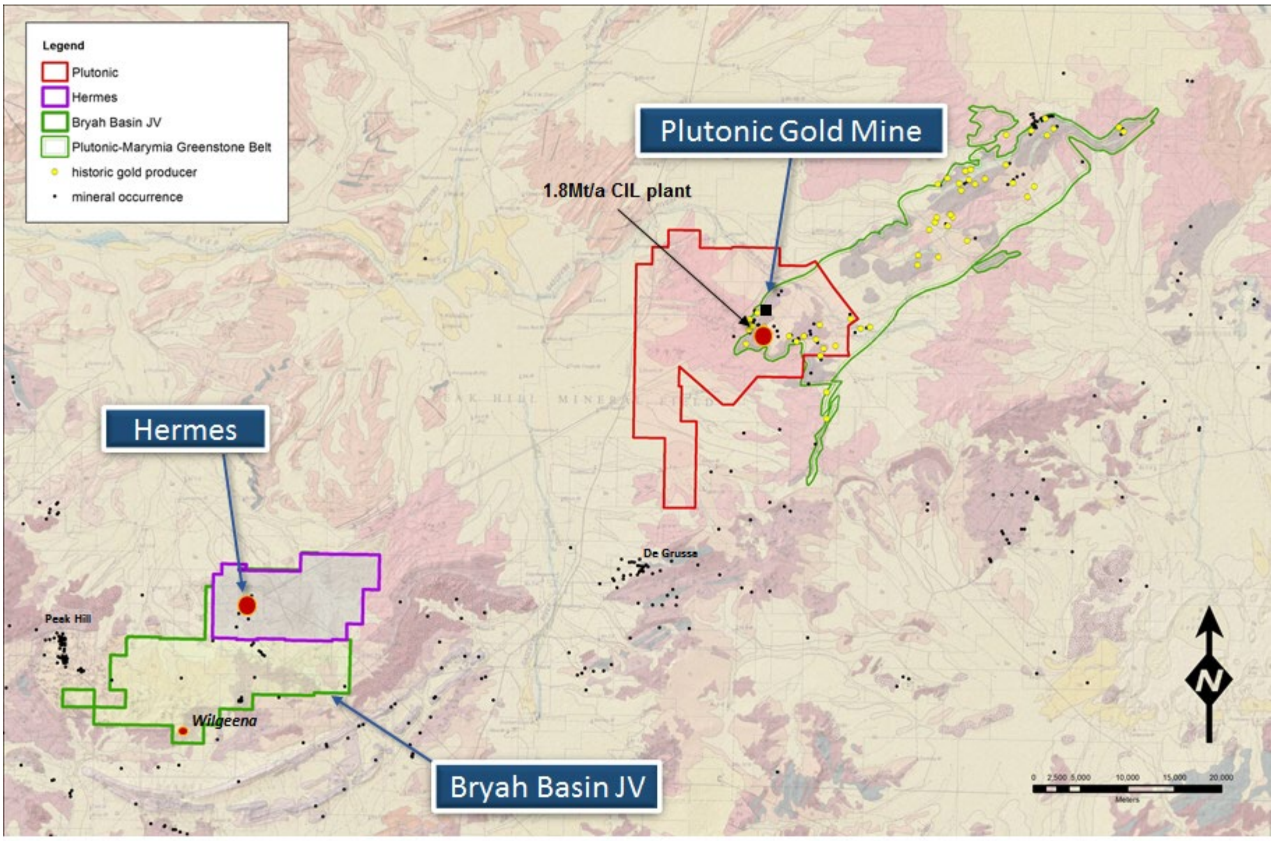
Figure 7-1 Regional geology plan



7.2 Local geology

The Belt is approximately 60 km long and 10 km wide, trending northeast-southwest, located in the central portion of the Marymia Inlier. The local geology is illustrated in Figure 7-2.

Figure 7-2 Local geology plan for the Plutonic/Hermes area



The Belt is sub-divided into two volcano-sedimentary sequences, consisting of mafic and ultramafic units which are overlain by predominately felsic volcaniclastic and sedimentary rocks. These units have been subjected to greenschist and amphibolite facies metamorphism, deformed by polyphase folding, shearing, faulting and intruded by felsic porphyry and granitiod bodies. This has resulted in a strong northeast trending fabric which is paralleled by multiple low-angle thrust faults which occur throughout the Belt and are intimately associated with the known gold mineralisation.

The Belt was initially interpreted as consisting of two parallel, northeast-trending mafic/ultramafic sequences, separated by a sedimentary/conglomeratic unit in the centre. Re-logging and solid geological interpretation differs from the initial interpretation in that there are no mafic and ultramafic assemblages on the south-eastern edge of the Belt. The northwestern edge of the Belt consists of amphibolite-facies metamorphosed and foliated assemblages of ultramafic rocks, tholeiitic basalt, BIF, chert, felsic tuff, arkose and pelite. The central and southern part of the greenstone belt consists of metamorphosed boulder conglomerate with sub-rounded clasts of monzogranite, BIF and mafic schist in a foliated mafic matrix. The conglomerate is interlayered with arkose and rhyodacitic volcanic rocks, quartzite, pelite and amphibolite. Proterozoic dolerite dykes intrude the greenstones and the surrounding granites.

In general, the greenstones dip shallowly to moderately to the northwest, parallel to the granite-greenstone contacts, and are cut by a number of east-westerly faults. Gentle open folding determines the outcrop pattern in the southern part of the Belt around the Plutonic Gold Mine. The Mine Mafic Rock (MMR) and Mine Package South Fault form the southern boundary of the greenstones against the granite.

Bagas, 1998 and 1999 interpreted that the north-western and south-eastern mafic-ultramafic sequences are connected through a westerly-dipping syncline, however, field evidence at Plutonic seems to suggest an upward-facing volcanic sequence, thrusted over the top of the south-western sedimentary sequence.

In this interpretation, three major structural events have shaped the Belt (Lally *et al*., 1999), with D1, north-directed, low-angle thrusting emplacing mafic and ultramafic units above sediments, followed by granite sheet intrusion and subsequent granite thrusting along the western portion of the Belt in D2. This was followed by D3 high-angle thrusting towards the southeast and open folding of earlier structures plus reactivation of D2-

thrusts. Gold mineralisation is thought to be associated with the earliest structural event (D1) within regional-scale thrust duplexes controlled by deep-seated east-west trending lineaments.

A number of later, mainly Proterozoic, deformation events have substantially shaped the final architecture of the greenstone belt.

The total historic Plutonic project area (including Marymia) comprises 39 known gold deposits, namely:

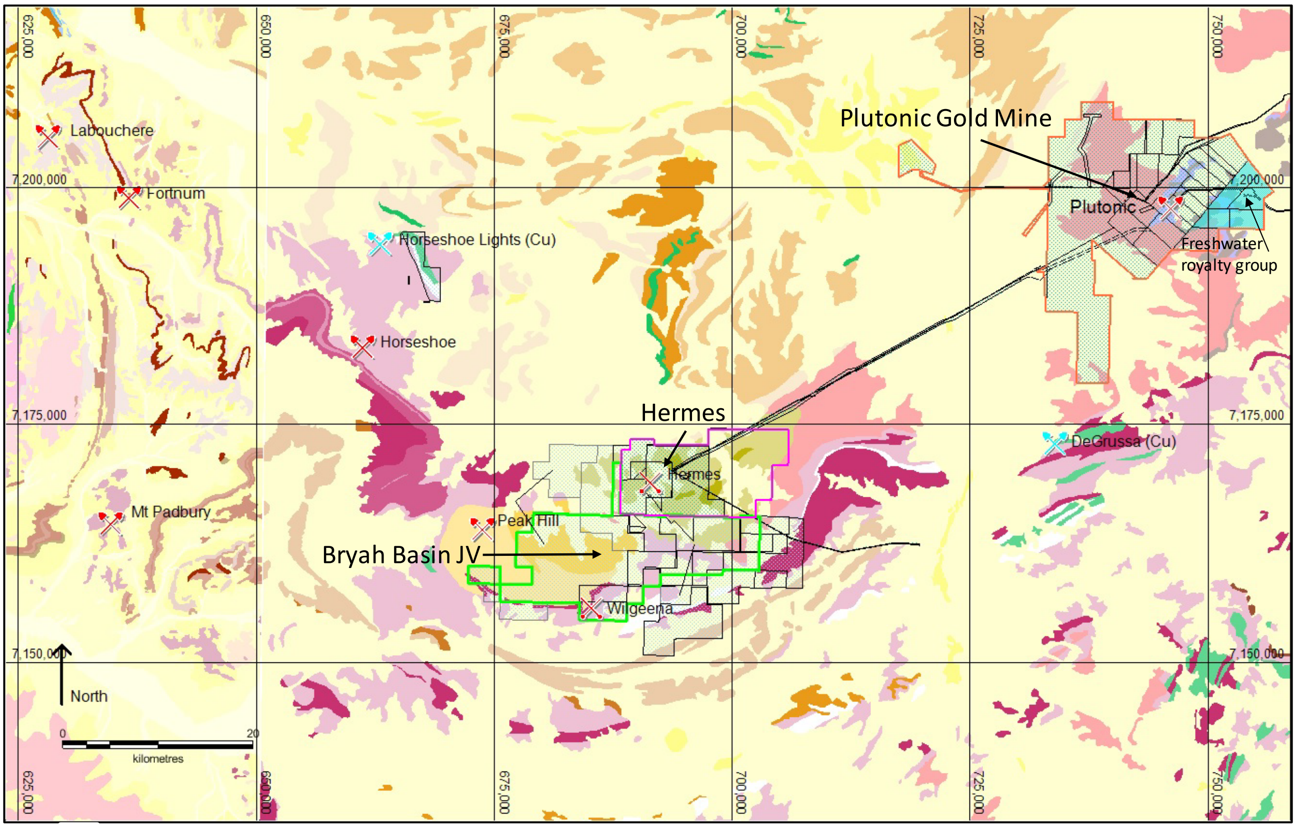
- Airstrip
- Albatross
- Apex
- Area 4*
- Barra
- Bass
- Bream*
- Brook*
- Callop*
- Carp
- Catfish*
- Channel South
- Cod
- Cutthroat*
- Cyclops
- Colossus
- Dingo
- Dogfish* (a.k.a. Trout North)
- Flamingo
- Gerbil
- Jiminya Pool
- John West
- Keilor (1 and 2)
- Kingston
- Orient Well
- Perch (North*, West* & Main*)
- Piranha*
- Plutonic
- Plutonic West
- Pelican
- Rainbow*
- Salmon*
- Sparrow
- Tinto
- Tomahawk
- Triple P
- Trout
- Unicorn
- Wagtail R

* Deposits within current Plutonic area and have been mined by open pit.

The Hermes Gold Mine area lies 65 km to the southwest of the Plutonic Gold Mine and covers the southwest portion of the Archaean Marymia Inlier near its southern contact with the Proterozoic Bryah Basin (Figure 7-3).

Mesothermal style gold deposits of the Peak Hill area occur in the Archaean Peak Hill Schist and the Proterozoic Naracoota Formation and associated formations of the Bryah Group. The largest gold production (650,000oz) came from the Peak Hill (Main & Five Ways) Mine. Although most of the deposits are confined to various stratigraphic units, mineralisation is generally structurally controlled.

Figure 7-3 Surface geology, tenement locations and regional mine sites



7.3 Property geology

7.3.1 Plutonic

The structurally lowest known unit in the Plutonic Gold Mine stratigraphy is the Lower Basal Mafics unit, a banded garnetiferous carbonate-altered amphibolite, possibly derived from mafic sediments. Overlying the Lower Basal Mafic unit is the Basal Sediment unit, a sequence of metasediments of varying thickness, comprised of garnetiferous siltstone and minor graphitic shale. This unit is overlain by the Upper Basal Mafic unit, of similar character to the Lower Basal Mafic, which is, in turn overlain by the Footwall Ultramafic unit, a downward-facing komatiite sequence. The Mine Mafic unit overlies the Footwall Ultramafic unit and is the host lithology for the Plutonic Gold Mine deposit and consists of a sequence of fine to medium grained amphibolites with relict pillow textures and narrow graphitic shale marker horizons. Detailed geochemistry of the Mine Mafic unit reveals a series of more primitive rocks at the top of the unit transitioning into low-K high-Fe tholeiites of more evolved parentage at the base, suggesting overturning of the unit. The Mine Mafic unit is comprised of multiple volcanic flows, separated into two sub units, the mineralised Upper Mine Mafic unit dominated by a coarse hornblende-rich high-Mg amphibolite at the top with intercalated high-Fe tholeiites, underlain by multiple volcanic flows of the Lower Mine Mafic unit comprised of only high-Fe tholeiites. The Mine Mafic unit is in turn overlain by the Hangingwall Ultramafic unit, a second sequence of downward facing komatiites. Studies of multiple komatiite flows within the Hangingwall and Footwall Ultramafic units indicate that both young downward and that the entire sequence is overturned. This has been confirmed by recent geochemistry profiles through the deposit. Pillow structures are commonly preserved, especially in low-strain areas, and show that deposition occurred in a submarine environment. Prior to recent high-resolution geochemical work, a detailed stratigraphy of the Mine Mafic unit had proven difficult to resolve as there are very few distinct and continuous markers. To further complicate the stratigraphy, the package is highly variable in thickness (<20 m to >300 m).

The orientation of the Mine Mafic unit varies widely throughout the deposit; but in general dips ~30° to the north (Figure 7-4).

Above the Plutonic Gold Mine stratigraphic sequence is a second mafic/ultramafic sequence locally known as the Overthrust Mafic Sequence consisting of a series of highly magnetic, strongly sheared mafic rocks with intercalated minor sediment and talc-chlorite (ultramafic derived) schist. The uppermost unit within the Plutonic Gold Mine area is a variably altered sheared granite. Intruded across all unit boundaries post-dating the granite thrust, in a sub-vertical orientation, are a series of dolerite dykes.

Geological structures at Plutonic Gold Mine can be separated into two broad categories: low-angle thrusts and high-angle faults, based on orientation, deformation character, alteration assemblage and sense of movement. Within the Mine Mafic unit, the dominant fabric runs sub-parallel to the mineralised lodes and lithological contacts and is locally overprinted by younger penetrative fabrics, cutting and folding the layer parallel fabric, lodes and lithological contacts. The overprinting fabric(s) is present as a crenulation cleavage and tension gashes developed across the layer-parallel fabric and is best observed where it cuts across high-grade replacement lodes.

The early layer parallel fabric is well-developed within the lodes and is evident by sub-parallel banded /zoned alteration and foliation, defined by crude mineral segregation and mineral alignment. The early fabric is further highlighted within the lodes by early quartz veins, pre-dating mineralisation that have been stretched, boudinaged and folded parallel to mineral elongation.

Peak metamorphism was to amphibolite facies (~600 °C and ≥8 kbar), with a long retrograde history through greenschist facies conditions. This has resulted in late-stage chloritisation and local retrogression of peak mineral assemblages.

The main style of gold mineralisation (Plutonic brown-lode) typically occurs as thin (~1 - 3 m wide) lodes that consist predominantly of quartz-biotite-amphibole-titanite-epidote-carbonate-tourmaline-arsenopyrite-pyrrhotite ± chalcopyrite ± scheelite ± gold. Visible gold is considered to have occurred at a late-stage during the evolution of the deposit as it is largely undeformed and overprints most, if not all, of the minerals and fabrics. It is typically associated with thin, discontinuous quartz-calc-silicate veins within the brown-lodes. Where these gold-bearing zones are well developed, they tend to be near-parallel to the stratigraphy as marked by the rare metasedimentary horizons and to the dominant foliation, which is also typically parallel to metasediment horizons. Geochemistry suggests that these lodes developed on the boundary between mafic units or are focused along or adjacent to minor metasedimentary units within the Mine Mafic unit. Lodes may be rich in arsenopyrite or pyrrhotite, and while arsenopyrite is a good indicator of mineralisation, it may not be present in all mineralisation.

Other less-common styles of gold mineralisation also occur at the Plutonic Gold Mine which include: sub-economic to marginally-economic gold grades in apparently-unaltered metabasalt, shear-controlled lodes that mineralogically resemble Plutonic brown lode but are hosted within structures (e.g. shears that cross-cut the foliation); and late-stage quartz-carbonate-pyrrhotite ± chalcopyrite ± gold veins. These styles of mineralisation only comprise a small amount of the gold mineralisation at Plutonic Gold Mine. As is typical for deposits that have formed at relatively high temperature conditions (e.g. amphibolite facies), there is little evidence of the distinctive widespread zoned wallrock alteration halos and quartz veining that can help define where fluids were focused and gold was deposited at greenschist-facies conditions.

The mineralisation of the Plutonic Gold Mine is truncated to the south by the MMR Fault. Early interpretations suggested that the MMR Fault had sinistral strike-slip movement of approximately 2.5 km, linking the main Plutonic mineralisation with that of Area 4. However, mapping of the fault zone in the Salmon and Area 4 pits suggests that the MMR fault is an early, steeply north to north-northwest dipping reverse fault that was reactivated during later deformation.

The Plutonic Gold Mine has been subdivided into geological domains in accordance with major Proterozoic dykes and large-scale faults. These domains include the Indian, Caspian (NW Extension), Adriatic, Cortez, Mediterranean, Spur, Area 134, Coral (Zone 124), Baltic and Caribbean (Zone 19), Pacific, Timor (Zone 124 North) and Plutonic East and Area 4. The geology of the open pits throughout the tenements is a deeply weathered Archaean terrane, with a combination of lithological contact and shear/fault mineralisation styles within mafic, ultramafic and sedimentary rock types.

Figure 7-4 Plutonic area simplified geology

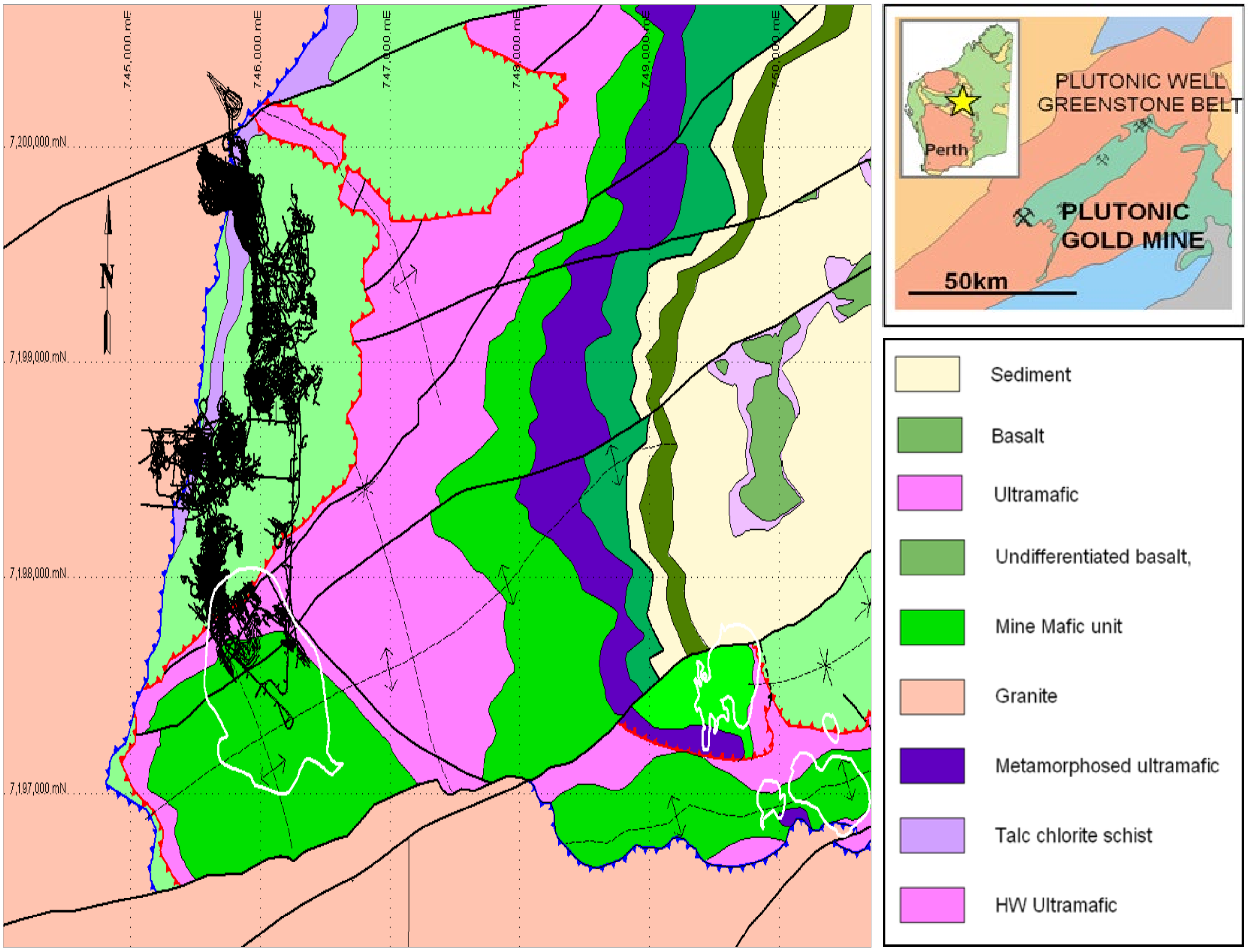
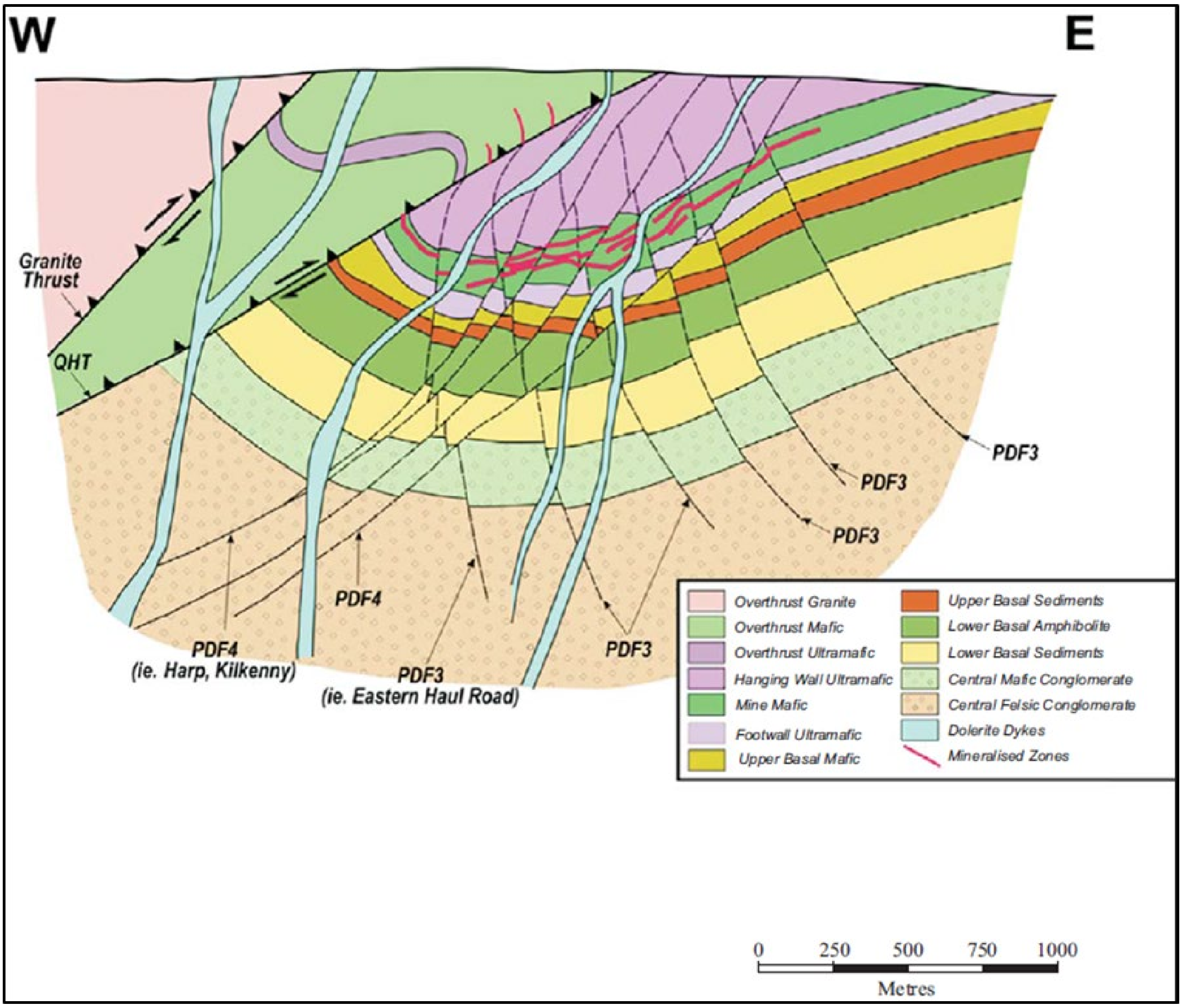


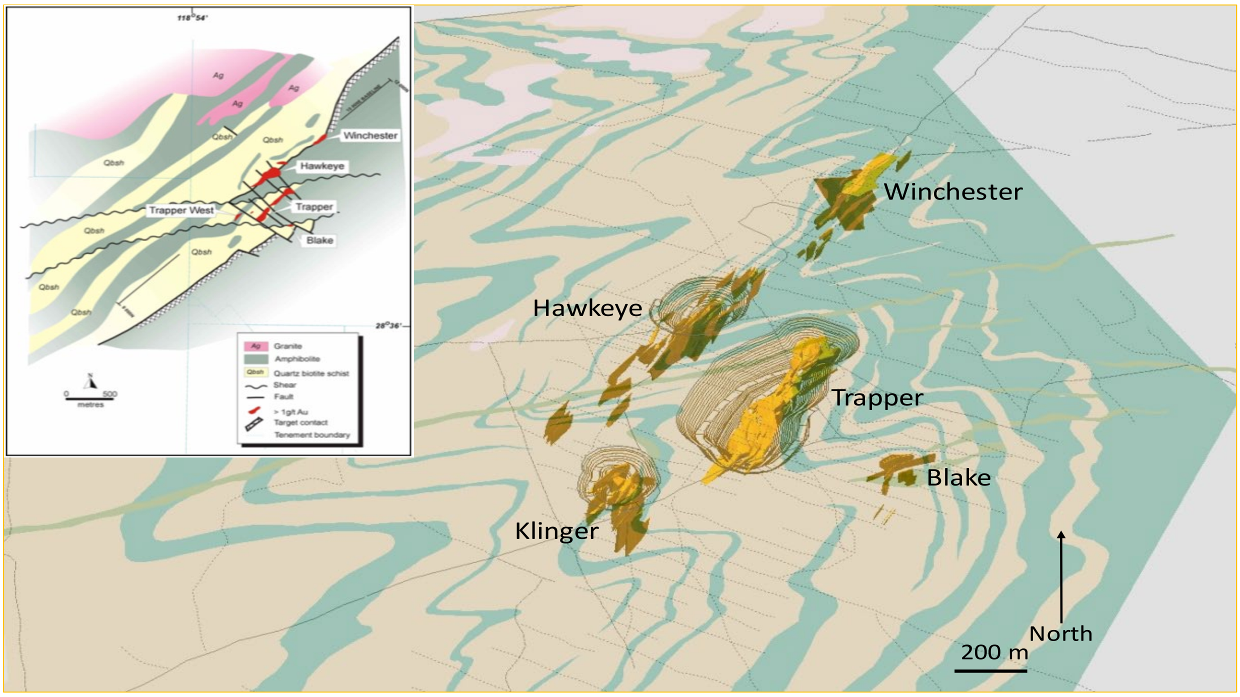
Figure 7-5   Plutonic diagrammatic cross section



7.3.2 Hermes

The Hermes Gold Resource, consisting of the Hawkeye, Trapper, Klinger, Winchester & Blake deposits, are parallel, northeast trending, mineralised zones separated by mostly barren amphibolite (Figure 7-6). Mineralisation is generally associated with quartz veins at or near the contact of sheared mafic amphibolite and quartz-biotite-sericite schist.

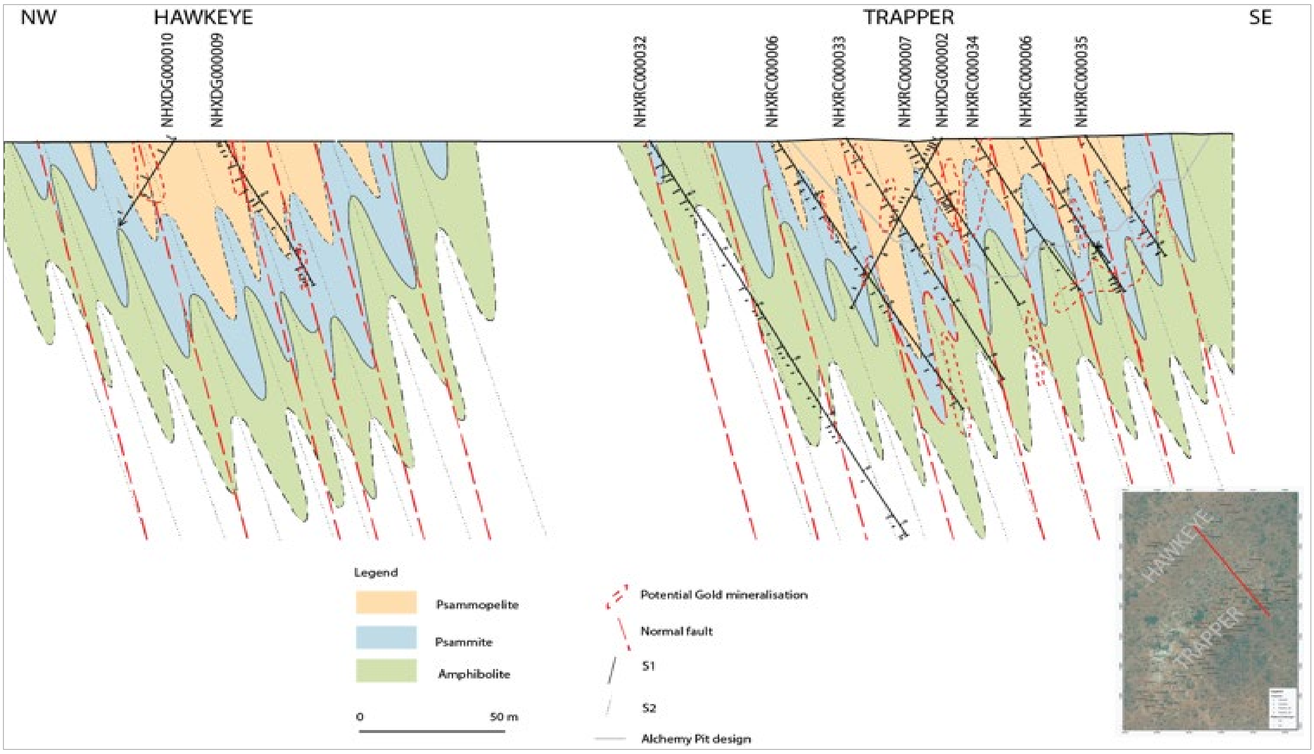
Figure 7-6 Hermes local geology orthographic projection



Note: Local geology of the Hermes Gold Mine showing previous interpreted solid geology (inset) and larger picture showing an orthogonal view of the latest solid geology interpretation, with large open (overturned) chevron folding, and mineralisation hosted within fold hinges and limbs.

In fresh rock, the mineralised zone is characterised by recrystallised (grey) quartz veining within silica-sericite-biotite alteration ± pyrite-arsenopyrite. The bulk of the mineralisation is contained within quartz-muscovite-biotite schist, however extensions into the mafic footwall unit are common. In general, the mineralised quartz veins, foliation and relict bedding are steeply-dipping to sub-vertical and high-grade shoots are interpreted to plunge shallowly to the north within the mineralised plane, Figure 7-7.

Figure 7-7 Hermes interpretative geological cross section



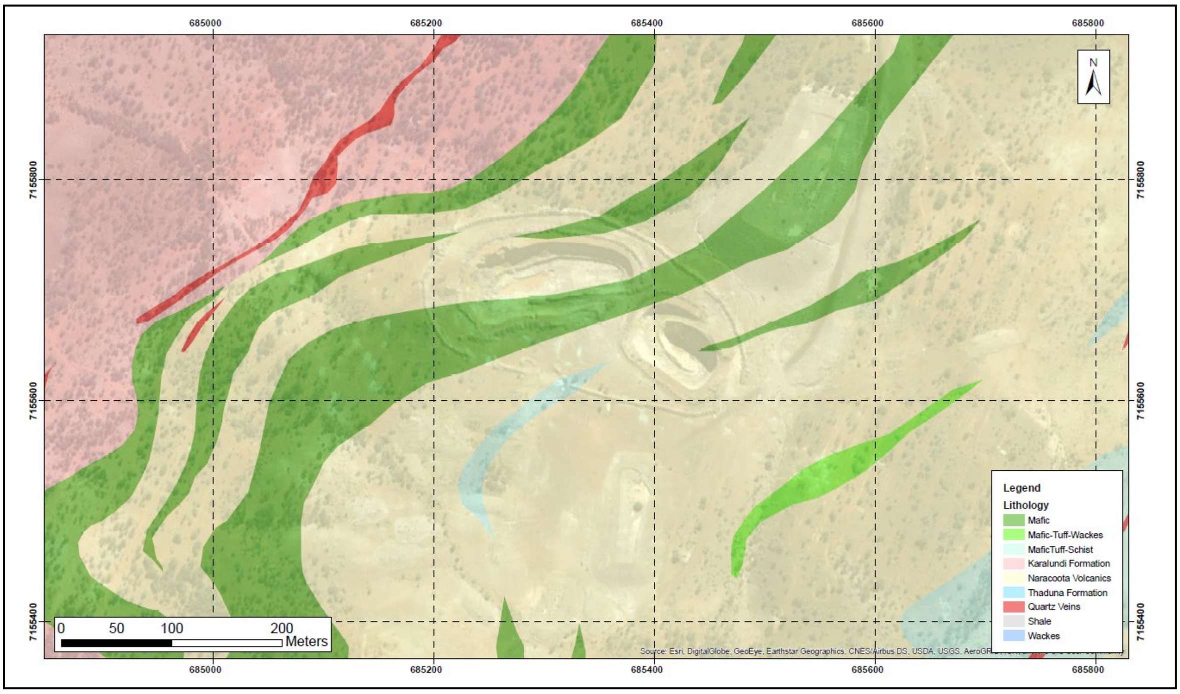
7.3.3 Hermes South (Wilgeena)

The Hermes South deposit lies within a predominantly metasedimentary sequence of the Proterozoic Peak Hill Schist and mafic units. The Peak Hill Schist comprises quartz-sericite schist and quartz-muscovite schist and is located on the south-western extreme of the Marymia Inlier.

The lodes occur within the Narracoota Volcanics, which have been intruded by mafic sills and are located on a northern limb of a syncline which plunges gently to the southeast. They are associated with the development of strong linear fabrics and quartz veining dipping at 65 degrees to the south and plunging gently to the southeast in predictable and consistent zones. On a mine scale, the lodes are offset by faults striking NE and dipping south east.

The host rocks have been highly weathered, making it difficult to model the exact geological contacts (Figure 7-8).

Figure 7-8 Geological Map of Hermes South



7.4 Mineralisation

7.4.1 Plutonic

The Plutonic Gold Mine Mineral Resources mined and unmined lie with a surface area of approximately 10 km east-west by 5 km north-south. The historical Plutonic Main Pit is approximately 1.5 km long by 800 m wide by 200 m deep. Current Mineral Resources being mined at the Plutonic Gold Mine including the Main Pit, Indian, Indian Extension, Baltic and Baltic Extension lies in a semi-continuous mineralised trend that extends from the base of the open pit 1.7 km down plunge (880 m in elevation) and mineralisation is 1-3 m thick but individual mineralised pods have a short range (generally <30 m).

The Cortez-Area 134-Timor zone extends approximately 1.2 km north-south, by 1.0 km east-west.

The main style of gold mineralisation (Plutonic brown-lode) typically occurs as thin (~1 – 3 m wide) lodes that consist predominantly of quartz-biotite-amphibole-titanite-epidote-carbonate-tourmaline-arsenopyrite-pyrrhotite ± chalcopyrite ± scheelite ± gold. Visible gold is considered to have occurred at a late-stage during the evolution of the deposit as it is largely undeformed and overprints most, if not all, of the minerals and fabrics. It is typically associated with thin, discontinuous quartz-calc-silicate veins within the brown-lodes. Where these gold-bearing zones are well developed, they tend to be near-parallel to the stratigraphy as marked by the rare metasedimentary horizons and to the dominant foliation, which is also typically parallel to metasediment horizons. Geochemistry suggests that these lodes developed on the boundary between mafic units or are focused along or adjacent to minor metasedimentary units within the Mine Mafic unit. Lodes may be rich in arsenopyrite or pyrrhotite, and while arsenopyrite is a good indicator of mineralisation, it may not be present in all mineralisation.

Mineralisation at Plutonic is separated into four distinct styles:

- Replacement “brown” or “Plutonic” lodes (which contain the bulk of the gold)
- Replacement “green lodes”
- “Invisible lodes”
- Dilation high angle quartz veins

The Plutonic “Brown lodes” are characterised by a series of moderately-dipping to very flat-lying, stacked, banded replacement-style lodes, individually up to five metres wide, that are hosted within ductile mylonitic shear zones, oriented slightly oblique to the main stratigraphic contacts. Hydrothermal alteration during mid- to lower-amphibolite facies conditions has resulted in a zoned hydrothermal assemblage consisting of plagioclase–biotite-quartz-amphibole-titanite-carbonate-arsenopyrite-pyrrhotite-tourmaline-muscovite-pyrite-scheelite-gold-sphalerite. The replacement style lodes are restricted within the Mine Mafic unit, preferentially within the Upper Mine Mafic unit, sub-parallel to primary lithological contacts. Arsenopyrite associated with gold mineralisation at Plutonic is subtly zoned with respect to gold, antimony, and arsenic abundance. Within individual grains of arsenopyrite there is a negative correlation between gold and antimony (core). Arsenic abundance generally increases from core to rims, indicating increasing temperature. There is a conspicuous lack of quartz veining associated with mineralisation except where the ductile shear zones have intersected early quartz veins subsequently deforming them. Wall rock alteration adjacent to the lodes is very narrow, often confined to 20 cm to 30 cm. Mass balancing of the lodes against the host amphibolite indicates a general SiO_2 loss of seven to ten percent and volume decreases of up to 30%.

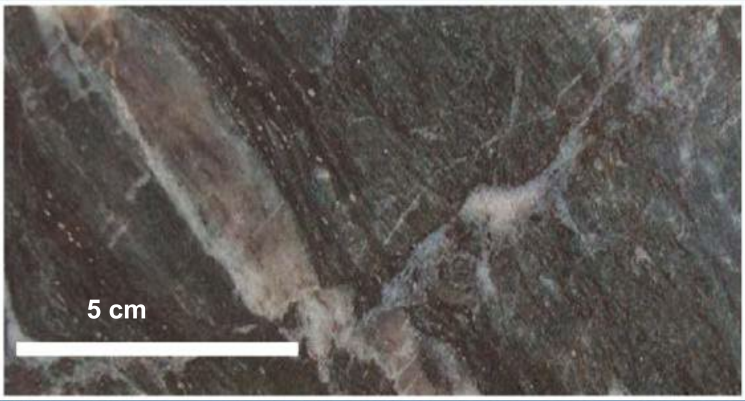
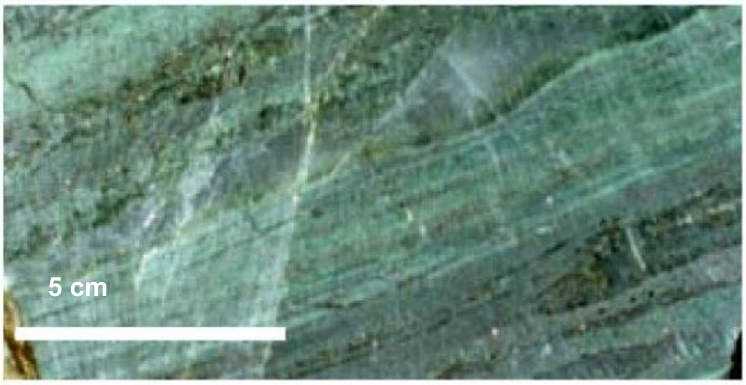
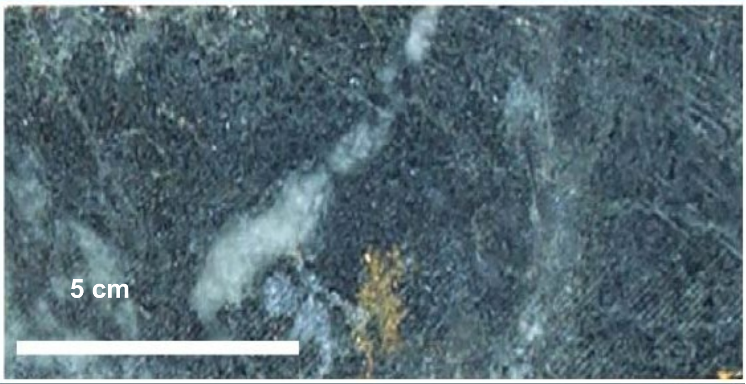
The Plutonic “Green lodes” are characterised by an amphibole-quartz-titanite-plagioclase-arsenopyrite-pyrite-visible gold-scheelite assemblage, generally confined to the upper portion of the Mine Mafic unit and commonly spatially associated with the Plutonic style “Brown” lodes. Both gold and arsenopyrite appear to overprint the layer parallel fabric where present. The green colour is associated with Fuchsite. The morphology of lodes is similar to the Brown lodes, situated within mylonitic shear zones. Quartz is more abundant and is present as a fine-grained interstitial mineral, commonly recrystallised.

Plutonic “Invisible Lodes” are less common than the Plutonic Brown and Green lodes. These are more abundant in the Zone 19 area. They do not occur within ductile shear zones but are developed predominantly within the upper five metres of the Upper Mine Mafic unit within the hornblende amphibolite. Gold is finely disseminated throughout an apparently unaltered groundmass in which minor pyrrhotite and pyrite are associated. There is no biotite, albite or arsenopyrite alteration. In higher-grade examples, free gold is sited within quartz-carbonate veins oriented parallel to overprinting local penetrative fabrics with no associated sulphides or visible alteration halo.

Quartz vein hosted mineralisation is the least abundant form of mineralisation and is mainly located close to the Quartz Hill Thrust which separate the Overthrust mafic to the Hangingwall Ultramafic or proximal to high angle dolerite dykes where the dykes cut replacement lodes. Above the Quartz Hill Thrust, gold is associated with pyrrhotite-pyrite-sphalerite-galena in quartz veins and unlike the shear zone-related gold mineralisation at Plutonic there is an absence of arsenic. Immediately below the Quartz Hill Thrust, high grade gold mineralisation is present in close proximity to Brown lode mineralisation. Coarse gold is observed within quartz veining and silica flooding. The gold overprints the Brown lode layer parallel fabric, possibly indicating a remobilised origin for this coarse free gold.

The mineralisation of the Plutonic Gold Mine is truncated to the south by a local structure called the MPS Fault, a minor fault splay off the major regional structure known as the MMR Fault.

Figure 7-8 Mineralisation styles

Lode type		**Characteristics**
Brown Lodes		Folded. Early associated mineralisation Bio, Si, Albite, AsPy, Po, Native Au
Green Lodes		Po, AsPy, Si, Chlorite, native Au
Hard to See Lodes		Amp, Plag, Qtz, Chlorite, Po, Py, native Au (Lack of Biotite Alteration and/or obvious shearing)
Quartz Vein/Later Lodes		Very high grade. Qtz, Carb, native Au Overprinting. Coarse gold

7.4.2 Hermes

At Hermes the Hawkeye, Trapper, Klinger, Winchester & Blake deposits are sub-parallel, northeast trending, mineralised zones (see Figure 7-6). Mineralisation at all deposits is typically associated with quartz veins at or near the sheared contact of mafic amphibolite footwall and hangingwall quartz-biotite-sericite schists. Graphitic schist occurs to a minor extent on the hangingwall and footwall sides of the mineralisation at Trapper, Klinger and Blake. The base of strong oxidation varies from 20-30 m vertically below surface at Hawkeye & Winchester, and from 25-45 m at Trapper, Klinger & Blake. Transition to fresh rock occurs at approximately 30-50 m and 40-65 m, respectively.

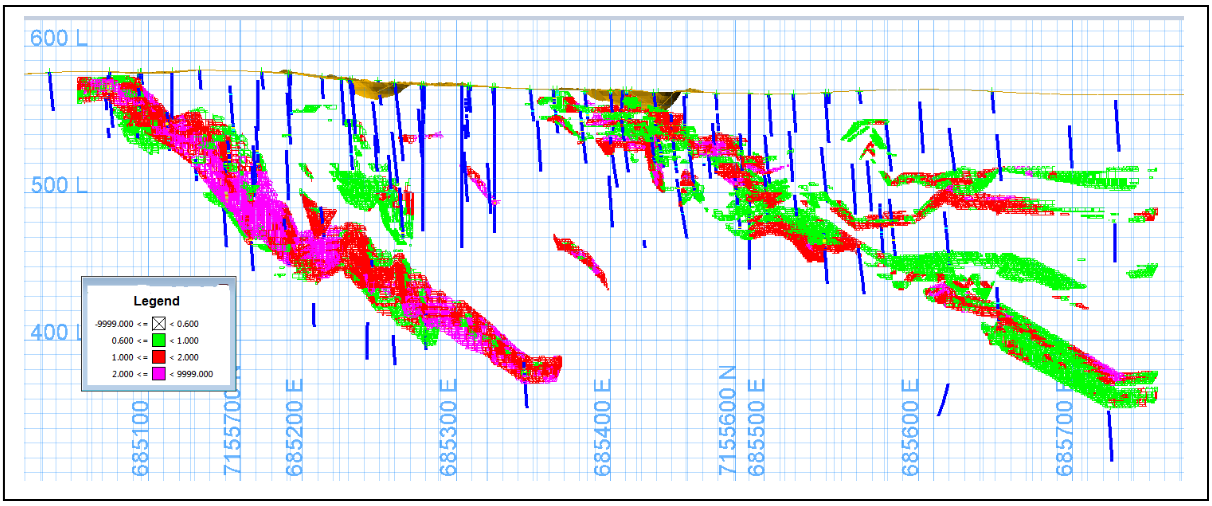
In general, the mineralised quartz veins, foliation and relict bedding are steeply NW-dipping to sub-vertical in both the Hawkeye and Trapper deposits and high-grade shoots are interpreted to plunge shallowly to the north within the mineralised plane.

7.4.3 Hermes South

Gold mineralisation occurs within a predominantly metasedimentary sequence of the Proterozoic Peak Hill Schist and mafic units. The Peak Hill Schist comprises quartz-sericite schist and quartz-muscovite schist and is located on the south-western extreme of the Marymia Inlier.

Mineralisation at Hermes South is associated with the development of strong linear fabrics and quartz veining dipping at 65 degrees to the south in fairly predictable and consistent zones. An overall moderate plunge to the east-southeast is illustrated below (Figure 7-9).

Figure 7-9 Hermes South oblique long section showing drilling and block model



8 Deposit types

The Plutonic Gold Mine deposits are Archean Greenstone gold deposits. The gold mineralisation is predominantly structurally controlled occurring in a variety of stratigraphic settings, mainly associated with replacement-style lodes and stockwork veining within a wide variety of host rocks ranging from ultramafic and mafic volcanic rocks, metasediments, felsic intrusive, volcanoclastic units, and banded iron formations.

In the Hermes Gold Mine and BBJV Projects there are two broad mineralisation styles (Outhwaite, 2013) referred to here as the Peak Hill Type and the Bryah Type.

The Peak Hill Type gold deposits are hosted in rocks that are generally highly deformed (four or more fold events) and metamorphosed (up to amphibolite facies), generally represented by the Peak Hill Schist Formation. Mineralisation is early in the paragenesis, (syn- to post-D1 isoclinal folding) with folded mineralisation commonly observed. Previously mined examples include Peak Hill Main/Five-Ways, Mt Pleasant, Jubilee, Wilgeena and St Crispin. The Hermes deposits may be examples of mineralisation that belongs in this category.

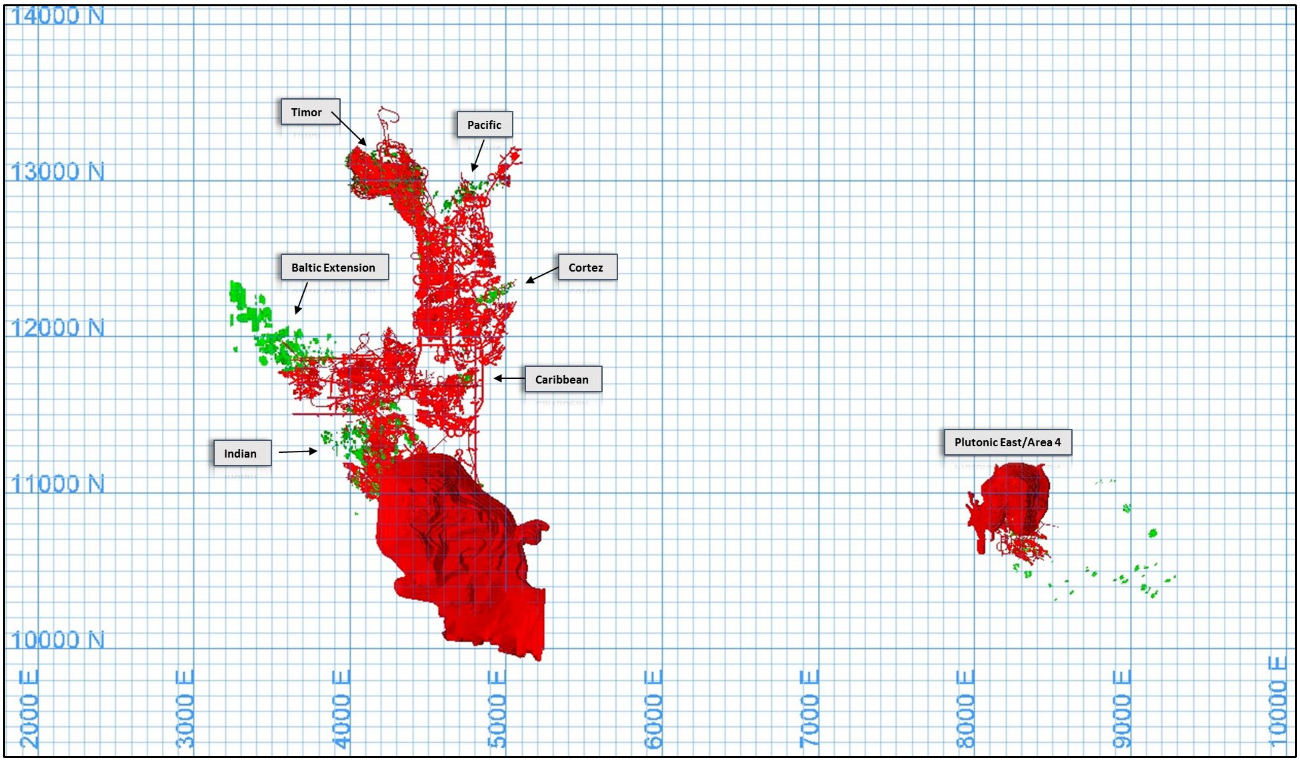
The local controls on this deposit class are difficult to identify, because of the effects of strong, post-mineralisation deformation, and probable remobilisation of Au. Despite this problem, some similarities between the deposits have been recognised:

- Located on a major structural and metamorphic gradient. The Peak Hill camp, Hermes, Wilgeena and Central Bore all lie around a significant gradient from high-strain, highly metamorphosed rocks at the core of uplifted basement blocks, outwards to lower-strain, less metamorphosed rocks. This gradient is a transitional structural zone up to a few kilometres wide. This zone was probably a major fluid conduit during early deformation, and hence a first-order corridor for Au exploration;
- Located at or around mafic-sedimentary contacts. With the exception of Central Bore, which is on a granite-sedimentary contact, all of the mentioned Peak Hill-style occurrences are closely associated with mafic rocks within dominantly sedimentary sequences. The mafic rocks are typically amphibolite, after dolerite or basalt, but high-Mg to ultramafic rocks are noted at Hermes, Hermes South, and possibly the Peak Hill camp (high Cr and Mg);
- Early structures. A likely early age on the controlling structural corridor has been recognised, based on the repetition of stratigraphy, which was then folded together during the identifiable fold events. The identification of early, controlling structures has proven difficult, due to the overprint of subsequent deformation events;
- Strong plunge controls. Due to the multiple folding events these deposits have strong plunge controls, meaning they can have small surface footprints – especially when considering their general lack of pathfinder anomalism (see below). Exploration must take this fact into account;
- Limited geochemical signature. Wilgeena, Central Bore, St Crispin, Pelorus and possibly Peak Hill have a limited range of pathfinder elements associated with the Au mineralisation – scattered W, Bi, Pb and Zn, but very little else. Hermes is a clear exception however, as limited multi-element analysis has shown that this system has a strongly developed pathfinder association, similar to that found in typical Archean Au systems: As, Sb, Mo, W, Bi, etc.

9 Exploration

Exploration in the Plutonic tenements has included geological mapping, geochemical and geophysical surveys, and drilling. Currently, most exploration is by drilling as described in Section 10 Drilling. The current Indicated Mineral Resource base in respect of the Plutonic Underground, and location relative to surface features is shown in Figure 9-1.

Figure 9-1 Plutonic Uderground Resource location map plan



(***Areas in red are mined out, green shapes are Resource)***

Prior to the ALY acquisition of the Hermes Gold Mine, the majority of work had been completed by Troy. Troy completed detailed geochemistry (stream sediment then soil geochemistry) followed by RAB drilling over the better gold geochemical anomalies, leading to the discovery in 1995 of the Hawkeye and Trapper gold deposits and a number of other gold prospects and prospective areas.

Most of the RAB drilling conducted by Troy was to blade-refusal, generally at the base of the oxide zone or into fresh rock. Strong oxidation was found to vary in depth from near surface to vertical depths of 80 m. Holes were terminated in the oxide zone when excessive volumes of water were encountered. Quartz veining encountered in the oxide zone was generally penetrated using a hammer bit. A total of 957 holes for 47,624 m RAB were drilled by Troy throughout the Project area.

Follow-up RC drilling was carried out along the Hawkeye-Trapper mineralised trend for a total of 234 holes for 23,274 m by Troy. This drilling delineated and defined the Hawkeye gold deposit and the Trapper gold deposit. Holes were generally drilled toward grid east at a declination of -60° with the exception of some holes drilled toward grid west and a few holes drilled toward grid southeast in complex areas to try and resolve the orientation of the gold mineralisation. Samples were collected in 1 m intervals, riffle-split and submitted for fire assay analysis (60 g charge with determination by inductively coupled plasma optical emission spectroscopy ("**ICP-OES**"). Limited diamond drilling was carried out to obtain structural and lithological information, as well as core samples of mineralisation for metallurgical and mineralogical work. Four diamond drill holes (HQ3) were completed for 521 m. Several samples of core were analysed petro graphically, and whole core in 1 m samples from oxide and transitional zones were used to determine specific gravity before being analysed. All other core was split, sampled as half core and submitted for analysis by fire assay.

After ALY acquired the Hermes Gold Mine, they completed a series of programs comprising data review, geological mapping, AC and RC drilling, diamond drilling and metallurgical test work. A total of 133 AC holes for 5,473 m, 112 RC holes for 12,946 m and 10 NQ diamond holes for 1,080 m were drilled in the general Hermes area. Samples were collected in 1 m intervals, riffle-split and submitted for fire assay analysis (60g charge with ICP-OES finish).

Metallurgical test work by ALY on diamond core samples from the Hermes deposits confirmed a relatively simple free milling ore type with gravity recoveries ranging from 38.9%-63.7% and overall recoveries greater than 92%. Recoveries from the oxide and transitional material were expected to average 94% in an operating environment.

Northern Star completed a Resource definition drilling program during April-June 2015 comprising 101 holes in total (including 16 diamond holes) for 11,477.5 m, and was carried out with the objective of upgrading the Hermes Gold Mine Resource to JORC 2012 standard in an effort to advance the potential for satellite mining operations to be established, servicing Plutonic. Holes were generally drilled toward the south-east at a declination of -60° with the exception of some geotechnical diamond holes. Samples were collected in 1 m intervals, cone-split and submitted for fire assay analysis (40g charge with inductively coupled plasma atomic emission spectroscopy (ICP-AES) finish). Limited diamond drilling was carried out to obtain metallurgical, geotechnical, structural and lithological information. This work delineated a Resource for a total of 230,172 oz gold at Hermes.

As a result of this work, the initial economic assessment of the Hermes Gold Mine indicated a robust mining inventory of approximately 100k ounces recoverable. In conjunction with development studies and permitting, the requirement for additional drilling was identified for de-risking stage one and two open pit operations. In addition, pit shells were constrained by Resource and drilling, with an opportunity identified to significantly increase the Hermes Resource in the vicinity of the proposed pits and along prospective mineralised corridors. Additional sterilisation drilling was also required for delineating the proposed waste dump footprints, as was a series of vertical hydrological investigation holes.

9.1 In-mine exploration

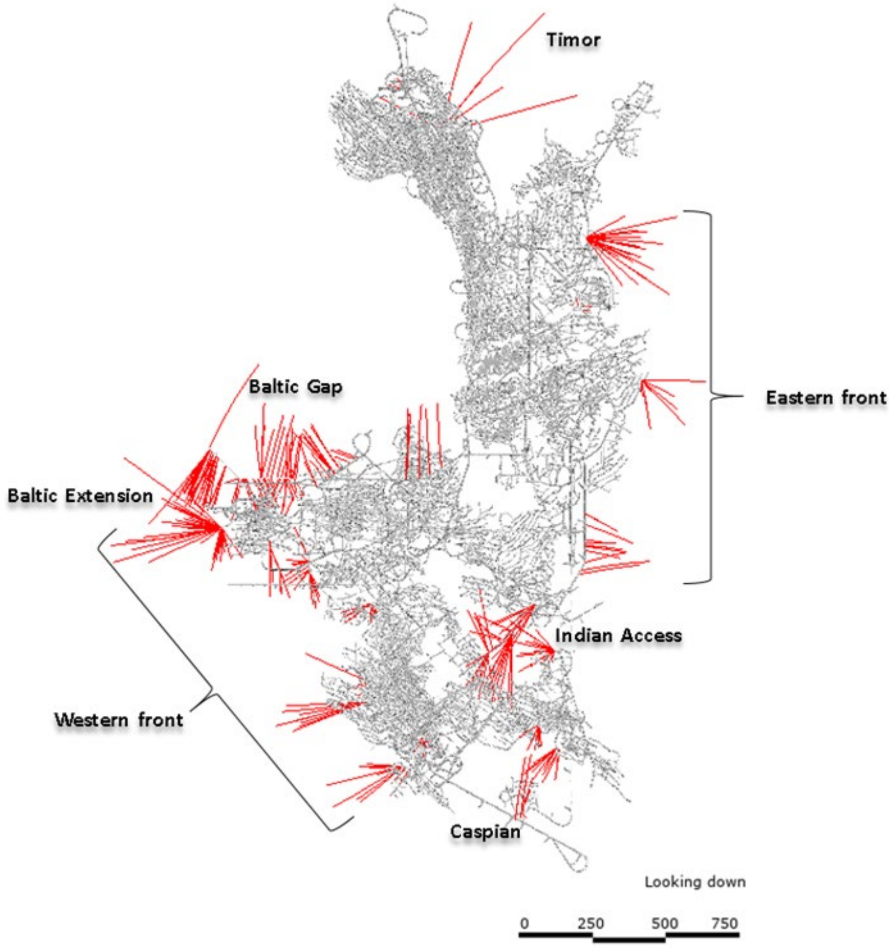
Over 400 km of underground development covers an area of 2.4 km^2 in the Plutonic Underground. This extensive network of declines and development drives affords the opportunity to test less well explored areas of the mine. The areas drilled during 2020 and 2021 is shown in Figure 9-2. A total of 388 holes for 53,773 m was drilled during this period with varying success. During this period the approach to In-Mine exploration (Minex) was changed to a staged method where a drill program would be staged and success in the stages would be required for the next stage to continue. Geology model updates would be completed prior to the follow stages to ensure best return on investment and improve the success rate of the Minex programs. This seems to be evident in the multiple press releases made public during latter part of 2020 and 2021. See Superior website for detailed press releases.

Details for each area are listed in Table 9-1.

Table 9-1 Details by area

Area	number of holes	Metres
AREA 134	24	4,092
BALTIC	150	21,401
BALTIC EXTENSION	11	2,724
CARIBBEAN	35	4,415
CASPIAN	77	8,115
CORTEZ	3	385
INDIAN	80	10,448
PACIFIC	4	1,485
TIMOR	4	708
Grand Total	**388**	**53,773**

Figure 9-2 Plan view of Plutonic Underground in-mine exploration during 2020 & 2021



9.2 Near-mine exploration

Plutonic near mine exploration targets (Figure 9-3) include:

- TSF testing ore shoot below tailings dam

Hermes near mine exploration targets (Figure 9-4) include:

- Hermes South (Wilgeena) RC to test extension, sterilisation and Boreholes

9.3 Tailings storage facilities

Tailings storage facility ("**TSF**") drilling targeted a historical high grade mineralisation below the tailings dam (figure 9-3). Results from this RC drilling did not replicate the historical grade. This target area will be revisited in future as the high nugget effect and short range grade continuity of the Plutonic deposit frequently results in poor replication values of follow up drilling.

Figure 9-3 Location map for Plutonic near mine exploration targets

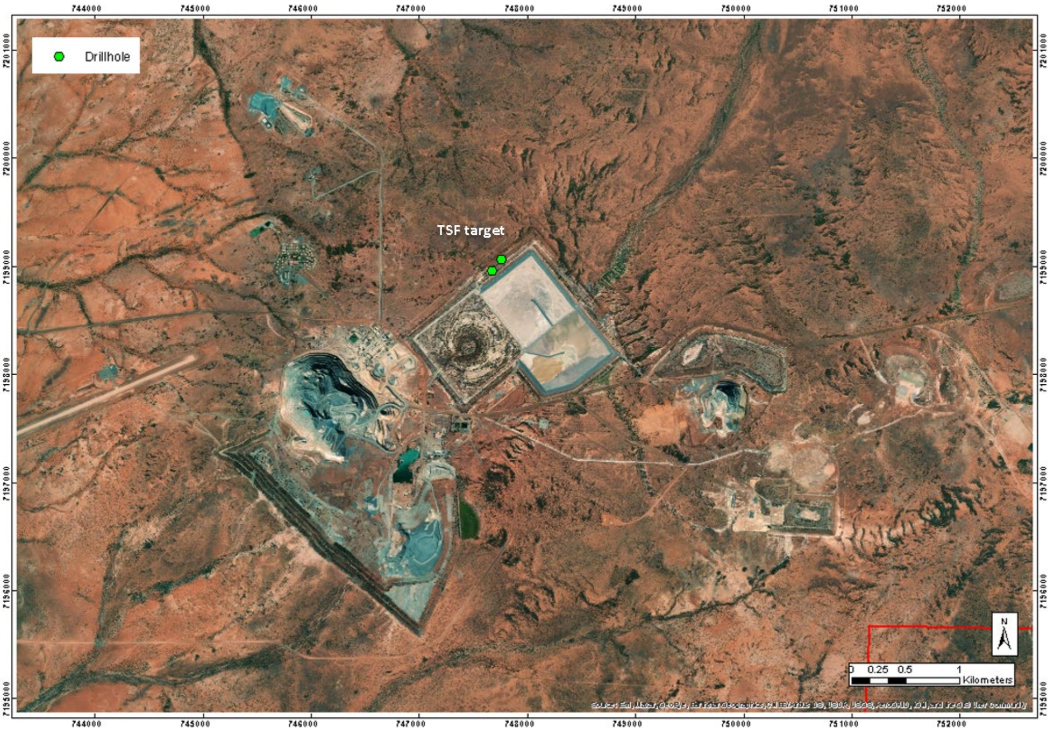
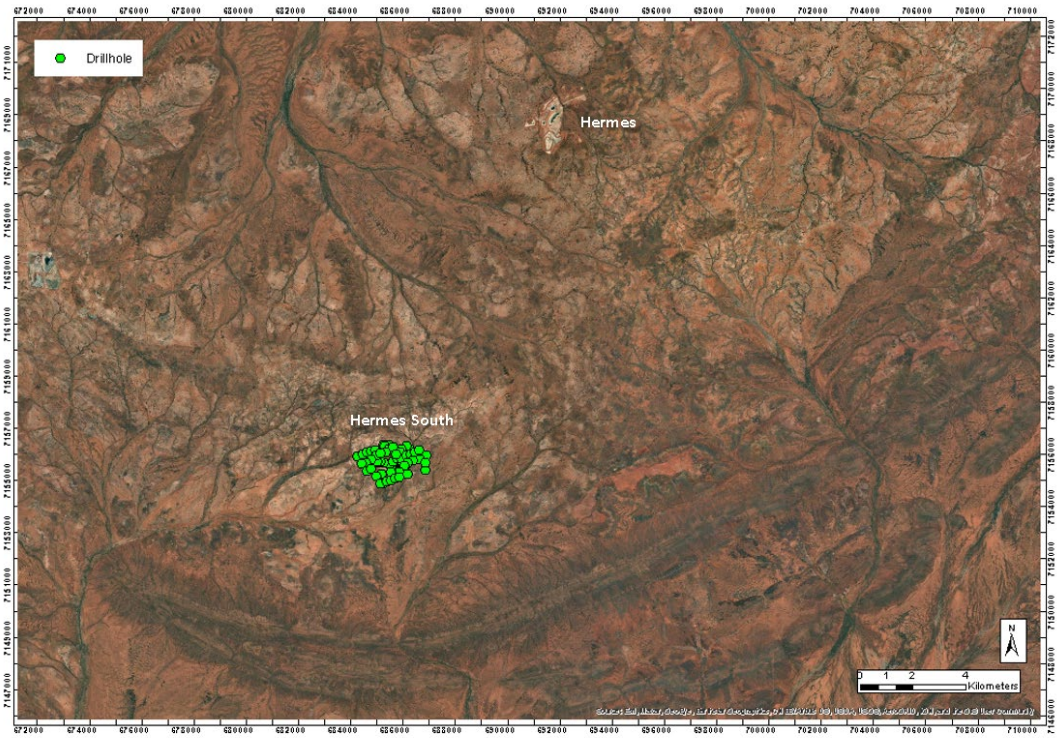


Figure 9-4 Location map for Hermes near mine Bryah basin JV exploration targets



9.3.1 Bryah Basin – Regional

Mineralisation occurs within highly deformed (multi-phase deformation) amphibolite-facies metasediments of the Peak Hill Schist within zones of high metamorphic/deformation gradient, thought to possibly represent an early shear-hosted mineralisation style, typically best developed proximal to amphibolite (a favourable structural/geochemical position).

Mineralised shear-zones have been strongly deformed by subsequent events which have led to very strong thickening/plunge control to mineralisation, and hence strong potential for small-footprint & blind mineralisation. Multi-element fingerprinting data suggests in many of the southern prospects and Peak Hill have an association of variable base-metals (such as Pb, Zn, Bi, Cu, & W), or a consistent As-Sb-Mo-W-Bi signature in the Hermes deposits.

The effectiveness of the existing surface geochemical coverage of the BBJV project has been hampered by the extensive colluvial cover (80% coverage). It is recognised that much of the current project area (and existing historical surface geochemistry) is therefore effectively untested/invalid.

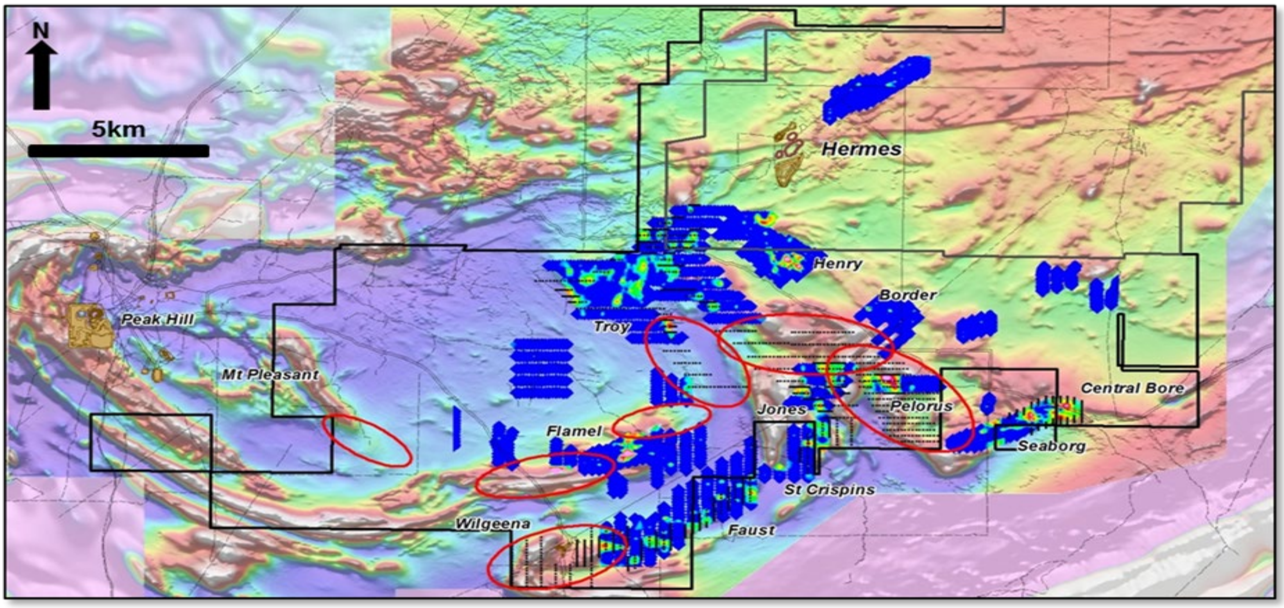
Previous explorers (ALY and Northern Star) embarked upon a campaign to test a number of priority targets with geochemical drill sampling (Figure 9-5) to effectively see beneath this cover. It is proposed that Billabong will continue to roll-out this strategy across targeted areas of the BBJV project and provide effective geochemical baseline coverage in priority target areas in an effort to advance new target areas into the Resource pipeline.

Over the BBJV area exploration will comprise further in-fill and extension geochemical drilling as well as AC and RC drilling traverses to test anomalous trends identified historically.

Exploration activities in 2019 in the BBJV area used geochemical survey to identify gold anomalism. The 42eochem target were identified using the location of recent and historical prospecting activities. Some of these areas recovered several ounce of gold nuggets. We realised 3 soil sampling campaign, respectively in Flamel, Jones and Papus areas. A total of 301soil samples were collected. Multi-element assays were used to identify gold, gold pathfinder and base metal. No significant gold anomalism were found but geochemical analysis indicated mineralised trends with similar orientation than the surrounding deposit. South east trend for Papus near Hermes South (Wilgeena), east north east trend at Flamel and north east trend at Jones.

Next stage of exploration will include AC program to confirm the 42eochem anomalism at depth.

Figure 9-5 Geochemical drilling coverage map of Hermes/Bryah Basin JV area



Note: Red circles indicated areas of potential future exploration

9.3.2 Hermes South (Wilgeena)

The Hermes South project area (Wilgeena deposit) has had historical mining with production reported in early 1920s and in 1988. Over 3 months in early 1988, Esmeralda Exploration Ltd ran a trial mining operation on two pits with a maximum depth reach of 20 m. The ore was treated at Horseshoe, owned by Barrick Mine Management Pty Ltd. with 12,915t ore processed via CIP, with 93% recovery averaging 2.51g/t. In 2018 Billabong completed ninety-six RC holes (Figure 9-6) for a total of 14,163 m to test mineralisation potential at depth, along strike and exploration for potential parallel (satellite) mineralisation. Best results include

4m@142.3g/t (BHSRC028), 3m@37.7g/t (BHSRC007), and 4m@13.5g/t (BHSRC039). The Mineral Resource (for further discussion please refer to Section 14) remains open to the south to the east and at depth and will require further drilling.

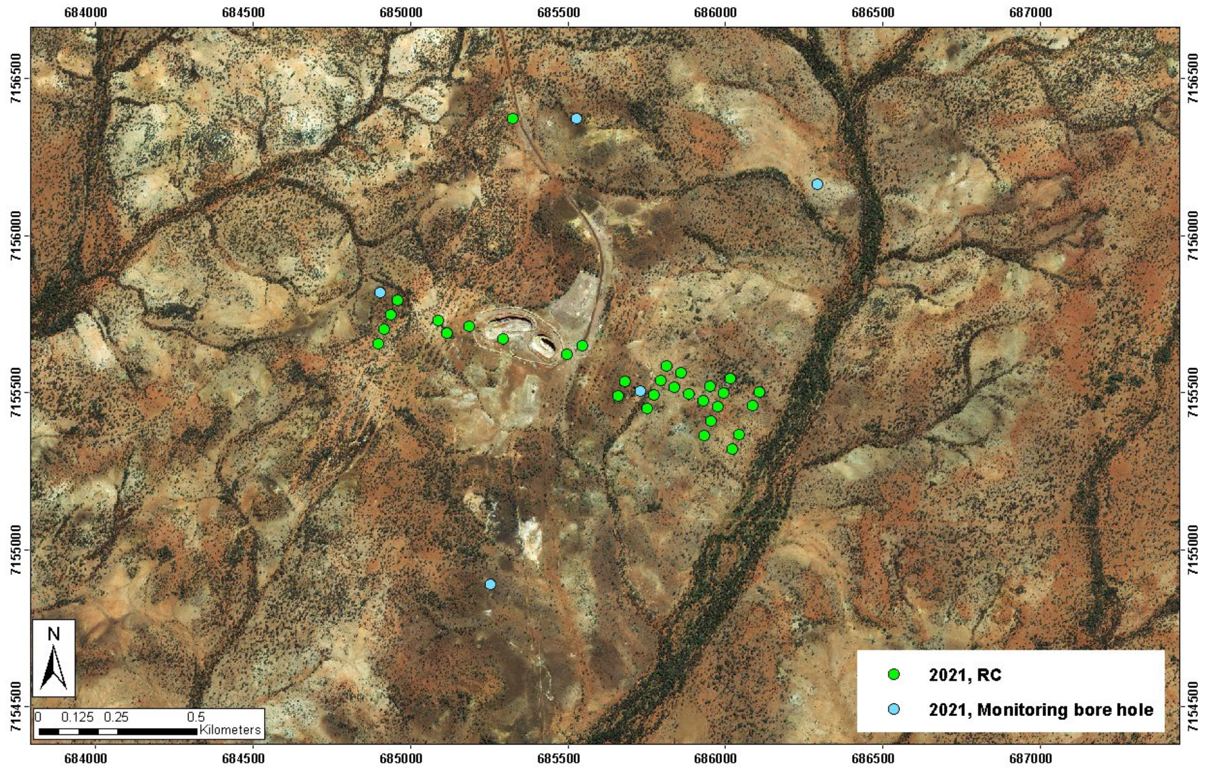
Five of the RC holes inside the Mineral Resource area were used to calculate density in oxide, transitional and fresh. Multi-element data using a portable XRF analyser to delineate gold pathfinder was also collected.

A ground magnetic survey was also completed covering an area of 3.43km² around Hermes South area. Two structural orientations appeared along N50 and N120. N120 is associated with regional foliation whereas N50 is sub-parallel to the "Wilgeena-St Crispin's" syncline axial plan.

4 Metallurgical holes were drilled in 2019 to the south of Wilgeena. 37 holes (32 RC holes and 5 Monitoring bore holes) were drilled in 2021.

The results of these holes were not included in the Mineral Resource update due to the extended Assay turnaround times experienced in the industry due to increased demand and low staffing levels experienced during the COVID pandemic period. The results from these holes will be included in the next update of the resource model and is expected to be available during the course of 2022.

Figure 9 -6 Plan of Hermes South 2021 drilling



9.4 Hermes summary

Mining of Hermes stopped in 2019 and no additional drilling has been conducted in the area. The mineral resource reported is unchanged from the prior estimate.

10 Drilling

10.1 Plutonic summary

Modern exploration on the Plutonic property began in 1986 and surface drilling began in 1987. Drilling campaigns have included diamond drilling with various core diameters, RC drilling, RAB drilling, and other minor types. Table 10-1 summarises the drilling and sampling on the property. Note that surface grade control drilling, and areas outside of current land holdings are excluded from this summary.

During 2020 and 2021 the bulk of diamond drilling was focussed on in-mine exploration (Minex) and grade control projects.

The Plutonic Gold Mine Mineral Resources and Mineral Reserves are based, primarily, on diamond drill and face sampling data. Current Mineral Resource estimates, for the most part, are based on average 20 m by 20 m drill pattern for Indicated and approximately 10 m by 10 m for Measured, depending on geological complexity and mining method. Core diameters include LTK60 (43.9 mm), BQ (36.4 mm), NQ (47.6 mm), and NQ2 (50.7 mm).

Drill collars are surveyed by the Mine Survey department using electronic total station equipment. Single shot downhole survey measurements are taken every 50 m. Primary drill patterns, ~40 m by 40 m, are drilled with oriented core measuring devices.

Barminco Ltd. has performed the recent underground diamond drilling using ATLAS COPCO MCR Rigs.

All diamond drill core is digitally photographed. Logging notes lithology, alteration, mineralisation and structures. Structural readings are taken at relevant structures and where the foliation is relatively consistent. Where possible, readings are taken in ore zones and at major structural contacts.

For un-orientated core, only alpha angles were measured; for oriented core, both alpha and beta angles were recorded.

If the core was BQ, LTK48, or LTK60 it was sampled as full core and dispatched to the laboratory for analysis. Most NQ2, is cut in half; the top half of the core was sent to the laboratory for analysis and the other half was placed back in the core tray, transferred onto pallets, and moved to the core yard library. All grade control drilling is sampled as whole core samples.

Table 10-1 Plutonic exploration drilling summary (includes Grade Control Drilling)

Year	Surface						Underground					Total	
	Diamond	Diamond	Reverse circulation	Reverse circulation	Rotary air blast	Rotary air blast	Diamond	Diamond	Sludge	Sludge	Face samples		
	No. of holes	Metres	No. of holes	Metres	No. of holes	Metres	No. of holes	Metres	No. of holes	Metres	Number	No. of holes	Metres
Pre-2002	1,280	443,968	8,361	599,467	3,867	175,817	2,285	291,730	0	0		15,793	1,510,982
2002	86	61,048	86	12,978	0	0	679	50,177	–	–	–	851	124,203
2003	22	19,068	258	20,296	179	9,120	542	36,430	–	–	–	1001	84,914
2004	32	12,163	298	39,708	0	0	761	49,571	–	–	–	1,091	101,442
2005	9	4,767	27	1,698	0	0	1284	72,140	–	–	–	1,320	78,605
2006	9	863	221	16,580	0	0	1232	72,905	18	226	–	1,480	90,574
2007	2	259	0	0	0	0	1283	68,694	–	–	–	1,285	68,953
2008	0	0	0	0	0	0	861	52,292	–	–	–	861	52,292
2009	11	4,437	0	0	0	0	779	45,233	54	768	–	844	50,438
2010	8	2,925	14	992	0	0	877	58,762	–	–	–	899	62,679
2011	35	9,581	0	0	0	0	942	66,842	–	–	–	977	76,423
2012	22	8,562	0	0	0	0	997	65,543	18	202	–	1037	74,307
2013	4	1,683	0	0	0	0	945	50,787	–	–	21,993[4]	949	52,470
2014	4	1,473	0	0	0	0	1,128	74,501	39	800	3,432[5]	1,171	76,774
2015	56	23,552	8	1,693	0	0	1,538	120,629	45	777	15,101	1,647	146,651
2016	0	0	0	0	0	0	1,096	65,561	18	328	10,506	1,114	65,889
2017	35	11,453	0	0	0	0	933	65,914	0	0	14,062	968	77,367
2018	5	4,552	241	10,837	0	0	1,135	90,566	12	202	11,595	1,393	106,157
2019	8	3450	0	0	0	0	1,064	79,648	31	395	15,619	1,103	83,493
2020	0	0	0	0	0	0	1,081	72,787	61	863	14,130	1,142	73,650
2021	0	0	2	262	0	0	1,109	77,708	22	193	13,388	1,133	78,163
Total	**1,628**	**613,804**	**9,516**	**704,511**	**4,046**	**184,937**	**22,551**	**1,628,420**	**318**	**4,754**	**94,401**	**38,059**	**3,136,426**

Note: For the purposes of summary tabulation drill holes with no date recorded in the database are summed up in Pre-2002. No RAB/Aircore or sludge drilling data is used in any Resource estimate.
Projection: MGA Zone 50.

[4] Samples are not recorded with a date but pre-date August 2014.
[5] Sample dating only recorded after August 2014.

11 Sample Preparation, Analysis and Security

11.1 Sample security

All sampling and sample dispatch activities are supervised by the project, mine geologist or senior field technician. The on-going mine operations discount the risk of sample tampering. The protocols for sample collection and despatch are standard for the Australian mining industry.

All cut drill core is kept in an unfenced core farm adjacent to the core cutting and processing shed. This is not regarded as a security risk due to the remote location of the mine with no community development near the mine. All core is photographed and records kept electronically.

The Plutonic assay laboratory (the "**Plutonic Lab**") is currently relied upon to process and assay a significant proportion of our underground diamond core samples. At the present time, 100% of our diamond core is going to the site lab however it should be noted that the proportion of diamond core being processed on-site does vary depending on the requirements at the time. It is usually the case that almost all of the grade control ("**GC**") core goes to the Plutonic Lab for assay, whereas Mineral Resource development drill core will go to a combination of the Plutonic Lab and to ALS Global Laboratories' (an arm's length lab or "**ALS**") (National Association of Testing Authorities, Australia (NATA)/International Standards Organisation (ISO) 17025:1999 Accredited) laboratories in Perth and thus there is some assay return delay.

Pulp rejects from assayed samples are kept in wooden boxes on top of the waste dump. These are visited frequently as samples are taken for research and other purposes.

In the opinion of the Qualified Person, the sample preparation, security, and analytical procedures are in line with industry-standard methods.

11.2 Plutonic

11.2.1 RC samples – Barrick and Resolute

RC samples were collected through a cyclone at one metre intervals and passed through a riffle splitter to produce a two kg to four kg assay sample.

Some of the RC holes drilled by Resolute were sampled by taking four metre composites in known waste zones. One metre samples were assayed where the composite assays were greater than 0.25 g/t Au adjacent to mineralisation and over 0.5 g/t Au in areas not adjacent to mineralisation.

The standing water table was at about 26 m below surface. Drilling was generally dry to at least 50 m or 60 m and wet samples were produced below this depth. No records have been found to indicate treatment of wet samples, although it is stated that no major sampling problems were encountered.

The principal laboratory used by both BMA and Resolute was Minlabs Assay Laboratories in Perth (Minlabs). RAB samples were assayed using an aqua regia digestion with an atomic absorption spectrophotometry ("**AAS**") finish, to a detection limit of 0.01 g/t Au. RC samples from the BMA drilling were fire assayed, with an AAS finish, to a detection limit of 0.01 g/t Au. Resolute assayed the majority of its RC samples using aqua regia method with an AAS finish, however, RC samples containing sulphides were fire assayed. All diamond drill core samples were fire assayed.

Resolute used Genalysis as an umpire lab to check the BMA results. These were reported as showing good agreement with the original assays. Check assaying on Resolute's own drilling was in the form of repeats by fire assay at Minlabs.

11.2.2 RC samples – Homestake and Plutonic

All RC holes were drilled with face hammers and were sampled at one metre down hole intervals. For each metre drilled, the sample was passed through a cyclone and collected into calico bags and the remaining un-sampled material dropped into a catchment sump. Depending on the oxidation state of the rock, the sample weight varied between three and five kilograms. A duplicate sample was also collected and retained in a temporary sample storage facility for further check sampling.

The RC drilling and sampling were supervised at the drill site by a company sampler and geologist. The riffle splitter was cleaned using compressed air after every sample and the cyclone was cleaned every 40 m, or more regularly at the geologists' discretion.

All pre-2006 Homestake Exploration samples comprising of RC and diamond core, were sent to Minlabs. The following procedures were used at Minlabs:

- Entire sample was crushed with a hammer mill to a particle size of less than 500 µm.
- A 0.3 kg to 0.5 kg sample split was pulverised to 100% passing 75 µm using a Labtechnic ring mill.
- A 50 g charge was fire assayed using an AAS finish to a detection limit of 0.01 ppm Au.
- At least two assay standards were submitted with each 300 to 400 sample batch to monitor the accuracy of the laboratory.

Plutonic primary assay samples, after passing through the splitter, was collected in a calico bag and submitted to the Plutonic Gold Mine assay laboratory for sample preparation and gold analysis using an aqua regia digestion/AAS determination.

Wet or damp samples were occasionally obtained, usually at rod changes or near the end of a hole. These samples were not riffle split immediately, rather the entire one metre sample was placed in a polyweave bag and retained in a temporary sample storage facility. Once dried, the original samples were riffle split and separated for aqua regia/AAS laboratory analysis. The RC drilling and sampling was supervised at the drill site by sampler and geologist.

11.2.3 Diamond core samples – Homestake and Plutonic

Minimum and maximum samples lengths were 0.3 m and 1.0 m, respectively, and honoured geological contacts. A field assistant allocated sample numbers, recorded the numbers on a sample sheet, sampled the core, and forwarded the sample sheet to the data clerk. The sample sheet and the drill log were entered into the database digitally and verified for agreement by the data clerk.

Core drilling was completed by the Homestake Exploration group and Plutonic for the purpose of:

- Twinning existing RC holes to verify mineralisation;
- Geotechnical information on pit slope stability;
- Density determinations on ore types; and/or
- Provide samples for metallurgical test work.

Where diamond core was to be assayed, it was cut in half, with half the sample being submitted for assay and the remaining half being retained for reference. Core from triple-tube, HQ3, holes were collected for geotechnical, relative density, and metallurgical test work. At the drill site, the core was wrapped in plastic wrap after removing from the split and then transported back to the core yard for geotechnical and geological logging. The core was then measured and weighed, wet and dry, for the relative density analysis. The core from the ore zones was then cut into quarters for assaying and metallurgical test work.

11.2.4 Diamond core samples – Northern Star

Sample preparation and assaying as per the flowcharts following (Figure 11-1 to Figure 11-3), and show the flow from site-based processing to submission to sample preparation at ALS.

11.2.5 Diamond core samples – Billabong

Sample preparation and assaying as per the flowcharts following (Figure 11-1 to Figure 11-3), and show the flow from site-based processing to submission to sample preparation at the ALS.

Billabong underground diamond drill gauge is BTW (42 mm). Due to the small diameter, the whole core is submitted for analysis.

Figure 11-1 Flowchart for site-based sample processing

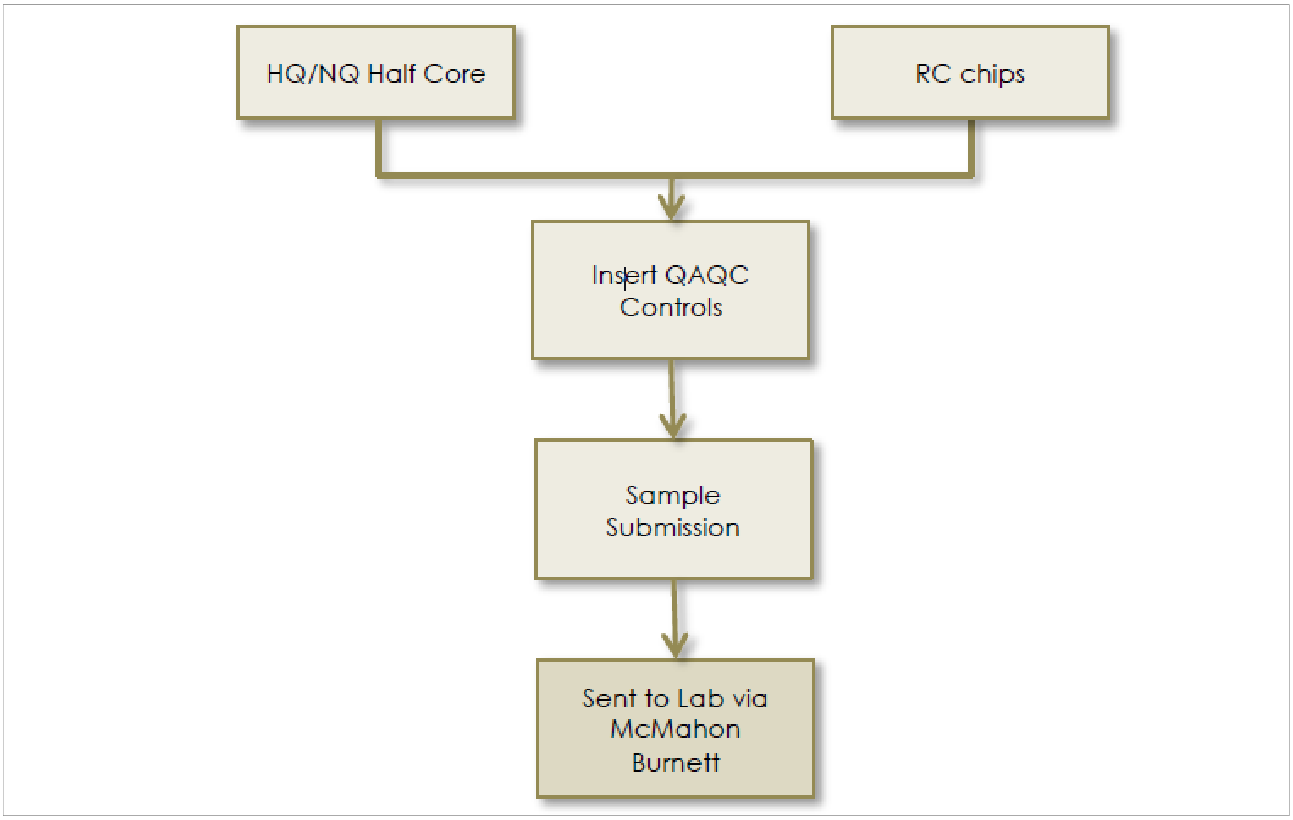


Figure 11-2 Flowchart for sample preparation at the ALS Malaga facility

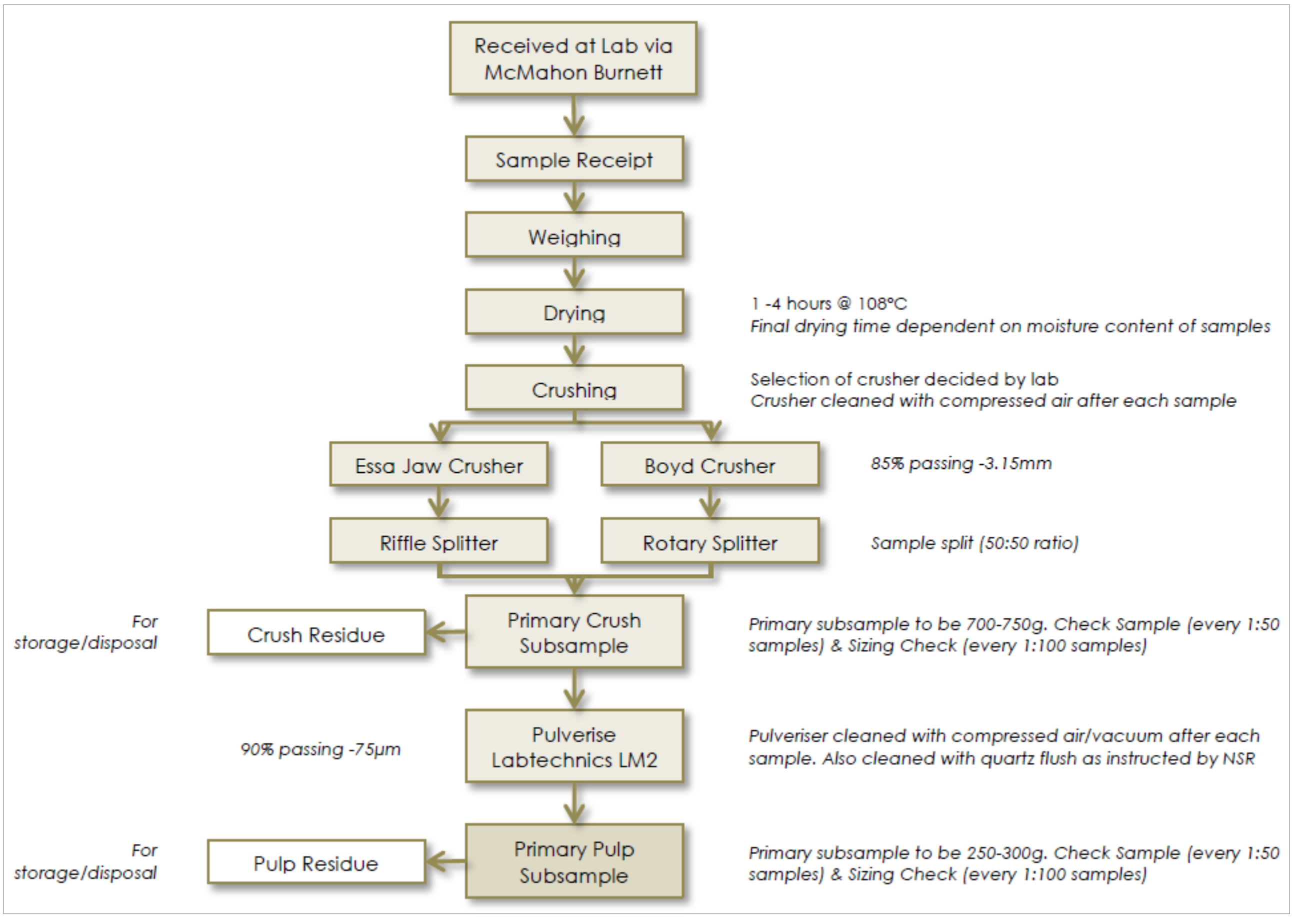
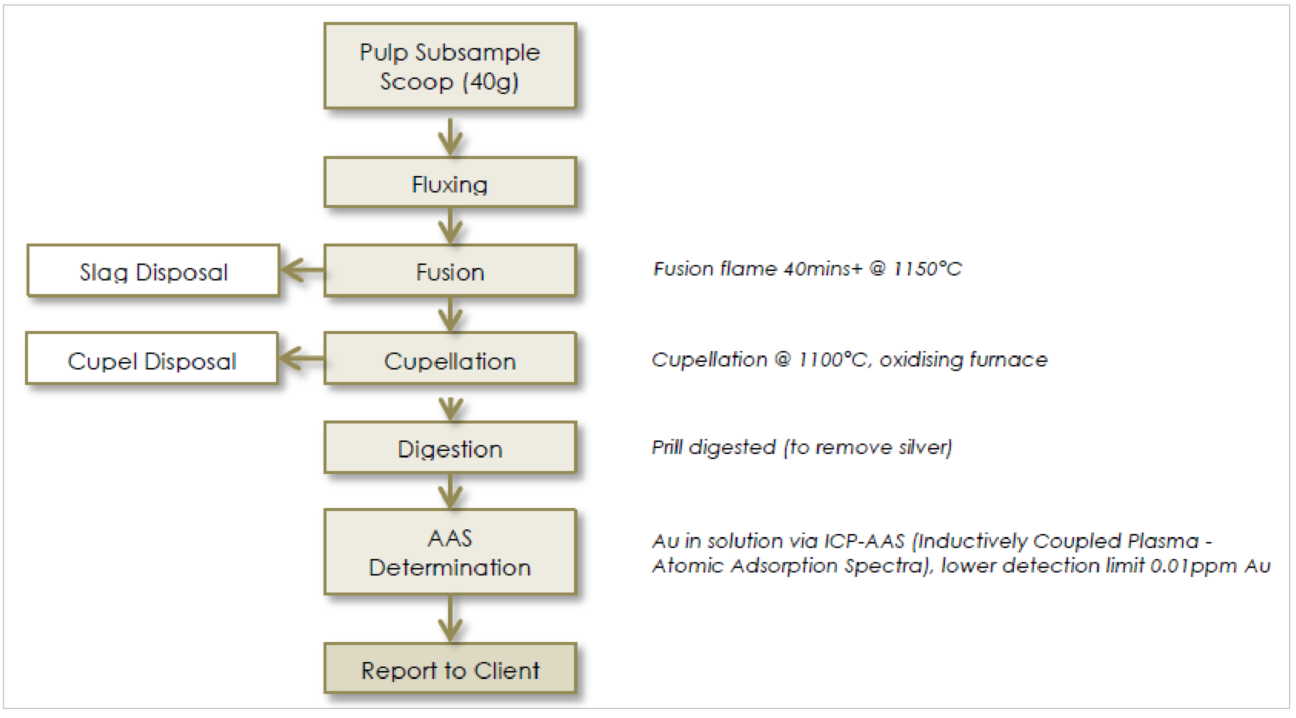


Figure 11-3 Fire assay flowchart for ALS Malaga facility



Gold concentration was determined by inductively coupled plasma atomic absorption spectroscopy (ICP-AAS), after conventional lead fusion and aqua regia digestion of a 40 g charge sample, with at least 170 g of litharge-based flux at the ALS Perth facility.

Plutonic samples taken by Billabong involved a chain of custody managed by Billabong personnel. Samples are stored on site in polyweave bags secured with zip lock ties, prior to pick-up by McMahon's Burnett freight for delivery to McMahon's Burnett depot in Perth, and then to the assay laboratory in Perth.

11.2.6 Face samples – Northern Star

Face rock chip/channel samples are collected from all (nominal) development faces. The data is incorporated into Resource estimates. A review to assess the relevance of combining drill and face data in estimates was completed in 2009 (Coombes, 1990) and found that the data could be combined as long on-going comparisons of relevance for combined top-cut was conducted. The data is currently stored in three separate databases at Plutonic. The three databases relate to time frames and systems of data recording used at the time. Face samples have been recorded in acQuire systems since August 2014.

The sampling is completed by geologists and underground sampling assistants. The sampling is taken by chipping the face into calico bags with definition by lithological boundaries. The face sample locations are marked up and mine survey pick up locations for recording as collar/azimuth/interval in the database. Duplicate intervals, blanks (every 20 samples) and certified reference materials (every 40 samples) are inserted into the sample sequence. All face samples are prepared and assayed at the on-site Plutonic Lab. No external checks are conducted on these samples.

11.2.7 Face samples – Billabong

Face data is very similar as per the Northern Star process.

The sampling is completed by the mine geologists. The sampling is taken by chipping the face into calico bags with definition by lithological boundaries. The face sample locations are marked up and measured from fixed survey points. Duplicate intervals, blanks (approximately 1 in every 10 samples) and certified reference materials (approximately 1 in every 15 samples) are inserted into the sample sequence. All face samples are prepared and assayed at the on-site Plutonic Lab. No external checks are conducted on these samples.

11.3 Hermes

11.3.1 1996–1998 Troy Resources

The sample preparation, analyses and security for all previous drilling campaigns to the end of 2012 are reported in Coxhell (2011). A total of 234 RC holes (TRC1 to TRC234) were drilled on the Hawkeye-Trapper mineralised trend for a total of 28,210 m. This drilling delineated and defined the Hawkeye gold deposit at a drill spacing of 20 m by 20 m and the Trapper gold deposit at a drill spacing of 40 m by 20 m with 20 m by 20 m and 20 m by 10 m spaced drill holes limited to the north end of the deposit. Holes were generally drilled toward grid east at a declination of 60º with the exception of some holes drilled toward grid west and a few holes drilled toward grid southeast in complex areas to try and resolve the orientation of the gold mineralisation. Samples were collected in 1 m intervals and split to approximately 2 kg through a multitier riffle splitter and submitted to Ultra Trace Laboratory Perth (National Association of Testing Authorities, Australia accredited (NATA) for fire assay gold analysis. The samples were pulverised in a ring pulveriser and a 50 g portion analysed using the fire assay method and Au, Pt and Pd values determined by Inductively Coupled Plasma Optical Emission Spectrophotometry (ICP-OES). The sampling as described is accepted as being to industry standards at the time.

11.3.2 2009–2011 Alchemy Resources

Alchemy Resources completed ten diamond drill holes, 117 RC drill holes, and 214 aircore drill holes between 2009 and 2011. Diamond drilling assay results were obtained from geochemical analysis of 1 m samples of half NQ2 (50.6 mm) core. All samples were analysed at the ALS Perth facility. Samples were prepared using single stage pulverisation of the entire sample. Gold assays were obtained using a 30 g fire assay and atomic absorption spectrometry analysis technique. Quality assurance quality control was achieved using a suite of certified standards, laboratory standards, field duplicates, laboratory duplicates, repeats, blanks and grind size analysis.

RC drill samples were taken as 1 m samples from a riffle spilt primary sample at the rig. Analysis of gold was completed by 30 g fire assay/AAS determinations. Field split duplicates, blanks and standards were included in all batches submitted to ALS Global laboratory in Perth.

11.3.3 2015–2016 Northern Star

Hermes samples taken by Northern Star involved the same protocols as Plutonic core as described in Section 11.2.4.

11.4 QA/QC procedures

11.4.1 Methods - Plutonic

The Plutonic Gold Mine has been in operation since 1990 following discovery in 1988. QAQC procedures have changed throughout that period, and most sampling in that period relates to Resources now mined out in the open pit mining period of Plutonic Gold Mine.

The current underground Mineral Resources have been identified over a long period of time with a number of companies. All high confidence Mineral Resources are based dominantly on underground diamond drilling completed in the last 12 years.

Blanks used to be inserted within the diamond drill core after every ore sample following a blue metal wash. In the last two years, blanks have been inserted randomly at 1 in 20 samples collected. For underground face samples a blank is inserted at the end of any face that contains ore. The frequency of blanks for mapped faces is proportionate to the amount of ore drives mapped per shift.

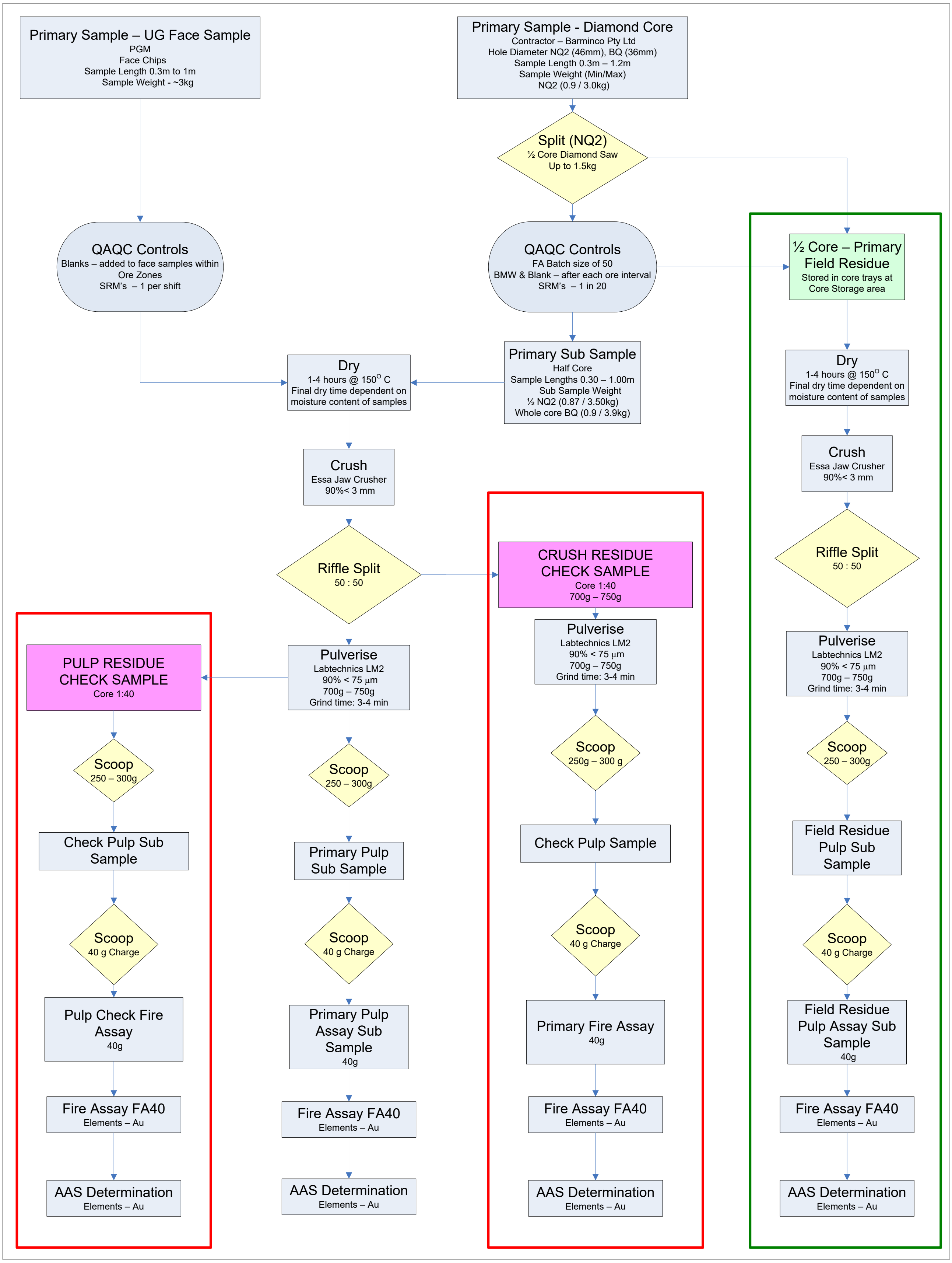
Grind checks or sizing was carried out on a frequency of 1 in 40 on both pulp residues and crush residues but since January 2020, crush sizing analysis was conducted randomly. The data is collected throughout the shift with results calculated at the end of shift. Pulp residues are expected to have 90% passing ≤75µm. the crush residue is expected to have 80% passing ≤3 mm. This data is monitored by the Laboratory Supervisor. Grind times can be lengthened accordingly.

Certified reference materials ("**CRM**") are inserted at a frequency of at least 1 in 20, as per the Plutonic Lab system of quality control. This amount to at least 2 standards per assay batch. Standards are selected based on their grade range and mineralogical properties. Geostats standards used have been sourced from Yilgarn ore deposits, with an emphasis on sulphide ores.

Field, crush and pulp duplicates, occur at a frequency of 2.5% and this data is made available at end of month reporting.

Company procedures dictate a process of validation and checking of laboratory results when data is returned by the laboratory as it is loaded into the acQuire database. A standard set of plots and checks are undertaken, and if results fall outside of the expected limits then re-assaying is requested. Monthly QAQC reports are generated by the database administrator and documented from automated routines out of the database.

Figure 11-4 QA/QC check sampling flowchart for field, crush, and pulp duplicates



11.4.2 Validation and QA/QC – CRM's

An audit was conducted of the Plutonic onsite laboratory for results reported up to and including October 2021. QAQC data was collected and examined for the period January 2020 to October 2021 to assess the quality of results returned by the analytical laboratories suppling results for Mineral Resource definition and grade control processes. Data was exported from the acQuire database and manipulated to exclude data previously flagged as being outside acceptable limits. CRM and various duplicate assay data were received from two laboratories, the details are summarised in Table 11-1.

Table 11-1 QAQC Sample Summary

QAQC Sample Type	PLU	ALS
Instrument Repeats	6	1,767
Pulp Duplicates	3,989	3
Coarse Duplicates	4,303	648
Field Duplicates	46	0
Blanks	7,056	1,674
CRMs	9,085	2,456
Check Assay (CRM)	45	45
Coarse Sample Sizing	40	137

The CRM's were analysed as part of the submitted sample batch and were blind submissions. All Au analyses are by fire assay (30 g to 50 g charge weight) with analysis by AAS (Plutonic Lab) or ICP-OES (ALS lab).

The results were examined using a box and whisker plots displaying expected gold grade, assay values and mean bias percentage on X, primary Y and secondary Y axes respectively for each CRM material. The ALS laboratory that has processed all the diamond drilling samples shows negligible bias in CRMs except for an apparent bias of 3.5% for CRM grades at 0.57 g/t Au. The Plutonic Lab that has processed all the face sampling shows the highest bias of only 3% for CRMs grading from 3 g/t Au to 8 g/t Au.

It was found that:

- Coarse duplicates revealed relative errors at 20% for samples with Au >7 g/t, 30% relative errors for samples with Au between 3 and 7 g/t
  - 50% of the errors of the coarse duplicates may have been caused by the nugget effect experienced in the Plutonic deposit;
  - Contamination, and other lab procedure breaches, human errors may have contributed another half of the errors in coarse duplicates;
- Larger relative errors at PLU lab against ALS lab for coarse duplicates matched the larger screen size of 3.15 mm at PLU lab against 2 mm at ALS, indicating that influence of the large nugget effect due to gold particle size.
- At the Plutonic Lab
  - there exists minor contamination at crushing stage, and possible contamination at pulverising, and instrument assaying stages as is commonly experienced in production laboratories;
  - There are some minor inconsistent non-compliances with procedures at crushing, pulverising, and instrument assaying stage (Martyn Zhu, November 1, 2021) and being addressed as part of the normal operational QAQC reviews;
  - Periodically increased assaying uncertainty caused by possible human errors due to high staff turnover experienced in recent years combined with the impact of COVID restrictions.
  - The extent of the lab contamination is unknown given the random nature of the blank insertion;
  - Blanks Au upper limit of 0.2 g/t seems too high and hinders detection of contamination;
  - The influence of the contamination to the underground operation is unknown but regarded as negligible for estimation at the mining grades; and

    - Waste material could be classified as low grade ore given the low grade nature of the open pit operation but is regarded as insignificant to production.
- At the ALS lab
    - There was insignificant contamination at the lab during the period;
    - The lab seemed to have performed consistently well; and
    - The lab precision test on standards indicated a better performance than CRM manufacturer. Instrument repeats however demonstrated that at least part of the grade intervals showed a significant worse performance compared to the similar grade CRM assays, the cause of this is to be investigated and resolved.

It was concluded in the opinion of the qualified person that

- Overall performance of the labs are adequate for the open pit and mining underground operation despite some minor shortcomings in the lab;
- The accuracy of the lab is within 3% error;
- The variance of the lab (precision) is about 2-3 times of the certified reference material (CRM) manufacturer, which is acceptable for production purposes; and
- Materials at Au <=0.8 g/t however contain relatively large errors, likely caused by contamination. It may cause waste material being classified as low grade ore in open pit operation.

11.4.3 CRM Assays – Accuracy and Precision Test

CRMs assays, although there are variations over time, tend to fall within 3% difference from CRM values (Figure 11-5, and 11-6).

SD Ratio: CRM assay standard deviation / CRM manufacturer standard deviation. SD Ratio <1 means the precision is better than the CRM manufacturer, and SD Ratio > 1 means the precision is poorer than the CRM manufacturer.

SD ratio for Plutonic Lab tend to fall between 2-3, indicating a poorer precision than the CRM manufacturer, and for ALS the ratio tend to fall between 0.44 to 0.97, indicating a better precision than CRM manufacturer.

Figure 11-5 Plutonic On-Site Lab CRM vs Time Plot

CRM assays demonstrated the relatively poor precision and the periodic nature of the precision changes

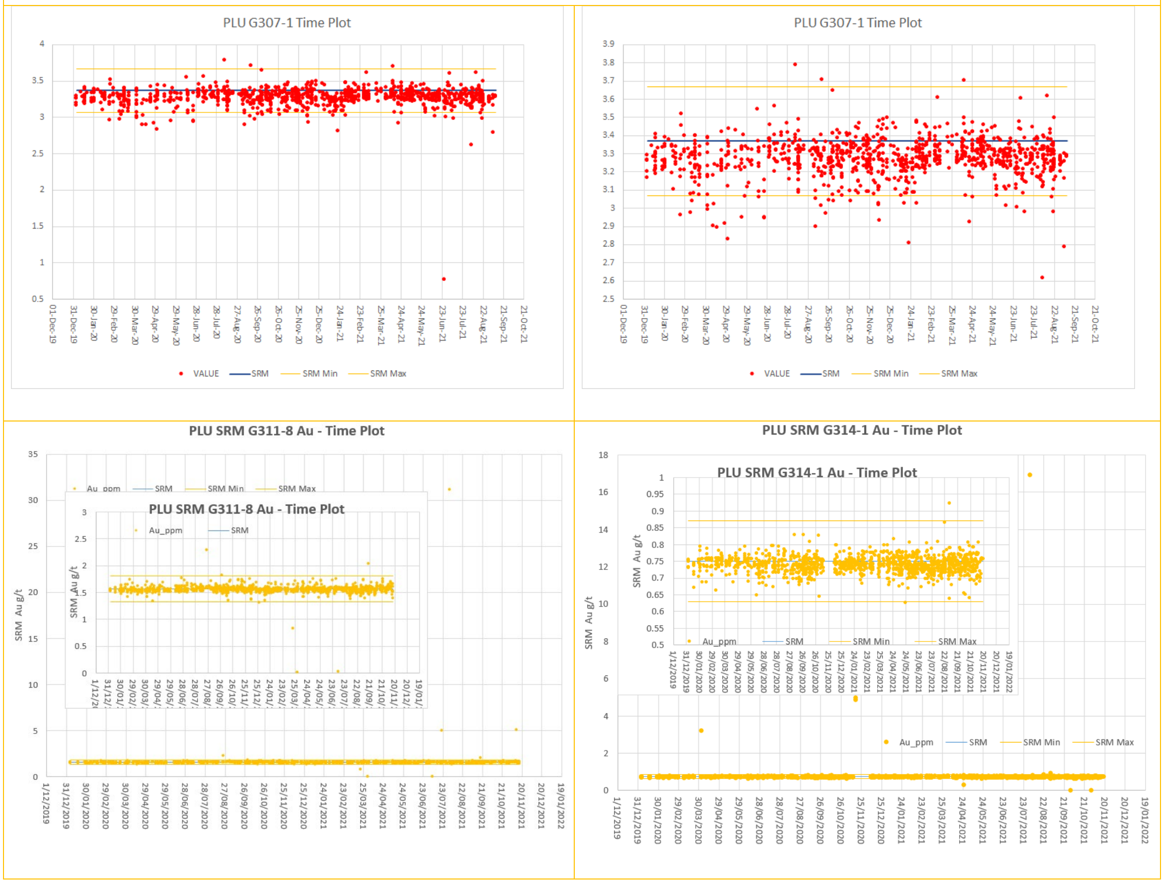
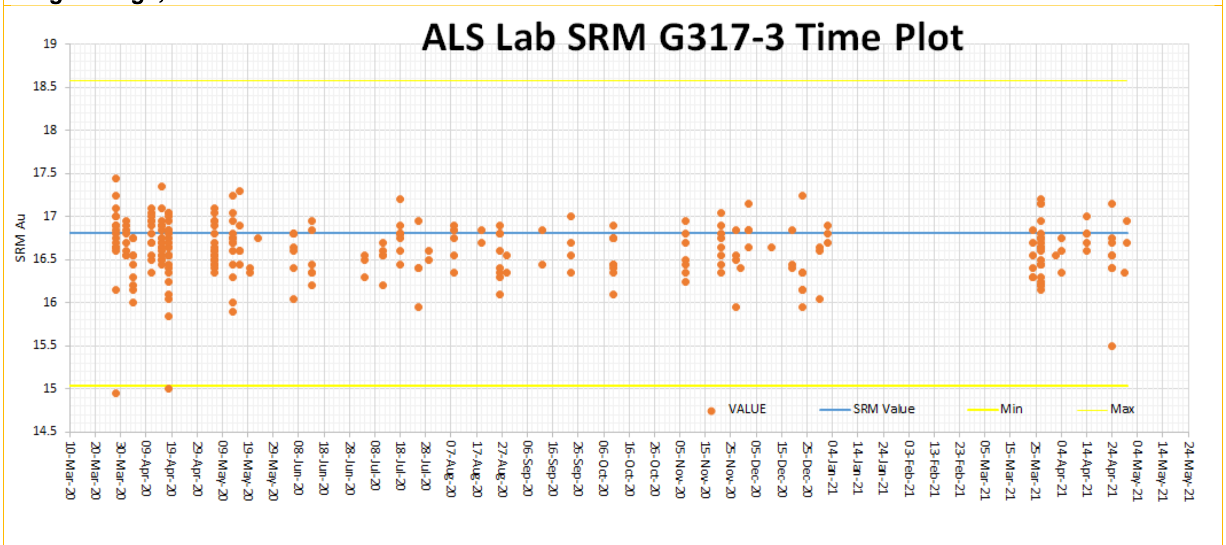


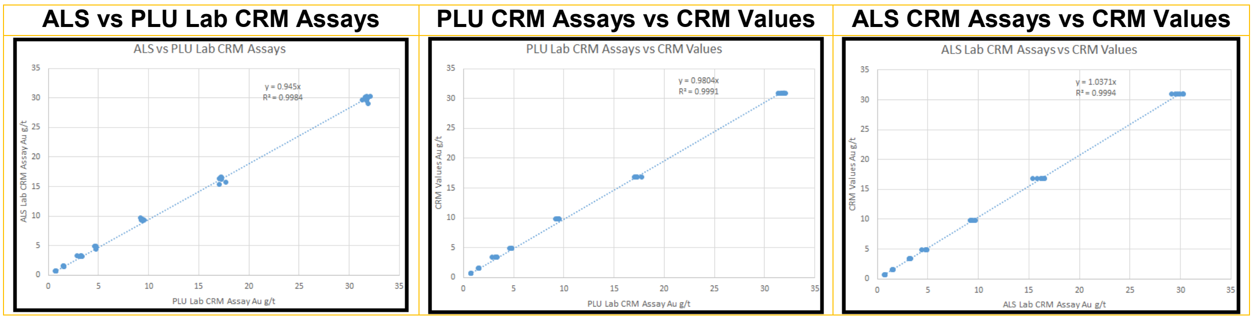
Figure 11-6 ALS CRM assay vs time plot

A tight range, and the mean is -1.37% difference from CRM



Check assays between Plutonic on site lab and ALS lab demonstrated good correlation (Figure 11-7), manifesting the assaying accuracy of both labs.

Figure 11-7 CRM Assays by Plutonic On-Site and ALS Labs



11.4.4 Lab Instrument Precision Test

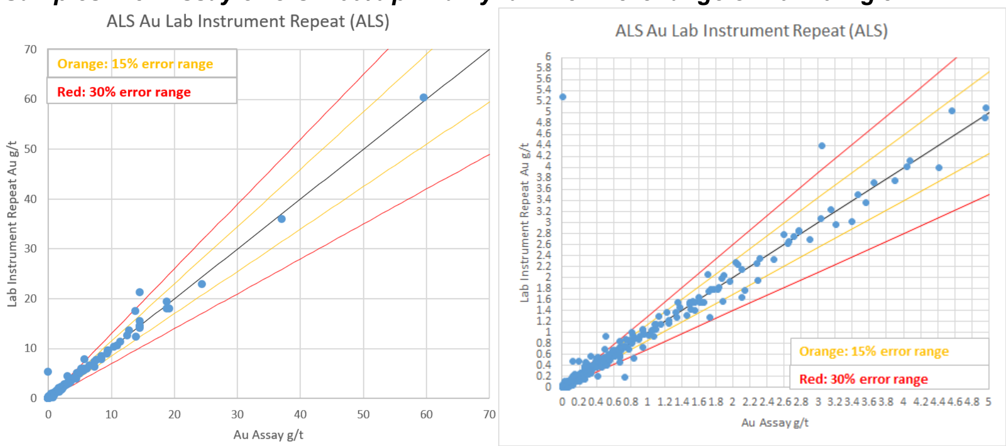
11.4.4.1 ALS Lab

1,768 samples were collected and analysed.

- Au >=2.2 g/t: all but two samples fall within the error range of<=15%, (Fig 7 top);
- Au = 0.8-2.2: Most samples fall within the error range of 30% (Fig 7 Top Right);
- Au = 0.2-0.8: most samples fall within the error range of 30%, up to 60% except 1 sample deviating significantly (Figure 11-8);
- Au <0.2 g/t: a significant number of samples contained errors >60%

Figure 11-8 Samples with Assay errors

Samples with Assay errors > 60% primarily fall within the range of Au < 0.2 g/t.



It is concluded that samples with assays <0.2 g/t are at best semi-quantitative. Samples with Au between 0.2-0.8 are largely semi-quantitative only with errors between 30-60%.

11.4.4.2 Plutonic Lab

There are insufficient lab instrument repeat samples (6 samples available) to conclude. Future lab instrument repeats are required.

11.4.4.3 ALS Lab.

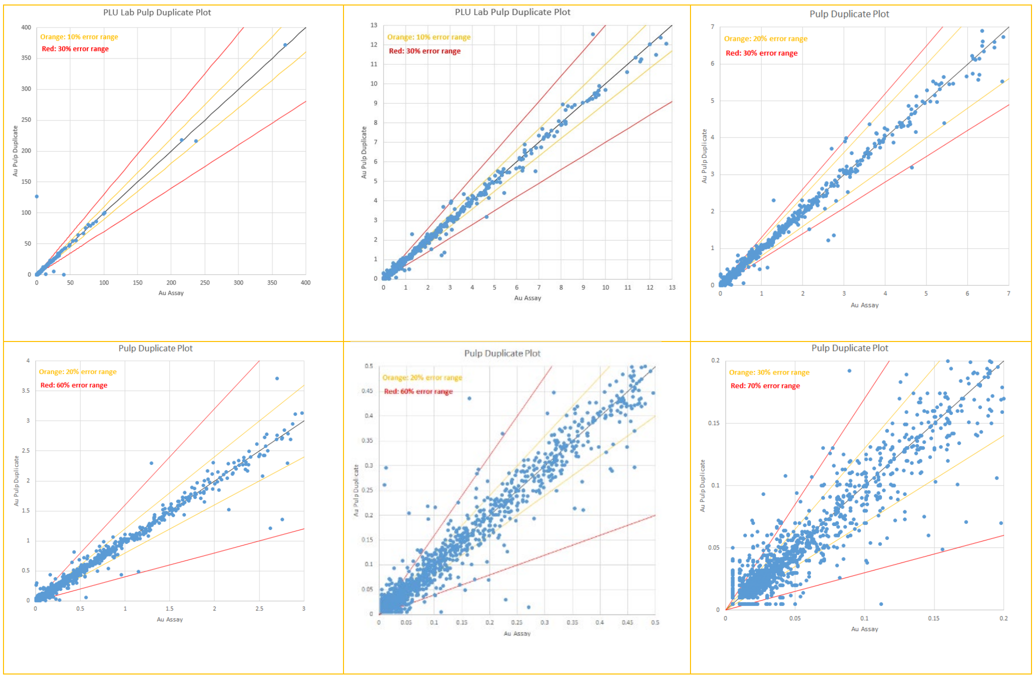
There are insufficient samples (3 samples only) at ALS to conclude.

11.4.4.4 Plutonic Lab

A total of 3,988 valid samples were selected, while 17 invalid samples with insufficient sample quantity or lost in process were not considered.

1. Samples with Au < 0.4 g/t tend to have relative errors at >30%;
2. Potential contamination or lab error was detected. Any contamination at the pulverising stage is likely to be relatively low compared with the crushing stage contamination (refer to next subsection on errors at crushing stage), and it is more like to have a larger impact on the low grade materials than the high grade ones, consistent with the first finding;
3. Large assaying impreciseness for low grade samples means samples having Au <0.4 g/t are likely to impact on the low grade materials mined in open pit operations;
4. It is uncertain the source of error given the insufficient lab instrument repeats.

Figure 11-9 Pulp Duplicate Assays



11.4.4.5 Errors Introduced during Crushing Stage

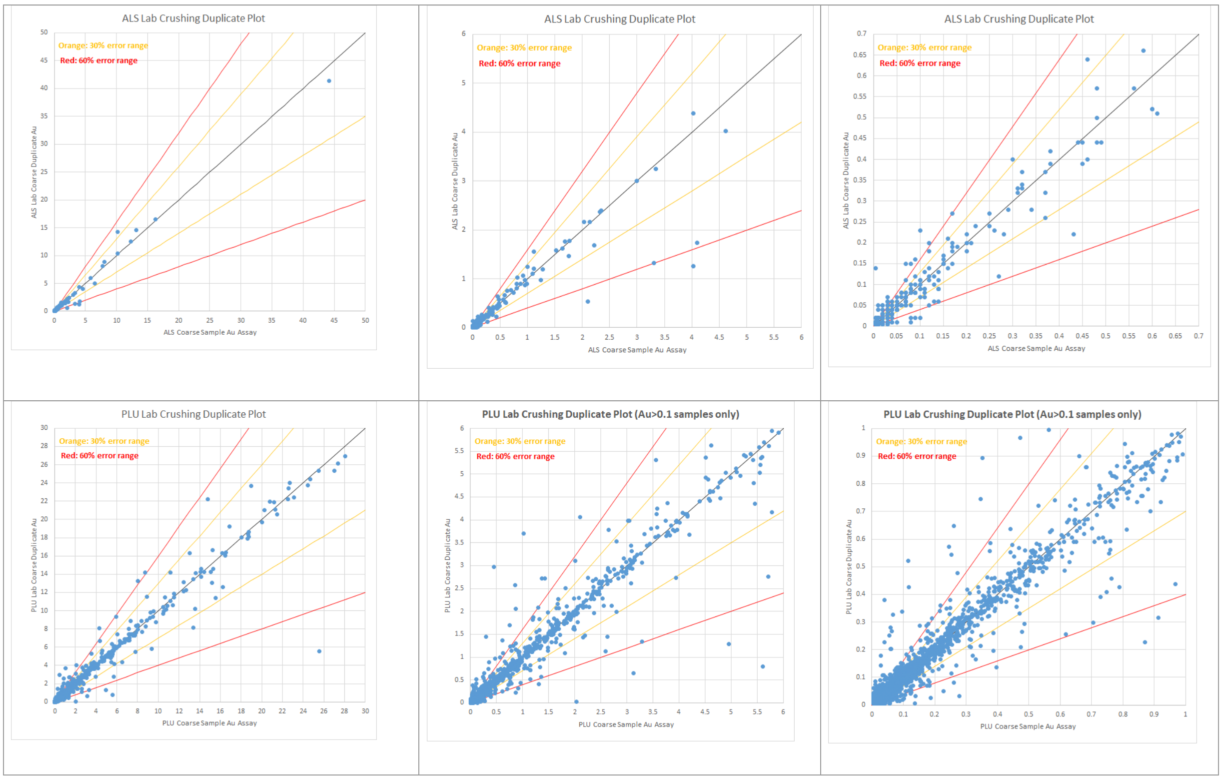
11.4.4.6 ALS Lab

648 valid coarse duplicate samples were used for analysis, only 119 samples containing mean Au >0.1 g/t were used for analysis.

It was found that:

- Most samples fall within the error range of 30% (Fig 11-10);
- A large number of samples with <5 g/t fall in an error range more than 60%; and
- Samples with Au <0.2 g/t fall in a range significantly higher than 30%, and the results can only be used as semi-quantitative at best.

Figure 11-10 Coarse Duplicates with Au>0.1g/t



11.4.4.7 Plutonic On-Site Lab

4,303 valid samples were used for the analysis, 17 invalid samples were discarded due to samples not received by the lab. 1,265 samples containing mean Au >0.1 g/t were used for analysis.

The scattering of the assays seems to be comparable with ALS lab assays (Figure 11-10).

There are 30% sample with errors >= 20%, and 10% samples with errors >=50% in ALS coarse duplicates, compared with PLU lab having 20% samples with errors >=20% and 7% samples with errors >=50%.

Contamination detected by blank samples shall affect the duplicated pair of a sample, it however does not seem to be case. Such large errors between the duplicates are suggested to be related to nugget effects given the fact that no significant contamination at pulverising or later stages was detected.

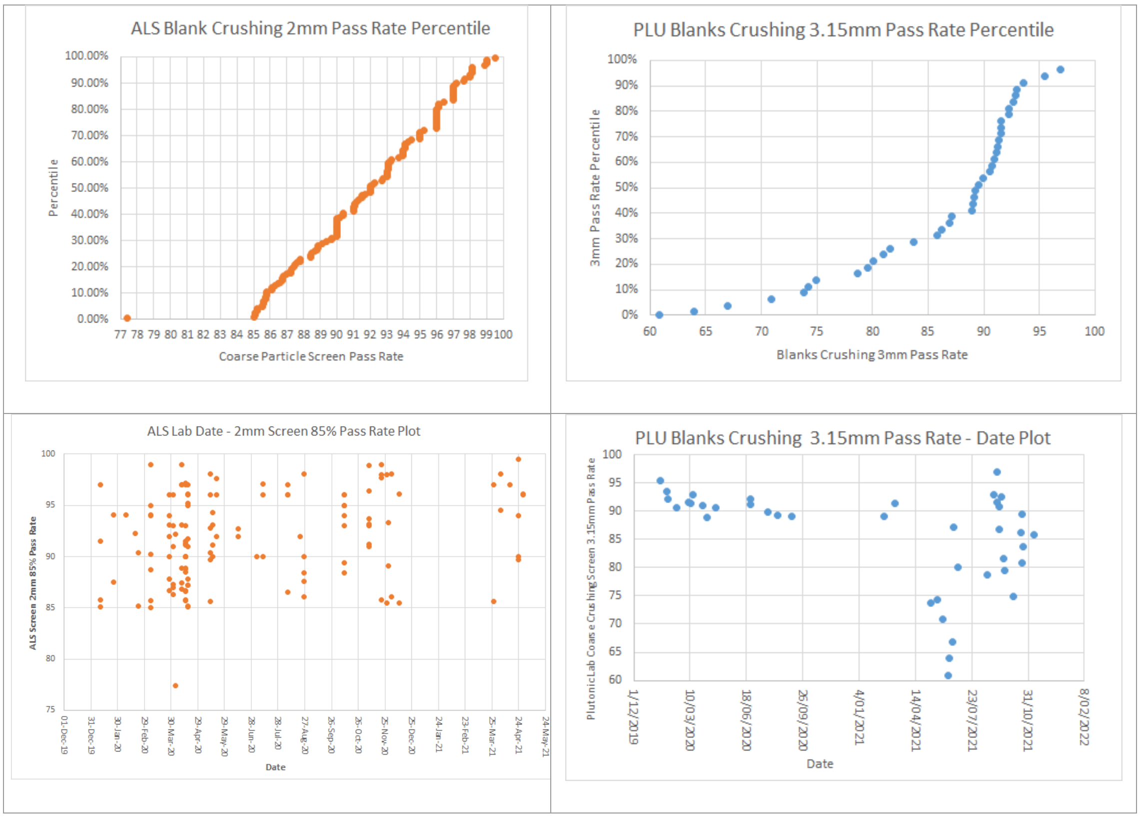
11.4.4.8 Sizing Analysis

137 Coarse crushing sample sizing data were collected for ALS lab, and 40 samples were collected for PLU lab.

ALS used a 2 mm sieve while Plutonic sieve size is 3.15 mm.

ALS lab showed a consistent screen size pass rate, PLU lab performed significantly worse in the later half year of 2021 when possible labour shortages were experienced (Figure 11-11).

Figure 11-11 Crushing Size Analysis



The finer crushing size in ALS lab with a larger Au assay dispersion contrasts prominently with a coarser crushing size and smaller dispersion in Plutonic site lab, and the better precision of the CRM assays by the ALS lab than the CRM manufacturer seems to stand out against Plutonic site lab where the sieve size (3.15 mm) is coarser and there are fewer samples with higher errors. A lab auditing is required on ALS lab if significant number of sample samples shall be processed by the lab in future.

11.4.4.9 QAQC Conclusions

- Both ALS and PLU labs performed well on precision and accuracy with ALS lab slightly better precision. Both lab's assays are adequate for underground mining operation;
- Relatively large errors in samples below 0.8 g/t range may cause some misclassification of waste as low grade ore in open pit operation;
- Coarse duplicates revealed relative errors at 20% for samples with Au >7 g/t and 30% relative errors for samples with Au between 3 and 7 g/t;
- 50% of the errors of the coarse duplicates may have been caused by nugget effects;
- Contamination, other lab procedure breaches and human errors may have contributed other half of the errors in coarse duplicates;
- At the Plutonic Lab:
  - some low level contamination at crushing stage, which could have caused assay discrepancies for low grade materials, were experienced;
  - some minor procedural non-compliance at crushing, pulverising, and instrument assaying stage during a lab audit are being addressed, (Z. H. Zhu, November 1, 2021);
  - periodic increased assaying uncertainty may be caused by possible human errors;
  - the extent of the lab contamination is unknown given the random nature of the blank insertion; and
  - blanks Au upper limit of 0.2 g/t seems too high and hinders detection of contamination.

- At ALS Lab:
  - there was insignificant contamination at the lab during the period;

- the lab seemed to have performed consistently well; and
- lab precision test on standards indicated a better performance than SRM manufacturer. Instrument repeats however demonstrated that at least part of the grade intervals showed a significant worse performance compared to the similar grade SRM assays, the cause of this is to be investigated and resolved.

11.4.4.9.1. QAQC Recommendations

- Review the relevant SOP's for geology department to insert blanks immediately after the logged/interpreted mineralisation intervals;
- Enhance geology department internal QAQC process by regularly testing duplicate assays, sizing analyses;
- Frequent Lab audits by the geology department to be conducted periodically, at minimum 6 month intervals;
- Lab procedure Compliance to be routinely measured;
- Blanks Au upper limit to be adjusted to 0.1 g/t to identify possible contaminations in the early stages;
- Review lab procedure to change crushing size from 3.15 - 2 mm to reduce nugget effects if possible. Tests to be conducted as this may impact lab throughput; and
- Lab instrument repeats are required from the Plutonic Lab to detect errors at the assaying stage.

12 Data Verification

12.1 Sample tracking

The Plutonic Lab operates an automated sample tracking system, LABMAN. LABMAN organises the samples into batches and samples are tracked based on batch number until the prill is created. Prills are tracked according to their numerical order from the batch print out, which is directly proportionate to the test tube rack layout. The AAS machine was connected to the LABMAN network with assay values either being entered automatically or manually (manual operation is the more common method used as multiple readings are taken until the operator is satisfied with a constant result). Upon completion, the data is exported in a .csv format to the Database Administrators (DBAs).

The sampling and assay process flow at the Plutonic Lab is as follows:

- An electronic requirements request file (sample sheet, despatch repot etc.) will automatically send to the Plutonic Lab.
- The Plutonic Lab will process the samples and store the results in a specific data directory.
- The AcQuire database system checks for assay results in the specified data directory and then imports them automatically into an appropriate series of temporary tables prior to checking and before it can be used in the various mining software systems as may be required.
- The Acquire import system process will generate the report declaring whether or not, the import process as successful.
- If the process has failed or contains errors, the Database Administrator (BDA) DBA will review and address observed problems and correct where necessary before the data loading process is run again.

For the ALS Lab data, the process flow is similar to that outlined above except the digital assay result files will be sent by secure email.

Upon receiving the digital file for the assay data, the DBAs import the file into a master AcQuire database. This data is not accessible for assessment until it is validated as complete and correct by the QA/QC Geologist and DBAs.

There are validation systems built into AcQuire to check Collar, Survey, Assay, Geology which are run as well as the validation processes also subsequently run in Vulcan and Leapfrog as necessary.

Face data is received in a similar format and is entered and validated for use also in the master AcQuire database.

12.2 Data verification

The Plutonic Mineral Resource database is regularly validated by Billabong staff using data validation modules of Vulcan, Leapfrog and AcQuire software programs to identify any inconsistencies or logical errors in the data. Mine staff also visually check the drill hole data on-screen on a regular basis.

Surface and underground drill hole and face data is validated to produce a digital database free of detected errors. This is undertaken by passing data through embedded macros and queries of the drill hole database software by table (collar, assay, lithology, survey, and grout).

Crosschecks are also undertaken to ensure that each drill hole has data from collar, assays, lithology, survey, and grout files. By undertaking the above procedures, all drill hole and face data is rigorously checked, verified, and corrected where necessary to ensure limited failures. Current data validation revealed some minor errors in the old data including wrong surface collar elevations due to lack of elevation surveys for some historical surface holes, assay code interpretation difficulties caused by lack of assay code records, hole type errors caused by lack of unique hole type fields common with old historical data sets when compiled into modern evolved databases like AcQuire. Such deficiencies were corrected during data validation process. It is the opinion of the Qualified Person that the corrected data used in the current resource modelling is adequate with further future improvements to validation processes forming part of continuous improvement projects, especially for the old historical datasets.

12.3 Previous data verification reviews

A previous review by Roscoe Postle and Associates (RPA) in 2012 concluded that the data verification systems were adequate for Mineral Resource estimation. Previous estimation process review by Optiro (2015) identified that reduced manning levels were having an impact on the quantity and quality of the data being generated in 2015, however, overall, the data collection systems which support the Mineral Resource estimation process were found to be best practice.

Data capture, entry and validation practices were reviewed and reported in Billabong's first NI 43-101 technical report with an effective date of September 30, 2016 pursuant to which the Qualified Person at the time was of the opinion that the data verification systems were adequate for Mineral Resource estimation.

12.4 Database Validation

AcQuire is the primary database. All drill hole and face sample information is obtained from this database.

Unless quoted source is indicated, otherwise, Section 12 is excerpted from Zhu, Z. H, (December 10, 2021).

Initial data is obtained from the Diamond Drill Hole Instruction of the planned program. Additional information is added to the database as the drill core is logged, sampled, and assays returned. Diamond drill programs are later validated to eliminate the risk of data errors. Once validated, AcQuire data is exported into Vulcan for 3D viewing and subsequent estimation.

Face data was stored in a Microsoft Access based program used prior to the introduction of Mine Mapper 3D and the Fusion Database. All information for this database was manually input from hardcopy face sheets that were produced underground. Assay values were exported from here to a corresponding digitised line within Vulcan.

From 2009 until August 2014 a Fusion™ Database was used for consolidation of underground face mapping and face sampling data. All maps created on tablets underground or in the office are loaded into the Central Fusion Database. This Database can export assay files that are dumped into Vulcan. Face positioning is conducted manually from digitised reference points in Vulcan. Since August 2014, all face mapping is hand sketched prior to scanning and loading to the Mining software systems as necessary.

Assay data is uploaded directly from laboratory electronic files to avoid manual data entry errors. Gold assays below the detection limit are assigned 0.005 g/t Au. Where the samples have been lost, not assayed, or insufficient sample was available for assaying, the Au assay is set to one of a series of negative value that indicates why the assay was not generated.

Current database review indicates that errors identified in previous reviews still exist, it is uncertain if such errors are caused by the negligence of not updating the database, or misplacement of the corrected data.

It was concluded that

- Incomplete / incorrect hole type values have been reassigned with sufficient evidence;
- The prefix of UDD series of holes can be used to accurately represent DDH hole type in estimation;
- Exclusion of samples with 0 and -0.01 gold values may cause over-estimation of the gold values; Validation in place to ensure this is appropriately tracked in all current and future drilling/sampling/assaying;
- Exclusion of samples with gold values <=-1 is considered appropriate;
- Samples with zero and negative values, and samples associated with holes with missing azimuth, dip and maximum depths are distributed randomly, and therefore there is no systematic bias in excluding such samples.

It was recommended that Au =0 and Au = -0.01 be assigned 0 in grade control modelling process to minimize the risk of overestimation. Because of the evolving nature of the standard procedures, earlier models excluded such values while later stage models included such values.

12.4.1 Data Acquisition and Validation

Due to acQuire database deficiencies, full dataset cannot be exported as required. Underground and surface holes had to be exported independently, and then combined and imported into an Access database. Only drill holes up to October 31, 2021 were included in this resource report.

Validation was conducted on all drill holes, no date differentiation was applied.

Drill hole type validation covers the entire current active Plutonic Gold Mine area within coordinate limits below as per Table 12-1.

Table 12-1 Drill Data Coverage

Drill Data Coverage					
East Min	East Max	North Min	North Max	RL Min	RL Max
2550	7599.7	9040	14902.1	821.222	1600

12.4.2 Drill Hole Type Validation

The current review on drill hole type covers the entire database. The correction summary however, only covers the Plutonic Gold Mine area.

A review of hole types showed there were some inconsistencies in drill hole type records in acQuire database. Some rules were applied in the data extraction process to mitigate any potential negative impacts of the inconsistency and described below.

Hole type was essential in resource estimation as unqualified drill holes such as AC, RAB, blast and sludge holes shall not be used although they are used for domaining purposes.

Original hole_type records in acQuire were backed up in a newly created fields "hole_type_old".

"hole_type" field is used to record the currently assigned hole type values.

The following rules were used to determine hole types in "hole_type" field:

- Category 1 rules: hole ID prefix for specified areas based on historical records;
- Category 2 rules: "hole_type_old" values;
- Category 3 rules: "hole_type_old" is null, use values in core size, category, HOLETPE_F, HOLETPE, PROJECTCODE field values;
- Category 4 rules: other conditions

Hole type assignment summary is listed in Table 12-2.

Table 12-2 Statistics of Hole Type Value Changes

"hole_type" Values Assigned			
hole_type	Changed Holes	Total Holes	Change%
BLST	380431	390558	97.41%
DD	17	128	13.28%
DDH	17896	21359	83.79%
Face	113489	113490	100.00%
RC	2010	6929	29.01%
RCD	17	1062	1.60%
Sludge	300	4933	6.08%

12.2.2.1 Category 1 Rules

If the following conditions are met, hole_type values are set to "RC" as defined in Table 12-3.

Table 12-3 Field "hole_type" Value Assignment - Category 1 Rules

HOLEID	PROSPECT	Hole_type	Holes Assigned
TD%	MAIN PIT	RC	161
LA%	MAIN PIT	RC	1848
BH%	Trapper, Hawkeye, Hermes South	RC	84
RCC%		AUG	54

Data source: M Sebbag, M Fallon, T Taimre, and M Woods, 2007, N:\Mining\Surface_Mining\Plutonic Projects\00_Caspian_MainPit\DATA_for_VISITORS\2007_Open Pit Redevelopment Project Study.doc

12.2.2.2 Category 2 Rules

If "hole_type_old" equals to the values listed below, "hole_type" values are assigned as in column "hole_type" and defined in Table 12-4.

Table 12-4 Field "hole_type" Value Assignment - Category 2 Rules

hole_type_old	hole_type	comment
AR	AR	(AR) Auger rig - core
AUG	AUG	auger
BLST	BLST	blast hole
DD	DD	surface diamond hole
DDH	DDH	UG diamond hole
DW	DW	unknown
GT	GT	geotechnical diamond hole
LTK60	DD or DDH	Surface Diamond hole DD, underground diamond hole DDH
NQ	DD or DDH	Surface Diamond hole DD, underground diamond hole DDH
NQ2	DDH	underground diamond hole DDH
RAB	RAB	RAB
RB	RB	RAB holes
RC	RC	RC
RCD	RCD	(RCD) RC pre-collar with diamond tail
RCP	RCP	percussion hole
REG	REG	Unknown hole type
SD	DDH	sonic diamond drilling
Sludge	Sludge	sludge
WB	WB	water bore

The corresponding "hole_type_old" values against the newly assigned "hole_type" values.

12.2.2.3 Category 3 Rules

If "hole_type_old" fields contain null values, and if the value of the field listed in "Field in Collar table" equals to the value in column "condition", then assign the value to "hole_type" field as defined in Table 12-5.

Table 12-5 Field "hole_type" Value Assignment - Category 3 Rules

Field in Collar table	condition	hole_type	comments
HoleID	Like %UDD%	DDH	

core_size	BTW	DDH	diamond hole, 48.5mm core size
core_size	LTK48	DD /DDH	diamond hole
core_size	LTK60	DD / DDH	diamond hole
core_size	HQ	DD	diamond hole
core_size	NQ	DD / DDH	diamond hole, surface.
core_size	PQ	DD	diamond hole
core_size	BQ	DD / DDH	diamond hole
core_size	NQ2	DD / DDH	diamond hole, UG
PROJECTCODE	Mhd	Face	
PROJECTCODE	Fhd	Face	
PROJECTCODE	Face	Face	
HOLETYPE	Face	Face	
category	WB	WB	
HOLETYPE_F	FACE	Face	

Note that hole_type values for holes with null "hole_type_old" values are assigned the above values.

12.2.2.4 Category 4 Rules

If the above rules are applied, and the fields are still blank, follow the following rules:

- PSU Hole type assignment rules
  - BLST: PROJECTCODE = PSU AND DEPTH <= 16M
  - UNKN: PROJECTCODE = PSU AND DEPTH > 16M
- Any hole
  - FACE: PROJECTCODE = FACE, OR fhd OR mhd
  - RC: PROJECTCODE = MaryExpRC
  - UNKN: PROJECTCODE = YSS
- UDD series of holes
  - DD: HoleID prefix = UDD, core_size not null, collar on surface;
  - DDH: HoleID prefix = UDD, core_size not null, collar in UG drives;
  - UNKN: HoleID prefix = UDD, core_size is null;
- PRGC series of holes
  - RC: PROJECT CODE = Plu_GC, and hole ID prefix = PRGC;
  - UNKN: PROJECT CODE = Plu_GC, and hole ID prefix = PRT;
- ALL other holes
  - UNKN: Anything not comply with above rules

Underground diamond drill holes at Plutonic follow strict naming convention (Geology Department, Plutonic Gold Mine, Superior, 11 Aug, 2020), as such UDD, USD series of holes can be used to accurately assign hole_type values.

12.2.2.5 Other Drill Holes

RC holes: Holes with the following conditions:

- Prospect = Wilgeena;
- hole_type_old = null;
- HOLEID prefix = "WR0"

Evidence: Other RC holes in WR series in the same area contained same accuracy "NM", same sample type, same sample intervals. All RAB holes in the area are named with prefix "WRAB" or "WRB". Therefore it is highly likely that all WR0% holes are RC holes.

Other near surface holes inside the open pit with unknown hole types that are shallower than 16 m are assigned as blast holes. This may cause some RC holes being incorrectly assigned as blast holes, however, it is considered insignificant to the estimation given that the areas have been mined out, and only the samples near the pit edge may be impacted.

Table 12-6 "hole_type_old" Field Value Meanings

NAME	Lookup	Comment
hole_type_old	AR	(AR) Auger rig - core
hole_type_old	AUG	auger
hole_type_old	BLST	blast hole
hole_type_old	DD	surface diamond hole
hole_type_old	DDH	UG diamond hole
hole_type_old	DW	Unknown, seems differing types of holes. Located in A4 – Trout only.
hole_type_old	GT	geotechnical diamond hole
hole_type_old	LTK60	Diamond
hole_type_old	NQ	Diamond
hole_type_old	NQ2	Diamond
hole_type_old	RAB	RAB
hole_type_old	RB	RAB
hole_type_old	RC	RC holes
hole_type_old	RCD	(RCD) RC pre-collar with diamond tail
hole_type_old	RCP	percussion hole
hole_type_old	REG	Unknown. 1980 holes, seems to be RAB holes at Marymia, Flyfish. Prefix PBP.
hole_type_old	SD	sonic diamond drilling
hole_type_old	Sludge	sludge
hole_type_old	WB	water bore

12.5 Drill Hole Survey Validation

The following errors were identified, and excluded for any use:

- Missing downhole azimuth values;
- Missing downhole dip values;
- Missing maximum depth

Drill holes with missing azimuth and / or dip values are caused by acQuire data export process. It only affects Leapfrog data, however not on Vulcan data export because different queries were used. Because of the time constraint, correction of the acQuire errors were not carried out at the time of the data export. Correction plan is in place to rectify the errors in future data export.

The number of holes with missing downhole survey data are summarised in table Table 12-7.

Table 12-7 Number of Holes with Missing Azimuth and Dip

HoleType	DH Survey Missing
DDH	126
Face	174

35 drill holes did not have maximum depths recorded, and all of them are face channels. Leapfrog software ignores samples from drill-holes without maximum depths. This is regarded as insignificant for the update of this global Mineral Resource and Reserve estimate.

12.6 Assay Validation

12.6.1 Assay Validation Statistics

There exists a large number of negative assays in the exported dataset for Leapfrog modelling.

Identified codes are listed in Table 12-8. The data only covers the Plutonic gold mine area and does not include any other area such as Area 4, Perch, Hermes, and Hermes South.

Table 12-8 Assay Code Summary

Assay Codes obtained from acQuire (All data)

Assay Codes	Meaning	Value in DB	Lab Code	Guessed meaning	Other Lab Code
0.005	below detection	0.005	X	below detection	<0.01(IS)
0	unknown	0	unknown	unknown	
-0.001	unknown	-0.001	unknown	unknown	
-0.002	unknown	-0.002	unknown	unknown	
-0.004	unknown	-0.004	unknown	unknown	
-0.005	unknown	-0.005	unknown	unknown	
-0.01	unknown	-0.01	unknown	unknown	
-0.02	unknown	-0.02	unknown	unknown	
-0.1	unknown	-0.1	unknown	unknown	
-1	unknown	-1	unknown	unknown	
-2	No sample	-2	NS	No sample	
-3	unknown	-3	unknown	unknown	
-5	Not received	-5	(NR)	Not received	SNR
-6	insufficient sample	-6	I.S.	Insufficient sample	
-8	Lost in process	-8	unknown	sample lost	
-9	unknown	-9	unknown	unknown	
-10	sample lost in process	-10	L.I.P.	Lost in process	LIP
-14	unknown		unknown	unknown	
-15	unknown	-15	unknown	unknown	
-20	unknown	-20	unknown	unknown	
-70	unknown		unknown	unknown	
-90	unknown	-90	unknown	unknown	
-91	unknown	-91	unknown	unknown	
-92	unknown	-92	unknown	unknown	
-93	unknown		unknown	unknown	
-94	unknown	-94	unknown	unknown	
-95	unknown		unknown	unknown	
-99	Not received	-99	D.I.P.	sample lost	
-5557	unknown		unknown	unknown	
-5558	unknown		unknown	unknown	

Samples with Au <=0 are summarized in Table 12-9.

Table 12-9 Number of Samples with Au <=0

Assay Codes	AR	BLST	Sludge	RCP	RAB	Face	DD	DDH	GT	RC	RCD
0	0	55602	2030	141	0	1328	0	36776	0	310	400
-0.01	0	154	0	0	0	0	0	27	0	0	0
-0.02	0	79	0	0	0	0	0	0	0	0	0
-1	0	144	0	0	0	0	0	16649	0	10	0
-2	29	3	0	2	6	11398	286	8133	3	311	600
-3	0	0	0	0	0	0	0	0	0	9	1
-5	0	0	0	0	0	14	0	120	0	10	0
-6	0	0	0	0	0	1	1	24	0	0	0
-8	0	52	0	0	0	0	0	10	0	0	0
-9	0	0	544	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	300	6	3	4
-14	0	645	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	1	0
-20	0	0	1	0	0	0	0	0	0	0	0
-91	0	0	0	0	4	0	77	0	0	272	1666
-92	0	0	0	0	0	0	0	0	0	4	0
-95	0	0	0	0	0	0	0	0	0	1	0
-99	0	0	1761	1	0	0	0	538	1	2	0

All known negative values at -1 or below represent no assaying due to lack of samples.

The meaning of the codes 0 and -0.1 is uncertain.

Au=0 meaning is confusing. It may contain both samples with Au < detection limit and samples that were not assayed but considered to be waste by the logging geologists.

Au=0.005: in general, it represents value below detection limit. In at least once incident, it was recorded as representing insufficient sample. However, it was unable to substantiate if this is an isolated mistake or a genuine code from historical records. Such values are considered representing values below detection limit.

It was therefore decided that all samples with assay values <0 are excluded from estimation to mitigate a possible impact to estimation.

To avoid over-estimation, samples with Au=0 were retained, some unknown number of models generated during the early stage of resource estimation however did exclude such samples, posing some potential risk of over-estimating grades if such samples were indeed below detection limit. This is not regarded as a material risk to the business and is addressed in all subsequent Grade Control models being run with additional data and or prior to mine development and stoping.

12.6.2 Invalid Sample Distribution

Samples from invalid drill holes with missing azimuth, dip or maximum depths and samples with Au <=0 from all valid validated drill holes are combined called "invalid samples", and are summarized in Table 12-10, and Table 12-11.

Table 12-10 Assay Codes

Assay Codes Summary for Plutonic Gold Mine

Assay codes	counts	ResInvalid	ResValid	LF Use
0	96587	57773	38814	exclude
-0.01	181	154	27	exclude
-0.02	79	79	0	exclude
-1	16803	144	16659	exclude
-10	313	40	20731	exclude
-14	645	0	10	exclude
-15	1	0	144	exclude
-2	20771	0	26	exclude
-20	1	52	10	exclude
-3	10	544	0	exclude
-5	144	0	313	exclude
-6	26	645	0	exclude
-8	62	0	1	exclude
-9	544	1	0	exclude
-91	2019	4	2015	exclude
-92	4	0	4	exclude
-95	1	0	1	exclude
-99	2303	1762	541	exclude

Table 12-11 Samples

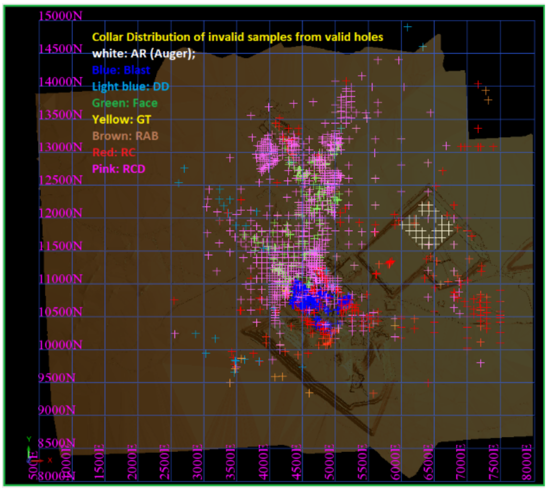
All samples included

hole_type	Total Samples	Invalid Samples	Invalid Sample%	Valid Samples	Samples%
AR	29	29	100.00%	0	0.00%
BLST	1179948	56679	4.80%	1123269	95.20%
RAB	4596	10	0.22%	4586	99.78%
RCP	436	142	32.57%	294	67.43%
Sludge	73284	4336	5.92%	68948	94.08%
DD	20377	244	1.20%	20133	98.80%
DDH	1422560	54530	3.83%	1368030	96.17%
Face	361631	1361	0.38%	360270	99.62%
GT	4834	7	0.14%	4827	99.86%
RC	299896	927	0.31%	298969	99.69%
RCD	218225	2654	1.22%	215571	98.78%
Total	3585816	120919	3.37%	3464897	96.63%

invalid sample means that Au <=0. Valid samples excluding invalid samples and all samples without maximum depth records.

The spatial distribution of the invalid samples are shown in Figure 12-1.

Figure 12-1 Invalid Sample Distribution at Plutonic



There are 3.8% underground DDH samples with Au=0, but only 0.38% face samples with Au=0. Other samples are considered insignificant to the underground resource models given the samples are predominantly blast hole samples. The invalid sample distribution is also similar to the drill hole distribution, there is no disproportional clustering of such samples. It is therefore suggested the influence on the estimation may be limited on a global scale. It is however uncertain of the influence on a local scale.

12.6.3 Drill Hole Statistics

Drill holes used for Plutonic Gold Mine are summarized as in Table 12-12.

Table 12-12 Drill Hole Type Statistics

hole_type	Total Holes	Total Meters	hole_type	Valid Holes	Valid Hole Meters	Difference	ResValid
AR	29	260.85	AR	29	260.85	0.00%	ResInvalid
BLST	390558	2153989	BLST	390558	2153989	0.00%	ResInvalid
DD	128	80844.59	DD	128	80844.59	0.00%	ResValid
DDH	21359	1570968.13	DDH	21347	1570207.66	-0.06%	ResValid
Face	113490	371696.33	Face	113281	371008.6	-0.18%	ResValid
GT	36	4062.92	GT	36	4062.92	0.00%	ResValid
RAB	597	16521	RAB	597	16521	0.00%	ResInvalid
RC	6929	340153.13	RC	6929	340153.13	0.00%	ResValid
RCD	1062	407869.35	RCD	1062	407869.35	0.00%	ResValid
RCP	5	587.94	RCP	5	587.94	0.00%	ResInvalid
Sludge	4933	86775.61	Sludge	4933	86775.61	0.00%	ResInvalid
Total	539126	5033728.85	Total	538905	5032280.65	-0.04%	

Data Source:
N:\Geology\20.1_R_R\33_ResourceReports\2021\20211231 Report Supporting Documents\acQuire LF Data export 20211031\Plutonic

ResInvalid: type of drill holes that *have passed sample validation, but are only* used to create geological domains, and not for estimating grades;

ResValid: type of drill holes that are validated and used for both creating geological domains and estimating grades.

Number of drill-holes used for geological domaining and grade estimation are summarised in Table 12-13.

Table 12-13 Summary of Drill Holes Used in Mineral Resource Report 2022

Summary	Total Holes	Total Meters	Valid Holes	Valid Hole Meters
ResValid	143004	2775594.45	142783	2774146.25
ResInvalid	396122	2258134.4	396122	2258134.4

13 Mineral processing and metallurgical testing

Plutonic has been in operation since August 1990 and is well understood. Various test work programs dating back into the 1990s has been used to understand potential impacts during crushing and milling as new ore sources come on line. As new areas are identified, testing is conducted to assess whether the metallurgical response will vary significantly for the anticipated responses. During 2009, ore characterisation, classification, and recovery test work was conducted on ore from five underground zones (Dilworth, 2010) and in 2016 test work was completed on Hermes in preparation for a new mine and ore source.

Mineral processing is covered in detail in Section 16.

During 2019 metallurgical testing was also carried out for the Hermes South (Wilgeena) project.

Mill recovery and metallurgical characters of the ore material remain unchanged during the period between December 31, 2019 and December 31, 2021. For further information and discussion on mill recovery and metallurgical characters of the ore material, please see the previous technical report dated December 30, 2020, available on Superior's SEDAR page at www.sedar.com.

14 Mineral Resource Estimates and Estimation Methodology

14.1 Summary

Mineral Resources as at December 31, 2021 are summarised in Table 13-1.

Table 14-1 Summary of Mineral Resources as at December 31 2021

Category	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnes (000's)	Gold grade (Au g/t)	Cont. gold (koz)	Tonnes (000's)	Gold grade (Au g/t)	Cont. gold (koz)	Tonnes (000's)	Gold grade (Au g/t)	Cont. gold (koz)	Tonnes (000's)	Gold grade (Au g/t)	Cont. gold (koz)
Underground												
Plutonic Main	4,567	4.8	705	4,294	4.4	610	8,860	4.6	1,315	16,810	5.2	2,830
Plutonic East	112	6.4	23	180	5.1	30	292	5.6	53	3,626	4.0	469
Plutonic West	-	-	-	-	-	-	-	-	-	393	2.8	35
All Underground Sub-total	**4,679**	**4.8**	**728**	**4,473**	**4.4**	**640**	**9,152**	**4.6**	**1,368**	**20,829**	**5.0**	**3,334**
Hermes Open Pit Complex												
Hermes	-	-	-	1,990	1.4	87	1,990	1.4	87	3,868	1.3	156
Hermes South (80% JV)	-	-	-	698	1.6	36	698	1.6	36	198	1.1	7
Plutonic Open Pit Areas												
Area 4	36	0.8	1	-	-	-	36	0.8	1	-	-	-
Perch	40	1.4	2	4	1.0	0.1	44	1.4	2	-	-	-
Plutonic Main Pit	1,575	3.7	187	3,718	2.0	243	5,293	2.5	430	7,408	2.0	476
All Open Pit Sub-total	**1,652**	**3.6**	**190**	**6,410**	**1.8**	**366**	**8,062**	**2.1**	**556**	**11,476**	**1.7**	**639**
Total	**6,331**	**4.5**	**918**	**10,884**	**2.9**	**1,005**	**17,214**	**3.5**	**1,924**	**32,304**	**3.8**	**3,973**

Notes:

1. Mineral Resources are quoted inclusive of those Mineral Resources converted to Mineral Reserves. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
2. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages. Numbers may not add correctly due to rounding errors.
3. 'Plutonic Underground Resources based on Deswik Mining Stope Optimizations ("DSO") using generalized Reserve DSO input parameters and / or restricted 'grade shell' reported Resources. Open Pit Resources based on simplified pit optimization parameters.
4. Mineral Resources are estimated using an average gold price of A$2,150 per troy ounce ($1,612 per ounce)
5. Mineral Resources are estimated at a cut-off grade of 1.7 g/t Au for the Plutonic Underground Gold Mine.
6. Mineral Resources are estimated at a cut-off grade of 0.40 g/t Au for Open Pits.

14.2 Introduction

In 2021 Superior commenced a large program to revamp Mineral Resource estimates for the Plutonic Gold Mine. Historically, mineral resource modelling was based on manual wireframing to create mineralisation envelopes, ID2 estimation was used with static search parameters, automatic resource classification. Such a process was found heavily biased by individual understanding of the mineralisation controls, resource classification deficiency was found to cause misallocation of the material categories, and the process constantly became a bottleneck for mine production. In particular, grade control model estimates vary vastly from resource models with more than 90% ore materials mined outside reserve designs in the previous 4 years.

To overcome human bias on mineralisation wireframing, remove the production bottleneck, and improve long term and short-term planning accuracy and efficiency, an automated resource modelling process was developed and tested during the period March 2021 to June 2021. The system and software Leapfrog was adopted in July 2021. More than 250 block models were generated between July 2021 and October 2021. Subsequent changes were introduced, and large number of models were re-run to create consistent block models for the entire mine between November 2021 and January 2022. The block models generated form the basis for the current Mineral Resource and Reserve report.

The new automated modelling process for vein type gold deposits is directed towards standardizing all current and future Mineral Resource estimation processes for all deposit areas within the project. A regular Mineral Resource update program is intended to enable Superior to focus on the critical short-term planning aspects of mining operations as well assess other long term mine planning objectives and thereby move towards an efficient and more profitable operation.

When comparing Mineral Resources estimation in December 2019 to the new estimates in December 2021, the major change has been the implementation of a standardized automated 'wire-frame constrained' Mineral Resource block models which take advantage of the vast number of structural measurements previously ignored in manually generated wireframes used in long and short term operations planning. This automated process means that modelling is now strictly guided by the available data like structural measurements, and restricted to similar grade wireframes, lithology, and fault boundaries.

DSO shapes were generated for mineral resource reporting using the assumptions discussed in Section 15 Mineral Reserve estimates, except gold price adjusted to A$2150. Mineralisation at a gold grade of >=1.66 g/t Au was used for reporting Measured / Indicated categories inside DSO shapes.

Grade shells with a gold grade of 1.5 g/t cut off were generated using the block models. Inferred category of materials within the DSOs, and all materials of Inferred or better categories at 1.66 g/t Au cut-off within the grade shells but outside the DSOs were combined and reported as Inferred Mineral Resources.

The major change has been the use of 5x5 m minimum undiluted SMU stope size for part of the areas compared with December 2019 model which universally used 10x15 m DSO size.

Table 14-2 UG DSO Size

Area	DSO Size
Timor	10x15
Caspian	5x5
Caribbean	5x5
Baltic	10x5
A134	10x15
Indian	10x15
Cortez	5x5
Pacific	5x5
Plutonic East	5x5
Plutonic West	5x5

Open pit Mineral Resources were constrained to in pit designs with varying gold prices. A 0.44 g/t Au cut-off grade, estimated from gold metal price at A$2,150 per ounce, was applied to pits within 40km radius of the mill, while December 2019 open pit Mineral Resources used cut-off grade of 0.4 g/t Au for all pits.

Table 14-3 Open Pit - Pit Design and Resource Cut-off Parameters

Pits	Cut off	Pit design A$
Caspian	0.68	$2,150
A4	0.44	$2,350
Perch A	0.44	$2,500
Perch B	0.44	$2,500
Hermes	0.4	$2,150
Hermes South (Wilgeena)	0.4	$2,150

Mineral Resource classification was based on spatial sample distribution within the broader mineralisation trend (for further discussion please refer to Section 14.8 Mineral Resource Classification).

Modelling and Estimation were conducted using a newly developed automated modelling methodology which was proposed by Selingue K, endorsed by Du Plessis E, implemented by Zhu Z. H. and Spurling J. with the aid of the geologist team at Plutonic Gold Mine geology department and some external specialist consultants.

Unless the source is quoted, subsections up to 14.10 in this Section are excerpted from Zhu Z H, Du Plessis E, Selingue K, and Spurling J, January 20, 2022.

Superior is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other issues that could materially affect the Mineral Resource estimates.

14.3 Plutonic Underground Resource Model Process

To eliminate human bias in mineralisation trend definition, improve efficiency and remove the production bottleneck, an automated efficient, reliable estimation method was adopted. Leapfrog software was selected to meet the following requirements:

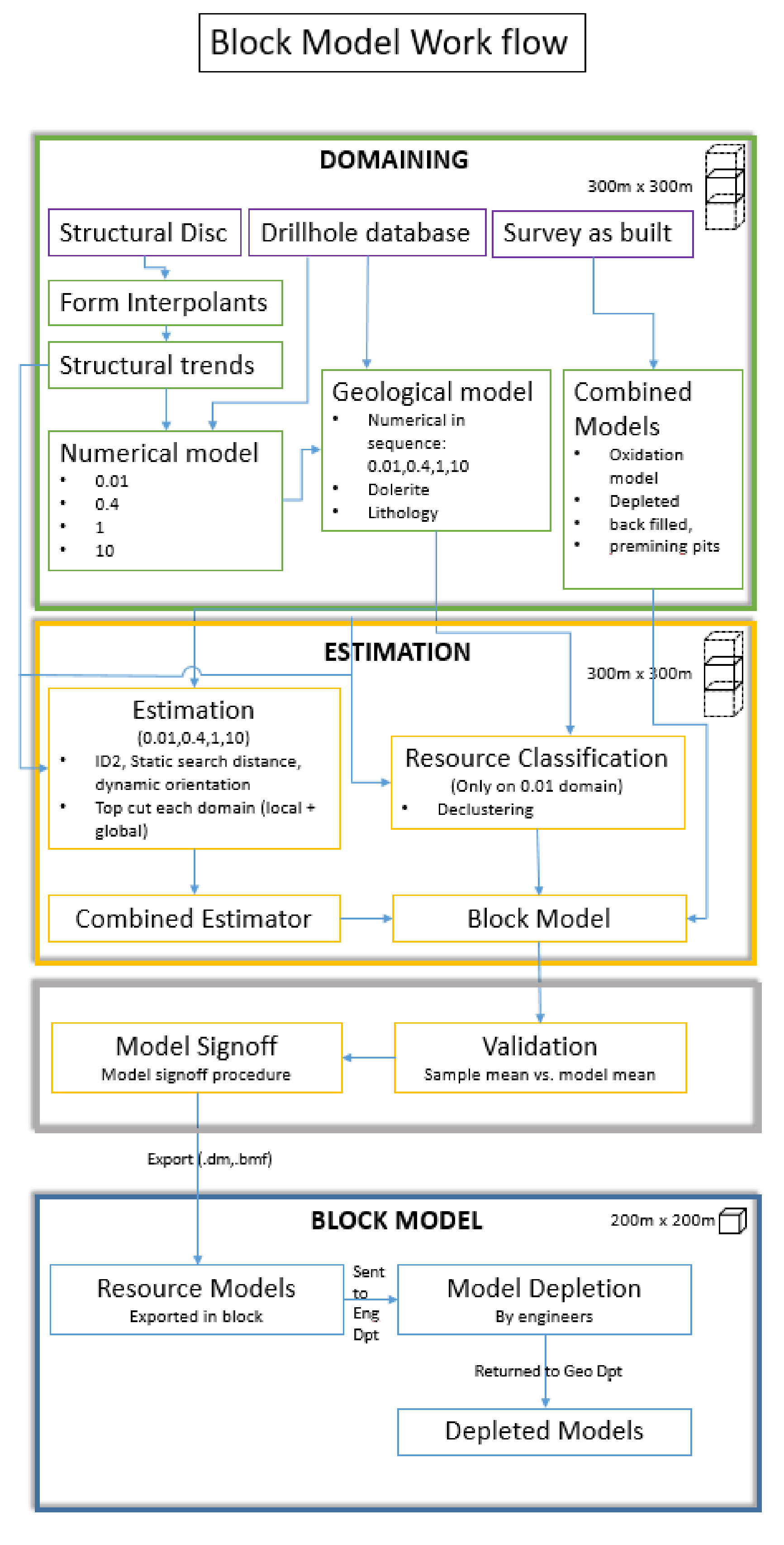
- Structural trends can be created dynamically using measured structural data in face mapping and oriented diamond drilling,
- Mineralisation envelops can be generated automatically based on different grade cut-offs following structural trends to simulate single population condition within similar geological settings, and
- Model updates can be carried out dynamically with progressive drilling within one day of the data being available.

14.3.1 Resource Modelling Work Flow

- The modelling process comprises 5 basic steps as depicted in Figure 13-1, namely:
- Building a Structural Trend
- Creating Domains
- Estimation;
- Validation
- Model Depletion

Figure 14-1 Block Model Work Flow

(drawn by Selingue K, May 2021)



14.3.2 Creating a Structural Trend

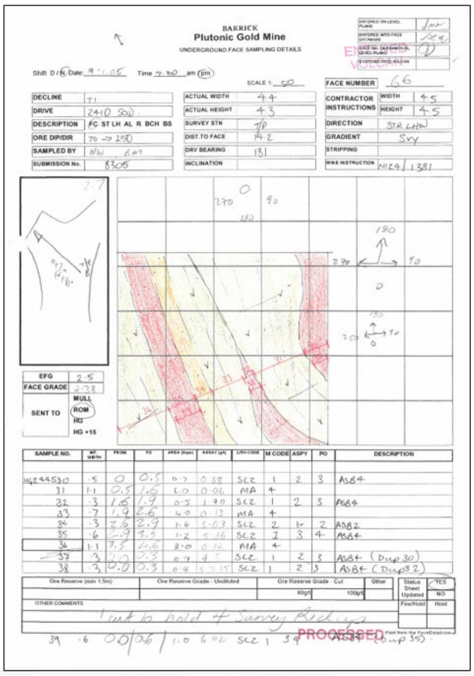
The dominant mineralisation at Plutonic Gold Mine is controlled largely by shearing / fracturing inside the mafic unit. Locally, quartz vein controlled mineralisation such as Bintang style mineralisation truncates the dominant bedding / foliation parallel mineralisation but is insignificant in the global sense of the Plutonic Resource. Both types of mineralisation are therefore considered independently with different structural trends.

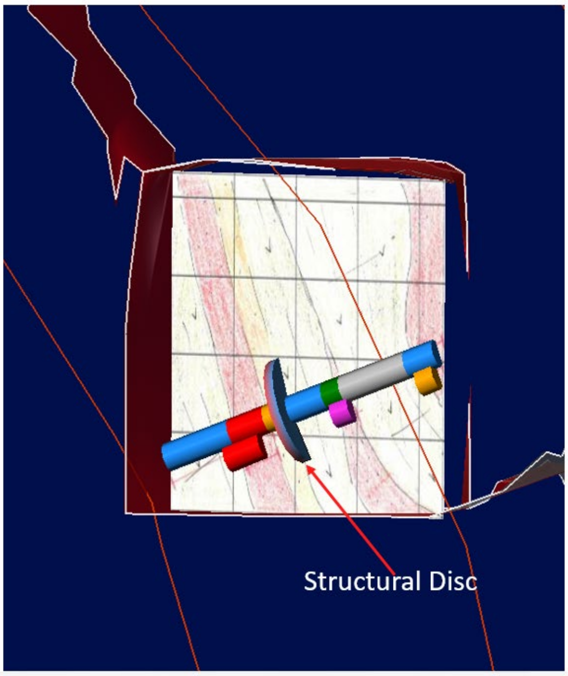
- Bedding and foliation measurements were collected, visually validated before being used for structural modelling;
- Structural trend surfaces were built using "Structural Modelling" function, and validated with face maps (see Figure 14-2).

Figure 14-2 Structural trend model

Structural trend modelled based on structural measurements matches structural measurements (J Spurling, etc, June 2021 [1])

- Face map cross section





- Quartz vein hosted Bintang style mineralisation was constrained inside quartz vein wireframes which were manually built using commonly used Leapfrog wireframing software.
- Quartz vein structural trends were built based on fault measurements.

14.3.3 Creating Mineralisation Domains

To simulate manual domaining and honour the assumption of single population, "Numerical Models" function was used to generate different numeric models or grade shells following the structural trend surfaces generated in the previous step.

To determine the optimal grade shells at different cut-offs so similar grade samples can be constrained in the same shell to mimic geological domaining, cut-off grades for grade shells were selected based on mining economics and grade continuity and sample coverage consideration.

Four grade shells were selected;

- Mining practice indicates that extreme grades at Au >= 10 g/t tend to have a very short influence range. Cut-offs higher than 10g/t tend to cause scarce samples being included. A 10 g/t cut-off was selected as a typical grade to represent this dataset after test works were performed;

- 1 g/t cut-off was selected to ensure that a 3D wireframe model close to the underground cut-off grade of 1.5 g/t does not exclude potential economic mineralization;
- 0.4 g/t cut-off was selected to suit open pit operation. For pits near the mill, 0.2 g/t rather than 0.4 g/t was selected to reflect the minimum economic block cut-off grade of 0.4g/t;
- 0.01 g/t was selected to cover the background values because the detection limit is 0.01 g/t. This is used to cover the background waste domain, and exclude any area outside the influence zone of the existing samples. A large number of zones with samples below detection may be excluded. Future revision may change such back ground values to 0 to constrain the estimation areas within the sample influence range. It is however considered insignificant at this stage given the fact that underground operation resource cut-off grade is >=1.5 g/t.

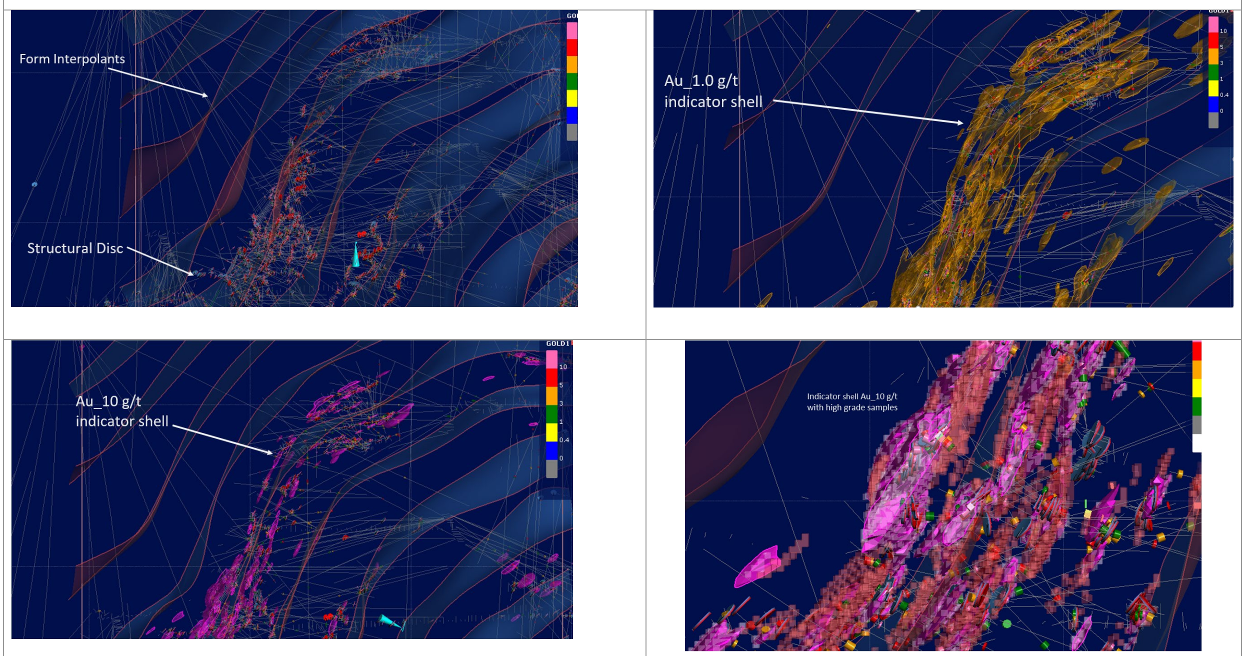
Only one grade shell at 1 g/t cut-off was created for Bintang mineralisation using fault structural trends, constrained inside the manually generated quartz wireframes.

14.3.3.1 Comparison with Conventional Wireframing

Auto wireframes performed remarkably well in defining the mineralisation trend; that is, the structural trends match structural measurements (see Figure 14-2), the grade shells match the structural trends (see Figure 14-3), and sample grade distribution (see Figure 14-3).

Figure 14-3 14F2 Block

Top left: structural trend matches structural discs; Top right: Au1 matches structural trend; Bottom left: Au10 matches structural trend; Bottom right: structural trend matches sample distribution trend, and Au10 grade shell matching high grade sample distribution.



Compared with conventional manual wireframing (see Figure 14-4), the current methodology produces a model honouring the geology trend (see Figure 14-2 and Figure 14-3) while manually created model truncates geology trend (see Figure 14-4 and Figure 14-5).

Figure 14-4 Manual wireframing for resource model

Manual wireframing (white colour) for resource model. Manual wireframing in cross section (Left) seems to perform reasonably well following the structural trend, on plan view however, it performs poorly, intersecting the structural trend (Right), development drive (under geology control) matches the Leapfrog structural trend (Right). Stope TI2411-NOD-P1 (J Spurling, etc, June 2021 [1])

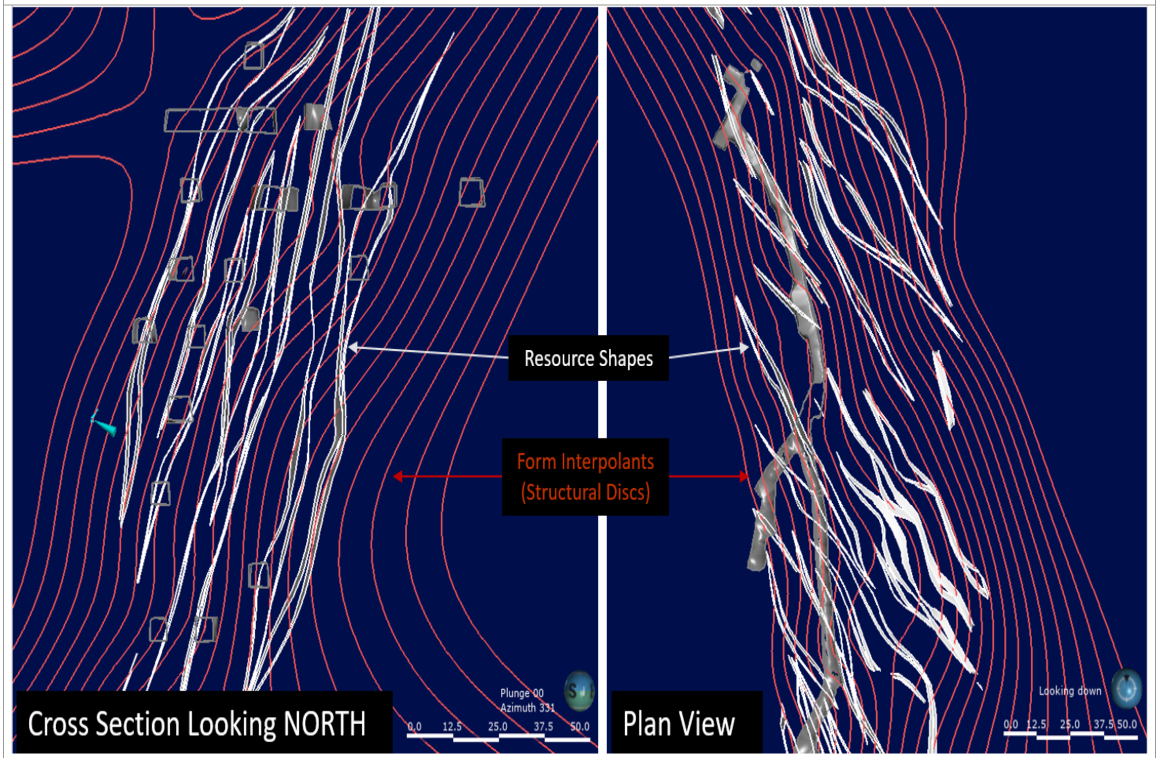
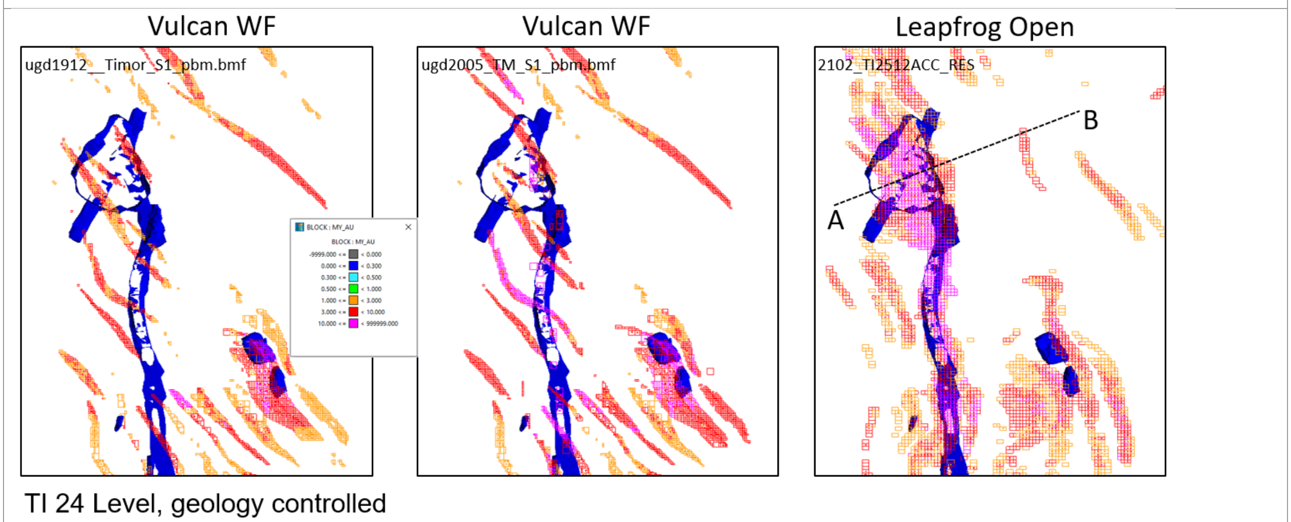


Figure 14-5 Leapfrog open block model using structural trends

Leapfrog open block model using structural trends to guide the dynamic ellipsoid direction. Blue – development drive under geology control; both left and centre are models using manual wireframing while right is Leapfrog open block model. The leapfrog relies on diamond holes only without face samples while manual wireframing relies on both types of samples. Manual wireframes crosscut the actual geology trend (J Spurling, etc, June 2021 [1]).



It seems that structural trends combined with grade shells performed significantly better than manual wireframing, and regardless of the methodology used - constrained or not, Leapfrog dynamic modelling process honours geological trend significantly better to manual wireframing.

14.3.3.2 Sensitivity Test on the Domains (Grade Shells)

To determine the influence of individual grade shells on the overall mineral resource estimation, individual grade shells were removed or added in to compare the combined influence.

It was found that the total tonnes and grade changed dramatically by the introduction of Au1 shell (1g/t grade shell) in Perch model and caused a significant reduction in volume and increase in grade. The removal of Au1 caused low grade material of 1.6m tonnes being pushed into higher grade across the entire grade range, thus artificially increased the ore material tonnage (see Table 14-4).

Table 14-4 Grade smearing and artificial increase in ore material tonnages

Decrease of number of grade shells causes grade smearing and artificially increases ore material tonnages.

grade range	With Au1 Au1 T V8	With Au1 Au 0.2 T V8	With Au1 sub Total T V8	Without Au1 Ton V1	T(V8)-T(V1) at grade interval	Au cutoff	TTon (V8)-TTon (V1)
0-0.1	0	76,186	76,186	7,754	68,432	0	64,320
0.1-0.2	446	1,626,147	1,626,594	96,820	1,529,774	0.1	-4,112
0.2-0.3	0	0	0	426,459	-426,459	0.2	-1,533,886
0.3-0.4	1,195	515,394	516,590	438,542	78,047	0.3	-1,107,426
0.4-0.5	0	0	0	440,495	-440,495	0.4	-1,185,474
0.5-0.6	8,179	339,018	347,198	318,030	29,167	0.5	-744,978
0.6-0.7	10,898	45,028	55,926	218,885	-162,958	0.6	-774,146
0.7-0.8	19,502	23,824	43,326	185,945	-142,618	0.7	-611,187
0.8-0.9	24,394	14,668	39,062	153,107	-114,046	0.8	-468,569
0.9-1	35,479	7,294	42,773	114,705	-71,932	0.9	-354,523
1-1.1	33,190	2,546	35,735	88,350	-52,614	1.0	-282,591
1.1-1.2	28,568	1,534	30,102	72,007	-41,906	1.1	-229,977
1.2-1.3	23,503	1,602	25,106	55,697	-30,591	1.2	-188,071
1.3-1.4	18,714	1,081	19,795	47,146	-27,350	1.3	-157,480
1.4-1.5	20,456	1,371	21,827	37,210	-15,382	1.4	-130,130
1.5-1.6	20,583	1,392	21,975	30,991	-9,016	1.5	-114,747
1.6-1.7	14,529	928	15,457	32,166	-16,710	1.6	-105,731
1.7-1.8	15,478	882	16,359	21,817	-5,458	1.7	-89,022

Similar effects were also identified on Au10 domain (10g/t grade shell). The relatively lower volume of Au10 domain however, means that it can cause significant grade variations at a stoping scale, but not on a global mine scale.

It was concluded that grade shells (domains) segregate grade zones effectively and reduce grade smearing from higher grade zones into lower grade zones.

Tests also found that overly high cut-off grade caused Au10 domain individual solids covering scarce samples, and that could lead to grade over-estimation at local scale. This is mitigated when the models are replaced by Grade Control models after additional drilling and/or development sampling.

Further test work have been implemented and introduced in the production process. These improvements will become part of the future resource updates but due to time constraints, not available for the current resource models.

14.3.4 Estimation Technique

To automate the entire estimation process, minimise human errors, and link resource classification with estimation quality, estimation parameters have to be static and therefore essential to determine the influence caused by the static estimation parameters.

Despite the remarkably well performed trend definition using Leapfrog auto-wireframing, grade estimations however vary significantly. Tests indicate that open block model performs significantly worse than auto-wireframe models.

14.3.4.1 Estimator Selection

Two popular methods were considered: ordinary kriging ("**OK**") versus ID2.

For grade estimation using kriging method, the conventional method of wireframing requires that

- the mean within the domain shall be constant;
- The variance within the domain with a fixed lag shall be constant;
- The variance is a monotonously incremental function of the lag distance (weak stationarity assumption)

Coombes J (2009) suggested that "any data analysis is to ensure the data is sourced from a single population".

This however is difficult to achieve in an extremely nuggetty deposit like Plutonic Gold Mine.

Previous tests revealed that OK tends to over-smooth the grades and extend grades to areas that contain no gold or vice versa. OK over-smoothing at Plutonic is not unique, and it was widely reported elsewhere (Guertin K., 1984, Olea and Pawlowsky, 1996, Rezaee H., Asghari O., and Yamamoto J.K., 2012, and Tomay L., 2014).

In contrast, inverse distance method is simple, versatile, and can handle both longer influence range of the dominant grades and the shorter influence range of the extreme grades. It can be adjusted to handle short distance continuity or even simulate nearest neighbour method. It does not require stringent assumptions on stationarity.

Squared inverse distance was therefore selected for test because of its simplicity and the loose requirements on stationarity.

14.3.4.2 Estimator Search Parameters

The search will follow the structural trend because dynamic orientation method is used without considering a fixed orientation.

Coombes J (2009) reported that "the bulk of the variability (80 to 90% of the total variability, including a nugget effect in the order of 30%) is within a much smaller range of 7 to 10 m within the plane of mineralisation and no more than 2 m across the width of the mineralisation".

Historically, 8x8x1.25 m search distances were used for it is consistent with Coombes suggestion.

The parameters used for the mineral resource models for the current reporting season are listed in Table 14-5.

Table 14-5 Estimation Parameters

	Ellipsoid Ranges			Number of samples		Sector Search		Drillhole Limit
Estimation Run	**Max**	**Int'med**	Min	**Min Sample**	**Max Sample**	**Max Sample**	**Max Empty Sect**	hole Per sector
R1	8	8	1	4	30	3	6	TRUE
R2	15	15	1	4	30	3	3	TRUE
R3	29	29	2	2	30	3	7	TRUE
R4	58	58	2	1	30			

Tests indicate that minor axis search distance changes between 1-2 m (100%) do not cause significant grade estimation changes (see Table 14-6). Changes more than 3 m do cause significant, at lease locally (small stope scale) (Zhu Z H, Du Plessis E., Selingue K, and Spurling J, January 20, 2022).

Table 14-6 Search Parameter Sensitivity Tests

Minor Axis Change	**LF2**	**LF3**	**Difference**
	g/t	**g/t**	**1-LF2/LF3**
STO_ND2762NODP1	2.25	2.25	0%
STO_ND2762NODP2	5.17	5.34	3%
STO_ND2762NODP3	3.96	4.07	3%
STO_ND2762NODP4	3.72	3.79	2%
STO_ND2762NODP4A	6.88	6.61	-4%
STO_ND3032NODP1	2.30	2.15	-7%
Unknown	0.35	0.35	0%
Total	0.35	0.35	0%
Grade Shells	LG+MG+HG	LG+MG+HG	
R3	8x8x1	8x8x2	
R4	15x15x1	15x15x2	
R5	29x29x2	29x29x3	
R6	58x58x2	58x58x3	
declustering	No	No	
LG topcut	10	10	
MG topcut	25	25	
HG topcut	125	125	
Grade Shell Params			
LG	base 40, iso=0.2	base 40, iso=0.2	
MG	base 40, iso=0.2	base 40, iso=0.2	
HG	base 40, iso=0.2	base 40, iso=0.2	

- **LF2 model used a very narrow search range on the minor axis at 1 m for the first pass;**
- **LF3 model used a search range between LF and LF2 on the minor axis at 2 m for the first pass.**

Given the work carried out by Coombes (2009) that minor axis search distance shall be less than 2 m, combined with the current test work, it is therefore suggested that minor search distance <=2 m would be appropriate, and would cause minimal changes in grade estimation.

14.3.4.3 Sample Declustering Tests

Declustering effects on grade estimation are assessed by keeping all parameters identical except declustering parameters (see Table 14-7).

Leapfrog declustering function is therefore considered unnecessary, sample restrictions within each octant however are considered adequate in this case.

Table 14-7 Declustering Test

Declustering Test

LG and HG shells used	LF10 (2m) declustered	LF11 (2m) no declustering	Difference%
Stope	g/t	g/t	1-Au LF10/LF11
STO_ND2762NODP1	2.07	2.19	5.5%
STO_ND2762NODP2	2.99	3.14	4.5%
STO_ND2762NODP3	2.78	2.87	3.2%
STO_ND2762NODP4	3.29	3.13	-5.0%
STO_ND2762NODP4A	5.10	5.13	0.7%
STO_ND3032NODP1	1.48	1.50	1.6%
Unknown	0.21	0.21	2.8%
Total	0.21	0.21	2.8%
Grade Shells	LG+HG	LG+HG	
Au0.4	base=40,iso=0.2	base=40,iso=0.2	
Au10	base=8,iso=0.4	base=8,iso=0.4	
search params	8x8x2,15x15x2,29x29x3,58x58x3		

There is no significant changes in grades estimated.

14.3.4.4 Dataset Edge Effects

Tests were conducted to test the extent of the influence of samples outside the model or edge of the block may have on the grades inside the model. This buffer (overlap) is used to ensure continuity across block boundaries as it was identified as an area requiring improvement on the use of previous fault block models and wireframes.

Like LF7, both LF7A and LF7B contain only Au0.4 grade shell, both used identical parameters except that the dataset for LF7A covered the exact block model range while LF7B included samples 50 m outside the block model extent on all sides.

It seems that edge effects are minimal, drillholes outside the block range can be ignored. It is concluded that 50 m buffer is adequate.

There are insignificant differences between the two models (Table 14-8).

Table 14-8 Dataset Edge Effect Tests

Boundary Effect	LF7A	LF7B	Difference
	g/t	g/t	1-LF7A/LF7B
STO_ND2762NODP1	2.70	2.70	0%
STO_ND2762NODP2	4.40	4.40	0%
STO_ND2762NODP3	2.96	2.96	0%
STO_ND2762NODP4	3.51	3.54	1%
STO_ND2762NODP4A	4.39	4.16	-5%
STO_ND3032NODP1	2.61	2.61	0%
Unknown	0.33	0.34	3%
Total	0.33	0.35	3%
Grade Shells	LH (>=0.4 g/t) grade shell only, rest shells all removed.		
Topcut	25 g/t	25 g/t	
Run 3	8x8x1	8x8x1	
Run 4	15x15x1	15x15x1	
Run 5	29x29x2	29x29x2	
Run 6	58x58x2	58x58x2	
declustering	not declustered	not declustered	
LG topcut	25 g/t		
MG topcut			
HG topcut			
Grade Shell Params			
LG	base 40, iso=0.2	base 40, iso=0.2	

all parameters in LF7B are the same as LF7A
except that the block model extent was extend 50m

14.3.4.5 Deposit Scale Influencing Factors

14.3.4.5-1 Au1 Domain (Grade Shell) Influence

To test the influence of domaining on grade ranges in a deposit scale, models with and without Au1 domains were created on both sets of drill-hole data: pre-grade control drilling (Table 13-9), and post grade control drilling (Table 13-10).

Regardless models are for pre- grade control (GC) drilling (Table 14-9) or post GC drilling (Table 14-10), the introduction of Au1 consistently caused a significant reduction in volume / tonnage and increase in grade. Its influence is even higher than new infill drilling on estimation. The findings from this comparative test work suggests that the application of grade domains can be regarded as an improvement to previous methods and better estimate this style of mineralization.

Table 14-9 Pre-GC Drilling With or Without Au1 Domain

Pre-GC Drilling Without Au1 Domain

No SOP, May 2021 Model (without GC RC drill holes) — Cumulative — Difference=Model / Dig block -1

Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
1512.5 - 1515.0	1512.5	1515	2850	5130	0.684257	112.8568	5130	0.68	112.8568	275%	11%	315%
1510.0 - 1512.5	1510	1512.5	7748	13946	0.628027	281.591	19076	0.64	394.4479	46%	13%	64%
1507.5 - 1510.0	1507.5	1510	14044	25278	0.675204	548.7424	44354	0.66	943.1902	33%	21%	61%
1505.0 - 1507.5	1505	1507.5	23571	42426	0.823258	1122.946	86780	0.74	2066.137	31%	28%	68%
1502.5 - 1505.0	1502.5	1505	22299	40137	0.915108	1180.886	126917	0.80	3247.023	32%	30%	73%
1500.0 - 1502.5	1500	1502.5	21843	39317	0.891475	1126.887	166234	0.82	4373.91	36%	16%	58%
1497.5 - 1500.0	1497.5	1500	22321	40176	0.733418	947.347	206410	0.80	5321.257	38%	5%	45%
1495.0 - 1497.5	1495	1497.5	22059	39704	0.712411	909.4021	246114	0.79	6230.659	42%	3%	46%
1492.5 - 1495.0	1492.5	1495	18782	33807	0.978209	1063.235	279921	0.81	7293.894	47%	5%	54%
1490.0 - 1492.5	1490	1492.5	15844	28518	1.244992	1141.502	308439	0.85	8435.396	46%	5%	53%
1487.5 - 1490.0	1487.5	1490	10736	19324	1.043144	648.0854	327763	0.86	9083.482	51%	5%	59%
1485.0 - 1487.5	1485	1487.5	9182	16527	0.969918	515.3714	344290	0.87	9598.853	54%	6%	63%
1482.5 - 1485.0	1482.5	1485	7123	12820	0.919251	378.8901	357110	0.87	9977.743	56%	7%	66%
1480.0 - 1482.5	1480	1482.5	0	0	0	0	357110	0.87	9977.743	54%	6%	64%
1477.5 - 1480.0	1477.5	1480	3854	6937	1.127313	251.4242	364047	0.87	10229.17	56%	7%	67%
1475.0 - 1477.5	1475	1477.5	2642	4795	1.3364	206.0232	368842	0.88	10435.19	56%	8%	69%
Indicator Shells	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1												
Au0.2	40	1	0	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	6	2	4	30	3	5		21	310	0	
R2	15	12	4	4	30	3	6		21	310	0	
R3	29	15	6	2	30	3	7		21	310	0	
R4	57	28	6	1	30				21	310	0	
Topcut	Topcut	Threshold	Threshold Dist									
Au10												
Au1												
Au0.2	10											
Au0.01												

Pre SOP model, withoug GC drilling data

Pre-GC Drilling With Au1 Domain

Version 8 model No SOP with Au1 added (without GC RC drill holes) — Cumulative — Difference=Model / Dig block -1

Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
1512.5-15	1512.5	1515	408	735	0.46601	11.01218	735	0.47	11.01218	-46%	-25%	-60%
1510.0-15	1510.0	1512.5	256	461	0.521711	7.732543	1196	0.49	18.74472	-91%	-15%	-92%
1507.5-15	1507.5	1510	2434	4381	1.048271	147.6515	5577	0.93	166.3962	-83%	70%	-72%
1505.0-15	1505.0	1507.5	6134	11041	1.375983	488.4413	16618	1.23	654.8375	-75%	112%	-47%
1502.5-15	1502.5	1505	6404	11527	1.798748	666.6188	28145	1.46	1321.456	-71%	139%	-30%
1500.0-15	1500.0	1502.5	5924	10664	2.027239	695.0503	38809	1.62	2016.506	-68%	129%	-27%
1497.5-15	1497.5	1500	6214	11186	1.347043	484.4483	49995	1.56	2500.955	-67%	104%	-32%
1495.0-14	1495.0	1497.5	6810	12257	1.048787	413.2971	62252	1.46	2914.252	-64%	90%	-32%
1492.5-14	1492.5	1495	7254	13057	1.457289	611.7587	75309	1.46	3526.011	-60%	88%	-25%
1490.0-14	1490.0	1492.5	6514	11726	1.884794	710.5667	87035	1.51	4236.577	-59%	86%	-23%
1487.5-14	1487.5	1490	5324	9583	1.420718	437.7241	96618	1.50	4674.301	-55%	83%	-18%
1485.0-14	1485.0	1487.5	4936	8885	1.102846	315.0382	105503	1.47	4989.34	-53%	80%	-15%
1482.5-14	1482.5	1485	3184	5731	1.29382	238.394	111234	1.46	5227.734	-51%	79%	-13%
1480.0-14	1480.0	1482.5	1892	3406	1.786849	195.6697	114640	1.47	5423.403	-51%	80%	-11%
1477.5-14	1477.5	1480	1950	3510	1.685621	190.2208	118150	1.48	5613.624	-50%	82%	-8%
1475.0-14	1475.0	1477.5	1870	3367	1.527268	165.3292	121517	1.48	5778.953	-49%	82%	-6%
Indicator	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1	40	1	0	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	6	2	4	30	3	5		21	310	0	
R2	15	12	4	4	30	3	6		21	310	0	
R3	29	15	6	2	30	3	7		21	310	0	
R4	57	28	6	1	30				21	310	0	
Topcut	Topcut	Threshold	Threshold Dist									
Au10												
Au1	11											
Au0.2	7											
Au0.01												

Pre SOP model with Au1 , withoug GC drilling data

Table 14-10 Post-GC Drilling With or Without Au1 Domain

Post-GC Drilling Without Au1 Domain

Version 3, No SOP, May 2021 parameters, with GC drilling data							Cumulative			Difference=Model / Dig block -1		
Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
PE-1510-1	1512.5	1515	3300	5940	0.752906	143.7865	5940	0.75	143.7865	334%	22%	429%
PE-1510-2	1510	1512.5	7460	13428	0.722586	311.9549	19368	0.73	455.7415	48%	28%	89%
PE-1505-1	1507.5	1510	10936	19685	0.712794	451.1182	39053	0.72	906.8597	17%	32%	55%
PE-1505-2	1505	1507.5	16456	29621	0.771894	735.103	68674	0.74	1641.963	4%	29%	33%
PE-1500-1	1502.5	1505	17170	30906	0.84692	841.5426	99580	0.78	2483.505	4%	27%	32%
PE-1500-2	1500	1502.5	16710	30078	0.958649	927.0419	129658	0.82	3410.547	6%	16%	23%
PE-1495-1	1497.5	1500	16388	29498	0.973818	923.552	159156	0.85	4334.099	7%	11%	18%
PE-1495-2	1495	1497.5	14916	26849	0.944357	815.1833	186005	0.86	5149.282	7%	13%	21%
PE-1490-1	1492.5	1495	12972	23349	1.015332	762.1973	209354	0.88	5911.48	10%	14%	25%
PE-1490-2	1490	1492.5	11132	20038	1.140053	734.4635	229392	0.90	6645.943	9%	11%	21%
PE-1485-1	1487.5	1490	7470	13445	0.996204	430.6259	242837	0.91	7076.569	12%	10%	24%
PE-1485-2	1485	1487.5	6554	11797	0.857292	325.1556	254634	0.90	7401.725	14%	10%	26%
PE-1480-1	1482.5	1485	5018	9033	0.865886	251.4686	263667	0.90	7653.193	15%	11%	28%
PE-1480-2	1480	1482.5	3254	5857	1.079619	203.2996	269524	0.91	7856.493	16%	11%	29%
PE-1475-1	1477.5	1480	2502	4504	1.052798	152.4524	274028	0.91	8008.945	17%	12%	31%
PE-1475-2	1475	1477.5	1950	3511	1.014878	114.5608	277539	0.91	8123.506	17%	12%	32%
Indicator Shells	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1												
Au0.2	40	1	0	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip azi	Pitch	
R1	8	6	2	4	30	3	5		21	310	0	
R2	15	12	4	4	30	3	6		21	310	0	
R3	29	15	6	2	30	3	7		21	310	0	
R4	57	28	6	1	30				21	310	0	
Topcut	Topcut	Threshold	Threshold	Max								
Au10												
Au1												
Au0.2	9			283								
Au0.01												

Pre SOP model with GC drilling data

Post-GC Drilling With Au1 Domain

Version 4, SOP 211014, with GC drilling data, two grade shells only							Cumulative			Difference=Model / Dig block -1		
Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
PE-1510-1	1512.5	1515	1476	2657	0.742878	63.45997	2657	0.74	63.45997	94%	20%	133%
PE-1510-2	1510.0	1512.5	3676	6616	0.76656	163.0544	9273	0.76	226.5143	-29%	33%	-6%
PE-1505-1	1507.5	1510	5742	10336	0.802027	266.5217	19609	0.78	493.036	-41%	43%	-16%
PE-1505-2	1505.0	1507.5	7528	13550	0.964639	420.2377	33159	0.86	913.2737	-50%	48%	-26%
PE-1500-1	1502.5	1505	7108	12794	1.193675	491.0021	45953	0.95	1404.276	-52%	56%	-25%
PE-1500-2	1500.0	1502.5	6692	12045	1.659214	642.5401	57998	1.10	2046.816	-53%	56%	-26%
PE-1495-1	1497.5	1500	7022	12640	1.671855	679.4175	70638	1.20	2726.233	-53%	57%	-26%
PE-1495-2	1495.0	1497.5	6202	11164	1.379403	495.1103	81802	1.22	3221.344	-53%	60%	-25%
PE-1490-1	1492.5	1495	5194	9350	1.457581	438.1627	91152	1.25	3659.506	-52%	62%	-23%
PE-1490-2	1490.0	1492.5	4782	8608	1.814235	502.0961	99760	1.30	4161.602	-53%	60%	-24%
PE-1485-1	1487.5	1490	3406	6131	1.306381	257.5088	105891	1.30	4419.111	-51%	58%	-23%
PE-1485-2	1485.0	1487.5	2974	5353	0.913913	157.2871	111244	1.28	4576.398	-50%	56%	-22%
PE-1480-1	1482.5	1485	2386	4295	1.031373	142.4197	115539	1.27	4718.818	-49%	56%	-21%
PE-1480-2	1480.0	1482.5	1802	3244	1.527912	159.3566	118783	1.28	4878.175	-49%	56%	-20%
PE-1475-1	1477.5	1480	1580	2844	1.502889	137.4192	121627	1.28	5015.594	-48%	58%	-18%
PE-1475-2	1475.0	1477.5	1316	2369	1.480608	112.7707	123996	1.29	5128.365	-48%	58%	-17%
Indicator Shells	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1	40	1	0.3	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0.3	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	8	1	4	30	3	6		18	308	39	
R2	15	15	1	4	30	3	6		18	308	39	
R3	29	29	2	2	30	3	7		18	308	39	
R4	58	58	2	1	30				18	308	39	
Topcut	Topcut	Threshold	Threshold	Au Max								
Au10												
Au1	13			240.53								
Au0.2	2			23.67								
Au0.01												

SOP 211014 with GC drilling data,

14.3.4.5-2 Influence of Additional Drill-holes

Comparison of pre and post drilling results (Table 13-9 and 13-10) revealed that additional drilling significantly reduced the volume / tonnage, and grade, but to a less extent by the introduction of Au1 grade shell. It is apparent that grade domaining exerts a more significant influence on the total resources and grades than the drilling and therefore an improvement to better reflect the different grade domains and estimation as compared to a single wireframed domain.

Au1 domaining is therefore considered irreplaceable even though Au0.2 domain is required in case of OP models.

14.3.4.5-3 Minor Influencing Factors – Au10 / Au0.01 Grade Shells

To test other grade shells for global influence, Au10 and Au0.01 grade shell were introduced (Table 14-11).

Table 14-11 Au10/Au0.01 Domain Influence on Deposit Scale

Post-GC Drilling With Au1 and Au0.2 Domains

Version 6. latested search distance test, all drill holes, including GC							Cumulative			Difference=Model / Dig block -1		
Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
PE-1510-1	1512.5	1515	1530	2751	0.702044	62.0935	2751	0.70	62.0935	101%	14%	128%
PE-1510-2	1510.0	1512.5	3875	6972	0.749331	167.9662	9723	0.74	230.0597	-26%	29%	-4%
PE-1505-1	1507.5	1510	5601	10079	0.834268	270.3425	19802	0.79	500.4021	-40%	44%	-14%
PE-1505-2	1505.0	1507.5	7404	13325	0.976231	418.2258	33127	0.86	918.6279	-50%	49%	-25%
PE-1500-1	1502.5	1505	6706	12070	1.202688	466.7146	45197	0.95	1385.342	-53%	56%	-26%
PE-1500-2	1500.0	1502.5	6549	11787	1.662379	629.9763	56984	1.10	2015.319	-53%	56%	-27%
PE-1495-1	1497.5	1500	6818	12271	1.739736	686.3639	69255	1.21	2701.683	-54%	59%	-26%
PE-1495-2	1495.0	1497.5	6243	11236	1.423618	514.2758	80491	1.24	3215.959	-54%	62%	-25%
PE-1490-1	1492.5	1495	4854	8736	1.505253	422.7787	89227	1.27	3638.737	-53%	64%	-23%
PE-1490-2	1490.0	1492.5	5002	9002	1.765218	510.8912	98229	1.31	4149.628	-53%	62%	-25%
PE-1485-1	1487.5	1490	2797	5034	1.392755	225.413	103263	1.32	4375.041	-52%	60%	-24%
PE-1485-2	1485.0	1487.5	2022	3639	0.954104	111.6269	106902	1.31	4486.668	-52%	59%	-24%
PE-1480-1	1482.5	1485	1220	2194	1.053976	74.34615	109096	1.30	4561.014	-52%	60%	-24%
PE-1480-2	1480.0	1482.5	941	1691	1.511531	82.17727	110787	1.30	4643.192	-52%	60%	-24%
PE-1475-1	1477.5	1480	904	1627	1.409039	73.70577	112414	1.31	4716.897	-52%	60%	-23%
PE-1475-2	1475.0	1477.5	545	981	1.476195	46.559	113395	1.31	4763.456	-52%	61%	-23%
Indicator She	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1	40	1	0.3	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0.3	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	8	0.6	4	30	3	6		18	308	39	
R2	15	15	0.6	4	30	3	6		18	308	39	
R3	29	29	1	2	30	3	7		18	308	39	
R4	58	58	1	1	30				18	308	39	
Topcut	Topcut	Threshold	Threshold	Au max								
Au10												
Au1	No topcut	13	30%	240.53								
Au0.2	2			23.67								
Au0.01												

Post-GC Drilling With All 4 Domains

Version 7. SOP 220104, all drill holes, including GC							Cumulative			Difference=Model / Dig block -1		
Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
PE-1510-1	1512.5	1515	1376	2474	0.702716	55.89471	2474	0.70	55.89471	81%	14%	105%
PE-1510-2	1510.0	1512.5	3463	6231	0.748331	149.9141	8705	0.74	205.8088	-34%	29%	-15%
PE-1505-1	1507.5	1510	5051	9091	0.812451	237.4653	17796	0.77	443.274	-47%	42%	-24%
PE-1505-2	1505.0	1507.5	7117	12810	0.94299	388.3716	30606	0.85	831.6456	-54%	46%	-32%
PE-1500-1	1502.5	1505	6880	12383	1.091823	434.6796	42989	0.92	1266.325	-55%	50%	-33%
PE-1500-2	1500.0	1502.5	6858	12343	1.328306	527.1206	55332	1.01	1793.446	-55%	43%	-35%
PE-1495-1	1497.5	1500	7026	12647	1.560221	634.402	67979	1.11	2427.848	-54%	45%	-34%
PE-1495-2	1495.0	1497.5	6679	12022	1.428488	552.1339	80001	1.16	2979.982	-54%	51%	-30%
PE-1490-1	1492.5	1495	5268	9480	1.267377	386.2827	89481	1.17	3366.264	-53%	51%	-29%
PE-1490-2	1490.0	1492.5	5159	9285	1.55531	464.2906	98766	1.21	3830.555	-53%	49%	-30%
PE-1485-1	1487.5	1490	3288	5917	1.276916	242.9153	104683	1.21	4073.47	-52%	47%	-29%
PE-1485-2	1485.0	1487.5	2975	5354	0.907046	156.1345	110037	1.20	4229.605	-51%	46%	-28%
PE-1480-1	1482.5	1485	2277	4096	1.088094	143.2905	114133	1.19	4372.895	-50%	46%	-27%
PE-1480-2	1480.0	1482.5	1761	3169	1.537504	156.6497	117302	1.20	4529.545	-49%	47%	-26%
PE-1475-1	1477.5	1480	1591	2863	1.454246	133.8598	120165	1.21	4663.405	-49%	48%	-24%
PE-1475-2	1475.0	1477.5	1384	2501	1.468486	118.0795	122666	1.21	4781.484	-48%	49%	-23%
Indicator Shell	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10	15	1	0	3	0.3	20	15	5	21	310	0	
Au1	40	1	0.3	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0.3	3	0.2	20	15	5	21	310	0	
Ay0.01	40	1	0.3	3	0.2	20	15	5	21	310	0	
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	8	0.6	2	30			1	18	308	39	
R2	15	15	0.6	2	30			1	18	308	39	
R3	29	29	1.2	2	30				18	308	39	
R4	58	58	1.2	1	30				18	308	39	
Topcut	Topcut	Threshold	Threshold	Au Max								
Au10	28	18	30%	24.5								
Au1	6			240.53								
Au0.2	1			23.67								
Au0.01	1			4.01								

The introduction of Au10 and Au0.01 combined only caused minor reduction in tonnes and minor increase in grade, with a neutral effect on the total metal.

It is therefore concluded that domain Au1 with the largest volume affects the estimation most significantly among all domains and is regarded as an improvement on previous methods.

As test work proved Au10 domains do cause moderate to significant changes in grades in stope scale, Au10 as a grade domaining tool is therefore considered an important integral part of the model and estimation process.

14.3.4.5-4 Global Influence of Search Distances

Because Au10 and Au0.01 did not make a huge difference in a deposit scale, search distance changes were then added to further test the changes in search parameters, where Au1 and Au0.2 domains were used without Au10/Au0.01 domains, and minor search distances were expanded and the results were compared with models with all 4 domains included, minor search distance were adjusted to 1-2 m only.

It was apparent that there was only insignificant difference (Table 14-12), that is, changes in minor axis search distances do not cause significant changes in estimation results on a deposit scale.

Fixed search parameters are therefore considered reasonable in grade estimation.

Future test works however are required to compare strictly search distance changes without changes on other parameters on a deposit scale.

Table 14-12 Global Influence of Search Distances

Pre-GC Drilling Au1 and Au0.2 Domains Only

Version 8 model No SOP with Au1 added (without GC RC drill holes) — Cumulative — Difference=Model / Dig block -1

Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
1512.5-15	1512.5	1515	408	735	0.46601	11.01218	735	0.47	11.01218	-46%	-25%	-60%
1510.0-15	1510.0	1512.5	256	461	0.521711	7.732543	1196	0.49	18.74472	-91%	-15%	-92%
1507.5-15	1507.5	1510	2434	4381	1.048271	147.6515	5577	0.93	166.3962	-83%	70%	-72%
1505.0-15	1505.0	1507.5	6134	11041	1.375983	488.4413	16618	1.23	654.8375	-75%	112%	-47%
1502.5-15	1502.5	1505	6404	11527	1.798748	666.6188	28145	1.46	1321.456	-71%	139%	-30%
1500.0-15	1500.0	1502.5	5924	10664	2.027239	695.0503	38809	1.62	2016.506	-68%	129%	-27%
1497.5-15	1497.5	1500	6214	11186	1.347043	484.4483	49995	1.56	2500.955	-67%	104%	-32%
1495.0-14	1495.0	1497.5	6810	12257	1.048787	413.2971	62252	1.46	2914.252	-64%	90%	-32%
1492.5-14	1492.5	1495	7254	13057	1.457289	611.7587	75309	1.46	3526.011	-60%	88%	-25%
1490.0-14	1490.0	1492.5	6514	11726	1.884794	710.5667	87035	1.51	4236.577	-59%	86%	-23%
1487.5-14	1487.5	1490	5324	9583	1.420718	437.7241	96618	1.50	4674.301	-55%	83%	-18%
1485.0-14	1485.0	1487.5	4936	8885	1.102846	315.0382	105503	1.47	4989.34	-53%	80%	-15%
1482.5-14	1482.5	1485	3184	5731	1.29382	238.394	111234	1.46	5227.734	-51%	79%	-13%
1480.0-14	1480.0	1482.5	1892	3406	1.786849	195.6697	114640	1.47	5423.403	-51%	80%	-11%
1477.5-14	1477.5	1480	1950	3510	1.685621	190.2208	118150	1.48	5613.624	-50%	82%	-8%
1475.0-14	1475.0	1477.5	1870	3367	1.527268	165.3292	121517	1.48	5778.953	-49%	82%	-6%
Indicator	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1	40	1	0	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	6	2	4	30	3	5		21	310	0	
R2	15	12	4	4	30	3	6		21	310	0	
R3	29	15	6	2	30	3	7		21	310	0	
R4	57	28	6	1	30				21	310	0	
Topcut	Topcut	Threshold	Threshold Dist									
Au10												
Au1	11											
Au0.2	7											
Au0.01												

Pre SOP model without Au1 added, withoug GC drilling data

Pre-GC Drilling with All 4 Domains

Version 2 model SOP 211014 (without GC RC drill holes), 2 grade shells only — Cumulative — Difference=Model / Dig block -1

Flitch	Toe	Crest	Vol	Ton	g/t	Oz	Tons	g/t	Oz	Tons	g/t	Oz
1512.5-1515	1512.5	1515	816	1469	0.487356	23.01755	1469	0.49	23.01755	7%	-21%	-15%
1510.0-1512.5	1510.0	1512.5	720	1296	0.479045	19.96053	2765	0.48	42.97808	-79%	-15%	-82%
1507.5-1510	1507.5	1510	2470	4446	1.088041	155.527	7211	0.86	198.5051	-78%	57%	-66%
1505.0-1507.5	1505.0	1507.5	5806	10451	1.408487	473.2622	17662	1.18	671.7673	-73%	105%	-45%
1502.5-1505	1502.5	1505	6544	11780	1.698078	643.1227	29442	1.39	1314.89	-69%	128%	-30%
1500.0-1502.5	1500.0	1502.5	6140	11052	1.912415	679.5384	40494	1.53	1994.428	-67%	117%	-28%
1497.5-1500	1497.5	1500	6402	11524	1.192693	441.8989	52018	1.46	2436.327	-65%	91%	-34%
1495.0-1497.5	1495.0	1497.5	6686	12035	1.011557	391.406	64053	1.37	2827.733	-63%	79%	-34%
1492.5-1495	1492.5	1495	7376	13277	1.434005	612.1272	77330	1.38	3439.86	-59%	79%	-27%
1490.0-1492.5	1490.0	1492.5	6928	12471	1.755894	704.0289	89801	1.44	4143.889	-57%	77%	-25%
1487.5-1490	1487.5	1490	5330	9594	1.548478	477.6346	99395	1.45	4621.524	-54%	76%	-19%
1485.0-1487.5	1485.0	1487.5	4722	8499	1.207251	329.8802	107894	1.43	4951.404	-52%	74%	-16%
1482.5-1485	1482.5	1485	3258	5864	1.290792	243.3555	113758	1.42	5194.76	-50%	74%	-13%
1480.0-1482.5	1480.0	1482.5	1890	3402	1.854437	202.8324	117160	1.43	5397.592	-50%	75%	-11%
1477.5-1480	1477.5	1480	2010	3619	1.576101	183.385	120779	1.44	5580.977	-48%	77%	-9%
1475.0-1477.5	1475.0	1477.5	1938	3488	1.447276	162.3002	124267	1.44	5743.277	-47%	77%	-7%
Indicator Shells	Base	Sill	Nugget	Alpha	Iso bslur	Major	Interm	Minor	Dip	Dip Azi	Pitch	
Au10												
Au1	40	1	0	3	0.2	20	15	5	21	310	0	
Au0.2	40	1	0	3	0.2	20	15	5	21	310	0	
Ay0.01												
Estimator:	Major	Interm	Minor	Min Samp	Max Samp	Max Samp	Max Empt	Max Samp	Ellip Dip	Dip axi	Pitch	
R1	8	8	1	4	30	3	6		18	308	39	
R2	15	15	1	4	30	3	6		18	308	39	
R3	29	29	2	2	30	3	7		18	308	39	
R4	58	58	2	1	30				18	308	39	
Topcut	Topcut	Threshold	Threshold Dist									
Au10												
Au1	no topcut											
Au0.2	2											
Au0.01												

SOP 20211014, without GC drilling data

14.3.4.5-5 Parameters Influencing Domain Volumes

It is apparent that the sheer volume of domain Au1 caused significant difference on mineral resource tonnes and grades. Influencing factors on the domain volumes were investigated to determine the cause of the significant difference on resource tonnes and grades.

There are following important factors controlling the auto-wireframing process (auto-domaining):

- Base: the maximum search distance;
- Nugget: the nugget of the gold distribution;
- Iso value: the probability of Au value at a point above the cut-off grade; and
- Resolution: the wireframing resolution, a lower resolution (larger wireframing distance value) will ignore isolated samples with grades significantly different surrounding samples.

Parameters used in the current resource models were amply tested and are listed in Table 14-13Table 13-12.

Table 14-13 Auto-Domaining Parameters

Auto-Domaining Parameters (Leapfrog Interpolant Parameters)					
Numeric Model	**Cut-Off**	**Surface Filter**	**Base-Range**	**Nugget**	**Iso Value**
10 FB1	**10**	**Fault Block Boundary 1**	**15**	**0**	**0.3**
10 FB2	**10**	**Fault Block Boundary 2**	**15**	**0**	**0.3**
1 FB1	**1**	**Fault Block Boundary 1**	**40**	**0.3**	**0.2**
1 FB2	**1**	**Fault Block Boundary 2**	**40**	**0.3**	**0.2**
0.4 FB1	**0.4**	**Fault Block Boundary 1**	**40**	**0.3**	**0.2**
0.4 FB2	**0.4**	**Fault Block Boundary 2**	**40**	**0.3**	**0.2**
0.01 FB1	**0.01**	**Fault Block Boundary 1**	**40**	**0.3**	**0.2**
0.01 FB2	**0.01**	**Fault Block Boundary 2**	**40**	**0.3**	**0.2**

In July 2021, the company committed itself to revamp the mineral resource modelling process, and apply the new process to the current resource report. This left little time for the methodology to be fully tested. Deficiencies were identified, in particular domain volume influencing factors.

Because "iso value" for all grade shells are set below 0.5, it means that all shells tend to cover lower grade samples than shells with neutral value of 0.5 do. All shells shall cause abrupt grade changes along the boundaries. Removal of any grade shells shall cause the balance point being pushed towards the higher grade area, leading to a lower grade and higher volume of lower grade cut-off ore material. A lower "iso value" is corresponding to a lower cut-off than the actual cut-off grade suggested, and is therefore considered acceptable because the domaining stage is only required to build a mineralisation envelope so estimation does not extend beyond unacceptable extent as open block model does.

Such a shell is considered similar to manual wireframing in which only one cut-off solid is created to cover the entire mineralisation zone, but in a much smaller scale in grade control modelling.

Base (search distance) value changes primarily influence areas where there are scarce samples. Domains can be expanded disproportionally forming a balloon at the edge of the dataset. Such influences however are considered insignificant as resource classification shall assign such areas as low confidence zone.

14.3.4.5-6 Conclusions

It was found that:

- In domaining
    - Au10 grade shell causes some changes in local grade estimation as compared to previous methods, however only exerts limited global influence because of its relative low volume;
    - Au1 grade shell causes minor to moderate changes to local grade distribution at stope scale because its influence is on the lower grade range, but introduces significant changes in estimated global tonnes and grades because of its volume;
    - The introduction of Au1, and Au10 both causes reduction in tonnes and increase in grades except the severity where Au1 causes significant changes in a deposit scale while Au10 only causes minor changes in a deposit scale, but significant changes in a stoping scale. This is possibly caused by the relatively low volume of the Au10 grade shell;
    - Base and iso values in "Indicator models" function exert the most significant influence on the volume of grade shells but impact is mitigated by short range used in estimation parameters.
- There are two major factors influencing global tonnes and grades in decreasing severity:
    - Au1 Domain (grade shell) causes significant changes in tonnes and grades in a deposit scale, more significant than new drilling,
    - Additional samples (drilling): additional samples cause significant changes to both tonnes and grades but to a lessor scale than Au1 domain's influence.
- Estimator's parameters:
    - Minor axis search distances cause negligible changes in grades
    - Declustering does not cause statistically meaningful changes in grades;
    - Static search parameters exert negligible influence on tonnes and grades.

It was concluded that:

- Automatic domaining can replace manual wireframing with greater efficiency and more accurate description of the mineralisation trend;
- 4 grade shells seem to work reasonably well for the Plutonic Gold Mine;
- The introduction of different grade shells improved the estimation quality significantly by isolating similar into same domains while conventional wireframes did not consider this.
- Static estimation parameters are considered acceptable in resource modelling;
- The new methodology can serve as an efficient, and reliable alternative to conventional manual modelling method.

14.4 Compositing

The Mineral Resource estimation process uses a standardised composite length of 1 m, which was reviewed statistically before proceeding. If the remaining sample after compositing is less than 0.7 m, it is evenly redistributed. Composite interval with sample less than 70% (caused by sample loss) is ignored.

14.5 Top-cutting Method

Top cutting is undertaken during the compositing process. Composites from Leapfrog were exported, top-cut were estimated, with high grade samples being capped prior to estimation.

Several top-cutting methods were tested, including

a) Median + 3 * standard deviation range;
b) Mean + 3* standard deviation;
c) Visual estimation based on disintegration point on sample distribution plots;
d) Iterative method.

Methods a) and b) are significantly affected by extreme values, while method c) tend to be severely affected by bias of individuals, and also does not work effectively when large number of samples are involved.

Method d) was developed by the Plutonic Gold Mine geology department, and gives consistent estimated top-cut values without significant outlier influences or human bias (Zhu Z H, February 7, 2022). However, due to time constraint, insufficient test works were carried out at the time of current reporting season.

For consistency method a) was used for current models. Because of the sheer number of block models, only an example of top-cut for 14D block model is listed in Table 14-14. This data is recorded and available for all block models at the property and forms part of the model validation process. Top-cut values are listed in summary sheet in the resource model dataset.

Table 14-14 14D Domain Top-cuts, Model Mean vs Sample Mean Comparison

		Block Model			Composite Samples inside Domain				Au_lf/	Au_lf /	Au_lf/	Au_lf/	Total Samples	Sample Counts	
Area	Column/BlockID	Grade Shell	Tons	Au_LF	Naïve Au	Au_Decl	Au_cut	Au_Decl_Cut	Au_naive -1	Au_Decl -1	Au_cut	Au_Decl_cut -1	Inside Domains	Inside Block Model	Comments
Baltic	14D	Au_10	48,427.10	30.05	33.67	34.03	28.90	27.93	-11%	-12%	4%	8%	830	550	
Baltic	14D	Au_1	1,353,383.60	1.64	1.89	1.60	1.66	1.50	-13%	3%	-1%	9%	10175	6263	
Baltic	14D	Au_0.4	1,610,509.20	0.35	0.37	0.35	0.36	0.34	-7%	-1%	-3%	2%	8649	4753	
Baltic	14D	Au_0.01	18,426,089.60	0.04	0.06	0.05	0.05	0.05	-23%	-17%	-16%	-14%	59463	22116	

Au_LF: block model mean; Naïve Au: naïve sample mean; Au_Decl: declustered raw sample mean; Au_cut: top-cut sample mean; Au_Decl_Cut: declustered; top-cut sample mean;

14.6 Density Determination

Bulk density for various materials were compiled from historical records, or previously published resource reports (Stephen Hyland, Mathew Keena, Ashutosh Srivastava, 7 Aug 2020. 2020) (Table 14-15 and Table 14-16 and Table 14-17).

Table 14-15 Bulk Density For Plutonic Gold Mine Area

Description	Density	Comments
Fresh ultramafic	2.9	
Fresh mma / mafic	2.9	
Fresh dolerite	2.9	
Fresh quartz	2.5	
Open void / Air	0	
Paste fill	2.9	To be reviewed in future modelling
CRF fill	2.9	To be reviewed in future modelling
Oxide waste fill	1.8	
Fresh waste fill	1.8	including all surface waste dump
Tail fill	1.8	Mill manager Marcus Neville verbal advice for Perch Pit
Oxide ultramafic	1.8	Caspian/Pacific
Transitional ultramafic	2.2	Caspian/Pacific
Oxide mma/mafic	1.8	Caspian/Pacific
Transitional mma/mafic	2.2	Caspian/Pacific
Oxide dolerite	1.8	Caspian/Pacific
Transitional dolerite	2.2	Caspian/Pacific
Transported laterite	2.1	Caspian/Pacific
Fresh shale	2.9	estimated
Transitional shale	2.2	
Oxide shale	1.8	

Table 14-16 Bulk Density at Area 4 and Perch Pits

Area 4 and Perch Pits	
Oxidation	**Caspian/Pacific**
Laterite	2.1
Oxide	1.8
Transition	2.2
Fresh	2.9

Data source: G:\Underground\Geology\06_R&R\Reports-Documents-Publications-Memos\1_Resource Statements\NI43-101-2020\FINALNewSGI NI43-101Report_2020v4.docx

Table 14-17 Bulk Density at Hermes and Hermes South

Hermes and Hermes South	
Transported Cover	NA
Oxide	1.8
Transitional	2.1
Fresh	2.75
Fresh schist	2.9

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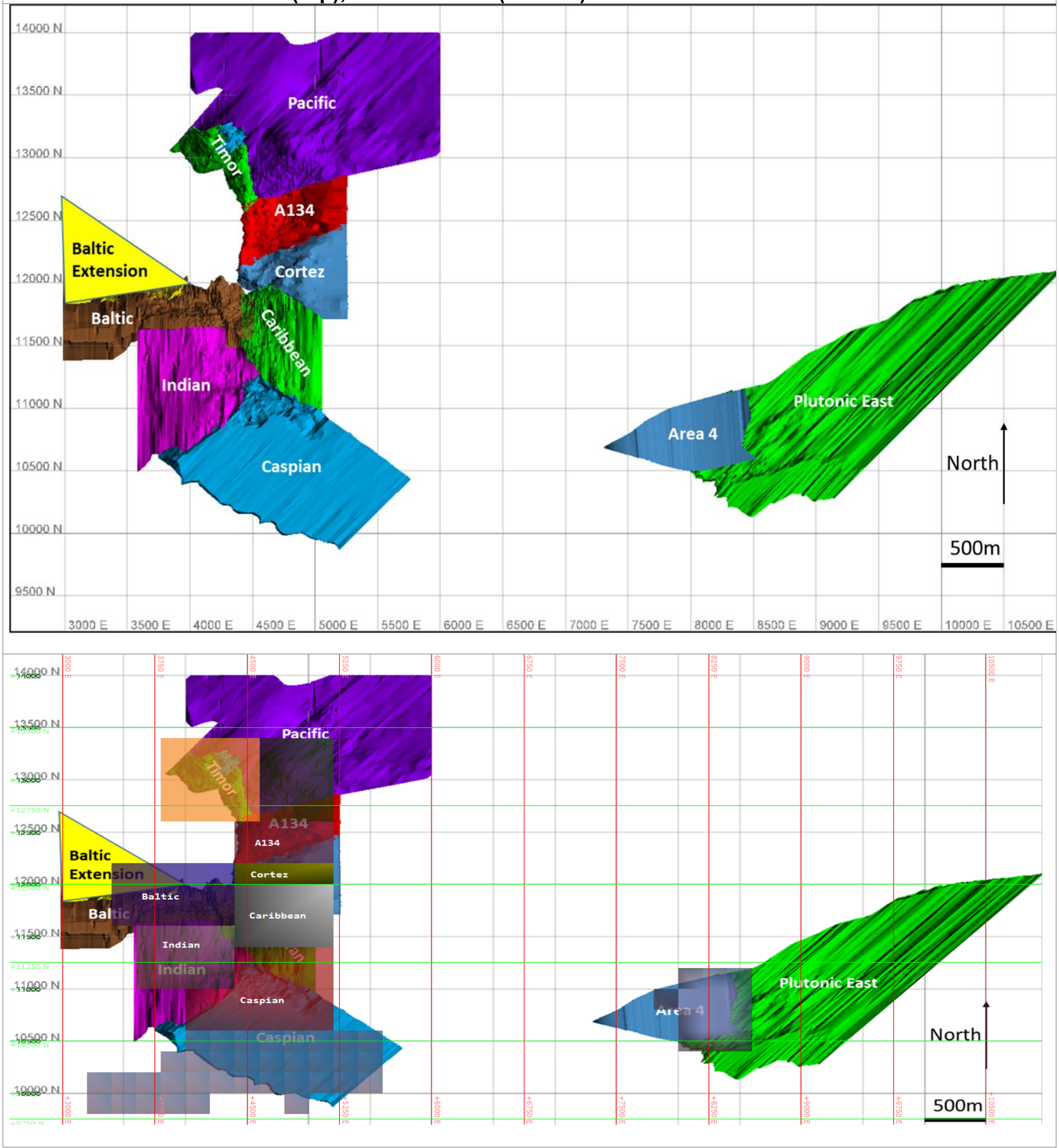
14.7 Resource Zone Boundaries

Historically, mineral resource models were bounded by natural faults dividing the mineralisation zones.

There are 8 historical resource zones plus a new resource zone of Baltic Extension, within each zone there exist fault blocks (Figure 14-6).

Figure 14-6 Historical Resource Zones and Comparison with Current Ones

Historical Resource Zones (top), Current Ones (bottom)



The large block size in historical models against the narrow width of mineralised zones means that the block model cannot provide reasonable resolution for mining. Automated domaining and estimation can generate block models in great details that are nearly impossible to generate by manual modelling, however at the cost of greater processing time.

Even though a block model at 1x1x1 m block size created artificial smoothness, it does not change the overall picture of the resource. It is therefore decided to adopt 1x1x1 m block size to accommodate the style of mineralisation at Plutonic Gold Mine.

To reduce the processing time to a manageable level, it was decided to divide the entire Plutonic Gold Mine and nearby areas into 200x200x200 m blocks (Figure 14-7 and Figure 14-8). The original resource zone names are kept, the boundaries however are not consistent with the historical boundaries.

Figure 14-7 Plutonic Gold Mine and Plutonic West Resource Zone Division and Naming Convention

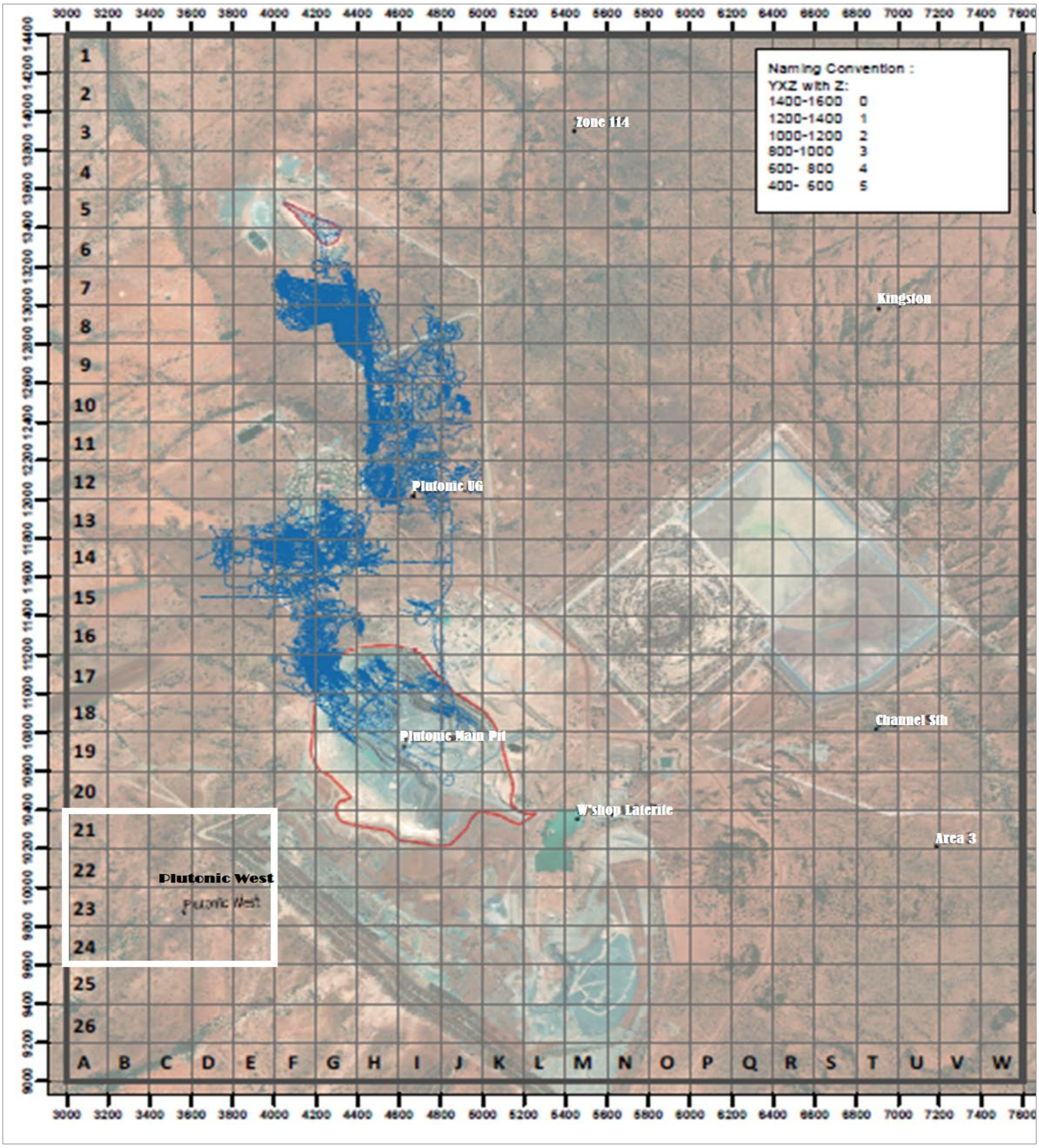
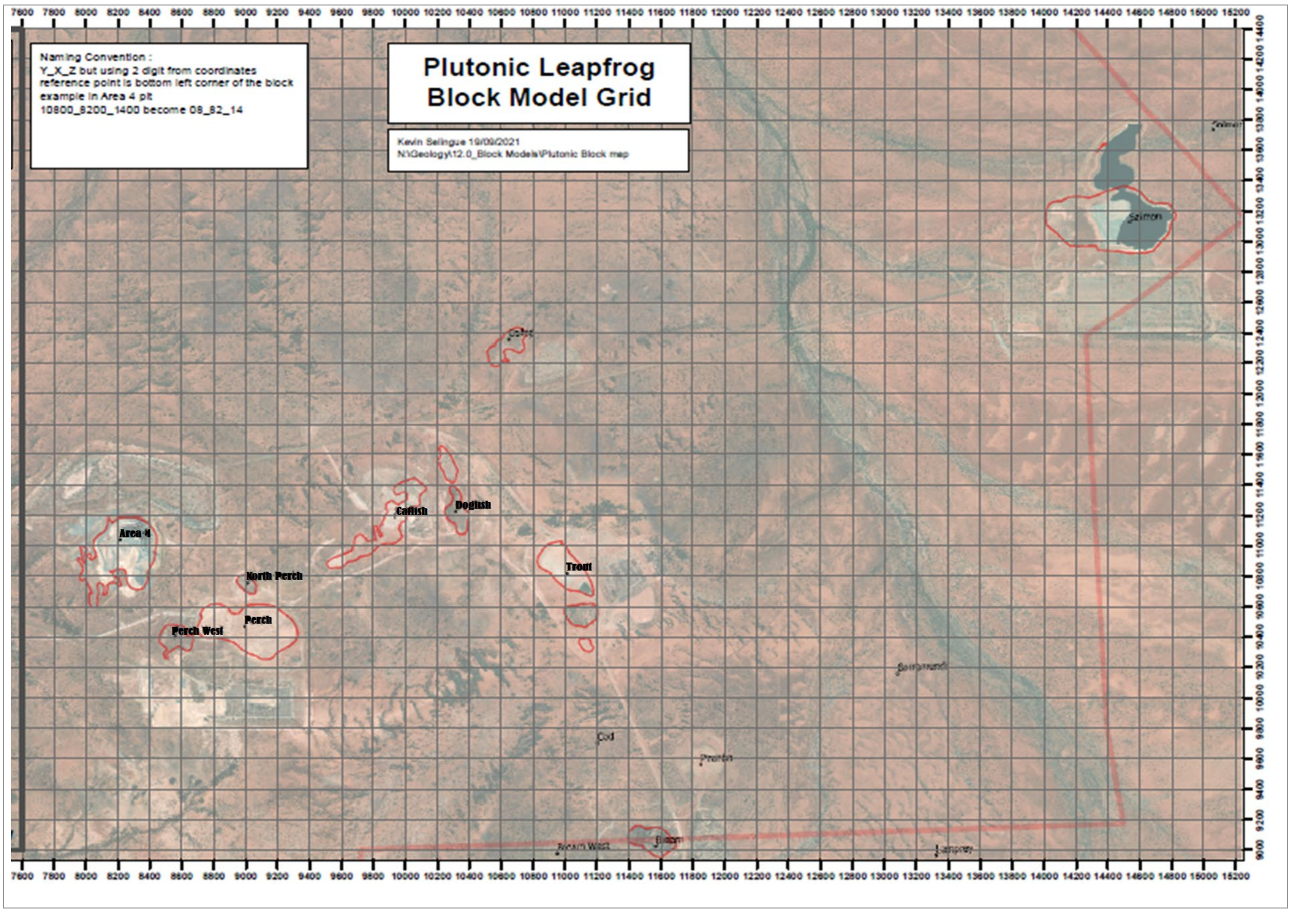


Figure 14-8 Plutonic East Resource Zone Division and Naming Convention



The block model areas are divided into columns and blocks.

- Each column of 200m(E)x200m(N) is defined as one resource column starting from 7600mN;
- Each resource column is subdivided into resource blocks starting from 3000mE and 9000mN, and extend from 1600mRL down to 200mRL;
- Blocks are named based on the coordinate codes of the blocks: [Y code][X code][Z code] (Table 13-15 and 13-16);

At Plutonic Gold Mine and Plutonic West, the following block model naming convention is used:

The Plutonic project area is divided into resource areas matching the historical resource zones (Figure 13-9):

- Timor
- Pacific
- Area 134
- Baltic
- Cortez
- Caribbean
- Indian
- Caspian
- Plutonic West
- Plutonic East

Each resource area consists of resource columns.

Resource columns are named as [Y code] [X code] (Table 14-15 and 14-16).

For instance, 6F column is in Timor area, occupying the area between 4000-4200mE along easting, 13200-13400mN along northing.

Each resource column consists of a sequence of resource blocks.

Resource blocks are named as [Y code] [X code] [Z code] (Figure 14-9).

For instance, 6F1 is in the 6F column covering the block at 4000-4200mE, 13200-13400mN, and 1200-1400mRL.

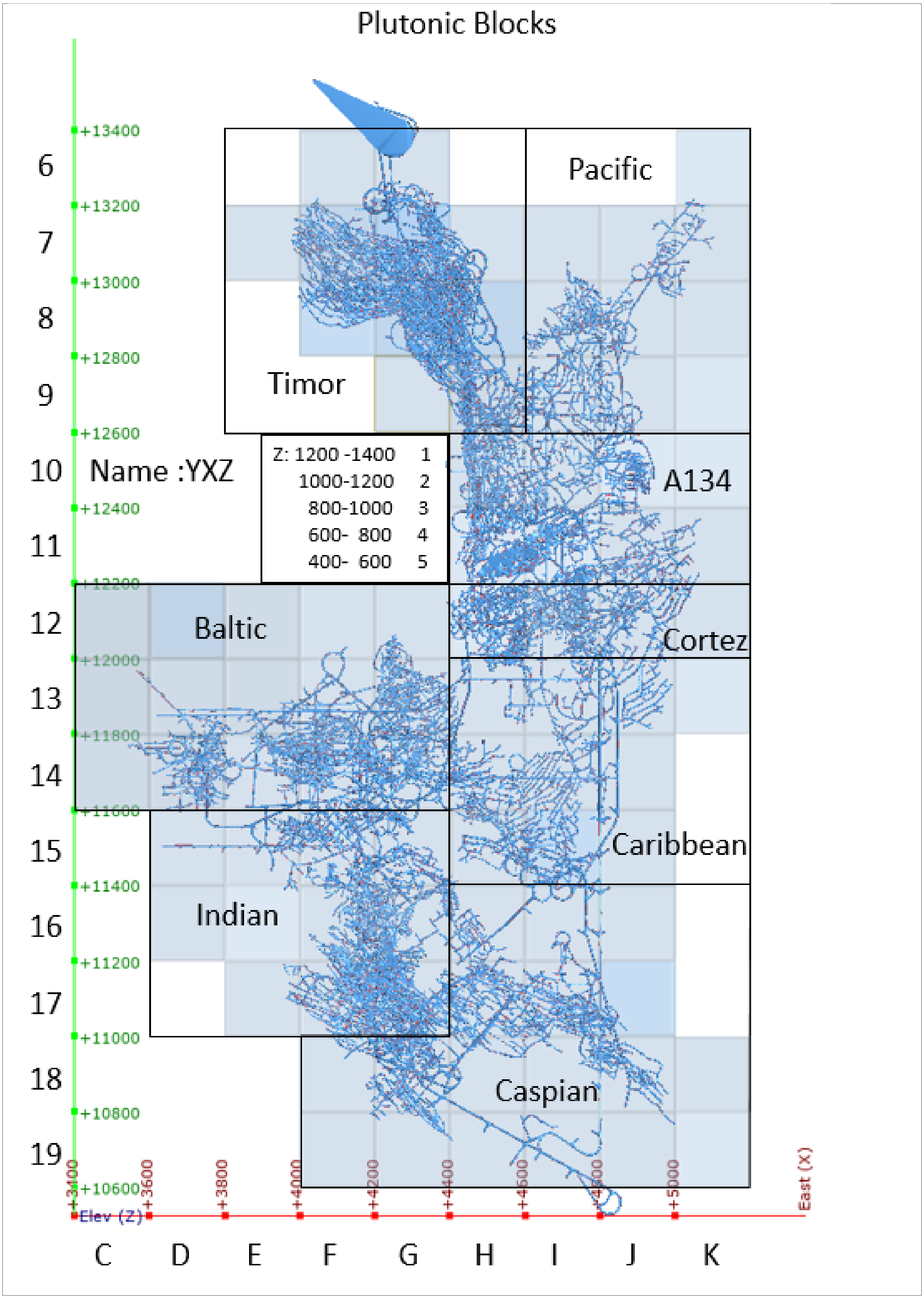
Table 14-18 Plutonic and Plutonic West Resource Zone Coordinate Codes

Plutonic and Plutonic West Resource Zone Coordinate Codes					
Y Range	**Y Code**	**E Range**	**E Code**	**Z Range**	**Z Code**
14400-14600	0	3000-3200	A	1400-1600	0
14200-14400	1	3200-3400	B	1200-1400	1
14000-14200	2	3400-3600	C	1000-1200	2
13800-14000	3	3600-3800	D	800-1000	3
13600-13800	4	3800-4000	E	600-800	4
13400-13600	5	4000-4200	F	400-600	5
13200-13400	6	4200-4400	G	200-400	6
13000-13200	7	4400-4600	H		
12800-13000	8	4600-4800	I		
12600-12800	9	4800-5000	J		
12400-12600	10	5000-5200	K		
12200-12400	11	5200-5400	L		
12000-12200	12	5400-5600	M		
11800-12000	13	5600-5800	N		
11600-11800	14	5800-6000	O		
11400-11600	15	6000-6200	P		
11200-11400	16	6200-6400	Q		
11000-11200	17	6400-6600	R		
10800-11000	18	6600-6800	S		
10600-10800	19	6800-7000	T		
10400-10600	20	7000-7200	U		
10200-10400	21	7200-7400	V		
10000-10200	22	7400-7600	W		
9800-10000	23				
9600-9800	24				
9400-9600	25				
9200-9400	26				

Table 14-19 Plutonic East Resource Zone Coordinate Codes

Plutonic East Resource Zone Coordinate Codes					
Y Range	**Y Code**	**E Range**	**E Code**	**Z Range**	**Z Codes**
14400-14600	0	7600-7800	76	1400-1600	0
14200-14400	1	7800-8000	78	1200-1400	1
14000-14200	2	8000-8200	80	1000-1200	2
13800-14000	3	8200-8400	82	800-1000	3
13600-13800	4	8400-8600	84	600-800	4
13400-13600	5	8600-8800	86	400-600	5
13200-13400	6	8800-9000	88	200-400	6
13000-13200	7	9000-9200	90		
12800-13000	8	9200-9400	92		
12600-12800	9	9400-9600	94		
12400-12600	10	9600-9800	96		
12200-12400	11	9800-10000	98		
12000-12200	12	10000-10200	00		
11800-12000	13	10200-10400	02		
11600-11800	14	10400-10600	04		
11400-11600	15	10600-10800	06		
11200-11400	16	10800-11000	08		
11000-11200	17	11000-11200	10		
10800-11000	18	11200-11400	12		
10600-10800	19	11400-11600	14		
10400-10600	20	11600-11800	16		
10200-10400	21	11800-12000	18		
10000-10200	22	12000-12200	20		
9800-10000	23	12200-12400	22		
9600-9800	24	12400-12600	24		
9400-9600	25	12600-12800	26		
9200-9400	26	12800-13000	28		
9000-9200	27	13000-13200	30		
8800-9000	28	13200-13400	32		
8600-8800	29	13400-13600	34		
8400-8600	30	13600-13800	36		
8200-8400	31	13800-14000	38		
8000-8200	32	14000-14200	40		
7800-8000	33	14200-14400	42		
7600-7800	34	14400-14600	44		
7400-7600	35	14600-14800	46		
		14800-15000	48		
		15000-15200	50		
		15200-15400	52		
		15400-15600	54		
		15600-15800	56		
		15800-16000	58		
		16000-16200	60		

Figure 14-9 Resource Area and Resource Zone Relationship



14.8 Mineral Resource Classification

14.8.1 Review of the Previous Classification Scheme

With the introduction of a new methodology on mineral resource estimation, a review of the classification scheme was necessary because of the software limitations.

Previous resource classification relied on a uniform formula:

Index = ns * n_holes/dist_av

- Index: Classification index
- Ns: number of samples (ns)
- N_holes: number of holes
- Dist_av: average anisotropic distance (dist_av)
- Sample constraint: maximum 2 samples per hole;

The classification index is listed in Table 14-20.

Table 14-20 Classification Index (2020)

Classification	Min Index	Max Index
1 (measured)	1.8	Inf
2 (indicated)	0.45	1.8
3 (inferred)	0.03	0.45
4 (unclassified)	<0.03	

The index is approximately in proportion to the square of the number of samples, in other words, the influence of number of samples increases significantly faster than mean sample distance (Zhu Z. H., May 26, 2021). For instance, a block at 20 m mean sample distance with more than 7 samples, the scheme would classify the block as measured.

The classification is sensitive to estimation parameter changes; the slight change in sample search distance parameters may cause significant difference on the measured category of material.

The proposed changes tie the estimation process, the number of samples, and sample distance with classification, and effectively eliminates the deficiencies in the previous classification scheme.

14.8.2 Aim of the Proposed Changes to Resource Classification Scheme

The scheme is aimed at

- Objectiveness without human bias
- Efficiency and consistency
- Reflection of sample density
- Reflection of estimation quality based on the number of samples within maximum allowed anisotropic sample distance, not mean sample distance
- Simple and easy to understand;
- Consistent with manual classification.

Associating the classification with estimation runs shall meet all above requirements. Such an association between estimation runs and classification however, requires static estimation parameters.

To maintain estimation parameters static requires that the grade estimates shall not be significantly influenced by estimation parameter variations.

As tests revealed, static estimation parameters do not change the grade estimates significantly with search parameters changing +/-30% along major and intermediate axis (Z H Zhu, 2015), and 1-3 m along minor axis (Zhu Z H, Du Plessis E, Selingue K, Spurling J, January 20, 2022). The test work conclusion is the foundation for the current automated classification scheme. Such a scheme using ID2 parameters for resource classification can closely resemble manual classification but without the subjectiveness of manual classification which only considers sample density (drill spacing).

14.8.3 Resource Classification

Mineral Resource classification is based on the maximum sample search range, number of samples, and samples per sector. A number of test works have been carried out, the parameters in Table 14-21 were adopted accordingly.

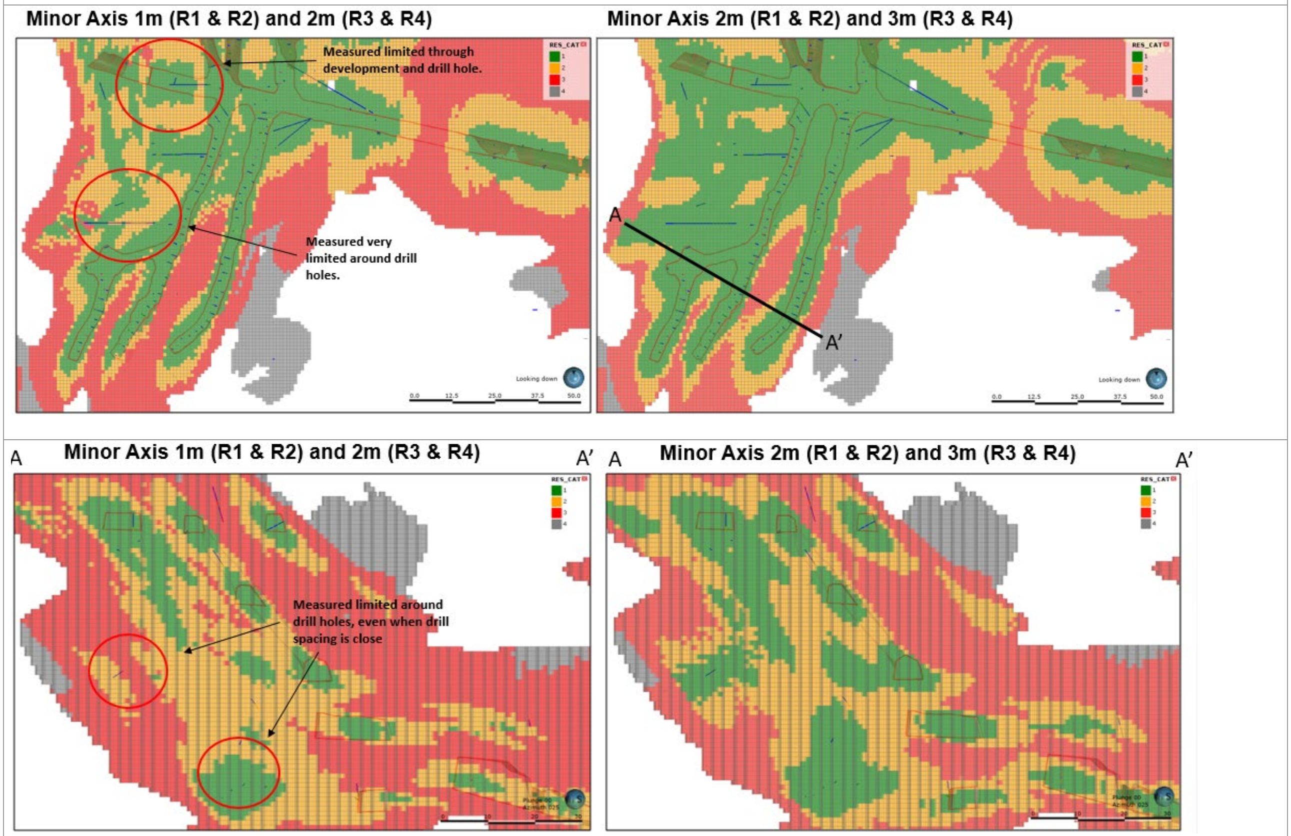
Table 14-21 Classification Parameters

	Search distance	Minimum samples	Implied Max samples	Max sample/ octant	Max empty octants
Measured	8x8x2	4	24	3	6
Indicated	15x15x2	4	3	3	6
Inferred	29x29x3	2	24	3	7
Unclassified	58x58x3	1	NA	NA	NA

Visual inspection of test works indicates that the category distribution seems to match reasonably well with the sample distribution (Figure 14-10).

Figure 14-10 Category Distribution vs Sample Distribution

Top left: measured category restricted almost immediately next to development drives; Bottom left: measured category restricted to drill holes only; top right and bottom right: measured category matches well with development drives and drill hole locations



At 1 m search distance, measured material is too restrictive causing measured category limited only immediately next to the development drive area (Figure 14-10 Top Left), or around drill holes if there are no development drives.

At 2 m search distance, measured category matches well with expected sample distribution (Figure 14-10 right).

For underground, a separate rule would have to be considered given there are holes which are nearly flat. Because of that, "max samples / octant" may not constrain the drill holes to at least 2.

Medium axis shall be adjusted based on the mineralisation plunge geometry, and it may not necessarily be the same as major axis.

Mining practice however seem to indicate that at 1 m search distance, measured category is closer to reality given the high nuggetty nature of the deposit.

14.8.4 Adopted Resource Classification Scheme

During the early test period it was thought that search distance of 2 m along minor axis was more appropriate and was therefore accepted to be the standard at Plutonic Gold Mine.

Tests also revealed that although there was no significant grade difference when the minor axis was changed between 1-2 m, locally however, 2 m search distance seems to smear grades, while 1 m search distance seems to make local high grades stand out.

To avoid such local grade smearing, 1 m search distance for minor axis was selected. This conflicts with the accepted measured category with minor search distance at 2 m. Decision was therefore made that classification shall be detached from estimation. A separate estimation run within the Au>=0.01 g/t indicator grade shell was used with minor axis search distance set at 2 m.

Such an approach effectively was delinked with estimation process. The consequence of this is that only sample distribution was considered, estimation quality was excluded.

Subsequent modelling revealed that such an approach could inflate the measured category, it however was too late to make any changes for the current reporting season.

Although there are questions regarding Measured Resources in the new Resource models, the confidence in the spatial location of most mineralization will adequately satisfy the classification of this material into the Indicated Resources category allowing for appropriate Mineral Reserves estimation and associated mine planning.

It is therefore considered allocation of Indicated Mineral Resources into Measured category is not a serious issue in a broader mine scale and associated mine planning.

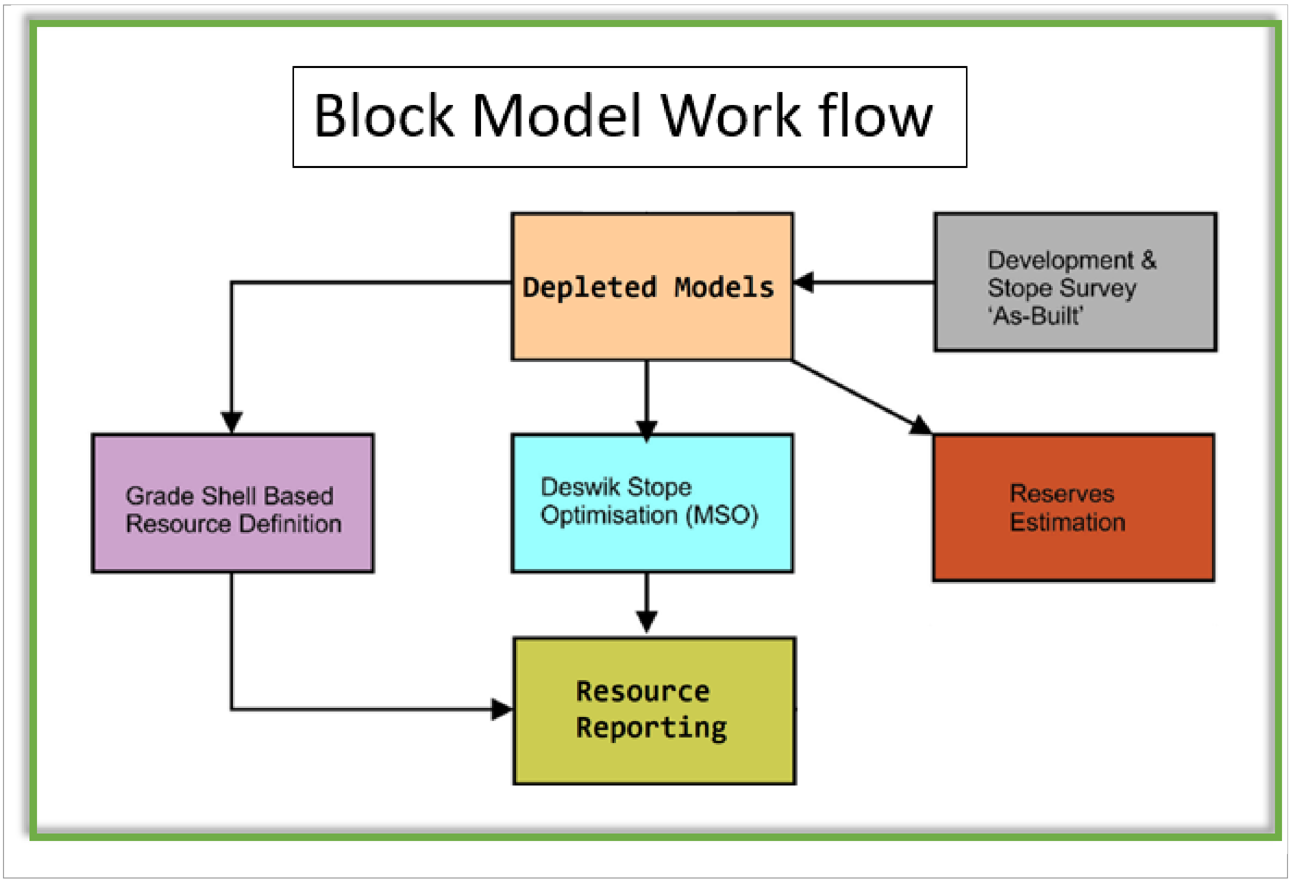
Such classification errors are not expected to affect mine production given procedure changes have rectified the situation for the current mine production.

14.9 Mineral Resource Reporting

On completion of the resource block models, they were provided to engineers for further processing (Figure 14-11).

- Models were first converted into Deswik format;
- Void models provided by survey department were used to deplete the models;
- Grade shells were generated using block models at cutoff grade of 1.66 g/t; and
- In parallel, DSO was conducted to build optimised stope designs with the similar assumptions as reserve DSO designs except that dilution and pillars were not considered with both set at 0.

Figure 14-11 Block Model Processing After Depletion



14.10 Geological Modelling

The dominant bedding / foliation parallel Mineralisation was controlled by the mine mafic unit ("**MMA**"), there is little mineralisation outside MMA (Optiro Pty Ltd, 2015, and Stephen Hyland, Mathew Keena, Ashutosh Srivastava, 7 Aug 2020. 2020). MMA is therefore needed to constrain the estimation.

Ultramafic unit does not generally contain mineralisation except extreme cases at the contact with MMA. Estimation for Au outside MMA is set to 0.005.

Dolerite dykes cross cut mineralisation and is not mineralised almost in all cases although abnormal grades or localised post-mineralisation remobilisation may exist randomly. All dolerite dykes were set Au = 0.

Bintang mineralisation is controlled by a sequence of dilation quartz veins. Quartz vein models are built as Bintang domains to constrain the estimation.

Fault models are used to isolate domains from extending into different blocks.

Surface mineralisation such as laterite mineralisation was built to constrain surface mineralisation.

All geological model wireframes are constructed independently using Leapfrog software "Vein Modelling tool" for dynamic surface generation by selecting appropriate lithology intervals in a Leapfrog process called "painting".

Lithology models are stored in Leapfrog files on the central server, and imported into each individual models when modelling to build geological model constraints using "Geological Models" vein tool.

14.11 Plutonic Underground Resource Models

The Plutonic Mineral Resource models were created using the newly developed methodology.

Historically, the understanding of mineralization lode continuity was an area requiring close attention, whilst modelling generally ignored tens of thousands of structural measurements. The current approach takes advantage of the structural measurements from orientated diamond holes and underground development faces to build structural trend surfaces, and uses the trend surfaces to determine the mineralisation trend in automatic domaining.

There are areas in some parts of the resource zones where the very large variances in observed gold grades particularly at the upper grade outlier end of the sample and assay distribution make Resource estimation decisions in these zones difficult when choosing an upper cut-off to limit the influence (and estimated metal content) of those zones. Examination of the high-grade outlier areas particularly in isolated areas revealed that some of the zones that don't show sufficient continuity in some instances, have been well isolated by the separation of different grade domains. Limiting the high grade is prudent given the known short-range continuity of this mineralization however ongoing review of the estimation methodology is still warranted to limit estimation risk, but it is accepted that part of this risk minimization must include more drilling to confirm mineralization continuity between wide-spaced holes. The production history of the mine shows considerable latitude in grade predictability in zones less well drilled. Despite these difficulties it should be noted that, the mine has successfully produced gold from the underground since 1995, including within those zones with known short-range geological structures and with associated lower confidence Mineral Resource estimations.

As discussed in Section 14.8 Mineral Resource Classification, there are questions regarding Measured Resources in the new Mineral Resource models, however the confidence in the spatial location of most mineralization will adequately satisfy the classification of this material into the Indicated Resources category allowing for appropriate Mineral Reserves estimation and associated mine planning.

Whilst a concerted effort was made to replace all block models with new automatically generated wireframe constrained models, areas, which were not on the high priority list of production, and without production activity since the last report, were not modelled in the current reporting season. Reporting for such areas were quoted directly from the previous Mineral Resource technical report dated December 30, 2020 and includes Plutonic East, Hermes and Hermes South.

Resource Reporting from all block models was aligned with DSOs for underground Mineral Resource based on identical parameters as those used for Mineral Reserve estimates except a higher gold metal price and subsequently a lower cut-off grade. Similarly, Open Pit Mineral Resources were described using generalized pit optimizations to arrive at Measured and Indicated material that would meet the 'reasonable prospects for eventual economic extraction' guidelines.

Inferred materials include all material not defined as Measured or Indicated using either the Deswik or pit optimization Mineral Resource estimation approach in the majority of block models, and additional inferred or better materials inside 1.5g/t grade shells generated using the block models. The gold price assumed for the underground optimization runs and the Open Pit optimizations was A$2,150 per ounce.

Assumptions on the Mineral Resources are listed in Table 14-22.

Table 14-22 Mineral Resource Report Assumptions

Gold Price (Resource)	A$2150
Gold Price (Reserve)	A$1950
Exchange Rate AUD/USD	0.77
Gold Rolyalty WA Gov	2.50%
Gold Royalty (Local)	3.60%
Mill Recoverty (Sulphide)	85%
Mill Recoverty (Free Gold)	90%
Longhole/Jumbo Stope Dilution	15%
Airleg Stope Dilution	5%
Stope Size (steep dipping ore)	10x15m
Stope Size(gentle dipping ore)	5x5m
Longhole Stope Minimum Mining Width	1.5m
Airleg Stope Minimum Mining Width	1.8m
Interstitial Pillar Width	4m

Stope Parameters	**Stope Sizes**	**Pillar Sizes**	**Resource Cut Off Grade**
Timor	10x15	5x5	1.66
A134	10x15	5x5	1.66
Baltic	5x5	5x5	1.66
Indian	10x15	5x5	1.66
Caspian	5x5	5x5	1.66
Cortez	5x5	5x5	1.66
Pacific	5x5	5x5	1.66
Caribbean	5x5	5x5	1.66
Plutonic East	5x5	5x5	1.5
Plutonic West	5x5	5x5	1.5

Open Pit	**Stope Size**	**Pillar Size**	**Resource Cutoff Grade**	**Gogld Pric**	**Pit Design Time**
Caspian (DSO Solids)	5x5	0	0.68	A$2150	2019
A4			0.44	A$2350	Jan-22
Perch Pit A & B			0.44	A$2500	Jan-22
Hermes			0.5	2150	2019
Hermes South			0.5	2150	2019

The Mineral Resources by zone for December 31, 2021 and the difference in ounces by zone versus the December 31, 2019 estimate are reported in Table 14-23.

Table 14-23 Plutonic December 31, 2021 Mineral Resources and Ounce difference vs December 31, 2019 Mineral Resources

	2021 Measured and Indicated			Gold Oz Diff	2021 Inferred			Gold Oz Diff
	Tonnes (000's)	Gold			Tonnes (000's)	Gold		
		Grade (g/t)	Ounces (koz)	Diff to 2019 (koz)		Grade (g/t)	Ounces (koz)	Diff to 2019 (koz)
Timor	**1,761**	**5.6**	**316**	**39**	**3,383**	**6.0**	**658**	**644**
Caspian	**567**	**3.5**	**63**	**58**	**730**	**3.9**	**92**	**-53**
Caribbean	**1,351**	**3.5**	**150**	**53**	**1,081**	**3.9**	**137**	**-92**
Baltic	**1,102**	**4.2**	**150**	**-34**	**3,649**	**5.2**	**607**	**357**
Indian	**1,298**	**6.6**	**277**	**66**	**2,886**	**5.3**	**490**	**272**
Cortez	**709**	**4.5**	**103**	**-14**	**991**	**6.6**	**210**	**-133**
Pacific	**1,192**	**2.9**	**113**	**-98**	**1,267**	**3.4**	**139**	**-232**
Area 134	**880**	**5.1**	**143**	**-37**	**2,824**	**5.5**	**498**	**171**
Plutonic East UG and Area 4 UG	**292**	**5.6**	**53**	**0**	**3,626**	**4.0**	**469**	**0**
Plutonic West UG	**-**	**-**	**-**	**0**	**393**	**2.8**	**35**	**0**
Plutonic Underground total	9,152	4.6	1,368	33	20,829	5.0	3,334	934

** Rounding errors exist in this table and number may not add correctly.*

The inconsistent area boundaries between the current and historical area divisions (Figure 13-6) mean that there is little meaning in reporting resources individually for each area. No direct comparison can be conducted on areas between the current resource and the 2019 resource. Resources are therefore only compared on the whole mine scale.

14.12 Resource Model Validation

14.12.1 Visual Validation

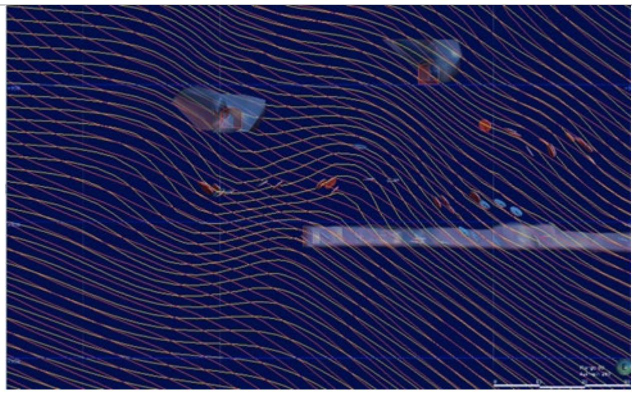
As Sections 13.3.2 to 13.3.6 demonstrated, the current resource models honour the structural trends remarkably well on a global scale.

With additional data higher resolution models will show the differences in orientation. On a local scale in grade control models, however, such global consistency may not reflect local trend without local restriction. With the model range constraint applied to the structural data, local trends were well followed (Figure 14-12).

Figure 14-12 Following the Structural Trend

Left: face map (BD2588_001) Purple – global trend; yellow – local trend. When the structural model range is restricted to local block model rather than mine scale, the local structural trend in a scale of 3-5 m is well modelled. Block model 15F3 (K Selingue and A Viey-Chevalier email, February 17, 2022)

SGS: sheared graphitic sediment; MZ: mineralisation; MA: mine mafic.



Visual validation also suggests overall consistency with sample grade distribution (see Figure 14-3).

14.12.2 Mine Reconciliation

To confirm the validity of the models, reconciliation data was used to compare with the resource models.

14.12.2.1 Mine Reconciliation Process

I = O + EOM + SOM

- I: input, for instance, reconciled trucked tonnes,
- O: output, for instance, mill crushed tons, reported by the mill,
- EOM: stockpile tons calculated using end of month survey volume and bulk density, reported by survey department, grade was based on EOM stockpile balance, and
- SOM: stockpile tons calculated using start of month survey volume and bulk density, reported by survey department, grade was based on SOM stockpile balance.

F = I / Tc

- F: reconciliation factor. Ft – ton factor, Fg – grade factor, Fo – ounce factor,
- I: reconciled input tons, in this case, reconciled trucked tons,
- Tc: claimed trucking tons from mine to the mill ROM,

Reconciled stope tons and grades

Tr = Ft * Fs

Tr: reconciled stope tons

Fs: claimed stope tons.

14.12.2.2 Comparison between Mine Reconciliation and Resource Models

Reconciliation was carried out covering the period between July 1, 2021 and February 28, 2022.

Because of the trucking record errors, any stope with (claimed tons / CMS -1) value at +/-15% is considered acceptable for model comparison purpose.

Stopes less than or equal to 1500 are considered unrepresentative.

Table 14-24 Stopes Used for Comparison with Resource Models

Stopes with Tons	Stope Num	Tons	T/Stope	Stope Num%	Oz	Oz%
<=1500	13	11792	907	13%	4992	12%
>1500	88	720391	8186	87%	37173	88%
Total Stopes	101	732183	7249	100%	42166	100%

There are only 13% stopes with tonnage <= 1500 tons.

Total of 487,076 tons were moved from underground stopes, including airleg stopes;

Only 168,386 tons from 22 stopes meet the criteria for model comparison, or 34.5% material in weight were selected. The results are therefore considered representative of the materials mined during the 8 month period.

Table 14-25 Reconciled Materials vs Resource Models

												Final Design Recovered			Resoruce Model report				
Area	StopeID	CMS File Name	Block ID	Central ID	CMS Ton	Claim Tons	Claim g/t	Claim Oz	Recon T	Recon g/t	Recon Oz	FDR T	FDR g/t	FDR Oz	LF T	LF g/t	LF Oz	Au Recon/LF	Oz Recon / LF
Baltic	**BD_3313_SOD_P01**	BD_33_13_SOD_LH_PO1.00t	14G2, 14G3	2111	5657	5207	1.77	296.32	5549	1.78	318.2	5858	1.77	333.4	5661	1.63	255.9	109%	124%
Baltic	**BW_3727_WOD_P01**	BW_37_3727_WOD_LH_P1_repair.00	14D3	2115	6980	6820	3.25	712.60	7267	3.28	765.3	7129	3.25	744.9	7026.7	4.64	1048.01	71%	73%
Baltic	**BW_4215_EOD_P01**	BW_42_15_EOD_LH_P1.00t	14E3	2112	1939	1613	1.54	80.07	1719	1.56	86.0	1563	1.66	83.4	1975	1.86	118.24	84%	73%
Baltic	**BW_4216_EOD_P01**	BW_42_16_EOD_LH_FINAL.00t	14E3	2112	1652	1705	2.11	115.46	1817	2.12	124.0	1286	2.91	120.3	1670	1.98	106.63	107%	116%
Caribbea	**CD_2208_WOD_P01**	CD_22_08_WOD_LH_P1.00t	15H2, 14H2	2113	15781	13455	1.93	836.51	14338	1.95	898.4	12082	2.27	883.4	15781.9	1.55	785.137	126%	114%
Caribbea	**CD_2411_SXC_P01**	CD_24_11_SXC_LH_P1.00t	14H2	2113	5879	5484	2.13	376.34	5843	2.15	404.2	5125	2.38	392.0	5982.7	2.43	468.307	88%	86%
Caribbea	**CD_2411_WOD_P01**	CD_24_11_WOD_LH_P1.00t	15H2	2113	11231	9723	2.47	773.49	10361	2.49	830.7	11116	2.47	884.3	11232	2.98	1075.8	84%	77%
Timor	**FF_1000_SOD_P01**	FF_10_10_SOD_LH_P12.00t	7G1	2121	29941	28339	1.99	1812.41	30199	2.00	1946.5	28505	2.06	1887.9	31285.2	2.68	2696.21	75%	72%
Baltic	**MD_2865_WOD_P01**	MD_28L_65___P1.00t	14F2		1659	1426	2.34	107.25	1519	2.36	115.2	1831	2.34	137.8	1670.4	3.02	162.342	78%	71%
Caspian	**ND_1010_EOD_P01**	ND_10_10_EOD_LH_P1.00t	18I1, 19I1	2125, 2126	4993	4931	5.00	792.61	5254	5.04	851.2	5246	5.00	843.4	4976.4	7.47	1195.34	67%	71%
Cortez	**ND_2310_NOD_P02**	ND_23_10_NOD_LH_P2.00t	12I2	2117	15545	13870	1.56	695.66	14780	1.57	747.1	15442	1.56	774.5	15529.5	2.60	1296.63	61%	58%
Pacific, A	**ND_3289_WOD_P01_F2**	ND_32U_89_WOD_P1_LH.00t	9I2, 10I2	2129,	3737	3779	3.17	385.47	4027	3.20	414.0	3261	3.83	401.5	3712	5.01	598.197	64%	69%
A134, Tim	**SD_2854_SXC_P01_F2**	SD_2854_SXC_P01.00t	10H2, 9H2	2136	3833	3456	1.71	190.00	3683	1.72	204.1	3999	1.71	219.9	3949.8	1.67	212.358	103%	96%
Timor	**TV_2320_NOD_P04**	TV_23_20_NOD_LH_P4.00t	7F2	2122	8194	6682	2.43	521.53	7120	2.45	560.1	6329	2.67	543.3	8166.4	3.18	835.274	77%	67%
Timor	**TV_2360_WOD_P02**	TV_23_60_WOD_LH_2.00t	7F2	2122	6482	5170	2.31	383.94	5509	2.33	412.3	11021	2.31	818.5	6507.6	1.59	332.942	146%	124%
Timor	**TV_2361_EOD_P01**	TV_23_2361___P1_repair.00t	7F2	2122	8166	8479	2.55	695.12	9035	2.57	746.5	8833	2.55	724.2	8166.4	2.14	561.434	120%	133%
Timor	**TV_2362_EOD_P01**	TV_23_62_EOD_LH_P1.00t	7F2	2122	1922	1751	2.44	137.33	1866	2.46	147.5	2738	2.44	214.7	1922.7	2.91	180.181	84%	82%
Caspian	**VD_1074_WOD_P01**	VD_10_74_WOD_LH_P01.00t	16I1, 17I1	2134, 2135	4322	5115	1.31	215.80	5451	1.32	231.8	4065	1.72	224.8	4341.3	1.77	246.836	75%	94%
Caspian	**VD_1075_WOD_P01**	VD_10_75_WOD_LH_P.00t	16I1	2134	3059	2949	1.27	119.95	3143	1.27	128.8	3060	1.27	124.9	3230.6	1.33	137.921	96%	93%
Timor	TI_2530_NOD_P01_F2	TI_25_30_NOD_LH_P01.00t	9H2	2118	36790	8847	1.63	463.00	9428	1.64	497.2	6255	1.56	314.0					
Timor	TI_2530_NOD_P01_F3	TI_25_30_NOD_LH_P01.00t	0	2118		5299	3.56	605.89	5647	3.58	650.7	5499	3.57	631.1					
Timor	TI_2530_NOD_P01_F4	TI_25_30_NOD_LH_P01.00t	0	2118		16635	4.30	2299.74	17727	4.33	2469.8	18144	4.30	2508.4					
Timor	**TI_2530_NOD_P01**		9H2	2118	36790	30781	3.40	3369	32802	3.43	3618	29899	3.59	3454	36917	3.82	4539.4	90%	80%
					CMS Ton	Claim Tons	Claim g/t	Claim Oz	Recon T	Recon g/	Recon Oz	FDR T	FDR g/t	FDR Oz	LF T	LF g/t	LF Oz	**Au Recon/LF**	Oz Recon / LF
All Stopes					177762	160733	2.44	12616	171281	2.46	13550	168386	2.55	13810	179705	2.92	16853	**84%**	80%

Recon T, Recon-g/t, Recon Oz are reconciled tons, grade, and ounces;

LF T, LF g/t, LF Oz are tons, grades, and ounces inside CMS solids cut from the Leapfrog resource models;

Au Recon / LF: reconciled grade / leapfrog model grade

Oz Recon / LF: reconciled ounces / leapfrog model ounces

Assuming the dataset is representative, the models overestimate the grades by 16%, or 20% ounces. Because of the trucking data error, the ounce errors are the combination of both the grades and tonnage, it is therefore concluded that the model may have overestimated the grade by up to 20%.

Procedure changes to the modelling process were introduced, and it is expected that such changes shall rectify the overestimation in future resource models.

14.13 Open Pit Resource Models

Previous Open Pit Mineral Resource estimates as at December 31, 2019 covered Hermes Area and the Hermes South Area, Caspian, Area 4 and Perch.

The historically operated Plutonic Main Pit area ceased operation in 2005 and had not been considered for any resource re-estimation since that time until Superior's December 2020 Mineral Resource report mainly because of economic conditions. Whilst the Plutonic Main Pit produced approximately 2.1 million ounces historically, most of the gold production since 2005 has been focused on the underground areas within the vicinity of this Open Pit area.

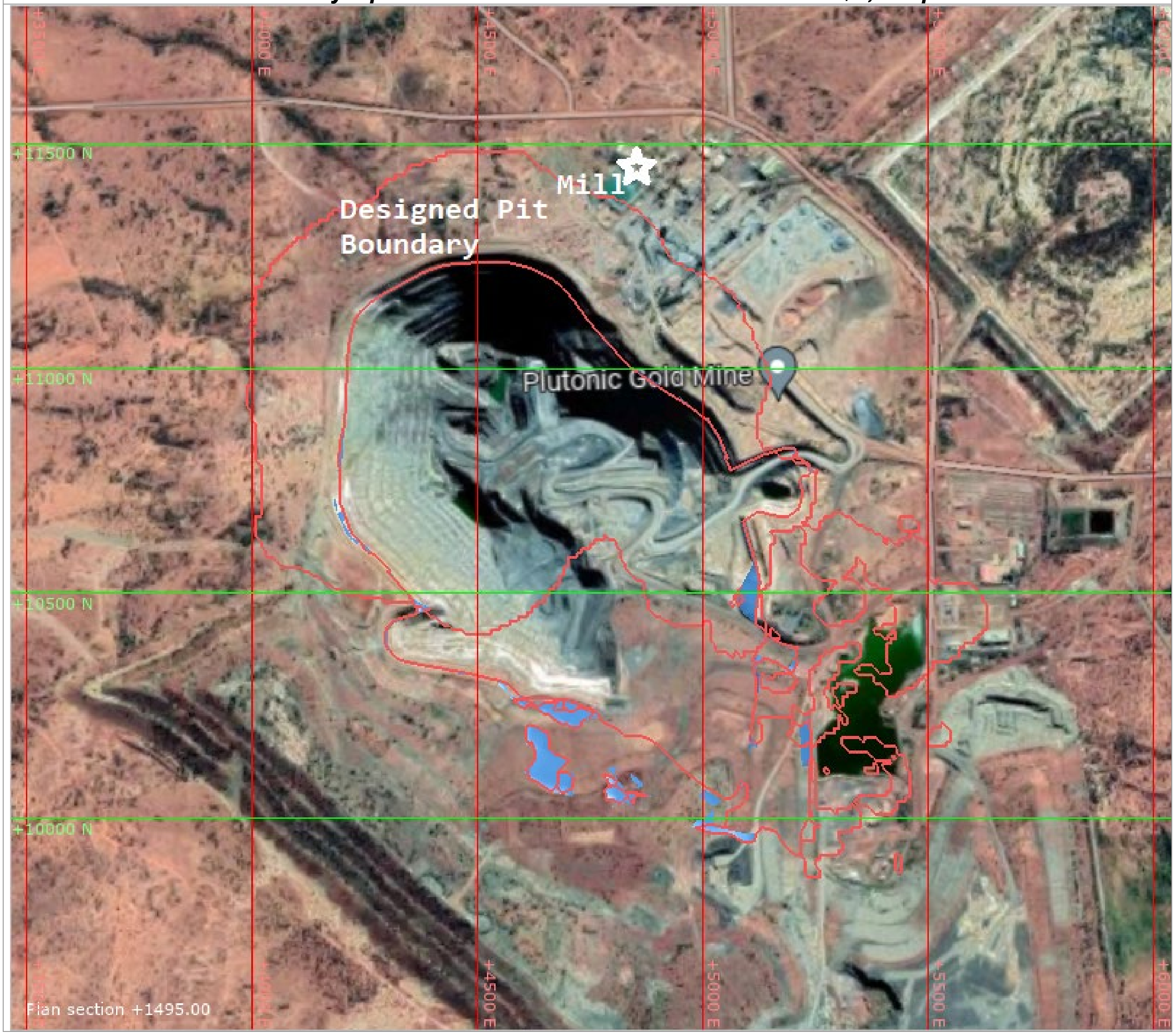
14.13.1 Plutonic Main Pit Resource Area and PEA Study

A PEA study for the Plutonic Main Pit area was completed in 2020 (S Hyland, M Keenan, A Srivastava, December 30, 2020). A pit design generated in the PEA was used in reporting the Main Pit resources for the current reporting season.

It was suggested that some mineralisation can only be mined by underground operation because of the proximity of the pit with the mill plant and the maintenance office (K Steyn, March 28, 2022, email communication) (Figure 14-13). Consequently, the DSO generated stope designs above the pit design and below the depleted pit survey was excluded from Caspian open pit Mineral Resource and included in underground Mineral Resource. The rest of the materials inside the DSOs above the pit design and below the depleted pit are counted as open pit resource at 0.68 g/t. For open pit reporting parameters, refer to Table Table 14-22 in Section 14.11 Plutonic Underground Resource Models.

Figure 14-13 Plutonic Main Pit Preliminary Optimised Pit Shell

Plutonic Main Pit Preliminary Optimised Pit Shell Based on Gold Price A$2,150 per ounce



14.13.2 Plutonic Main Pit Resource Area Resource Estimation.

Different style of mineralisation types near the surface were modelled independently.

- Primary mineralisation that is parallel to the bedding / foliation are modelled identically as other underground resources.
- Laterite material, surface supergene mineralisation was manually wire framed, static orientation was adopted, and different variography was used (Table 14-26 and Table 14-27).

Table 14-26 Laterite Mineralisation Search Parameters

	Ellipsoid Ranges			Number of samples		Sector Search		Drillhole Limit
Estimation Run	**Max**	**Int'med**	Min	**Min Sample**	**Max Sample**	**Max Sample**	**Max Empty Sect**	hole Per sector
R1	8	6	2	4	30	3	6	TRUE
R2	15	15	2	4	30	3	3	TRUE
R3	29	29	3	2	30	3	7	TRUE
R4	58	58	3	1	30			

Table 14-27 Laterite Variogram

Laterite Variogram	Dip	Dip Azimuth	Pitch
Au_Laterite:	0	0	30
Au_Laterite:	0	0	30

14.13.3 Plutonic Main Pit Optimization Input Parameters for Resource Reporting.

The Open Pit Mineral Resources for the Plutonic Main Pit are reported at a 0.4g Au/t cut-off grade. The resource estimation is also aligned with some basic underlying economic parameters to ensure that the 'reasonable prospects or eventual economic extraction modifying factors' are adequately considered. Table 14-28 below describes the Main Pit optimization parameters and assumptions that were considered for the preliminary pit optimization runs that helped derive the reportable resources.

Table 14-28 Summary of Parameters and Assumptions used for Preliminary Pit Optimization and Resource Reporting

Description	Units	Amount / Level
Gold Price	A$/oz	2,150
ROM Grade	Au (g/t)	0.4
Ore Mining Cost	A$/t ROM	3.90
Processing Cost	A$/t ROM	19.00
General & Admin Cost	A$/t ROM	4.00
Metal Recovery	%	88.0
Overall Wall Angle	degrees	45
Royalty	%	2.50%

14.13.4 Plutonic Main Pit Resource Summary (Within Optimized Pit) By Material Type.

The Plutonic Main Pit Mineral Resources were reported at a 0.4g Au/t cut-off grade following preliminary pit optimization in Table 14-29 below.

Table 14-29 Plutonic Main Pit Resource Summary – Reporting Cut-Off at 0.4g Au/t

Areas	Measured			Indicated			Meas + Ind			Inferred		
	Tonnes (Kt)	Au (g/t)	KOz (Troy)	Tonnes (Kt)	Au (g/t)	KOz (Troy)	Tonnes (Kt)	Au (g/t)	KOz (Troy)	Tonnes (Kt)	Au (g/t)	KOz (Troy)
Total	1,575	*3.7*	187	3,718	*2.0*	243	5,293	*2.5*	430	7,408	*2.0*	476

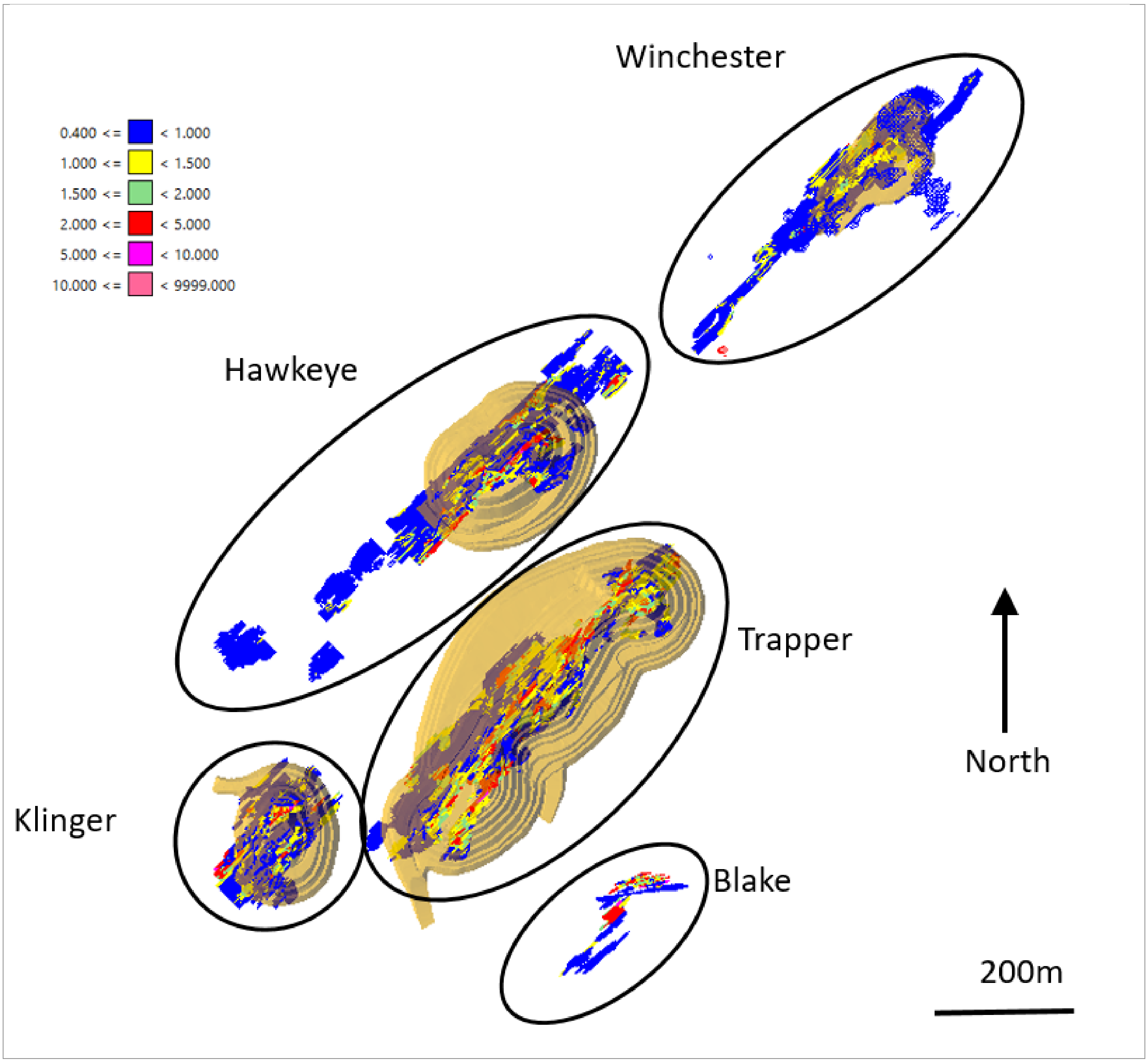
** Rounding errors exist in this table and number may not add correctly.*

14.13.5 Hermes and Hermes South Open Cut Pit Resource Areas.

At the Hermes Open Pit area, Mining ceased at this area in May 2019, there was no mining activity since and the Mineral Resources are unchanged from December 31, 2019.

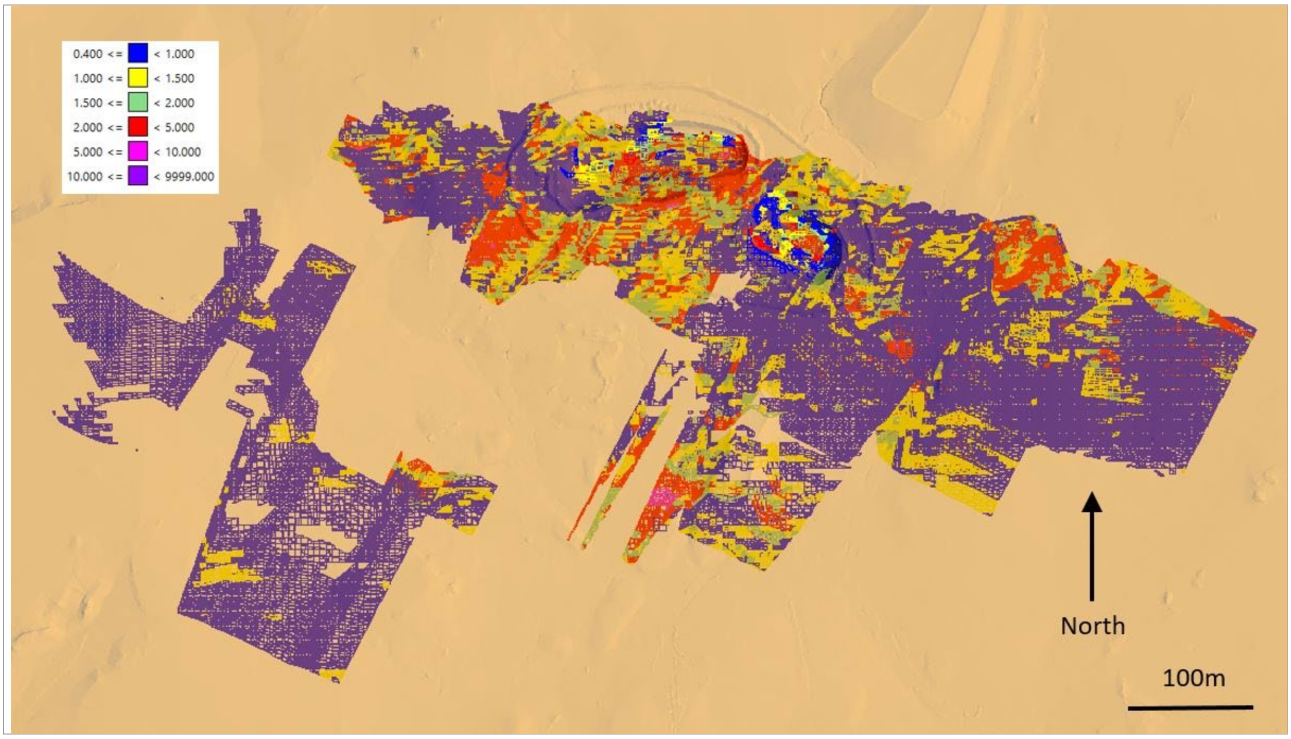
Figure 14-14 below is a plan view schematic showing remaining +0.4g Au/t mineralization (below pit surfaces) and describes the general Resource geometry present at Hermes.

Figure 14-14 Hermes Resource model (depleted) >0.4g/t with current pit surfaces



The Hermes South project area is a joint venture between Billabong (80% ownership) and Alchemy Resources Ltd (20% ownership). The project is located approximately 20km south-southwest of the Hermes mining operation which is 65km southwest of the Plutonic gold mine. The mineralisation remains open at depth and there is potential for further drilling to expand the area of gold mineralisation and add to the known Mineral Resource. Figure 14-15 below describes the general Resource geometry present at Hermes South.

Figure 14-15 Hermes South Resource model showing >0.4g/t with current pit surface



15 Mineral Reserve estimates

The Mineral Reserve estimate for Plutonic as at December 31, 2021 is shown in Table 15-1. This estimate is based on open pit design and underground mine design work completed by Superior. The estimate includes modifications to account for un-mineable material, dilution, and Inferred metal within the mining shapes (any contained Inferred material was set to waste grade).

All Mineral Reserves are shown on a 100% ownership basis.

Table 15-1 Summary of Mineral Reserves –December 31, 2021

Area	Total			Proven			Probable		
	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz
Hermes	-		-	–	–	–	-	-	-
Hermes South (80% JV)	-	-	-	–	–	–	-	-	-
Area 4 & Perch	69	1.1	3	65	1.1	2	4	0.9	0
Main Pit	334	1.8	20	159	2.0	10	175	1.6	9
Open Pit Sub-total	**403**	**1.7**	**22**	225	1.8	13	**179**	**1.6**	**9**
Plutonic East UG and Area 4 UG	-	-	-	-	-	-	-	-	-
Plutonic	5,148	3.7	608	2,489	3.8	307	2,660	3.5	301
Underground Sub-total	**5,148**	**3.7**	**608**	**2,489**	**3.8**	**307**	**2,660**	**3.5**	**301**
December 31, 2021 Total	**5,552**	**3.5**	**630**	**2,713**	**3.7**	**320**	**2,839**	**3.4**	**310**

Notes:

1. Open Pit Mineral Reserves are estimated at a cut-off grade of 0.5 g/t Au.
2. Underground Mineral Reserves are estimated at a stoping cut-off grade averaging 1.8 g/t Au dependent on mining area.
3. Mineral Reserve economics are estimated using an average long term gold price of $1,348 per ounce (A$1,950).
4. Underground and Main Pit fresh rock bulk density defined as 2.9 t/m3.
5. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages.
6. All figures are rounded and use significant figures and numbers may not add correctly

15.1 Plutonic Underground

The Mineral Reserves at Plutonic are generally derived from multiple lode systems with variable dip from horizontal to vertical hosted by mafic amphibolite rocks (referred to as mafic at the mine). Thin sedimentary layers including graphitic shales and chert bands are present within the mafic unit. The ore bodies have complex shapes and mineral distribution, and there are mine wide structural features.

Planned and newly designed stope and development shapes were used to determine the Mineral Reserves. Stope shapes were evaluated for mine ability against a variety of criteria, including a preliminary check on the stope economics. Stopes that did not represent a reasonable return or were considered impractical for mining were removed from the Mineral Reserves during compilation of the Mineral Reserve statement.

15.1.1 Mineral Reserve estimation process, cut-off grades, factors, mining recovery, and dilution

The approaches used to generate the Mineral Reserve stope shapes were:

1. Stope optimisations were run using DSO on the new Mineral Resource models using updated inputs including gold price and mining costs. The optimiser shapes were then reviewed to ensure mine ability. The reviews ensured there was no counting of material already extracted. The mining areas where this approach generated Mineral Reserve material included in this estimate were from Plutonic Underground, namely:
    a. Baltic including Baltic Extension,
    b. Indian,
    c. Caspian
    d. Carribean
    e. Timor,
    f. Cortez,
    g. A134,
    h. Pacific.
2. Plutonic site staff provided current site stope designs which were evaluated against the new Mineral Resource models and included if economic under the 2022 Mineral Reserve requirements.

All designed stope shapes regardless of derivation method had mining dilution and recovery factors applied. Mining factors used to determine the Mineral Reserves were based on site reconciliation data as follows:

— Longhole stoping had an average mining dilution of 15% (at dilution grade 0.0 g/t) and mining recovery of 90% applied;

— In the flatter-dipping Indian area, some longhole stopes were designed with a flatter minimum footwall angle of 30° (compared to normal minimum footwall dip of 40°), these stopes had a mining dilution of 15% (at waste grade) and mining recovery of 90% applied to reflect the difficulty associated with rolling of blasted material down to bogging levels on these reduced footwall angle surfaces;

— Airleg stoping (~% of tonnes in the total Mineral Reserve) had mining dilution of 5% (at dilution grade 0.1 g/t) and mining recovery of 98% applied; and

— Ore development had no dilution applied and 100% mining recovery assumed.

Cut-off grades were determined for each mining area based on a gold price of A$1,950/oz, a state royalty of 2.5%, and costing and metallurgical inputs from site reconciliation data. The mining costing includes drill and blast, load and haul, processing, site general and administration costs, geology costs, sustaining capital expenditure and all mine overheads. These inputs are summarised in Table 15-2.

Table 15-2 Cut-off Grade Estimation Cost and Revenue Inputs

Factor	Unit	Assumption	Source
Gold Price	A$/oz	$1,950	Market
State Royalty	%	2.5%	Site Actuals
Op Development	$/m	$5,225	Site Actuals
Capital Lat Development	$/m	$5,225	Site Actuals
Development Rehabilitation	$/m	$4,195	Entech Estimate from Site Actuals
Escapeway Rises	$/m	$1,742	Site Actuals
Return Air Rises	$/m	$1,742	Site Actuals
Longhole Stope	$/t stope	$57	Site Actuals
Airleg Stope	$/t stope	$53	Site Actuals
Jumbo Stope	$/t stope	$50	Site Actuals
Geology	$/t ore	$15	Site Actuals
Mill Cost	$/t ore	$27	Site Actuals
G&A	$/t ore	$9	Site Actuals
Sustaining Capex	$/t ore	$7.53	Site Actuals

Metallurgical recoveries used to generate the Mineral Reserves were based on site production data and detailed metallurgical testing to an appropriate standard. A summary of the metallurgical recoveries used to determine the cut-off grades is shown in Table 15-3.

Table 15-3 Metallurgical Recovery Assumptions for Cut-off Grade Estimation

Mining Area	Met. Recovery
A134	88.80%
Baltic	94.00%
Caspian	81.90%
Cortez	88.80%
Indian	83.10%
Pacific	79.30%
Plutonic East	84.20%
Timor	93.50%

Cut-off grades used for the estimation of the Mineral Reserves were generated based on metallurgical recoveries, costing and revenue data and then adjusted to reflect mine planning priorities as detailed in Table 15-4.

Table 15-4 Mineral Reserve Cut-off Grades by Mineral Resource Model

Mining Area	Resource Model	Stoping COG (g/t Au)	Ore Dev COG
A134	10H, 10I, 10J, 10K, 11H, 11I, 11J, 11K	1.8	1.4
Baltic	11B, 12B, 12C, 12D, 12E, 12G, 13B, 13C, 13D, 13E, 13F, 13G, 14C, 14D, 14E, 14F, 14G	1.8	1.4
Caspian	16H, 16I, 16J, 17H, 17I, 17J, 17K, 18E, 18F, 18G, 18H, 18I, 18J, 18K, 19E, 19F, 19G	1.8	1.4
Cortez	12H, 12I, 12J, 12K	1.8	1.4
Caribbean	13H, 13I, 13J, 13K, 14H, 14I, 14J, 15H, 15I, 15J	1.8	1.4
Indian	15D, 15E, 15F, 15G, 16D, 16E, 16F, 16G, 17E, 17F, 17G	1.8	1.4
Pacific	6I, 6J, 6K, 6M, 7I, 7J, 7K, 7L, 8I, 8J, 8K, 8L, 9I, 9J, 9K	1.8	1.4
Plutonic East	pe_my2015reclss_mii	1.8	1.4
Timor	6F, 6G, 7E, 7F, 7G, 7H, 8F, 8G, 8H, 9G, 9H	1.8	1.4

The following process was applied to estimate the Mineral Reserves:

1. Stope optimisations were run on the Mineral Resource models with Inferred and depleted material set to waste grade (0 g/t), and with an exclusion flag on material within 5 m of existing stoping voids, assuming the cut-off grades summarised in Table 15.5;
2. Stope shapes were reviewed where required for practicality. Stope design parameters were applied based on site operational data as follows;
   a. Longhole Stoping:
      i. Minimum footwall dip angles were set at 40° (30° in parts of the Indian area);
      ii. Maximum vertical sub-level distances were designed to match existing development or set at either 15 m, floor to floor, or 7.5 m (half-height stopes);
      iii. Minimum design stoping widths were set at 1.5 m (prior to dilution being applied);
   b. Airleg Stoping:
      i. Maximum footwall dip angles were set at 30°;
      ii. Maximum horizontal extents up-dip were set at 30 m;
      iii. Minimum design airleg stoping widths were set at 1.8 m (prior to dilution being applied).
3. Development required to access the stope shapes was designed to a sufficient (feasibility study) standard of detail;
4. Tonnes and grades were determined by evaluating shapes against the Mineral Resources. Development was depleted from stope shapes during the evaluation process to avoid double counting;
5. Levels by level were evaluated using the cost and revenue assumptions applied in the cut-off grade estimation and sub-economic levels were removed from the Mineral Reserve.

A preliminary mine plan was generated in Deswik software to ensure that mining of the Mineral Reserve material only would provide a positively economic case applying current fleet resources and reconciled site productivity assumptions.

15.1.2 Reconciliation

The reconciliation of Mineral Reserves to the mine production typically provides a measure of the accuracy of the previous estimates. At Plutonic, the complex nature of the zones, the small zones, and the modification of ore zones as additional geological information is obtained results in a significant proportion of the annual production being from areas beyond the Mineral Reserve estimate. In many cases the ore is defined and mined before it is ever included in the Mineral Reserve estimate.

Since acquisition, Billabong has not continued with the practice of comparing DOM to OR largely due to the short turnaround time of identifying new ore and bringing it into production prior to the yearly Mineral Resource and Reserve update.

To gauge grade performance at Plutonic Underground, Billabong has maintained the practice of comparing DOM to GC (Grade Control) and is shown in Table 15-5 below.

Table 15-5 Declared Ore Mined v Grade Control (planned mining)

Mine Call Factors		Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21
- Ore Tonnes	t	-1%	-1%	-1%	15%	6%	10%	14%	8%	-3%	-10%	-4%	10%
- Grade	g/t	20%	14%	11%	3%	16%	32%	12%	10%	6%	9%	-19%	6%
- Contained Au Variance	oz.	19%	14%	11%	19%	23%	45%	24%	17%	3%	0%	-23%	15%

The historic reconciliation has been negative however for the last 12 months it has been positive as demonstrated in Table 15-5.

Table 15-5 Reconciliation by Year

Mine Call Factors	2017	2018	2019	2020	2021
Ore Tonnes	0%	-2%	-2%	-1%	4%
Grade	-6%	-12%	-4%	-8%	10%
Oz	-5%	-14%	-6%	-8%	14%

15.2 Hermes Open Pit

The prior Mineral Reserves at Hermes and Hermes South were reclassified to Mineral Resources at December 31, 2021 while further work in the area is being conducted.

15.3 Open Pit Mineral Reserve

The Area 4, Perch and Main open pit Mineral Reserve at December 31, 2021 is shown in Table 15-1.

Area 4 open pit began mining in April 2021 and Perch open pit began mining in August 2021. At year end, small Mineral Reserves remained to be completed in both open pits.

Main Pit Deeps open pit has been added to the Mineral Reserves. Some of the Mineral Resources previously estimated as part of the Main Pit Pushback PEA in 2020 located at the bottom of the Main Pit have been included in this Mineral Reserve estimate.

15.4 Plutonic stockpiles

All open pit stockpiles are completed.

15.5 Changes in the Mineral Reserve estimate over time

The tonnes and ounces changes between the technical reports of Superior dated December 31, 2019 and December 31, 2021 result from:

- Plutonic Underground Mineral Reserve has changed significantly since the last Mineral Reserve update in December 2019, as summarised in Table 15-6. This is mainly related to significant changes in Mineral Resource estimation methodologies by using advance technological 3D modelling by including all historic data sets, including geological structure, lithology and alteration, to be incorporated into the 3D modelling software, where the 3D models are better predicting the volume and grade of gold and where it exists in space.

Table 15-6 Plutonic Underground Mineral Reserve Variance to Previous

Area	Total			Proven			Probable		
	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz
Dec 2021 UG Mineral Reserve	5,148	3.7	608	2,489	3.8	307	2,660	3.5	301
Dec 2019 UG Mineral Reserve	2,578	4.0	329	1,071	4.4	152	1,507	3.7	177
Variance	**2,571**	**-0.3**	**279**	**1,418**	**-0.6**	**156**	**1,153**	**-0.1**	**124**

- Plutonic Open pit Mineral Reserves have also changed significantly since the last Mineral Reserve update as summarised in Table 15-7. This is mainly related to removal of Hermes Gold Mine and Hermes South from Mineral Reserves and the addition of Area 4, Perch and Main Pit Deeps to Mineral Reserves.

Table 15-7 Open Pit Mineral Reserve Variance to Previous

	Total			Proven			Probable		
	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces Koz
Dec 2021 OP Mineral Reserve	403	1.7	22	225	1.8	13	179	1.6	9
Dec 2019 OP Mineral Reserve	1,354	1.1	48	0	0	0	1,354	1.1	48
Variance	**-950**	**0.6**	**-26**	**225**	**1.8**	**13**	**-1,175**	**0.5**	**-39**

- Cost and gold price assumptions have been materially adjusted based on site estimates and the current gold market climate.

16 Mining methods

Ore feed to the mill during 2020 - 21 was from mining operations at Plutonic Underground (underground mining methods), the Area 4 and Perch Open Pits and surface stockpiles of mineralised waste which commenced in November 2019 after the Hermes Open Pit ores were depleted. The current plan anticipates continued ore feed from these mining operations.

There is substantial site history and experience with the underground mining methods employed. The only previously unmined area in the underground Mineral Reserve mine plan is the Baltic Extension and Western Front (Indian & Baltic West) area, which is envisaged to continue to employ those mining methods.

Open pit mining has been undertaken by Billabong at Area 4 and Perch over the last year and the open pit Mineral Reserve is based on this extensive experience.

16.1 Plutonic Underground

Plutonic Underground is a mechanised access underground mine that has been in continuous operation since 1995. Historically the mine has produced at a rate of up to 1,400 ktpa ore, although in recent years' production has stabilised at approximately 800 ktpa. The current constraint on underground production is not the infrastructure: the constraint is gathering the data to move the stopes through the planning process and into production.

The Plutonic Underground has seven active mining zones as shown in Figure 16-1. Seven of these mining zones are well-established having been active for several years (Established Areas). The eighth zone, Baltic Extension, is a new mining zone (New Areas).

The underground mining operation covers an area of about three kilometres north-south and two kilometres east-west and currently extends over a 500 m vertical extent from approximately RL 150 m to RL 650 m. The Baltic Extension is a new mining area adjacent to existing workings and is planned to extend the depth of operation by a further 500 m vertical including Inferred Mineral Resources (total depth below surface 1,150 m). As the depth of mining increases, the ground stress also increases and can create significant mining issues. The mining studies to date have not considered stress as part of the Baltic Extension, however mining to this depth will occur gradually and the issue is not imminent or expected to materially impact successful extraction of the Mineral Reserves in this area.

Underground mining at Plutonic takes place from five declines, four of which are in the Plutonic main operation and the fifth is located about five kilometres east of the main operation at Plutonic East. The underground workings are extensive with several internal ramps in place to access the mining zones. A mine schematic of the main Plutonic area is shown in Figure 16-1.

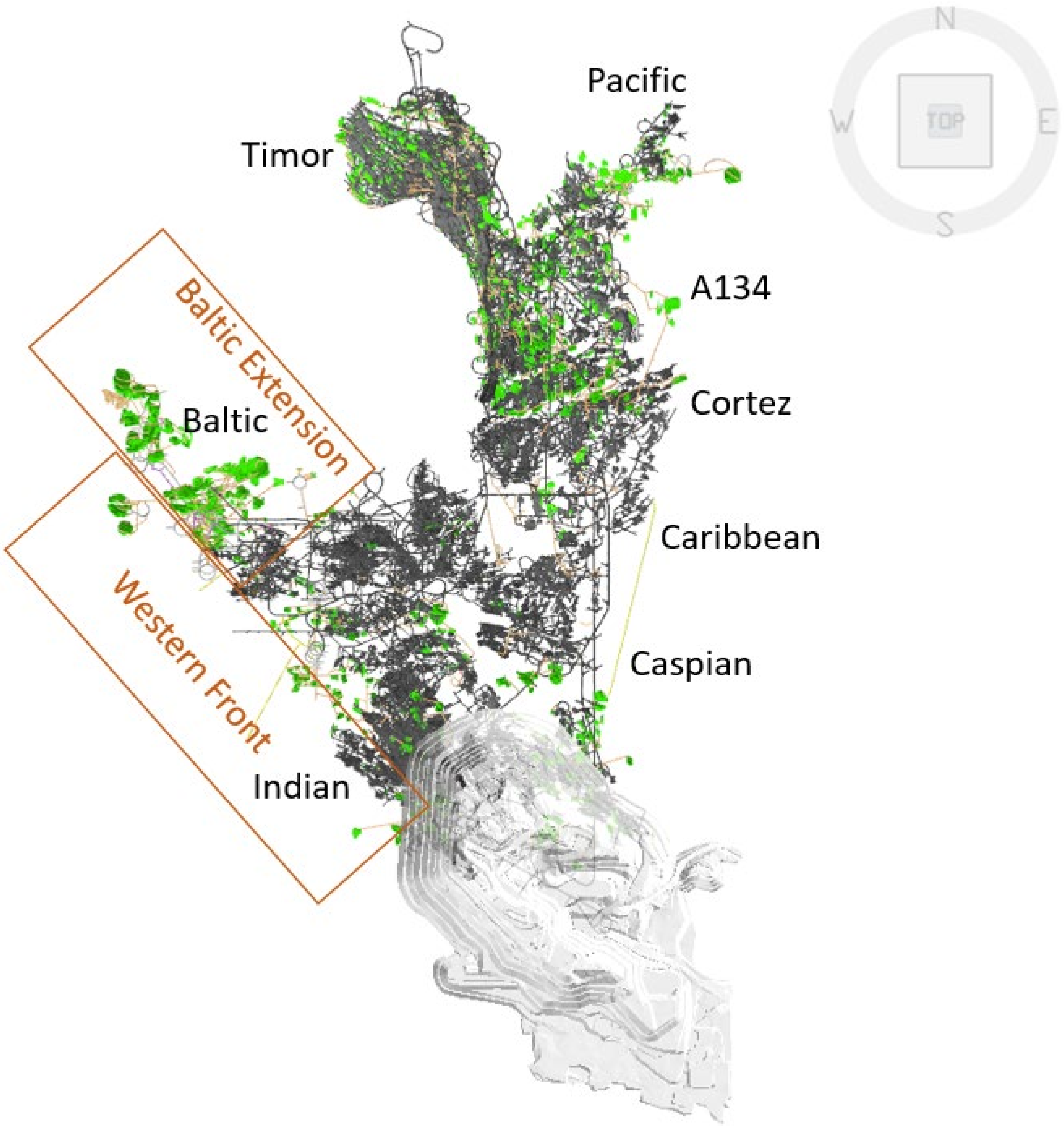
There are three general mining methods used at Plutonic:

- Long hole retreat mining (the main method applied to the vast majority of stoping);
- Jumbo stripping (slashing); and
- Airleg (jackleg) mining.

The split of Mineral Reserves ore tonnage production by mining method is;

- Long hole stoping – 87%;
- Airleg stoping – 1%; and
- Ore development – 12%.

Figure 16-1 Plutonic Main Underground Reserves Plan



16.1.1 Plutonic Underground mine design

Mine designs for stopes and development are regularly reviewed and updated as more detailed information is acquired through development and infill drilling. The mine design process is rigorous and includes detailed mine plans and comprehensive approvals prior to execution of the plan. Planning commences using the latest updated Mineral Resource block models, modified to reflect localised geological features, and any infill drilling. Development designs are based upon these updated models. Stope designs are prepared based upon the final Mineral Resource block models, referred to as grade control block models. The stope design is compiled in a mine instruction which includes all aspects of the stope design such as development, mining method, ventilation, ground support, long hole drill layouts (if needed), and backfill. The mine instruction is circulated for approval before the work commences.

Stope designs are reviewed for:

- Stability (use of a stope stability graph as required).
- Degree of undercutting of hanging wall or footwall.
- Stope geometry and shape.
- Local ground conditions.
- Amount of planned dilution and allowance for unplanned dilution.

- Mining recovery factors.
- Historical stope performance in the area.
- Historical stope performance for similar conditions.
- Presence of adjacent voids or filled stopes.

16.1.2 Mining methods

Long hole retreat stoping is the most common mining method used at Plutonic. Stope dimensions are variable from six metres to 20 m high vertically and shapes vary from vertical stopes to stopes that incorporate side wall slashing and overhead drilling to extract a mineralised zone. Stopes vary from narrow vertical stopes to wedge shaped stopes where the footwall is blasted at an angle such that the broken material will drill down the footwall and the load-haul-dump ("**LHD**") vehicle can operate out to the footwall limit of the stope when mucking. The blast holes are drilled using electric hydraulic long hole rigs and charged with ANFO-type explosives by pneumatic charge wagons.

Long hole stopes are mucked (bogged) with tele-remote LHD units. The LHDs generally muck from the stopes to a stockpile on tele-remote. The ore is moved to the surface ROM pile by underground trucks that are loaded manually by an LHD.

Where ore zones are horizontal or shallow dipping and do not extend for a significant distance into the wall of a heading the ore is mined by slashing with a development jumbo.

For very narrow zones and small raises, the ore is mined using airleg / jackleg drills. In thin lenses the stope is mucked with a scraper to bring the ore from the heading to an ore drive from where it is mucked with an LHD for haulage to surface. This method has much lower productivity compared to longhole stoping but has significantly lower dilution. This method is generally reserved for narrow moderately to gently dipping high grade zones.

Development is mined using electric hydraulic twin boom jumbos.

In general, the ground conditions at Plutonic are good although the ultra-mafic rocks are weak and can fail if exposed in the hanging wall. The site has an extensive history of mining performance contributing to strong geotechnical knowledge and has developed guidelines to respond local conditions. A ground control manual has been prepared for the site and is used in mine planning, mine development, and production.

16.1.3 Mobile equipment

The mine equipment at Plutonic is industry standard trackless underground diesel equipment constructed by reputed manufacturers. The equipment is generally more appropriately sized for a larger operation (the mine previously operated at a higher rate and in larger stopes) and the equipment offers limited potential for more selective mining of smaller stopes. The main underground fleet is shown in Table 16-1.

The age of the mobile fleet is variable:

- The trucking and loading fleets are currently planned and being upgraded with the purchase of two new loaders (1x 17t and 1 x 14t) and two new trucks (2 x 63t). These will directly replace existing equipment.
- The jumbo drilling fleet consists of 1 new jumbo and 2 refurbished jumbos. The longhole drill fleet consists of one new drill and two longhole drills of more than 10 years old and are likely to require either replacements or major rebuilds in the next few years.

Table 16-1 Plutonic Underground mobile equipment

Unit type	Description	Age
Jumbo	D07-260 Twin Boom Jumbo	2002
	DD420 Twin Boom Jumbo	2008
	DD421-60 Twin Boom Jumbo	2020
Longhole Drill	D07 Production Drill	2002
	D07 Production Drill	2006
	DL432i Production Drill	2019
Loader Truck	LH517 Loader	2017
	LH517 Loader	2018
	LH514 Loader	2017
	LH514 Loader	2018
	R1300G Loader	2005
	TH663 Truck	2014
	TH663 Truck	2014
Truck Support	TH663 Truck	2014
	TH663i Truck	2018
	TH663i Truck	2018
	IT62i Integrated tool carrier	2008
	Volvo L90H	2019
Support	WA250 Integrated tool carrier	2006
	IT930H Integrated tool carrier	2008
	IT908H Integrated tool carrier	2010
	IT908H Integrated tool carrier	2010
	Getman Anfo charger	2013
	Normet Charmec	2021
	140 Cat Grader	2006
	Izusu FVZ26-300 water cart	2018

16.1.4 Underground infrastructure

The mine is accessed by portals and a series of ramps throughout the mine. Many of the ramps are interconnected for ventilation and ease of access. The ramps are typically 5.8 m high by 5.5 m wide, however, some of the older ramps are smaller. Ore access drives and ore drives have historically been driven at 4.5 m high by 4.5 m wide headings in Timor and Plutonic East and 4.5 m high by 4.5 m wide headings in Spur and Baltic. Current mining of ore drives is done at 4.5 m high and 4.5 m wide.

Ore is mucked from the stopes and hauled by underground trucks to the surface ROM pad, where it is stockpiled according to metallurgical recovery type. It is then fed into the primary crusher.

There are ventilation raises to surface as part of the ventilation circuit. The mine is ventilated with a combination of intake and exhaust fans which move 481 m^3/sec of fresh air. There are numerous auxiliary fans in the mine which are used in conjunction with ventilation ducting to provide fresh air to active workplaces. The mine has sufficient ventilation in place to achieve the Mineral Reserve mine plan.

Electrical power is generated on site and is distributed throughout the mine at 11,000 volts. The 11kV power is transformed to 1,000V for service as required for the mine equipment.

In general, the mine is dry and there are only minor inflows aside from water used in operations, however, the wide-spread nature of the mine necessitates a pumping system that can remove water from each of the areas. The existing pumping system (consisting of centrifugal pumps transferring water to the helical rotor pumps in the primary system) will be sufficient for achievement of the Mineral Reserve mine plan.

The mine historically used paste fill in some stopes. The paste backfill plant is located on surface above the mine workings and there is a system of pipelines and boreholes for the delivery of paste fill to the stopes. The paste fill plant is currently decommissioned and there is no paste fill required for the Mineral Reserve mine plan.

Mine equipment maintenance is all carried out in a surface shop located near the pit rim. Provision has been made in cost estimation for servicing infrastructure equipment in the underground mine.

There is a two-way radio communications system throughout the mine.

16.2 Open Pit Operations

16.2.1 Open pit mining method

Current Open Pit Mining at Billabong occurs at Area 4, Perch and Plutonic Main Pit. Open pit mining was paused at the Hermes Complex in May 2019, which is about 65 kilometres from Plutonic. The Hermes Complex consists of two project areas, namely the Hermes Gold Mine and the Hermes South project.

- **Area 4** – It has one open pit cutbacks (see Figure 16-2)
- **Perch** – It has two open pit cutbacks, A and B (see Figure 16-3)
- **Main Pit Deeps** – It has following one open pit (see Figure 16-4)

Figure 16-2 Area 4 Layout

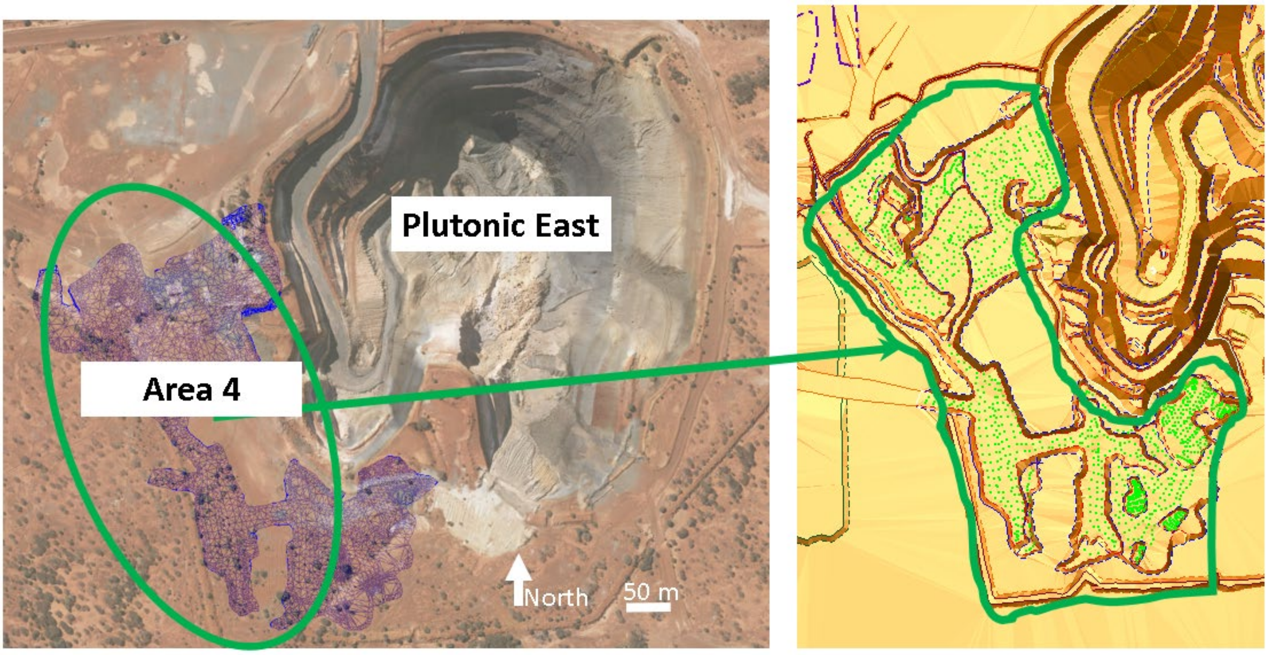


Figure 16-3 Perch Layout

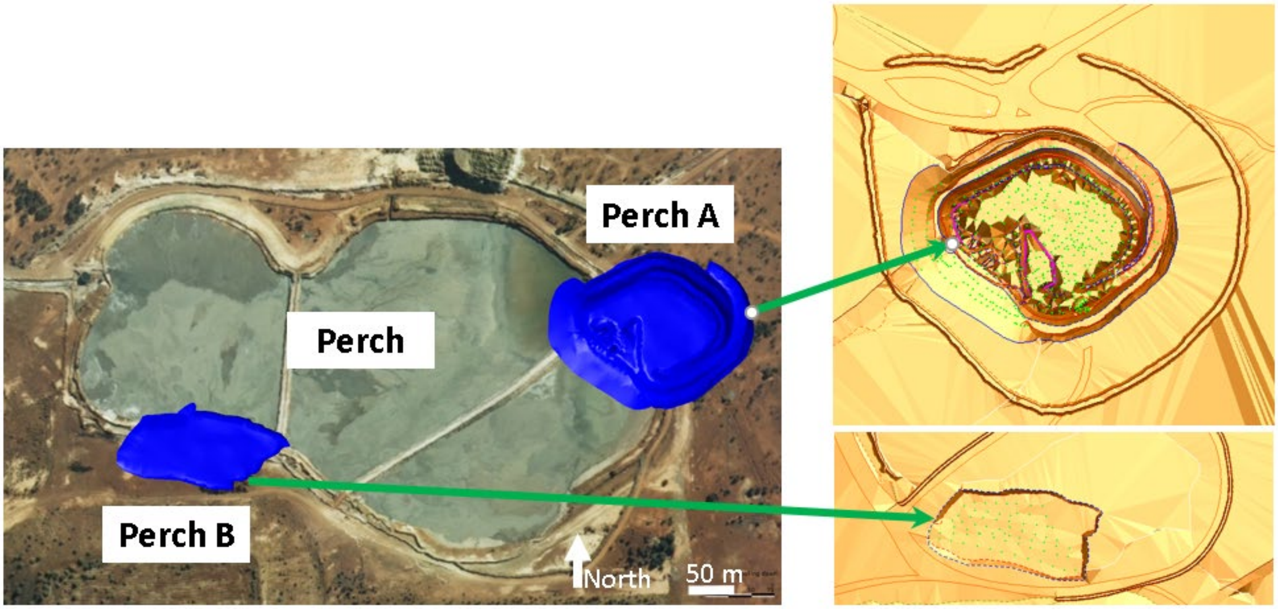


Figure 16-4 Main Pit Deeps Layout

The Area 4 open pit commenced being mined in April 2021 and completed in August 2021. During this period, total saleable gold produced was 9,252 ounces.

The Perch open pit commenced being mined in September 2021 and completed in April, 2022. During this period, total saleable gold produced was 6,334 ounces.

The Main Pit Deeps open pit is scheduled to commence being mined in 2022.

All pits are mined as a conventional open pit excavator-truck mining operation. A mining contractor was engaged for drilling, blasting, loading, hauling, and dumping, as well as civil services for general site maintenance works. The material mined from each pit is transported along the site haul road to the ROM pad for processing through the existing mineral processing configuration.

Areas disturbed by mining activities have been stripped of vegetation, topsoil, subsoil, and potentially hardpan duricrust material and stockpiled within designated storage areas for later use in rehabilitation. Laterite waste rock is being used to construct haul roads, erect windrows and sheet ore pads, with surplus material stockpiled in an accessible location for use in haul road maintenance. All other waste rock is being hauled directly to the waste dump, and sequenced so that any potential acid forming or hazardous material is encapsulated within the dump.

Some near surface weathered material is free-dig, but 100% of transitional material and fresh rock is blasted. Blast-hole drilling is undertaken using surface top hammer drill-rigs on 5 m benches using hole sizes up to 115 mm diameter. Drill burden, spacing and sub-drill design is a function of material types and powder factor. Drill and blast of 10 m benches in the upper waste sections of each pit is reviewed. Explosive selection depends on the presence of groundwater and the success of dewatering. For pit optimisation, ammonium nitrate fuel oil (ANFO) is assumed in the oxide material and emulsion for the remainder of the deposit.

CAT 777F Haul trucks with a load capacity of 90 t is used in conjunction with 120 t class hydraulic excavators in a backhoe configuration to achieve the required waste extraction ratio and selectively mine the ore. In general, 5 m benches are mined on two 2.5 to 3.5 m fitches (allowing for heave after blasting). In harder material, where extensive heaving of blasts occurs, the heave is mined separately down to bench level, followed by two 2.5 m fitches to minimise ore dilution. Ancillary services to support the production fleet include graders and water trucks for haul road maintenance and dozers for maintenance of pit benches, preparation of blasted benches, along with waste dump management.

The mining operation excavate and load ore and waste in accordance with marked ore and waste boundaries to ensure minimum dilution and maximum recovery of ore, with a geologist present during all ore mining. Standard practice to minimise dilution include mining along the strike of ore blocks, mining from hanging wall to footwall contacts, and grader or dozer clean-ups restricted to along strike in the ore zones. Ore and waste boundaries delineated based on grade control sampling results and bench and face mapping. Blocks are marked out by flagging tape and paint for excavation. Blast monitors are installed prior to blasting and surveyed post blast to determine ore movement. Blast design software (such as Shotplus) is used for all blast tie-ins ensuring ore shots are fired in a direction along strike. Ore above cutoff grade is transported to the Plutonic ROM pad and stockpiled separately by material type and grade. The frontend loader (FEL) on the Plutonic ROM pad maintains stockpiles. A rock breaker is maintained at the Plutonic ROM pad to break stockpiled oversize ore.

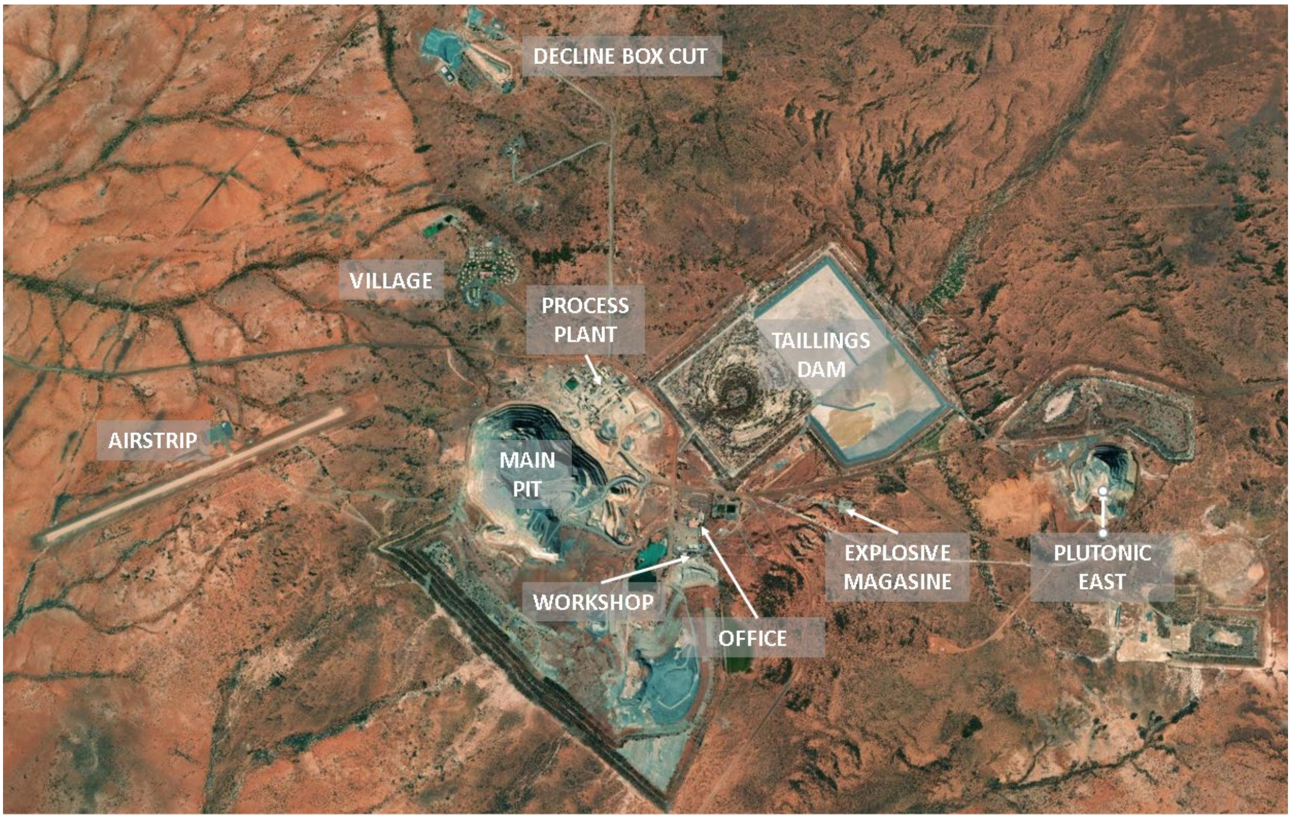
A dedicated fleet of a grader, watercart, and roller maintain the haul road to the Plutonic ROM pad. Low-grade material may be stockpiled for possible processing later in the mine life.

Waste rock dump sides are progressively battered down to the final design slope at the completion of each segment. Topsoil is placed using the ancillary equipment on the crest of these walls in readiness for spreading over the slopes. At the completion of mining, stockpiled topsoil will be re-spread over all other remaining disturbed areas. These areas will then be contoured, ripped and seeded with plants native to the area or appropriate to the prevailing conditions. The mining contractor will decommission and demobilise all plant and infrastructure making good all disturbed areas for rehabilitation. The mine abandonment bund has been designed in accordance with DMP guidelines "Mining Abandonment Bunds" and will be constructed with competent mine waste material towards the end of operations.

16.2.2 Site layout

The office and workshop area are near the mine administration building to be outside the expected blast exclusion zone of 500 m. Traffic management controls include haul road layouts designed to manage heavy vehicle and light vehicle segregation, right angle intersections, dedicated parking areas, and one-way flow of traffic. The explosive magazines and explosive compounds are located to be outside the blast exclusion zone and comply with licensing separation distances from infrastructure areas.

Figure 16-5 Mine Site Layout



16.2.3 Mining equipment fleet

The primary mining fleet for Plutonic consists of:

- 2 x 120-t hydraulic backhoe excavator (such as Hitachi EX1250) with 6.7 m3 sized bucket
- 6 x 777 Cat Haul trucks
- 3 x drill rig for blast hole, drain hole and pre-split drilling (such as Terex GD5000)

The ancillary mining fleet consists of:

- 1 x large dozer (such as Caterpillar D10T)
- 1 x small dozer (such as Caterpillar D8R)
- 1 x grader (such as Caterpillar 14M)
- 1 x large water-cart (such as Caterpillar 740)
- 1 x small water-cart (such as Hino 500 Series 2630

Other support equipment includes:

- 1 x tool carrier/ tyre handler (such as Caterpillar IT38HQ)
- 1 x fuel/lube truck (such as Isuzu 300SV)
- 2 x 21 seater (such as Toyota Coaster)
- 10 x lighting plant (diesel)
- 16 x light vehicles.

16.2.4 Mining infrastructure

The major Plutonic infrastructure consists of:

- 2 x 12x6.6 transportable building for technical offices
- 2 x 12x3.3 transportable building for crib and meeting room split with office at one end
- 2 x 6x3 transportable building for first aid room
- 2 x male/female ablution facility – leach septic system
- Workshop comprising sea-containers with dome and concrete floor
- Wash down facility with oil separator
- 2 x 110 kl fuel tanks with smart fill system
- 1 x detonator magazine (DG licenced for 20,000 detonators)
- 1 x explosive magazine (DG licence for 10 t)
- Explosive compound (DG licence for 150 t AN and 60 t ANE)

Power is provided by onsite gas generation and water provide from open pits or borefields (see section 18.2). In-pit communications is by UHF radio repeater.

16.2.5 Mining schedule

The Plutonic LOM plan is created using methods that are common to the industry. The Resource models are overlain with the designed mine shapes to calculate tonnes and grade. The shapes are evaluated to ensure that the shape is mineable and that the proposed ore block will generate a profit. The economic ore shapes are then scheduled using industry standard software (EPS) and then adjusted as required for mining. The key elements of development, longhole drilling and blasting, backfilling, and material trucking are included in the schedule. Within each zone, the schedule is organised in a logical manner consistent with continuity, geometry, mining constraints, and back fill availability.

For the open pit, equipment size, planned extraction rates, pit design and haulage distances are used to develop the open pit LOM.

Historically the underground mine has produced at a rate of up to 1,400 ktpa ore, although in recent years' production has stabilised at approximately 800 ktpa. This reduction in production is a result of a combination of factors including smaller stopes and less consistent stoping areas. With smaller stopes, it is necessary to plan and mine more stopes per year to maintain production. Stopes sizes in the current Mineral Reserves are typically less than 10 kt.

It should be noted that these schedules may periodically be adjusted through routine grade control and ongoing conversion of Inferred Mineral Resources.

17 Recovery methods

17.1 Summary

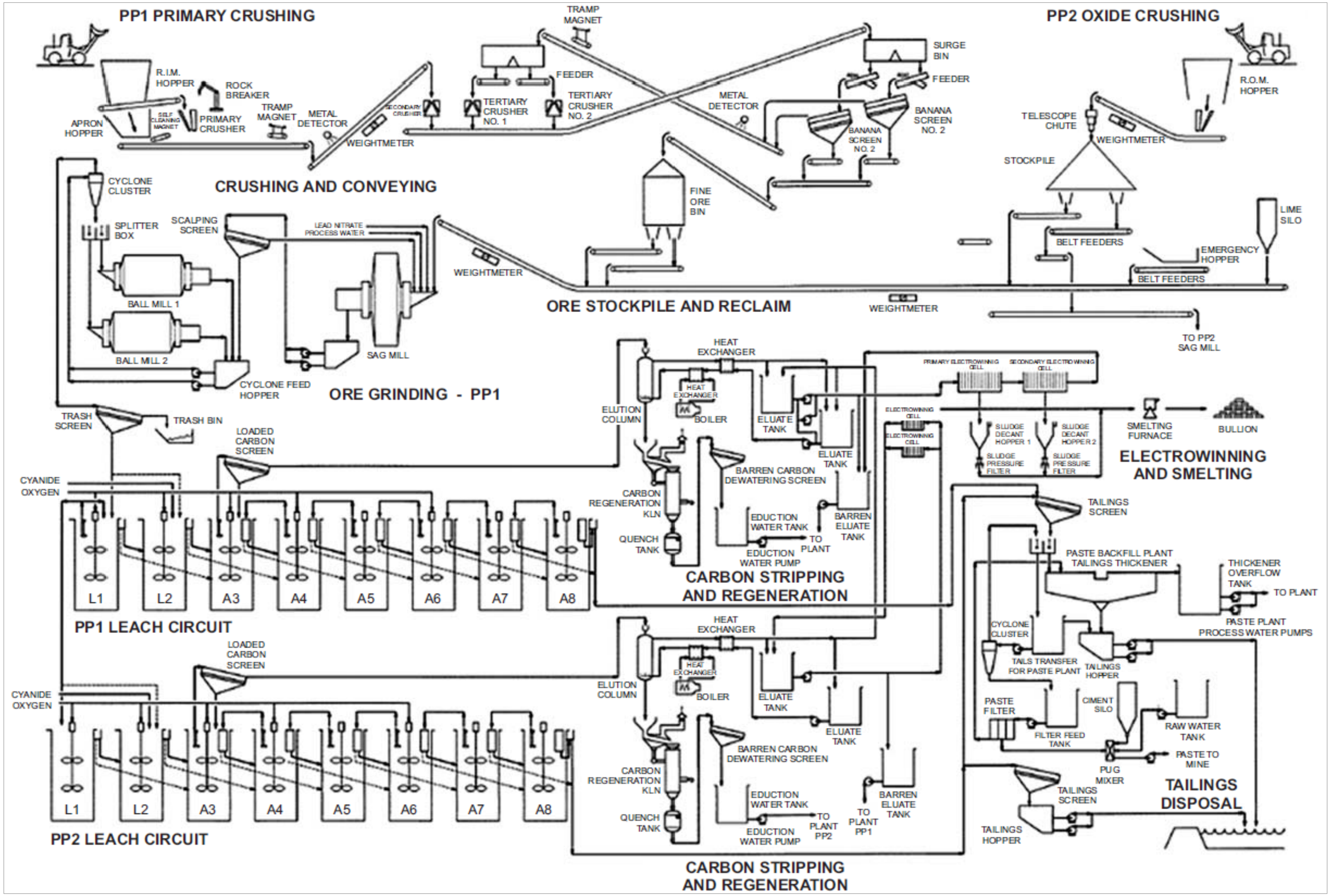
Plutonic Gold Mine has been in operation since August 1990. The original process plant (PP1) consisted of an open circuit jaw crusher, coarse ore stockpile, semi-autogenous grinding (SAG) mill and ball mill, two leach tanks, and six carbon adsorption tanks. A three-stage hard rock crushing circuit was incorporated in 1994 which included a fine ore bin and an additional ball mill. A second process plant (PP2) was added in 1996 utilising the original PP1 jaw crusher and coarse ore stockpile and adding SAG and ball mill, two additional leach tanks and six additional carbon adsorption tanks. A 16 MW gas power station was added in 1997 with extra gas sets added in 2014 and 2020 respectively.

PP1 was designed for the treatment of primary ore while PP2 was designed to process oxide ore. At the end of June 2004, oxide ore sources were exhausted and the crushing and milling components of PP2 were shutdown, however, the leach and carbon adsorption circuit of PP2 was run in parallel with the PP1 leach/adsorption circuit. In April 2008, the PP2 leach and carbon adsorption circuit was emptied, cleaned, and placed into care and maintenance as part of a strategy to reduce the site power load and power consumption due to power restrictions caused by the June 2008 gas supply crisis. Four tanks in the PP2 leach and carbon adsorption circuit were re-commissioned in June 2010 to provide additional residence time which is shown to improve gold recovery. These four tanks from PP2 have again been decommissioned in late 2012.

The primary sections of the processing plant that are currently in use are:

- Crushing and conveying
- Ore reclaim and grinding
- Leaching and carbon adsorption
- Carbon stripping, electrowinning, refining and carbon regeneration
- Tailings thickening
- Tailings deposition and storage
- Reagent mixing and handling
- Plant services

Figure 17-1 Simplified process flow sheet



17.2 Process description

17.2.1 Crushing

Run of Mine (ROM) ore is trucked to the ROM pad from the underground mine. The ore is classified and stockpiled according to gold grade, arsenopyrite content, pyrrhotite content, and graphitic content so that blending can be undertaken to maintain an optimal feed to the processing plant. Oversize ore and tramp metal are sorted from stockpiles and broken on the ROM pad using a loader or excavator. Any oversize that cannot pass through the primary crusher grizzly is broken by a rock breaker mounted at the grizzly.

The PP1 crushing circuit has a nameplate capacity of 2.5 Mtpa and consists of three stages of crushing:

A 60 x 48 Jacques primary double-toggle jaw crusher,

A Symons 7' SXHD secondary standard head cone crusher, and

Two Symons 7' SXHD tertiary short-head cone crushers.

In addition, there are separate surge bins that are operated in closed circuit with two Nordberg 7.1 m x 2.4 m double deck vibrating banana screens. Crushed ore exits the product screen with a top size of 10 mm and is stored in the fine ore bin. The fine ore bin has a live capacity of 3,000t.

PP1 crushing circuit contains 2 x Thermo Scientific Ramsey 10-17 belt scales (CV07 and CV13) for measuring mass of circuit ore.

The now decommissioned PP2 oxide crushing circuit consists of a 48 x 42 Kemco double toggle jaw crusher with a nameplate capacity of 1.2 Mtpa, a product conveyor and a coarse ore stockpile with a live capacity of 2,200 tonnes. Crushed oxide ore was transferred to PP2 grinding mills using two variable speed belt feeders.

17.2.2 Grinding

Crushed ore is withdrawn from the Fine Ore Bin via two belt feeders (CV 14/15), which transfer ore onto the mill feed conveyor (CV04) that feeds into the primary grinding mill (ML01). Mill feed can also be fed via an emergency feed hopper (CV02) which is fed via the oxide coarse ore feed slots. Quicklime is discharged onto CV04 via a variable speed, manually controlled rotary valve from a 200t lime silo. Liquid lead nitrate (40% w/w) is discharged directly into CV04 head chute into the grinding circuit.

The grinding circuit comprises a Svenson 4.5 m diameter by 5.63 m long primary mill and two Svenson 4.2 m diameter by 5.63 m long secondary ball mills. The primary mill has a grate discharge and is rubber lined. Its speed is fixed at 14.6 rev/min (72 per cent of critical) and the installed power is 1,600kW (1,350kW drawn). 78 mm diameter forged steel grinding media is used in the primary mill.

The secondary mills are rubber lined overflow mills run at 15.8 rev/min (75% of critical), also with 1,600 kW power (1,450 kW drawn). The grinding circuit throughput is currently operated at 210 tph with a primary mill and two ball mill configuration. 40 mm High Chromium steel grinding media is used in the secondary mills.

The primary mill discharge slurry is screened on a 6 mm aperture scalping screen and oversize is returned to the primary mill. Screen undersize reports to the ball mill discharge hopper. ML01 mill undersize and ML02/ ML03 mill discharge is pumped to a hydrocyclone cluster consisting of 18 x 250 mm Cavex cyclones. Operating pressure is 130 to 150 kPa. Each cyclone contains 90 mm ceramic vortex finders and 75 mm ceramic spigots. Coarser cyclone underflow is returned to the operating secondary ball mill for further size reduction. Cyclone overflow (approximately 80% passing 75µm) discharges over a trash screen (1 mm) with screen undersize reporting to the leaching circuit.

17.2.3 Leaching and adsorption

The PP1 leach and adsorption circuit consists of two leach tanks and six CIL carbon adsorption tanks, all with a 1,020m^3 capacity. All tanks mechanically agitated with dual, open, down-pumping impellor systems powered by 55kW drives. Facilities are currently available to inject oxygen into tanks #1, #2, #3, #4 and #6, with a high shear EDR oxygen injector feeding into Tank #1 and Tank #2. Gold in solution is recovered and concentrated by adsorption onto activated carbon in the adsorption tanks. Leach tank 1 is used as a pre-oxidation (oxygen sparged) conditioning tank, to oxidise reactive sulphides that would otherwise form thiocyanates and increase cyanide consumption. Slurry flows from this tank into the leach tank 2 in which cyanide is added then into the carbon adsorption circuit. Gold that is dissolved into the cyanide leach solution is recovered and concentrated by adsorption onto activated carbon (supplied by Haycarb) in the adsorption tanks.

In the CIL tanks, the carbon is advanced counter-current to the slurry flow, with new and regenerated carbon added to the last tank and advanced to the first tank while the slurry flows from tank one to tank six. Loaded carbon is pumped from adsorption tank one to the gold room periodically for stripping of the gold.

The target pH in the circuit is 10.5 and the target cyanide concentrations up to 250 ppm. An on-line free cyanide analyser (Orica OCM5000) is used to control the cyanide addition. Cyanide can be added to tank one, tank two, or tank three. Dissolved oxygen probes are installed in tanks one, two, three, and four.

17.2.4 Carbon stripping, electro-winning, refining, and carbon regeneration

Gold is recovered from the loaded carbon by a split Anglo American Research Lab stripping and electro-winning circuit. Gold is deposited onto steel wool cathodes by the electro-winning cells. The cathodes are subsequently dried and smelted in the gold room barring furnace to produce gold bullion for shipment. Barren carbon is reactivated using a liquid natural gas fired vertical kiln at around 700°C prior to being returned to the adsorption circuit for reuse.

17.2.5 Cyanide destruction

A cyanide destruction circuit that included both hot and chilled Caro's acid was commissioned in 2008 to reduce the free and weak acid dissociable cyanide ("**WAD CN**") concentration in the final tailings prior to deposition. The circuit includes one tank to store sulphuric acid and two tanks to store hydrogen peroxide. A WAD CN analyser is used to continuously monitor the WAD CN concentration of the tailings. The cyanide destruction circuit has since been decommissioned, with the majority of equipment being returned to Evonik.

17.2.6 Tailings disposal

Tailings from the CIL circuit gravitate to the carbon safety screen. Screen oversize gravitates to the clean-up sump and is returned to the circuit. Screen undersize is piped into a splitter box where the slurry is directed to either the tailings thickener, to bypass the thickener directly to the tailings pump hopper, or to the paste backfill plant.

The tailing thickener is a 15 m diameter, high rate Supaflo thickener. Flocculant (Magnafloc 5250) is added to the thickener feedwell to agglomerate the fine particles and aid solid/liquid separation. Solids at a density of 55% to 60% solids are removed from the thickener underflow and piped to the tailings disposal pump hopper. Water is recovered from the thickener overflow launder, directed into the thickener overflow tank, and pumped to the process water dam for utilisation in the grinding and leach circuits.

The thickened tailings were pumped to a variety of locations for disposal, using variable speed, centrifugal pumps (one operating, one standby). The hopper level is measured by an ultrasonic meter and the pump speed varied to maintain a set level. There is provision to flush the tail lines using water from one of several options.

Currently tailings are sent to a paddock style TSF. There are three paddock-style TSFS.

TSF1 is reclaimed, TSF2 and TSF3 can be operated. All in-pit tails facilities have been filled and tailings pipework retreated back to the current paddocks storage facilities. A recently completed wall raise on TSF3 has provided additional capacity.

17.2.7 Plant services

All necessary plant services are available to support the operation of the Plutonic processing facilities. Raw water is sourced from two main production bore fields. Process water is stored for use in a 100,000 m3 process water dam. Process water is made up of water from production borefields and tailings return water. Potable water is sourced from raw water tank and passed through automatic chlorinator for utilisation in process plant, admin, workshop, stores, and main camp and mining offices. High pressure air is provided at a nominal pressure of 650 kPa. Power is generated in the gas and diesel power stations at 11 kV and distributed to various plant and mine areas.

17.3 Plant performance

17.3.1 Gold recoveries

The Plutonic processing plant has been in operation for a number of years with historical throughput vs. recoveries for the past four years shown in Figure 17-2. Recoveries have ranged from 76.5% to 90%, with the average recovery over the four-year period at 86%.

Improved plant recovery since March 2018 corresponded with oxide/transitional ore processed sourced from Hermes, LG Oxide stockpiles and Area 4 material.

Figure 17-2 Plutonic - Process recoveries vs plant throughput

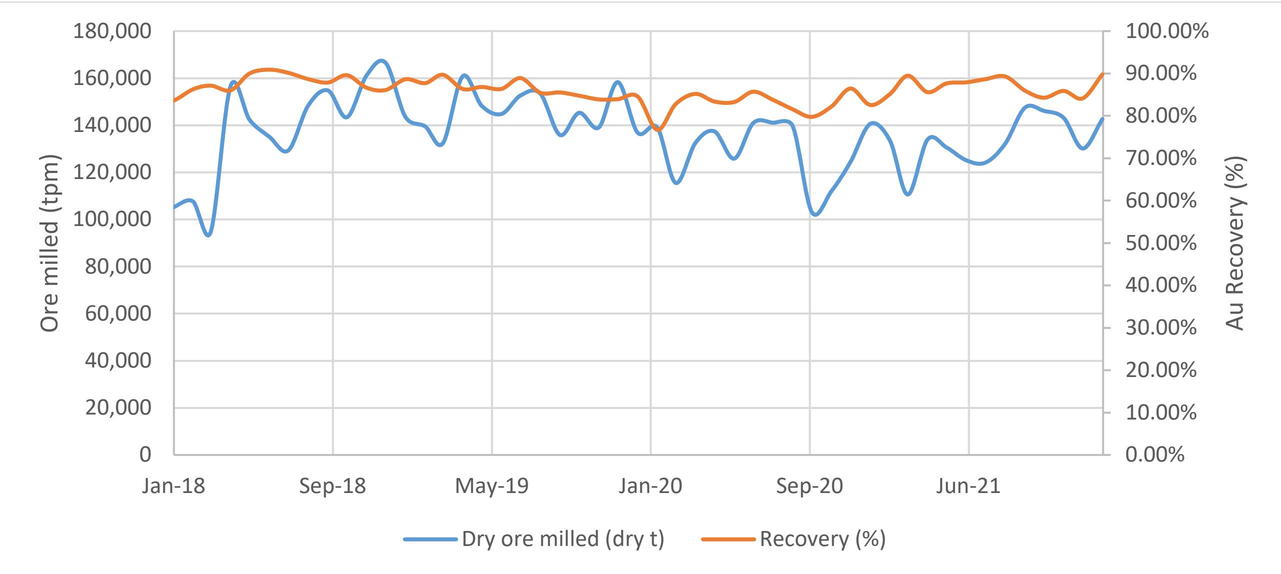


Figure 17-3 shows the historical processing recoveries against the calculated and assayed head grades, showing that there is no obvious correlation between head grade and recovery. The calculated and assayed head grades are in good agreement and have ranged from 1.30 g/t Au to 2.38 g/t Au during the observed period, with an average head grade of 1.76 g/t Au.

The tails grade during the same period of time has ranged from 0.18 g/t Au to 0.41 g/t Au. As expected and shown in Figure 17-4, there is good correlation between the head grade and the tails grade discharge from the mill to the TSF.

Figure 17-3 Plutonic mill - Process recoveries vs head grade

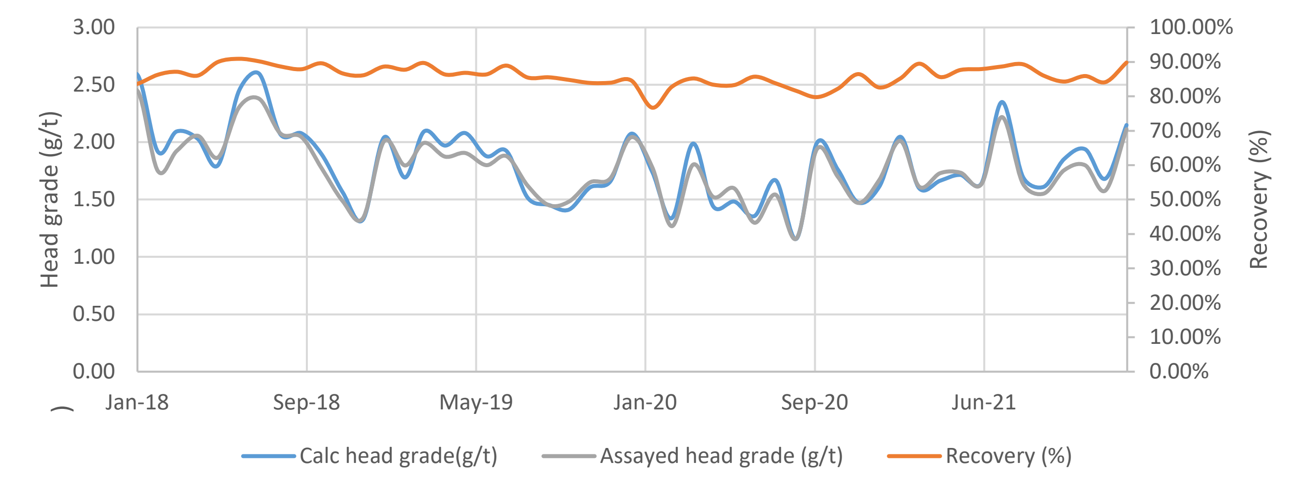
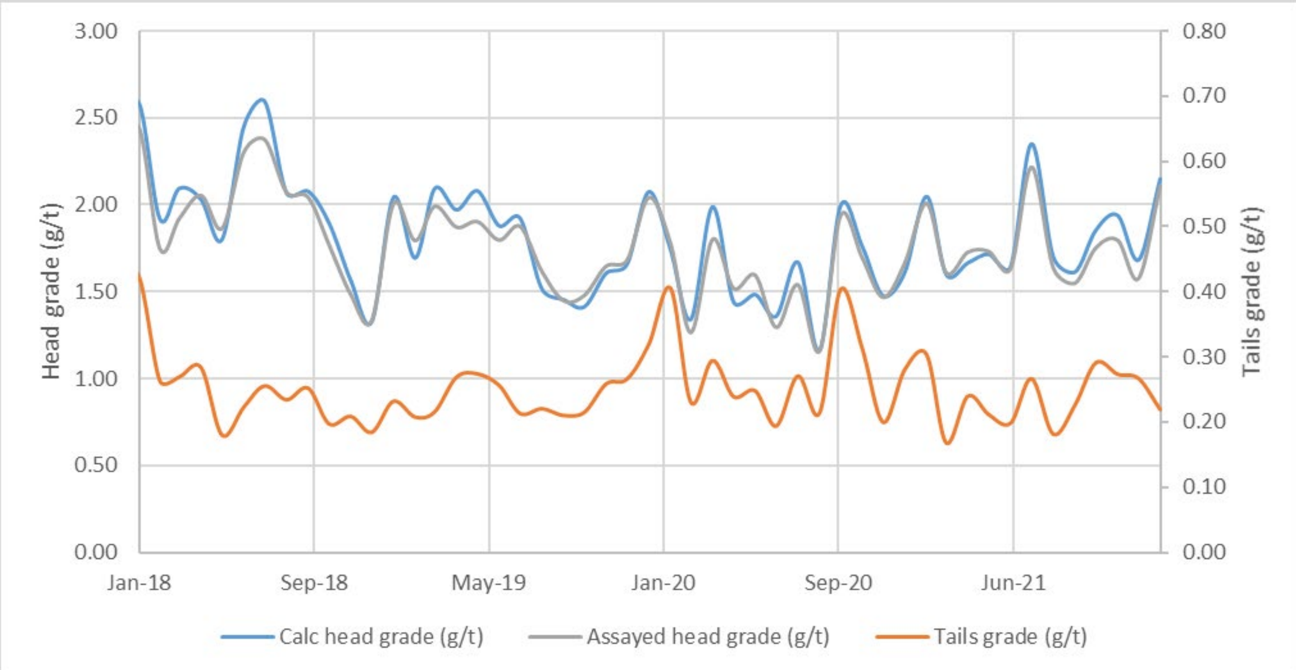


Figure 17-4 Plutonic Mill - Head grades vs tails grade



17.4 Process operating costs

Historical process operating costs have varied between A$16.52/t ore treated to A$27.11/t, with an average processing cost of A$19.92/t for the period reviewed. Average processing costs for 2021 were at A$20.21/t.

17.5 Process capital costs

The existing processing facilities at Plutonic are considered to be suitable for ongoing operations and no significant capital expenditure is currently foreseen.

TSF expansion is planned for 2022/2023.

17.6 Processing conclusions

The Plutonic Gold Mine has been in operation since August 1990 and plant and equipment has been reasonably well maintained and upgraded to treat both oxide ore initially and only sulphide ore from 2004 onwards.

Plant performance has been reasonable, with recoveries ranging from 76.5% to 90%, and the average recovery of 86.9% achieved in 2021.

Historical process operating costs varied between A$16.52/t ore treated to A$27.11/t, with an average processing cost of A$19.92/t for the past four years. Projected future operating costs are estimated at approximately A$22/t.

TSF expansion capital expenditure is expected in 2022/2023 to cater for the remaining LOM plan.

18 Project infrastructure

The Plutonic Gold Mine is a well-established mine which has services and infrastructure consistent with an isolated area operating mine.

Billabong believes that the existing site infrastructure is capable of supporting the mine plans envisaged. Historically the site has successfully operated at production rates significantly higher than those envisaged.

18.1 Transportation

The mine can be accessed by an unsealed airstrip or by road. The airstrip is adjacent to the site and is a 2,000 m long runway suitable for aircraft carrying up to 80 passengers in a Turbo prop aircraft. There is a decommissioned aircraft fuel tank and fuelling facility at the airstrip. From Perth, the flight time is approximately 90 minutes. There is also an all-weather sealed airstrip at DeGrussa located about 35km southwest of Plutonic and is used when wet weather prevents planes landing on site.

The mine is located approximately 10 km east of the Great Northern Highway and is approximately 1,000 km north and east of Perth. Freight is brought to site by transport trucks using the highways.

18.2 Utilities

Electricity is generated on-site by means of a gas-powered generating station which supplies all power requirements within the vicinity of the camp and processing plant. An additional 3 diesel units are installed for back up supply and provide capability for the site infrastructure.

Water requirements for dust suppression and road maintenance during mining activities are supplied from water sources in the existing Salmon pit, the Main Pit or from the main borefield.

Potable water requirements are provided on-site using the existing reverse osmosis system installed at the processing plant.

18.3 Disposal and drainage

Both domestic and industrial waste is disposed of by deep burial at the Plutonic landfill site located on the Perch and main pit waste dumps.

Sewage disposal is via septic tanks and leach drains at the existing toilet facilities located adjacent to the Plutonic Main Pit, the Surface Mining crib room, the underground office area, and the Plutonic site camp.

All used oils, greases, and lubricants are collected and removed from site for recycling or disposal. Waste oil from mobile and fixed equipment is stored on site within existing bunded storage areas. Oil is transported to an oil recycling facility based in Perth on a regular basis. Any oil-contaminated ground is treated on site using existing bio-remediation treatment facilities.

18.4 Buildings and facilities

All infrastructure required for extraction of the Mineral Reserves is in place and operational including offices, workshops, first aid/emergency response facilities, stores, water and power supply, processing plant and associated infrastructure, ROM pad, waste dumps and site roads.

Plutonic operates as a fly-in/fly-out operation and maintains a camp on site for the employees and contractors. The camp has capacity for 500+ persons, and includes wet and dry mess facilities, a recreational oval, gymnasium, and entertainment room.

18.5 Communications

The mine site has a communication network of telephones and licensed UHF radio repeaters within the Main Pit mining area and village facilities. Outside these areas, communication is by means of radio or satellite phone only.

18.6 Tailings storage facilities

There are three paddock-style TSFs, two of which are in operation (TSF2 and TSF3).

For TSF3, a 2.5 m lift was completed in Q4 2021. This is the final permitted lift with the final height of 532 mRL achieved. Deposition to this cell will commence in Q1 2022. A further 2.5 m lift on TSF2 is scheduled to be completed in Q2 2022 to the final permitted 532 mRL. TSF4 expansion work is scheduled to commence in Q4 2022 to allow progression from TSF2 to the new facility in Q2 2023. All relevant permits from DWER and DMIRS have been secured.

19 Market studies and contracts

19.1 Markets

Gold metal is a freely and widely traded commodity with a transparent mechanism for setting prices and for sale of gold produced.

Plutonic produces a gold doré, containing varying gold and other metal contents, depending upon the relative grades of the mineralisation processed. Doré is transported from site to Perth via plane and then securely transported to the refinery. The Western Australian Mint (WAM) in Perth, trading as the Perth Mint, will refine the doré bars to a commercial purity and facilitate the sale.

At the Perth Mint, doré bars are weighed and melted to ensure that there are no pockets of high or low purity within the bar. A sample is taken from this melted doré and assayed to determine the exact amount of gold and other metals present. The Company then receives an outturn, which is a statement indicating the weight of the doré bar, the percentage of gold and silver in the bar, and from these two, a calculated amount of pure gold and silver.

The Company can then sell this pure gold and silver for cash and the doré bar becomes the property of the refiner or other counterparty as the case may be.

Superior has not conducted any studies or analyses such as commodity price projections, product valuations, market entry strategies, or product specification requirements.

19.2 Contracts

The mining and processing operations at Plutonic are generally carried out by company crews. There are contracts for some specialist work such as diamond drilling and mill shutdown works.

Catering for the site is contracted to Sodexo, a worldwide catering contractor.

Open Pit Mining is currently contracted out to Wolf Mining.

Underground diamond drilling is currently contracted to Barminco Ltd.

Charter flights for the operation's fly in - fly out workforce is contracted to Cobham Aviation Services.

Supply of electric power is contracted to Zenith Pacific (NSR) P/L.

The contracts in place are considered normal within the mining industry.

20 Environmental studies, permitting, and social or community impact

20.1 Land access overview

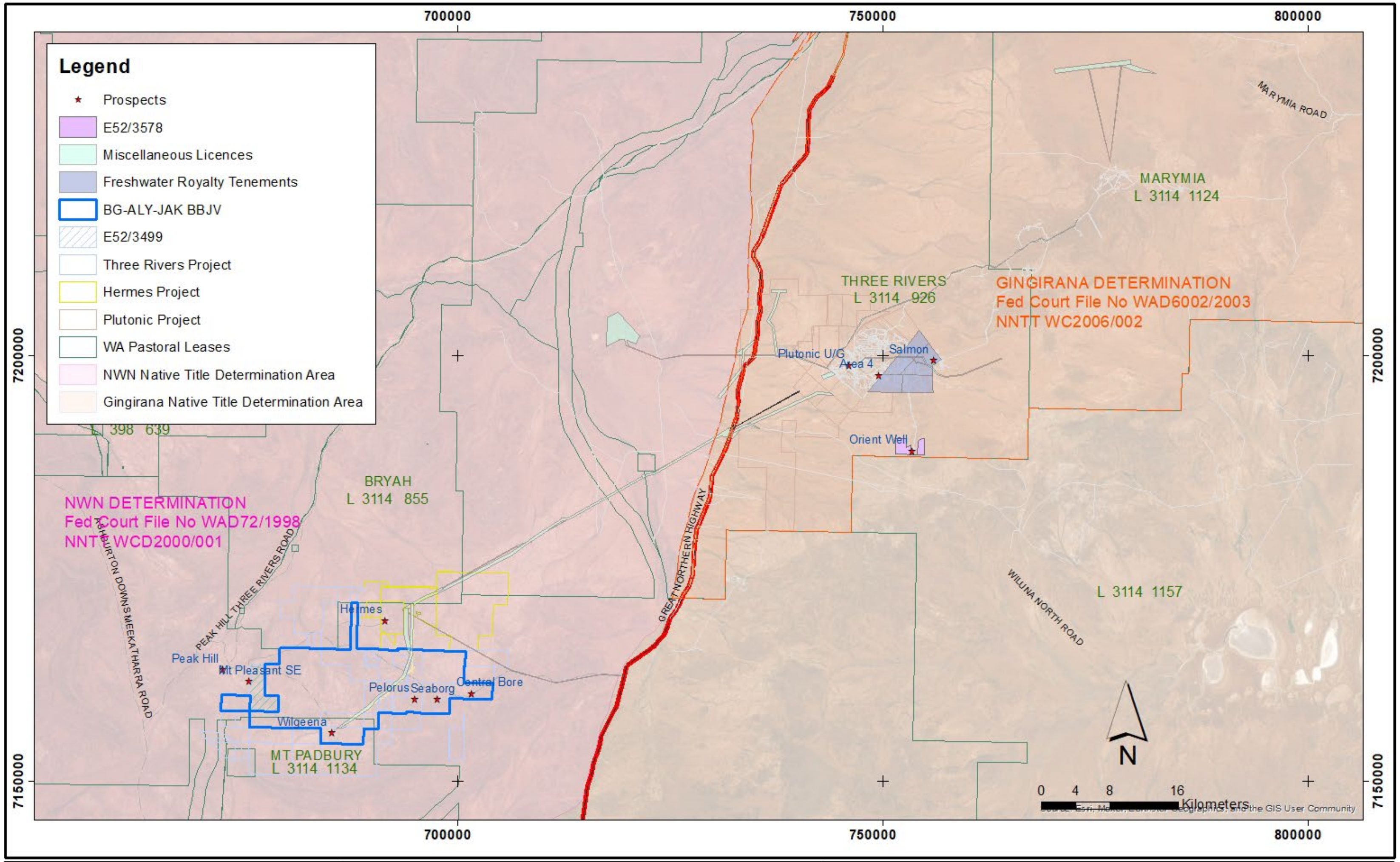
Mining projects in Australia typically require land access under three main forms of title:

- Real property
- Mining tenure
- Native title.

Real property and native title claim boundaries are shown in Figure 20-1.

The grant of mining tenure is often subject to consideration and development of agreements on real property and native title.

Figure 20-1 Real property and native title claim boundaries



BillabongGold	**Real Property and Native Title Determination Boundaries**	DEPARTMENT: GEOLOGY - EXPLORATION DATE: 23/06/2022 DRAWN BY: E.M. BONSALL SCALE: 1:400,000 DATUM: GDA94 MGA Zone 50

20.2 Real property title

20.2.1 Introduction

The provisions of the Mining Act allow for the grant of a Mining Lease or Miscellaneous Licence, and other mining tenures over Crown land, including pastoral leases and public reserves. Once granted, the tenure holder has access to the land for the purposes of the mining tenure, and subject to the conditions of grant. Compensation is generally payable for damage or removal of improvements on pastoral land and loss of grazing land.

The grant of mining tenure over private land (freehold land, land held in fee simple) requires the written consent of the owner and occupier, and compensation arrangements must be resolved prior to commencement of mining activities.

20.2.2 Plutonic

The Plutonic operation is located within the Three Rivers pastoral lease (Lease No N049591) which is currently held by Pinnacles WA Land Company Pty Ltd. ("**Pinnacles**").

A major natural gas pipeline on Petroleum Pipeline Licence PL24 (the Goldfields Gas Transmission pipeline) held by Goldfields Gas Transmission Pty Ltd, and operated by APA Group, traverses land to the immediate east of the Plutonic operations. The mining tenure for the operation was granted under agreement (where required) of the petroleum tenure holder.

Billabong also holds a petroleum pipeline licence; PL35 granted under the Petroleum Pipelines Act 1969 (Western Australia) for operation of the pipeline for the use of natural gas for power generation purposes at Plutonic. Billabong has nominated APT Goldfields Pty Ltd as the pipeline operator for the day to day management and control of the activities in relation to the pipeline.

Suitable real property land access is in place by way of the grant of existing mining tenure for the Plutonic operation. There is no compensation payable to the pastoral leaseholder as the operation does not affect any existing improvements on the lease.

The sale of pastoral leases covering the majority of the tenements held by the Company was completed in late 2020. Concurrent with the sale, the Company entered into an access agreement with the new holder of the pastoral leases to ensure the Company has continued access on the pastoral leases for mining and exploration activities.

20.2.3 Hermes Gold Mine

The Hermes Gold Mine is mostly located within the Doolgunna ex-pastoral lease, which is now unallocated crown land currently under management by the Department of. Biodiversity, Conservation and Attractions.

The Hermes Gold Mine is also located partially within the Bryah pastoral lease (Lease no N049600) which is currently held by Pinnacles.

Suitable real property land access is in place by way of the grant of existing mining tenure for the Hermes Gold Mine. There is no compensation payable to the pastoral leaseholder as the operation does not affect any existing improvements on the lease.

20.2.4 Hermes South

Hermes South is part of the BBJV and is located south-west of the Plutonic Gold Mine gold processing facility. Billabong had an option to earn up to an 80% interest in the BBJV by spending A$1.2 million (US$888) over three years beginning April 2015. The Company earned the interest and a formal joint venture agreement was finalized in 2020.

20.2.5 Haul road corridor

The Haul Road Corridor traverses the following real property titles:

- The Three Rivers pastoral lease (Lease no N049591), held by Pinnacles.
- The Bryah pastoral lease (Lease no N049600) held by Pinnacles.

- The Doolgunna ex-pastoral lease (unallocated crown land).
- The Great Northern Highway, Crown land, managed by Main Roads Western Australia. The haul road and highway intersection were completed in 2017.
- An historical stock route, assumed to be unallocated crown land.

The granted Miscellaneous Licences L52/164 and L52/116 provide land access to most of the land required for the haul road corridor. The granted Miscellaneous Licences L52/165 and L52/166 provide land access to the additional parts of the haul road corridor that are required for improved drainage channel crossings and improved road intersection design.

20.2.6 Mineral tenure

Mineral tenure is discussed in Section 4.

20.2.7 Native title

Billabong's native title adviser[6] has provided an overview of native title, summarised below.

Native title is the name used for recognition by Australian laws that Indigenous people have a system of law and ownership of their land before European settlement.

Native title recognises that Indigenous people may have rights and interests in their lands and waters through their traditional laws and customs; Native title may recognise that Indigenous people have traditional rights to speak for country; but native title does not provide Indigenous people with ownership of the land or stop development.

Native title is a form of land title that recognises the unique ties some Aboriginal groups have to land. Australian law recognises that native title exists where Aboriginal people have maintained a traditional connection to their land and waters, since sovereignty, and where acts of government have not removed it.

Under Australian law, native title holders have the right to be compensated if governments acquire their land or waters for future developments. Native title can co-exist with other forms of land title (such as mining or pastoral leases) but is extinguished by others (such as freehold).

Registered native title claims and determined native title holders have certain rights under the provisions of the NTA 'future act' regime. A 'future act' is an act done after 1 January 1994, which affects native title. The 'future act' can be a proposed activity or development on land and or waters that has the potential to affect native title, by extinguishing it or by creating interests that are inconsistent with the existence or exercise of native title.

Common examples of 'future acts' in Western Australia are the proposed grants of mining tenements by the DMIRS or land titles by the Department of Lands. The NTA stipulates that the 'future act' process need only apply where a registered native title claim or a determined native title claim exists. A mining tenement (proposed 'future act') cannot be granted unless it has satisfied the 'future act' requirements of the NTA or where appropriate evidence is available that proves native title has been extinguished such as the granting of freehold tenure. The Mining Act provides that holders of mining tenements are liable for compensation, where awarded, by reason of their mining tenements having affected native title.

20.2.8 Plutonic tenements and eastern section of the Haul Road Corridor

- The Plutonic Gold Mine tenements (the "**Plutonic Project Tenements**") lie inside the Gingirana Native Title Claim application (WC2006/002 & WAD6002/2003), registered on 13 April 2006. The Gingirana Native Title Claim was determined by way of consent on December 7, 2017 at a ceremonial sitting of the Federal Court of Australia at the Kumarina Roadhouse, south of the town of Newman.
- No native title agreements or heritage protection agreements currently exists in relation to the granted Plutonic Project Tenements.

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[6] Matthew Hansen, Principal, Extent Legal Pty Ltd.

- In April, 2021, Superior executed a negotiation protocol with the Marputu Aboriginal Corporation, the RNTBC for the Gingirana People, and is currently negotiating a heritage agreement, to apply to the broader Plutonic project. Those pending Plutonic Project Tenements, that are yet to be granted, being L52/203 (the "**Pending Project Tenements**"), are subject to the NTA 'future act' provisions.
- As the Pending Project Tenements were applied for after the consent determination of the Gingirana Native Title Claim, accordingly, the Gingirana Native Title Claim are afforded the rights contained with the NTA 'future act' provisions, being the right to object/right to be consulted, as the Pending Project Tenements are either proposed or miscellaneous licenses applications.

20.2.9 Hermes tenements and western section of the Haul Road Corridor

- The Hermes Gold Mine tenements (the "**Hermes Gold Mine Tenements**") lie inside the NWN People's native title consent determination (the "**NWN Consent Determination**"), the first native title claimants in Western Australia to successfully prove native title to their country under Australian native title law.
- On August 29, 2000, it was determined, by consent, that the NWN People held native title in an area of about 50,000 square kilometres of land. However, much of the NWN Consent Determination area is alienated for pastoral and mining purposes.
- The NWN Consent Determination involved three elements:
  - The Federal Court's consent determination of native title in favour of the NWN People in relation to the claim area;
  - The State and the NWN People agreed to enter into the NWN ILUA under s 24CG(1) of the NTA, which provides for a localised procedure for 'future acts' (primarily the grant of mining tenements) within the NWN Consent Determination area; and
  - Each pastoral lease holder within the NWN Consent Determination area agreed to enter into an access protocol with Jidi Jidi.
- The NWN People accepted extinguishment of their native title rights and interests over vast areas, the agreed extinguished areas include granted mining tenure, enclosed and/or improved parts of pastoral leases, and any interests that are wholly inconsistent with native title rights and interests.
- It was agreed, and determined by the Court that:
  - There is no native title right or interest in minerals and petroleum in the NWN Consent Determination area;
  - The native title rights and interests are not exclusive of the rights of others and to the extent of any inconsistency they must yield to the rights conferred by other specified interest in the land (including the rights of miners and pastoralists);
  - The native title rights and interests are subject to regulation by State laws of general application and by Federal law; and
  - Native title has been extinguished in the following parts of the NWN Consent Determination area:
  - Those parts of pastoral leases granted prior to 1933 and which were, prior to 1994, enclosed and improved;
  - Those parts of pastoral leases granted under the *Land Act 1933* (Western Australia) which were, prior to 1994 enclosed or improved;
  - Mining leases and general purpose leases granted prior to 1994 under the Mining Act and gold mining leases and coal leases granted under the Mining Act; and
  - Any interests that are wholly inconsistent with native title rights and interests.
- The Hermes Gold Mine Tenements are located wholly within a pastoral lease area, i.e. an area where native title has been extinguished.
- Northern Star have actively engaged with Jidi Jidi and the NWN People. In December 2015, Northern Star entered into terms with Jidi Jidi to facilitate a 'one off' heritage survey over the proposed mining area (M52/685).
- During the course of the consultation with the NWN People and Jidi Jidi regarding the heritage survey terms, Northern Star was advised that the NWN People did not acknowledge that areas of extinguishment existed within NWN Consent Determination area. Effectively, the NWN People disagreed with the provisions contained within the NWN ILUA in regards to the areas where native title had been extinguished within the NWN Consent Determination area.

- The NWN People requested that Northern Star enter into negotiations in regards to the proposed mining on M52/685. While Northern Star considered M52/685 (and the remaining Hermes Project Tenements) to be valid, a decision was made to enter into negotiations on the basis that pursuant to the NWN ILUA, the NWN People may have the right to seek compensation against the State following the commencement of productive mining.
- The Mining Act provides that holders of mining tenements are liable for such compensation where awarded by reason of their mining tenements having affected native title. Consequently, a decision was made to remove the potential risk of a future compensation claim.
- In addition to the removal of a potential compensation claim, Northern Star were able to agree to terms allowing for the immediate grant of miscellaneous license (L52/164) and heritage protection/survey procedures.
- Following a constructive negotiation period Northern Star and the NWN People agreed to terms that would form a productive mining agreement and a separate heritage protection agreement. Both parties executed those agreements on June 22, 2016.
- The agreements provide for compensation arrangements under the productive mining agreement and heritage management procedures under the heritage protection agreement.
- The agreements were assigned to Billabong under a deed of consent, assignment and assumption dated October 12, 2016.
- Billabong has now negotiated a deed of variation – heritage deed to include all tenure in which Billabong has a beneficial interest, including the BBJV. The deed of variation was executed by Billabong and Jidi Jidi on October 28, 2019.
- The deed of variation provides for survey terms for heritage protection surveys to be conducted on the BBJV and for the negotiation of a further productive mining agreement for any deposits discovered within the BBJV tenure.

20.3 Mining-related environmental approvals

20.3.1 Overview of approvals requirements

Environmental protection in Western Australia is governed by both State and Commonwealth legislation. Non-compliance with these conditions could result in fines or penalties being levied against individuals or companies, or even termination of the approval and licence to operate. All personnel undertake inductions containing environmental content so that they understand their legal obligations in relation to their scope of work and implement systems to monitor and ensure compliance with these requirements.

20.3.2 EPBC Act

The primary Commonwealth environmental legislation is the EPBC Act. Projects require referral to the Department of Agriculture, Water and the Environment (DAWE) if there is potential for impacts to be of a national significance.

The project has not had to be referred to DAWE under the EPBC Act, as it does not trigger any of the MNES criteria.

20.3.3 EP Act

The EP Act is the primary legislation for the protection and management of the environment in Western Australia. This legislation is administered by the Environmental Protection Authority (EPA), DMIRS and DWER.

20.3.4 Part IV EP Act

Proposed projects which are deemed to have a significant impact on the environment are required to be referred to the EPA and considered for formal environmental impact assessment (EIA) under Part IV of the EP Act. However, a MoU is in place between DMIRS and the EPA which specifies criteria for determining if a project should be referred for assessment.

The Project has not triggered any of the criteria within the MoU between DMIRS and the EPA in relation to the referral of mineral proposals, as a result of the Project not being considered to have a significant impact on the environment. The project has not been required to be referred to the EPA under Part IV of the EP Act.

20.3.5 Part V EP Act

Plutonic operates under the EP Act (Part V) Licence L6868/1989/12, first issued by the DWER predecessor DER on September 18, 2014, expiring on September 24, 2024 and administered by the DWER.

The Plutonic operations has obtained and maintained requirements under Operating Licence L6868/1989/12 for the following prescribed premises to date:

- Category 5 – Processing or beneficiation of metallic ore
- Category 6 – Mine dewatering
- Category 52 – Electric power generation
- Category 54 – Sewage facility
- Category 57 – Used tyre storage (general)
- Category 89 – Putrescible landfill site.

The Project has obtained a number of historic clearing permits to date. The current and most relevant approved NVCPs are:

- CPS 7555 in relation to clearing for Hermes. Granted July 1, 2017 and expires July 1, 2022.
- CPS 8616 in relation to clearing for TSF4/5. Granted October 5, 2019 and expires October 4, 2024
- CPS 8651 in relation to clearing for Area 4. Granted November 16, 2019 and expires November 15, 2024

20.3.6 Mining Act

DMIRS, formerly DMP, administers and regulates the activities of the mining industry under the provisions of the Mining Act.

MP applications for proposed Project activities are to be prepared in accordance with the Mining Act, with reference to DMP/DMIRS guidelines which include:

- "Statutory Guideline for Mining Proposals" (March 2020).
- "Statutory Guideline for Mine Closure Plans" (March 2020).
- "Mining Proposal Guidance – how to prepare in accordance with Statutory Guidelines" (March 2020).
- "Mine Closure Plan Guidance – how to prepare in accordance with Statutory Guidelines" (March 2020).

A MP document, including an MCP, must be submitted for written approval by the director of the environment division of DMIRS prior to the commencement of mining operations.

20.3.7 RIWI Act

The abstraction of groundwater for water supply and/or mine dewatering purposes requires licences to be issued by the DWER (Water Section) under section 5C of the RIWI Act.

The Project has obtained water licences under the RIWI Act as follows:

- GWL151450 – Plutonic Mine water supply and dewatering. Granted December 7, 2016 and expires May 23, 2023
- GWL182889 - Hermes Haul Road water supply. Granted June 12, 2022 and expires June 30, 2026
- GWL183063 Hermes Mine water supply and dewatering (now expired).

The dewatering discharge of water to the environment from dewatering of the pits workings is also classified as a prescribed activity (Category 6 – Mine Dewatering) under Schedule 1 of the Environmental Protection Regulations 1987, where the water is extracted to allow mining of ore and discharged (if excess water is not utilised for dust suppression) to the environment at a rate above 50 ML/annum.

A detailed Groundwater Operating Strategy is required to support the section 5C water abstraction licence application, which is to be prepared in accordance with the DoW guideline entitled "Policy – Use of operating strategies in the water licensing process (December 2020)".

The construction of bores also requires a licence to be issued by DWER to construct or alter a well under section 26D of the RIWI Act. No such licence is required for the site at this time.

20.3.8 Other legislation

In addition to the legislation noted in the subsections above, the Commonwealth primary legislation relevant to the Project includes the following:

- *Native Title Act 1993.*
- *National Greenhouse and Energy Reporting Act 2007.*

Other Western Australia state government primary legislation of key relevance to the Project includes the following:

- *Aboriginal Heritage Act 1972.*
- *Agriculture and Related Resources Protection Act 1976.*
- *Biodiversity Conservation Act 2016.*
- *Biosecurity and Agriculture Management Act 2007.*
- *Building Act 2011.*
- *Bush Fires Act 1954.*
- *Conservation and Land Management Act 1984.*
- *Contaminated Sites Act 2003.*
- *Country Areas Water Supply Act 1947.*
- *Dangerous Goods Safety Act 2004.*
- *Health Act 1911.*
- *Heritage Act 2018.*
- *Land Administration Act 1997.*
- *Local Government Act 1995.*
- *Mines Safety and Inspection Act 1994.*
- *Mining Rehabilitation Fund Act 2012.*
- *Occupational Safety and Health Act 1984.*
- *Planning and Development Act 2005.*
- *Public Works Act 1902.*
- *Road Traffic Act 1974.*
- *Soil and Land Conservation Act 1945.*
- *Waterways Conservation Act 1976.*

Note that subsidiary legislation such as regulations and local government by-laws, as well as regulatory standards and guidelines, may also include important compliance requirements.

20.3.9 Mining tenure approvals

20.3.9.1 Plutonic

NoI documents, now known as MP(s), detail the environmental impacts associated with the Project and provide a list of environmental commitments made to manage those impacts in a responsible manner. DMIRS assesses, approves and manages MP applications, including the associated MCP requirements. The following is a list of the Mining Act related environmental regulatory documents for the Plutonic operation (in date ascending order):

- "Notice of Intent for the Plutonic Project, Shire of Meekatharra", dated August 1989.
- "Plutonic Gold Project Tailings Dam Works Approval Application", dated September 2, 1991.
- "Plutonic Gold Project Tailings Dam No. 2 Amendment to Works Approval Application", dated November 25, 1991.
- "Plutonic Gold Mine Addendum to Notice of Intent", dated April 4, 1992.
- "Plutonic Gold Mine addendum to Notice of Intent Open Pit Expansion", dated April 4, 1992.
- "Plutonic Gold Project Tailings Dam No. 1 Raising Works Approval Application", dated May 25, 1992.
- "Plutonic Operations Ltd, Notice of Intent for the Development of the Salmon Project", dated July 1993.
- "Plutonic Gold Mine, Addendum to Notice of Intent Waste Dump G", dated November 21, 1993.
- "Plutonic Gold Mine Underground Project Notice of Intent", dated August 31, 1994.

- "Addendum to Notice of Intent Waste Dump G", dated October 5, 1994.
- "Perch Project, Plutonic Gold Pty Ltd, Addendum to Notice of Intent for the Development of the Salmon Project", dated June 1995.
- "Plutonic Operations Pty Ltd Zone 550, Addendum to Notice of Intent for the Development of the Zone 550 Project", dated May 1996.
- Area 4 Addendum Notice of Intent for the development of the Area 4 Project", dated October 1996.
- "Plutonic Gold Mine Tailings Storage No. 1 Raising Addendum Works Approval Application", dated November 12, 1996.
- "Plutonic Gold Mine Tailings Storage No. 2 Addendum to the Notice of Intent", dated September 1, 1997.
- "Plutonic Gold Mine Tailings Storage Nos 3 and 4 Notice of Intent", dated August, 29 1997.
- "Plutonic Gold Mine, Channel Pit, Addendum to Notice of Intent for the Development of the Channel Pit Project", dated September 1997.
- "Plutonic Operations Limited, Area 4 Underground Addendum to Notice of Intent for the Development of the Area 4 Underground Project", dated December 1997.
- "Trout Pits Project on Mining Leases 52/296, 52/300 and 52/301", dated July 1998.
- Letter of Intent "Mining of Eastern Extension of Main Pit Laterite", dated July 2, 1998.
- "Plutonic Gold Mine Notice of Intent for the Redevelopment of Area 4 Pit", dated January 17, 1999.
- "Tailings Disposal, Perch Pit, Notice of Intent, Plutonic Gold Mine", dated August 10, 1999.
- "Homestake Gold of Australia, Plutonic Gold Mine, Bream Deposit, Notice of Intent to Develop the Bream Deposit", dated April 2000.
- Letter from Plutonic Gold Mine to CALM titled "Re: Priority Flora Eremophila lanata MS Bream NOI", dated May 5, 2000.
- "Homestake Gold of Australia, Plutonic Gold Mine, Notice of Intent to Develop the Catfish Deposit", dated January 2001 (NOI 3614).
- "Amendment to Notice of Intent (NOI) Catfish Deposit", dated June 18, 2001 (NOI 3714).
- "Homestake Gold of Australia, Plutonic Gold Mine, Callop Deposit, Notice of Intent to Mine, Callop Deposit", dated August 2001 (NOI 3787).
- "Amendment to Notice of Intent (NOI) Trout Deposit", dated October 17, 2001 (NOI 3812).
- "Addendum to Notice of Intent (NOI) Zone 550 Project", dated November 26, 2002.
- "Tailings Storage, Catfish, Dogfish and Trout Pits, Plutonic Gold Mine, Notice of Intent", dated January 22, 2003 (NOI 4201).
- "Amendment to Notice of Intent Trout Deposit", dated April 2003 (NOI 4246).
- "Plutonic Gold Mine Supplementary Notice of Intent to Mine Salmon Project Area" (NOI 4482), dated December 2003.
- "Addendum to NOI Raising of Combined Tailings Storage Facilities 2 and 3 Plutonic Gold Mine" (NOI 4661), dated March 22, 2004.
- Barrick Gold of Australia Leases M52/296, M52/300 and M52/301 Tailings Storage Facility Callop and Piranha Pits Plutonic Gold Mine Mining Proposal" (MP 5296A), dated March 23, 2006.
- "Sand Harvesting Project Mining Proposal M52/300 and M52/306" (MP 5438A), dated July 2006.
- "Sand Harvesting Project Mining Proposal M52/300 and M52/306 Amendment" (MP 5438B) dated September 2006.
- "In-Pit Tailings Storage Facility Trout Pits Mining Proposal" (Reg. ID 29506), dated November 8, 2010.
- (Reg. ID 34706) "Mining Proposal, Deposition of Sandfire Tailings to Trout Pits TSF, Plutonic Gold Mine (M52/296)", dated March 27, 2012.
- (Reg ID 35376) "Mine Closure Plan, Plutonic Gold Mine", dated May 1, 2012.
- (Reg ID 54714) "Northern Star Resources Plutonic Mine Closure Plan Revision 2", dated September 29, 2015.
- (Reg. ID 81643) "Mining Proposal, Plutonic Gold Mine, Tailings Storage Facility 4 and 5 (M52/148 and M52/170)", dated August 6, 2019.
- "Mining Proposal, Plutonic Gold Mine, Area 4 and Perch Pit Expansions (M52/148, M52/149, M52/170, M52/295 and M52/301)", dated December 6, 2019.

- "Mine Closure Plan, Plutonic Gold Mine (M52/148, M52/149, M52/150, M52/170, M52/171, M52/295, M52/296, M52/300, M52/301, M52/308, M52/309, L52/40, L52/41, L52/48, L52/52, L52/54, L52/55, L52/56, L52/70, L52/71 and L52/74)", dated February 14, 2020.
- "Mining Proposal, Plutonic Gold Mine, Area 4 and Perch Pit Expansions (M52/148, M52/149, M52/170, M52/295 and M52/301)", dated March 12, 2020.

The main mining-related tenements are:

- M52/148.
- M52/149.
- M52/150.
- M52/170.
- M52/171.
- M52/295.
- M52/296.
- M52/300.
- M52/301.
- M52/308.
- M52/309.

Miscellaneous Licences for the mining operations are:

- L52/40.
- L52/41.
- L52/48.
- L52/52.
- L52/54.
- L52/55.
- L52/56.
- L52/70.
- L52/71.
- L52/74.

20.3.9.2 Hermes

The original MP for the Project was approved by DMP, now DMIRS, in December 2016 (Registration ID: 60472). The MP was revised in relation to updated tenure for the haul road in May 2017, with approval by the DMP in June 2017 (Registration ID: 64986).

The following is a list of the additional environmental regulatory documents for the Hermes operation (in date ascending order):

- "Mining Proposal, Hermes Gold Project – Mine Expansion (M52/685 and M52/797)", dated February 28, 2019.
- "Mine Closure Plan, Hermes Gold Project (M52/685, M52/797, L52/116, L52/164, L52/165, L52/166, M52/309, M52/150 & M52/149)", February 14, 2020.

The Hermes site planned to remain in a Care and Maintenance phase until further gold resources are confirmed in the surrounding area.

The Hermes mine is located on tenements:

- M52/685.
- M52/797.

Miscellaneous Licences for the mining operations are:

- L52/116.
- L52/164.
- L52/165.

- L52/166.

The associated haul road is also part of Plutonic tenure (M52/309, M52/150 and M52/149).

20.4 Environmental management

The Superior Environmental Management System (the "**EMS**") provides the structure and framework for the strategic management of environmental risks and compliance with legal requirements and standards in accordance with the Superior Environment Policy.

The EMS provides a systematic approach to managing and minimising environmental risks arising from Superior's operations and activities, and to drive continuous improvement.

20.4.1 EMS process

The process that the Superior EMS follows is consistent with the Australian/New Zealand Standard AS/NZS ISO 14001:2015 Environment Management Systems. It comprises the following four principal elements (steps) which constitute a continuous improvement model:

- Plan: establish objectives, targets, processes, documents and training necessary to deliver results in accordance with Superior's environmental policy;
- Do (Implement and Operate): implement approved environmental plans, procedures, guidelines and work instructions during operations;
- Check: undertake audits, inspections, monitoring and measurement of performance against environmental requirements and report the results to internal and external stakeholders; and
- Act (Management Review): conduct an annual review of the EMS to achieve continual improvement in environmental performance.

20.4.2 Environmental Policy

Superior's environmental policy (SG-HSET-ENV-POL-001) (the "**Environmental Policy**") outlines the key principles that underpin environmental management at Superior. The Environmental Policy acknowledges Superior's responsibility to perform its activities in an environmentally responsible manner.

To ensure EMS alignment with ISO 14001, Superior:

- Reviews the Environmental Policy regularly and update it as needed.
- Makes the Policy available to the public. The Policy is also to be communicated to all personnel through the Superior induction process, notice boards and made available on the Superior document management system.

20.4.3 Environmental risk assessment

To ensure EMS alignment with ISO 14001, Superior:

- Establishes, implements and maintains a process to identify and evaluate the environmental aspects of its operations activities, products or services that can interact with the environment.
- Determines those aspects that could have a significant impact on the environment through the use of an Aspects and Impacts Register (screening tool).
- Conducts Formal Risk Assessments ("**FRA**") and document them for each identified significant environmental aspect according to Superior procedures.
- Reviews and updates FRAs annually or when significant additional information comes to hand, such as operational changes or opportunities for improved management practices.
- Uses the results of risk assessments to establish environmental management priorities and factor them into business planning, including the setting of objectives and targets and the implementation of management and control measures.
- Links formal risk assessments that are undertaken at a site level, to the Corporate and Site Risk Register.
- Ensures that risk assessment criteria take into account potential and actual impacts and consequences to the surrounding environment, compliance to licence/permit obligations, current operating and

planned activities. Particular consideration must be given to the management and control measures of significant environmental risks identified.

A formal risk management process for the identification and management of all Project related risks is undertaken and maintained. The process is based on the International Standard, "AS/NZS ISO 31000:2009, Risk Management- Principles and Guidelines", and outlined in Superior's project risk management plan.

Superior utilises a risk assessment criteria matrix to assess and prioritise risks. Key environmental risks are captured in the Environmental Risk Register (the "**ERR**") and risk owners assigned accordingly. It is the responsibility of the designated risk owner to ensure that the risk controls and other mitigation measures that have been identified are implemented, and that the register is updated with new or amended risks and controls. The ERR is reviewed and revised annually, where key activities have changed or where legislation or approvals have changed.

A Hazard Identification (HAZID) is undertaken prior to the commencement of new works or works in new areas, and a construction risk register is used to record and address risks specific to the construction scope of work. A task level job hazard analysis or similar process is used to identify potential environmental risks and appropriate control measures prior to the commencement of any task for which there is no documented process that ensures compliance with legal obligations, conditions and commitments.

20.4.4 Legal and other requirements

To ensure EMS alignment with ISO 14001, Superior:

- Identifies, documents and maintains access to applicable legal requirements, corporate requirements and relevant commitments made to external stakeholders that apply to operations and activities.
- Maintains a register and associated tools to manage recurring legal and other requirements including for example, inspections, sampling, analysis and reporting
- Establishes a process by which compliance to applicable legal requirements and other commitments is periodically reviewed. Document and communicate the compliance review process.
- Communicates and informs employees and others working on behalf of the Company of existing and emerging legal and other requirements that apply to their job responsibilities.
- Tracks developing legislation and regulatory guidance for requirements that may apply to construction and operations, in order to anticipate and prepare for compliance.

Superior operates in accordance with relevant Commonwealth and State legislation and regulations.

Applicable legal and other commitments are identified, documented and maintained such that they are accessible to personnel having responsibility to ensure compliance. Hard file systems are maintained as an alternative or as backup to electronic systems.

Approval applications and granted approvals contain commitments and conditions (legal requirements) that must be met while undertaking Project activities. Project related licences, approvals and permits are listed in the Legal and Other Requirements Register (the "**LORR**") and can be accessed within the project document control management system. Approval conditions and Superior's commitments to regulators and stakeholders are documented in the LORR.

Obligations tracking includes routine inspections, sampling and reporting as well as periodic compliance reviews. Environmental compliance at Plutonic is managed using the InControl system. This system stores, tracks and provides notification to personnel when actions relating to legal and other obligations are required. This system is also used for incident investigations, tracking corrective actions and managing internal audit and inspections. A site based environmental legal obligations register allows the review and tracking of all legal obligations.

Legal requirements have been embedded into environmental-related management plans, procedures and work instructions (environmental management documents). Legal requirements are also met through the implementation of studies, surveys and monitoring programs. Relevant requirements from the LORR are also embedded in Superior's environmental management documents.

Superior's environment team (the "**Environment Team**") communicates any changes to relevant environmental legislation to the business as needed. An email information notification service from http://www.legislation.wa.gov.au can be utilised to receive weekly updates regarding changes to state legislation. Superior has access to current Australian Standards through SAI Global. Mechanisms for informing personnel concerning obligations that apply to their job responsibilities include orientation and refresher training, task training, posters and notices, Standard Operating Procedures, staff meetings, toolbox discussions etc.

20.4.5 Environmental management requirements

Minimisation, mitigation and management of impacts to key environmental aspects including the following is required:

- Flora (including Conservation Significant Vegetation Associations and Flora}.
- Fauna (including Conservation Significant Flora).
- Weeds.
- Plant Pathogens (not considered significant for this Project).
- Surface Water.
- Groundwater.
- Heritage.
- Air emissions (including dust and greenhouse gases).
- Environmental noise and vibration (not considered significant for this Project).
- Light emissions (not considered significant for this Project).
- Chemicals and hazardous substances.
- Waste.
- Wastewater.
- Bushfire.

Superior's environmental management documents have been developed to address the minimisation, mitigation and management of impacts to key environmental aspects.

20.4.6 Monitoring, Measurement and Data

To ensure EMS alignment with ISO 14001, Superior:

- Establishes and implements processes, programmes or schedules to regularly measure and monitor the key environmental activities at operating sites.
- Ensures that monitoring and measurement programmes consider legal requirements and other commitments, maintaining performance and be appropriate to mitigate environmental risks and impacts.
- Ensures all monitoring and measurement activities are undertaken in accordance with site specific documentation including plans, procedures, work instructions, schedules and training/competency needs.
- Ensures associated performance monitoring equipment is fit for purpose, tested operated and maintained as per the manufacturer's requirements.
- Periodically undertakes reviews with relevant departments and personnel regarding environmental performance including significant findings and trends from monitoring and measurement programmes.
- Where monitoring results identify opportunities and/or concerning or adverse trends, corrective actions must be agreed, documented and actioned.

20.4.6.1 Monitoring and Measurement

Environmental monitoring of operations is required in order to understand the impacts on key environmental values. Monitoring is a requirement of permits, approvals and licences.

The monitoring requirements during construction and operations are outlined in various approval documents. These are included in monitoring schedules. Where monitoring is required by a contractor, the health, safety environment, community and training manager will advise the contractor as to what is required to be done.

Superior procedures, forms and work instructions also detail the monitoring and measurements that are required and how they are to be conducted.

Monitoring and measuring equipment must be regularly maintained, serviced and calibrated according to the manufacturer's instructions/specifications and/or recognised national/international standards. Personnel conducting the equipment calibration are trained and competent, and records of maintenance, service and calibration must be retained.

All monitoring and measurement records are retained and stored within the Superior Document Management System.

Some of the specific information that requires monitoring and reporting is related to annual reporting requirements. Relevant personnel are required to collect and collate monitoring information for submission to the Superior Environmental Team.

Additional plans, procedures and work instructions will be developed where further information on sampling and monitoring is required.

20.4.6.2 Environmental Data

Environmental data is required to be collected across all Project sites for reporting to government regulatory agencies on a periodic basis.

Key environmental data may be requested on a monthly basis from contractors and Superior Environmental Reporting Groups.

The data is to be captured in an environmental data management system and reviewed on a regular basis to compare against licence limits and other environmental criteria.

Environment personnel can assist by providing training on the use of monthly environmental reporting tools as needed.

20.4.7 Evaluation of Compliance

To ensure EMS alignment with ISO 14001, Superior must:

- Conduct internal audits and inspections at planned intervals to evaluate and verify compliance to applicable environmental legal obligations and conformance to the Superior's Standards.
- The frequency of audits and inspections must be based on the risk and significance of the environmental activities of the work area and/or legal obligations being assessed.
- Results from key audits and inspections and any required corrective or preventative actions must be documented and communicated to relevant personnel.
- An internal audit of the Construction and Operational Environmental Management Plan (COEMP) must be undertaken annually to determine each sites overall conformance with its requirements, and implementation status of planned environmental management activities.

20.4.7.1 Internal Audits and Inspections

Environmental audits and inspections are conducted to ensure that Project activities are implemented in accordance with the Environment Policy, legal and approval requirements, the COEMP, environmental plans, procedures and work instructions. Audits are undertaken in accordance with the Australian/New Zealand Standard AS/NZS ISO 19011:2014: Guidelines for Auditing Management Systems.

Inspections and audits are scheduled by Superior teams, contractors and the Environment Team. The status of planned versus completed inspections and audits is recorded and reported to Superior's leadership team (the "**Leadership Team**") on a monthly basis.

Superior teams conduct daily and weekly inspections of their work areas and activities. Inspection findings are recorded in the approved inspection forms or checklists and actions raised as required. Actions arising from inspections are entered by Superior teams into Superior's action management system (the "**Action Management System**") for tracking and close out.

The Environment Team conducts regular inspections of operational areas and activities where there are potential environmental risks, using approved environmental inspection checklists. All actions raised during the inspection are loaded into the Superior Action Management System for tracking and close out.

The Environment Team conducts audits of activities undertaken by Superior teams and contractors to determine compliance key EMS documents, legal requirements and approval/licence/permit conditions. The results are to be communicated to the Leadership Team. Actions raised during the audit are communicated to the auditees and entered into the Superior Action Management System for tracking and close out.

20.4.7.2 External Audits and Inspections

External audits and inspections are conducted periodically by government regulators to ensure compliance with permits, licences and commitments made by Superior. Relevant Superior representatives accompany the regulator during their inspection or audit.

Findings and recommendations of these audits are recorded as corrective actions by the Environment Team in the Superior Action Management System. Actions are undertaken by Superior teams and contractors as required to close them out within agreed time frames. Evidence of close out of actions is provided to regulators where required.

20.4.7.3 Internal Environmental Reporting

Superior teams and contractors (including subcontractors) complete a monthly data reporting as requested by the Environment Team to ensure that data relating to their activities is provided. The Environment Team conducts a review of the submitted data for completeness and accuracy. Reports provided to the Environment Team may be used as evidence of legal compliance or non-compliance and therefore must be correct and auditable.

The Environment Team submits a monthly internal environmental report to the Leadership Team.

20.4.7.4 External Environmental Reporting

Superior prepares and submits a range of environmental compliance reports to government regulatory agencies in accordance with legislative and approval requirements.

An Annual Environmental Report ("**AER**") for the Plutonic project is required to be submitted to DMIRS in March of each year. An AER for the Hermes Gold Mine is required to be submitted to DMIRS in June of each year.

An AER for the Operating Licence is required to be submitted to DWER in March each year. Other reporting is required throughout the year as well.

As of December 31, 2021, there were no significant legal non-compliances raised for either the Plutonic project of the Hermes Gold Mine.

20.4.8 Environmental impact assessment

20.4.8.1 Waste rock

<u>Plutonic</u>

Open pit mining ceased in 2007 and recommenced in 2021. Plutonic has multiple waste rock landforms, primarily constructed from open pit waste. Testing of materials from the Salmon, Perch, Main Pit and Zone 550 waste dumps all returned results between -6 to -158 kg H_2SO_4/t, indicating non-acid forming ("**NAF**") status. The majority of the waste dumps have been at least partially rehabilitated, with rehabilitation complete on many of the satellite pits.

There is limited waste rock from development activities in current underground operations, with some of the development waste disposed of as backfill in mined out stopes. Surplus waste is disposed of in above ground waste rock landforms, and subject to determination of acid generating potential and appropriate management mechanisms.

<u>Hermes</u>

Mine waste-streams generated from the Hermes deposits included waste regolith materials of saprolite ('fluffy-oxides') and saprock (material transitional between saprolite and fresh bedrock) of psammite and amphibolite. The footprints of all the pits are characterised by a well-developed hardpan layer, with a typical thickness of 1–2 m.

Geochemical studies have shown some 12% of mine waste to be Potentially Acid-Forming (PAF), 45% to be highly erodible but NAF, 35% NAF fresh rock suitable for armouring, and 8% transitional saprock and hardpan excellently suited to sheeting surfaces of waste stockpiles. The PAF material is not highly reactive, and is unlikely to pose even short-term challenges prior to encapsulation with waste stockpiles.

Potentially acid-forming material was identified in-situ and was encapsulated on the 513 m RL in the Hawkeye pit.

20.4.8.2 Tailings

Plutonic

Studies into tailings geochemistry at Plutonic have concluded that the tailings stream net acid producing potential can be classified as barren to NAF, due to low sulphur concentration and the presence of carbonates.

As per the Plutonic DWER licence, Billabong is required to monitor groundwater quality for the area surrounding the TSFs. Water samples are collected to monitor the pH, TDS, WAD CN, arsenic, copper and nickel on a quarterly basis; any exceedances are reported against licence limits. A small number of elevated levels have occurred mainly relating to TDS with no breaches recorded for arsenic, copper or nickel.

Hermes

Tailings from the Hermes Gold Mine were disposed of in the existing Plutonic TSF.

20.4.8.3 Land

Plutonic

The Plutonic mining leases are listed as known or suspected contaminated sites under section 15 of the *Contaminated Sites Act 2003*. This is in relation to historical and current mining operations, and include suspected groundwater contamination from historical in-pit tailings disposal. Contaminated land remediation has been considered in the mine closure planning for the operation.

Hermes

The Hermes Gold Mine is not affected by significant contaminated site issues, as there is no processing on site, and the potential for contamination is limited to facilities associated with mining operations such as vehicle workshops and fuel storage.

20.4.8.4 Surface water management

Plutonic

In June 2016, the Plutonic Gold Mine prepared a Site Water Improvement Program, under the direction of former DER. The report addressed:

- An assessment of the site water balance including dewatering rates, water storage capacity, water usage rates and water storage buffer required for climatic variability.
- An assessment of the adequacy of current site water storage infrastructure
- Environmental risk assessment of periodic discharges to the receiving environment.

Dewater usage in dust suppression, underground services and the processing plant minimises the need for off-site discharges.

Hermes

Open Pit mines at Hermes do not require dewatering as mining operations have ceased.

The haul road corridor traverses a number of drainage lines. Culverts have been developed to allow water to flow beneath the haul road.

Post closure surface water management

Mine water management post closure is likely to involve drainage of rainfall runoff to existing pits. The area is semi-arid, with average evaporation exceeding average rainfall for all months of the year, and annual evaporation exceeding rainfall by approximately 3,500 mm. Given the extent of storage available in disused pits and the arid conditions, post closure water mine water management is unlikely to be a significant issue. Long term post closure integrated water balances and water quality studies will be required to confirm this preliminary assessment.

20.4.8.5 Groundwater

Plutonic

The Plutonic Gold Mine area contains alluvial and fractured rock aquifers in fresh and slightly weathered rock. These aquifers are limited in extent and storage capacity.

Production and potable water are sources from Borefield 1 (30 km west of the mine) and Borefield 2 (15 km west of the mine). A number of mine dewatering bores and sumps are also licenced within the mining area including via water recovery bores in mine out pits, and the current underground workings.

No groundwater dependent ecosystems have been identified within the immediate area of groundwater abstraction. Groundwater monitoring is carried out in accordance with licence conditions.

Hermes

The groundwater level drawdown from mine dewatering has been assessed to have a negligible impact on the available supply of groundwater to other groundwater users or groundwater dependent vegetation. There are no other groundwater users within the predicted extent of groundwater drawdown, and no groundwater dependent vegetation has been identified within the Project area.

Post closure groundwater management

Post closure groundwater management is likely to involve:

- Inflows from surrounding aquifers to pits, with formation of a saline pit lake below surrounding levels, due to evapo-concentration of groundwater salts.
- Flooding of underground workings due to inflows from surrounding aquifers until water levels reach natural groundwater levels.

Long term post closure groundwater modelling and water balances will be required to confirm the management practices.

20.4.8.6 Ecology

Plutonic

Plutonic Gold Mine manages its known priority flora species on site in two ways; defining the distribution and minimisation of clearing. Site surveys are conducted, as required, for any proposed land disturbance in accordance with regulatory requirements. Information gathered during these surveys, as well as the targeted surveys, is included in the Environmental GIS database. This database is used during the assessment of clearing applications for both drilling programs and surface mining activities.

A number of desktop surveys and opportunistic field surveys have been conducted for flora and fauna species at Plutonic over the years. None of these surveys have identified any species of protected flora or fauna within the mining lease or within close proximity. It was identified that habitats present on the lease are very common in surrounding areas.

Hermes and the Haul Road Corridor

No conservation-sensitive vegetation community or species are known to have been impacted by the Hermes Gold Mine and haul road corridor, except for one low-protection species along the haul road.

While database searches show a number of fauna species occurring in the general project area and region, none were recorded in field surveys. Significant impacts on conservation-significant fauna are thus not expected to have occurred.

A field survey indicated that stygofauna in the project area are not unique and are well-represented elsewhere in the region. There are no suggestions of any threats to stygofauna conservation values or the persistence of any stygofauna species as a result of the Hermes mining operations.

20.5 Community

20.5.1 Social context and nearest sensitive receptors

Plutonic exists within the Doolgunna ex-pastoral lease, now managed by the DBCA, and the Bryah and Three Rivers Pastoral Leases. Public access to the project area is possible via the gazetted Ashburton Downs and Peak Hill roads, both unsealed roads maintained by the Meekatharra Shire. Existing access within the Project area is primarily by way of station tracks from the Peak Hill-Doolgunna Road.

There are no human settlements nearby, with cattle raising or mining activities being the primary land uses in the Peak Hill District. The nearest place of potential interest to tourists is the historic Peak Hill townsite, a heritage-listed abandoned mining centre located approximately 30 km east of the Hermes Gold Mine area.

20.5.2 Community engagement

The following stakeholders have been identified for the project. There is relatively low number of directly affected stakeholders as a result of the remote location of the project and fly-in, fly-out workforce for the operation.

The Community:

- Pastoral station owners and operators
- Local Aboriginal groups (People)

Local business and service providers:

- Shire of Meekatharra
- Neighbouring mining companies
- Other local community groups and individuals.

Government Departments:

- Department of Mines, Industry Regulation and Safety (DMIRS)
- Department of Biodiversity, Conservation and Attractions (DBCA)
- Department of Water and Environmental Regulation (DWER)
- Department of Planning, Lands and Heritage (DPLH)
- Department of Regional Development

A site-based stakeholder register is in place to capture all communications between external stakeholders and onsite personnel.

20.5.3 Aboriginal cultural heritage

20.5.3.1 Plutonic

No heritage protection agreement currently exists in regards to Plutonic project. In April 2021, Superior executed a Negotiation Protocol with the Marputu Aboriginal Corporation, the RNTBC for the Gingirana People, and is currently negotiating a heritage agreement, to apply to the broader Plutonic project. A number of archaeological and ethnographic surveys have been undertaken during the LOM. A search list of the Department of Indigenous Affairs sites and databases in order to identify both previously recorded archaeological and ethnographical sites has been prepared, and is considered in mine planning and operations.

20.5.3.2 Hermes

Heritage surveys were completed over the mining area and haul road, with clearance provided by Jidi Jidi to undertake the required ground disturbing activities (i.e. mining and construction of the Hermes haul road).

20.5.3.3 Hermes South

Heritage surveys were completed over the Hermes to Hermes South proposed haul road corridor and the Hermes South proposed mining footprint. A number of Heritage Sites were identified, two of which were surveyed to site identification standard, the remainder to site avoidance standard. These sites are to be avoided during mine construction and development.

20.6 Mine closure and security bonds

20.6.1 Regulatory regime and closure costs

Tenement holders operating on Mining Act tenure are required to report disturbance data and contribute annually to the Mining Rehabilitation Fund. Tenements with a rehabilitation liability estimate below a threshold of $37,000 must report disturbance data but are not required to pay into the fund.

The fund essentially replaced the need for the provision of an environmental security bond in Western Australia. Money in the fund is available to rehabilitate abandoned mines across the State in circumstances where the tenement holder/operator fails to meet rehabilitation obligations and after every other effort has been used to recover funds from the operator.

The introduction of the Mining Rehabilitation Fund does not absolve tenement holders/operators of their legal obligations to carry out rehabilitation works on a tenement.

20.6.2 Rehabilitation Liability

The rehabilitation liability estimate calculator is used to determine the applicable rehabilitation liability estimate and Mining Rehabilitation Fund levy based on a range of tenement activity scenarios. The Mining Rehabilitation Fund levy for Plutonic and Hermes for 2021 was A$270,449. The MCPs for Plutonic and Hermes outline the works needed in order to successfully close and relinquish the mining operations.

As of December 31, 2021, Plutonic:

- Total disturbed footprint to date (ha), excluding pits that do not require rehabilitation, is 964.24 ha.
- Total area under rehabilitation (i.e. sum of all rehab, stages) is 483.35 ha.
- Mine closure provision is estimated at $22.3 million with a relinquishment date 10 years after closure.

As of December 31, 2021, Hermes (including the haul road):

- Total disturbed footprint to date (ha), excluding pits that do not require rehabilitation, is 406.07 ha.
- Total area under rehabilitation (i.e. sum of all rehab, stages) is 32.87 ha.
- Mine closure provision is estimated at $5.1 million with a relinquishment date 10 years after closure.

A provision has been included for the rehabilitation of the haul road corridor. While it is probable that the haul road will be left in place following mine closure, as a valuable piece of transport infrastructure, this is not yet approved and therefore the estimate for rehabilitation remains in the closure estimates.

21 Capital and operating costs

21.1 Capital Costs

The Company has a long history of capital cost information required to maintain operations and to the extent possible, these are used to inform future capital expenditure requirements.

A PEA of the Main Pit pushback was published in Superior's previous technical report dated December 30, 2020, which outlined significant capital expenditure required to develop the project. Further studies are required to advance the project.

21.2 Operating Costs

Plutonic site has a long history of cost information and to the extent possible, mining, processing and site administration costs were derived from actual performance data. The following data was used to inform the cost estimate:

- **Plutonic Underground**. The costs are scheduled based on first principles unit costs and scheduled physicals. Fixed and variable costs have been included as appropriate. Personnel quantities (including mine management, supervision, underground personnel, and maintenance) have been calculated from the activity required in the scheduled physicals and used to calculate salaries, wages, on costs, flights, and accommodation. Capital development costs have been separated.
- **Open pit mining (Plutonic and Hermes)**. The costs are scheduled based on contractor unit costs. Fixed and variable costs have been included as appropriate. Personnel quantities (including mine management, supervision, underground personnel, and maintenance) have been calculated from the activity required in the scheduled physicals and used to calculate salaries, wages, on costs, flights, and accommodation. Capital costs have been separated.
- **Processing and TSF**. The costs are scheduled based on first principles unit costs and the scheduled physicals. Fixed and variable costs have been included as appropriate. Personnel quantities (including mill management, supervision, mill operators, and maintenance) have been calculated from the activity required in the scheduled physicals and used to calculate salaries, wages, on costs, flights, and accommodation.
- **General and administration**. The costs are scheduled based on first principles unit costs and scheduled physicals. Fixed and variable costs have been included as appropriate. Personnel quantities have been calculated from the activity required in the scheduled physicals and used to calculate salaries and wages.
- **Royalties**. Royalties have been calculated as per Section 4.
- **Closure costs**. Closure costs are based on detailed estimates prepared under the MCPs.

22 Economic analysis

As Superior is a producing issuer, it has excluded information required by Item 22 of Form 43-101F1 as there has not been and there is no planned material expansion of current production.

23 Adjacent properties

23.1 Plutonic

The Plutonic Gold Mine is located in the south-western extremity of the Belt which extends over 70 km strike length and averages 20 km in width. Because of its remote location, the Belt largely escaped the attention of the gold prospectors in the late 19th and early 20th centuries, and remained unknown until 1986, when stream sediment sampling revealed gold mineralisation at Plutonic in the south-western part of the belt. By 2010 Plutonic ranked as the sixth largest gold camp in Western Australia with an estimated total endowment of 12.2 Moz of gold.

The closest active adjacent property to Plutonic Gold Mine is Sandfire's DeGrussa copper operation, located approximately 30 km to the southwest. Construction and development of the project was completed in 2012, with initial open pit mining completed in April 2013, and the mine is now underground focused. The mine has a reported total open pit and underground Mineral Resource[7] as at December 31, 2020 of 2.1Mt grading 4.7% copper and 1.8 g/t of gold for contained metal of 98 kt copper and 122 koz of gold with an Ore Reserve[8] of 1.9Mt grading 3.8% copper and 1.6 g/t of gold for contained metal of 72 kt copper and 84 koz of gold (refer 2021 Annual and Sustainability Report: (https://sfr.live.irmau.com/site/PDF/a691feaa-ec67-4d1c-a67d-ea743b33964d/2021AnnualandSustainabilityReport). The qualified person has been unable to verify this information and the information is not indicative of the mineralisation held by Plutonic.

The closest recently active gold mine is the Andy Well mine, part of Meeka Gold Ltd's Murchison Gold Project (formerly owned and operated by Doray Minerals Ltd, - now Meeka Gold Limited) is located 120 km due south west from Plutonic. The mine ceased production in October 2017 and is now in care and maintenance. The Murchison Gold Project, including Andy Well Mine and Turnberry Deposit, has total Mineral Resource of 150 Kt grading 11.4 g/t Au for 55 koz Au Measured, 7,850 Kt grading 2.7 g/t Au for 670 Koz Au Indicated and 5,150 Kt grading 2.4 g/t Au for 390 koz Au Inferred totalling 13,100 kt grading 2.6 g/t totalling 1,115 koz as reported by Meeka Gold Ltd to the ASX on May 18 2021 (https://wcsecure.weblink.com.au/pdf/LCD/02375620.pdf). The qualified person has been unable to verify this information and the information is not necessarily indicative of the mineralisation held by Plutonic.

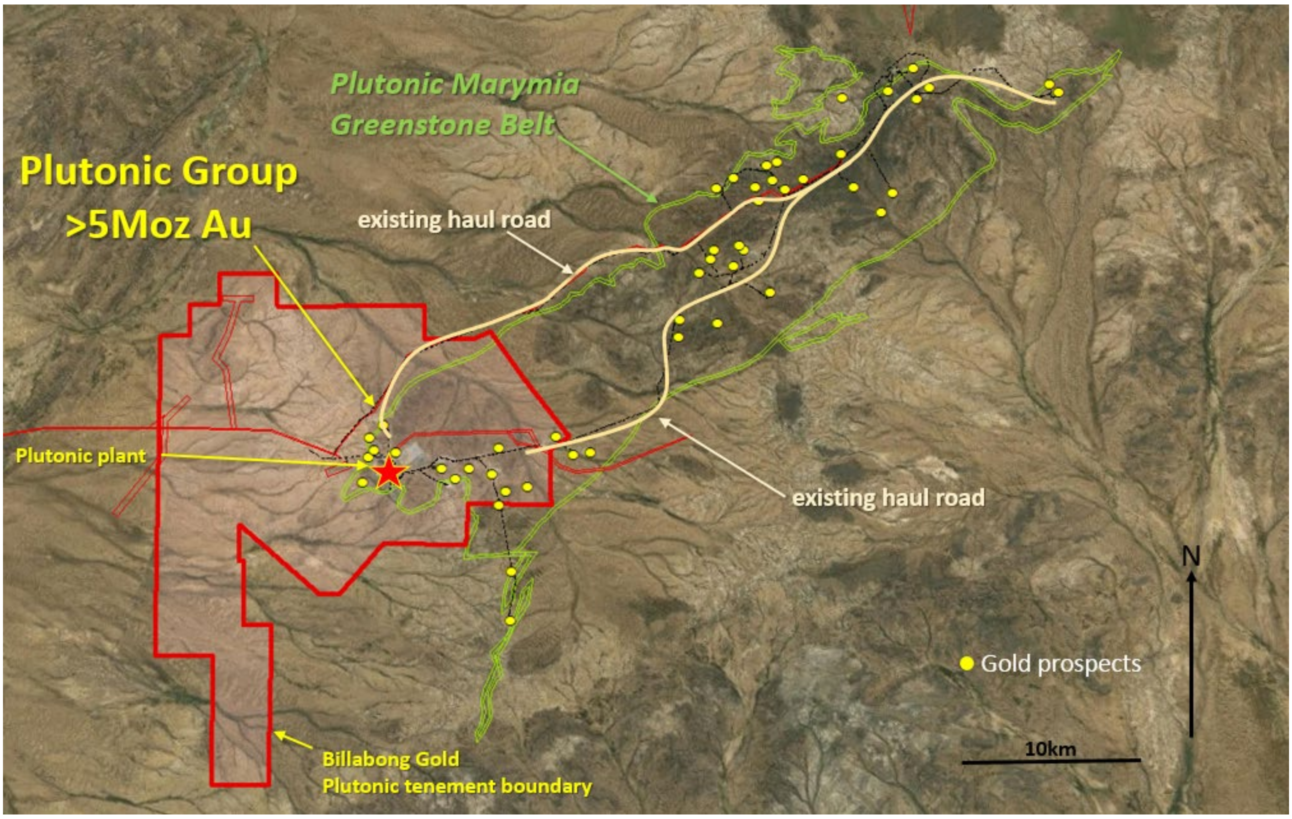
The historically mined Belt extends in a north-easterly direction from the Plutonic tenements.

Production from the Marymia section of the Belt (Figure 23-1) amounts to approximately 682,000 gold ounces as reported by Dampier Gold Limited in an ASX announcement on August 28, 2012 (http://www.asx.com.au/asxpdf/20120828/pdf/428980z4prybj0.pdf accessed 15/12/2016). Current Mineral Resources within the tenement package to the north-east and adjacent to the Plutonic Gold Mine tenements at May 2020 are Indicated Resources of 6,442 Kt grading 3.2 g/t Au for 663 koz and Inferred Resources of 3,942 Kt grading 2.7 g/t Au for 339 Koz Au as reported by Vango Mining Limited (https://www.asx.com.au/asxpdf/20200520/pdf/44hyzw3th235pt.pdf). The qualified person has been unable to verify this information and the information is not necessarily indicative of the mineralisation held by Plutonic.

There are no other gold processing facilities within a 120 km radius of Plutonic.

[7] JORC
[8] JORC

Figure 23-1 Adjacent prospects in the Plutonic Marymia Greenstone Belt



23.2 Hermes

Apart from the Hermes deposits there are also a number of other exploration targets closely associated with this mineralisation trend, including Radar, Hot Lips and Burns within the Hermes Gold Mine area. Other exploration targets possibly related to this mineralisation trend within the adjoining BBJV Project include Troy, Henry-Border, Jones, Pelorus, Seaborg, Central Bore, and Faust & Flamel.

The approximate sizes of the nearby gold deposits are summarised in Table 23-1, and include the previously estimated Hermes South (Wilgeena) Mineral Resource (Coxhell, 2012b), which is situated within the BBJV Project, and the Peak Hill deposits are located within the Metals-X Peak Hill Project, adjacent to the BBJV Project. These targets and nearby deposits are shown in the plan in Figure 7-3. The Hermes South deposit area Resource is subject to an 80% JV agreement between Billabong and Alchemy Resource Ltd. The qualified person has been unable to verify the details relating to the information presented in Table 23-1 and as such the information is not necessarily indicative of the mineralisation held by Plutonic.

Table 23-1 Adjacent Resources to the Hermes Gold Mine Area

Resource	Tonnes	Grade	Ounces
Wilgeena	789,970	2.0	50,550
Peak Hill (total)	11,525,000	1.5	561,000
Fortnum	14,316,000	2.1	985,000
Horseshoe	2,291,000	2.2	163,950

24 Other relevant data and information

24.1 Potential production from non-Mineral Reserve material

Plutonic underground has a long history of successfully converting Mineral Resources directly into production, without ever being declared as a Mineral Reserve.

24.2 Drilling results

Plutonic underground drilling is on-going. The holes are all drilled from underground and the results are continuously influencing grade control decisions to mine within the Plutonic Underground mine.

24.3 Other

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 Interpretation and conclusions

25.1 Plutonic Underground

- Plutonic is currently 100% held by Billabong, a wholly-owned subsidiary of Superior;
- Mineral Production from eight out of the ten main underground operations areas is on-going as at the end of December 2021;
- Underground mining produced 835,291 tonnes at an average grade of 2.79 g/t or 75,022 contained Au oz for the period January 2021 to December 2021;
- Updated mineral resource estimations are now completed for all underground Resource areas from the Plutonic Main Operation including the Main Pit, Perch and A4, but excludes Plutonic East that is currently under final validation review.
- Drilling and sampling procedures, sample preparation and assay protocols are currently conducted in agreement with industry good-practice standards. Drilling and assay information was available from the previous owner of the property and is assumed to be to a similar standard;
- Digital data verification of all the drill-hole collars, surveys, and assays was not completed and for much of the data is difficult to achieve due to the size and age of the data. The data as provided continues to acted upon to generate the on-going mining operations;
- The modelling methodology for the majority of the Plutonic Resources is aligned with typical industry methods albeit produced in a more efficient, standardized and automated method. The model method was review for fatal flaws by an external consultancy with no major fatal flaws identified. Mine planning and grade control practices refine the global model to better predict grade distributions at a mine planning and production stope scale.
- The geological understanding is excellent due to history of mining and investigation. However, understanding how much and why mineralization occurs at the local scale does not necessarily help with predicting where the highest grade mineralization occurs at larger scales.
- The bulk density characteristics of the Plutonic Gold Mine material, particularly from underground is well understood from mining the material for many years and application of a global density value is appropriate;
- Exploration potential for Plutonic Underground is present in several locations, most importantly in the Baltic, Indian and Caspian areas. These areas are open to the west and provide opportunity to establish mining fonts.

25.2 Plutonic Open Pit

- Plutonic Open Pit Mineral Resources currently include Area 4, Perch, and Main Pit
- The Main Pit was the subject of a PEA dated 30 December 2020 which demonstrated a longer life open pit pushback with positive economics;
- Further evaluations are now necessary to advance the project and convert Mineral Resources into Mineral Reserves
- At a gold cut-off grade of nominally 0.4 g/t Au (aligned with LG pit optimization) for all mineralised material, the block model contains a Measured, Indicated Resources of about 5.29Mt @ 2.5 g/t Au for about 430 koz contained gold. There is also an Inferred Resource of 7.41Mt @ 2.0 g/t Au for about 476 koz ('not LG optimized")

25.3 Hermes

- The Hermes Gold Mine is currently held 100% by Billabong;
- Hermes Gold Mine was suspended in May 2019 to focus on opportunities in the area to improve the economies of scale.
- At a gold cut-off grade of nominally 0.4 g/t Au (aligned with LG pit optimization) for all mineralised material, the block model contains a Measured, Indicated of about 1.99Mt @ 1.4 g/t Au for about 90 koz contained gold. There is also an Inferred Resource of 3.87Mt @ 1.3 g/t Au for about 160 koz ('not LG optimized")
- The Mineral Resource is sufficient to warrant further studies to find an economic solution to the increased strip ratio and when combined with other open pit opportunities in close proximity to Hermes.

25.4 Hermes South

- The Hermes South project is currently held 80% by Billabong who is the operator;
- The Hermes South project mineralisation is likely hosted primarily by the Archaean Marymia Inlier near its southern contact with the Proterozoic Bryah Basin;
- Mineralisation is currently defined in numerous domains, all of which range from oxide to fresh material. Around these domains is a waste sediment/amphibolite host which contains anomalous gold values;
- Drilling and sampling procedures, sample preparation and assay protocols are currently conducted in agreement with industry good-practice. Drilling and assay information was available from the previous owner of the property and is assumed to be to a similar standard;
- Digital data verification of the drill-hole collars, surveys, assays, and core and drill-hole logs indicates that the data is reliable;
- The mineralisation model for Hermes South has been constructed using industry standard practices;
- The geological understanding is sufficient to support the Resource estimation;
- At a gold cut-off grade of nominally 0.4 g/t Au (aligned with LG pit optimization) for all mineralised material, the block model contains a Measured, Indicated Resource of about 0.698Mt @ 1.6 g/t Au for about 36 koz contained gold. There is also an Inferred Resource of 0.198Mt @ 1.1 g/t Au for about 7 koz ('not LG optimized")
- The specific gravity values used to determine the tonnages was validated and updated from analysing data obtained from diamond drilling into the deposit;
- Adjacent deposits and potential extensions could provide enough mineralisation to allow conversion to Mineral Reserves

26 Recommendations

26.1 Photographic records

Continue to Systematically Photograph RC drilling chip trays and underground development faces to assist using digital records with geological interpretation and modelling.

26.2 Mineral Resource Models

It is recommended to expand the use of the software based modelling to ensure consistent interpretations and focus on more local factors to improve the predictability in space of the Mineral Resources.

26.3 Refined LSAM (Lithology, Structure, Alteration and Mineralization (M-Code)) Modelling

It is recommended a new Plutonic (detailed mine scale) Underground rock model program be started to help characterize structural and alteration characteristics of mineralization as 3D geometries to help with prediction of gold distribution and both local and larger scales. Completing 3D solid geology interpretations of both Plutonic Underground and zones associated with Area 4 pit/Plutonic East Underground will assist with exploration and project development. This sort of modelling will necessarily draw upon the Resource and grade control drilling data-sets as well as the large collection of underground face mapping and sampling data. The difficulty experienced in being able to accurately predict mineralization grades on a cut by cut basis due to the inherent gold spatial variability at Plutonic can often cause difficulties related to Mine planning and scheduling decisions.

26.4 Evaluation of Hermes South and Hermes Underground

Finalise Hermes South mining studies and advance permitting and review Hermes existing pits for underground mining potential.

26.5 Open Pit Potential

The PEA completed in 2020 indicates that the proposed Plutonic Main Pit is potentially economically viable and further technical investigations are warranted including the preparation of a pre-feasibility study into this development.

26.6 Bulk Underground Potential

Given the large Resource, review the potential of bulk mining the extensive underground Resource.

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28 Dates and signatures

The report is issued on July 5, 2022.

The data on which this contained Mineral Resource and Reserve estimate for Plutonic Operations is based were current as of the Effective Date, December 31, 2021.

The undersigned are all qualified persons and were responsible for preparing or supervising the preparation of parts of the Report, as described in Section 2.

Signed: Ettienne du Plessis	July 5, 2022
Signed: Karel Steyn	July 5, 2022
Signed: Russell Cole	July 5, 2022

CERTIFICATE OF QUALIFIED PERSON

This Certificate of Qualified Person has been prepared to meet the requirements of National Instrument 43-101 - Standards of Disclosure for Minerals Projects ("**NI 43-101**").

(a) Name, Address, Occupation:

Ettienne du Plessis
Chief Geologist – Plutonic Gold Mine
Level 1, 30 Richardson Street
West Perth, Western Australia, 6005

(b) Title and Effective Date of Technical Report:

Issued on July 5, 2022, entitled "2022 Mineral Resource and Reserve Estimate for the Plutonic Gold Operations", with an effective date of December 31, 2021 (the "**Technical Report**").

(c) Qualifications:

I graduated with a B.Sc. (Geology & Soil Science) in 1978 from Potchefstroom University for CHE, South Africa and also achieved a MBA at same in 1992. I was a member of AusIMM for ~15 years and am now a member of the AIG in order to meet CIM (Canadian Institute of Mining, Metallurgy and Petroleum) criteria as a "qualified person" as set out in NI 43-101.

I have worked for +40 years through the entire range of geology positions in the mining industry in predominantly gold exploration, mine production and near-mine exploration (Minex) positions including senior management positions.

I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101.

(d) Site Inspection:

As a full time, permanent employee of Billabong Gold Pty Ltd, I am regularly at the Plutonic Gold Mine on a routine 'fly-in / fly-out' roster of approximately 2 weeks onsite and 1 week off.

(e) Responsibilities:

I am responsible for all sections of the Technical Report other than sections 15, 16 and 18 and the open pit and underground contributions to Sections 25 and 26 for which the other two Qualified Persons are responsible for.

(f) Independence:

I am not independent of Superior Gold Inc. in accordance with the application of Section 1.5 of NI 43-101.

(g) Prior Involvement:

I have had prior involvement with the property that is the subject of the Technical Report.

(h) Compliance with NI 43-101:

I have read NI 43-101 and the parts of this Technical Report for which I am responsible and certify that the Technical Report has been prepared in compliance with NI 43-101.

(i) Disclosure:

At the Effective Date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 5th day of July, 2022.

/s/ Ettienne du Plessis
Name: Ettienne du Plessis

CERTIFICATE OF QUALIFIED PERSON

This Certificate of Qualified Person has been prepared to meet the requirements of National Instrument 43-101 - Standards of Disclosure for Minerals Projects ("**NI 43-101**").

(a) Name, Address, Occupation:

Karel Steyn
Manager Technical Services – Plutonic Gold Mine
Level 1, 30 Richardson Street
West Perth, Western Australia, 6005

(b) Title and Effective Date of Technical Report:

Issued on July 5, 2022, entitled "2022 Mineral Resource and Reserve Estimate for the Plutonic Gold Operations", with an effective date of December 31, 2021 (the "**Technical Report**").

(c) Qualifications:

I graduated with an A.Eng. from the University of South Australia. I also completed a Certificate in Mineral Resource Management from Wits University in 2005. I am a member of the Australasian Institute of Mining and Metallurgy.

I have worked for a total of 43 years in the mining industry in various technical and management positions.

I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101.

(d) Site Inspection:

As an employee of Billabong Gold Pty Ltd, I am on a routine 4/3 day 'fly-in / fly-out' roster.

(e) Responsibilities:

I was responsible for Sections 15, 16, 18, and the underground contributions to Sections 25 and 26 of the Technical Report.

(f) Independence:

I am not independent of Superior Gold Inc. in accordance with the application of Section 1.5 of NI 43-101.

(g) Prior Involvement:

I have had prior involvement with the property that is the subject of the Technical Report.

(h) Compliance with NI 43-101:

I have read NI 43-101 and the parts of this Technical Report for which I am responsible and certify that the Technical Report has been prepared in compliance with NI 43-101.

(i) Disclosure:

At the Effective Date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 5th day of July, 2022.

/s/ Karel Steyn
Name: Karel Steyn

CERTIFICATE OF QUALIFIED PERSON

This Certificate of Qualified Person has been prepared to meet the requirements of National Instrument 43-101 - Standards of Disclosure for Minerals Projects ("**NI 43-101**").

(a) Name, Address, Occupation:

Russell Cole
Vice President and General Manager – Plutonic Gold Mine
Level 1, 30 Richardson Street
West Perth, Western Australia, 6005

(b) Title and Effective Date of Technical Report:

Issued on July 5, 2022, entitled "2022 Mineral Resource and Reserve Estimate for the Plutonic Gold Operations", with an effective date of December 31, 2021 (the "**Technical Report**").

(c) Qualifications:

I graduated with a B. App Sc. (Mining Engineering) from the Western Australian School of Mines, Kalgoorlie, WA. I am a Fellow member of the Australasian Institute of Mining and Metallurgy (FAusIMM).

I have worked for a total of 35 years in the mining industry in various positions. I joined Superior Gold Inc. in August 2021 as an employee at the Plutonic Gold Mine in the position of General Manager.

I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

(d) Site Inspection:

As an employee of Billabong Gold Pty Ltd, I am regularly at the Plutonic Gold Mine on a routine 'fly-in / fly-out' roster.

(e) Responsibilities:

I was responsible for Sections 15, 16, 18, and the open pit contributions to Sections 25 and 26 of the Technical Report.

(f) Independence:

I am not independent of Superior Gold Inc. in accordance with the application of Section 1.5 of NI 43-101.

(g) Prior Involvement:

I have had prior involvement with the property that is the subject of the Technical Report.

(h) Compliance with NI 43-101:

I have read NI 43-101 and the parts of this Technical Report for which I am responsible and certify that the Technical Report has been prepared in compliance with NI 43-101.

(i) Disclosure:

At the Effective Date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 5th day of July, 2022.

/s/ Russell Cole
Name: Russell Cole