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2020 Mineral Resource and Reserve Estimate for the Plutonic Gold Operations Including Main Open Cut Pit Area

Plutonic Gold Mine
Superior Gold Inc

Plutonic Gold Mine, Western Australia, Australia

NI 43-101 Report

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Effective Date: 31 December 2019

Signature Date: 30 December 2020

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 Mine, 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 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 nor its Regulation Services Provider (as that 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 Hyland Geological and Mining Consultants ("HGMC"), RPM Global ("RPM") and Superior Gold Inc. ("Superior"). In the preparation of the report, HGMC, RPM and Superior have utilised information relating to operational methods and expectations provided to them by various sources. Where possible, HGMC, RPM and Superior have 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 the NI 43-101 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. The majority of these factors are usually beyond the control of any operating entity.

1 Summary

Billabong Gold Pty Ltd (Billabong), a wholly owned subsidiary of Canadian based Superior Gold Inc., is an Australian corporation that acquired the Plutonic Gold Operations 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 the Plutonic Gold Operations, Western Australia for public disclosure by Superior Gold Inc. Data presented in this report is as of December 31, 2019.

The Plutonic mine currently produces gold from a large underground operation through a traditional crushing, grinding and carbon-in-leach (CIL) circuit. Historically, numerous open pits were mined at the Plutonic mine between 1990 and 2005—underground mining commenced in 1995. Mining is currently conducted from eight underground geological 'Fault Block' domain zones at an average rate of approximately 0.8 Mtpa. The Hermes open pit project, which lies approximately 60 km southwest of the Plutonic mine, operated from 2017 to 2019.

The Resources now reported from all these areas represent the consolidated Global 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 the Plutonic Gold Operations and is supporting evidence that the Plutonic mine is a large mineralized system with long term potential.

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

Prior Resource estimations utilized open block models inherited by the Company that required further evaluation and definition. Experience with the Plutonic 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 constrained wire-framed models which are expected to better demonstrate the grade and distribution of the mineralization. As a result, the 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 the Plutonic Gold Operations, the focus has been on better understanding the mineralization through the upgrading of pre-existing Inferred Resources to Measured and Indicated and by adding Inferred 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 Resources to Measured and Indicated and also outline new areas of mineralization. Particular focus is given to better defining and expanding the high-grade mineralization for the Baltic, Baltic Deeps and Indian Zones.

Given the increase in overall Resources and favourable economic conditions, re-examination of the potential to increase the rate of underground production is also underway. As part of the Resources and Reserves revision process, including the use or a lower reporting cut-off grade, the underground grade has declined relative to the year end 2018 Reserves. This is also partly a result of the change from the prior use of open block models to those based on geologically controlled wire-framed models.

Mineral Reserves as at December 31, 2019 were estimated using a long-term gold price of A$1,925 per ounce ($1,348 per ounce). Cut off grades for the Mineral Reserves for Plutonic underground were 2-3 g Au/t (depending on stoping area), and 0.4 g Au/t for the open pit areas. Dilution of 10% was factored into the estimation of underground Mineral Reserves. Mineral Resources as at December 31, 2019 were estimated using a long-term gold price of A$2,150 per ounce ($1,505 per ounce). Cut off grades for the Mineral Resource estimates were 1.50 g Au/t for underground and 0.40 g Au/t for open pit.

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

Continuing development work is also being directed towards better defining Open Pit Resources and Reserves.

The Plutonic East, with Resource and Reserve Estimations work for the Workshop, Salmon and Trout area pits continuing.

In addition to the previously reported Open Pit Mineral Resources for the Hermes, Wilgeena (Hermes South), Area 4 and Perch areas, a new Preliminary Economic Assessment (PEA) study for the Plutonic Main Pit area was completed in December 2020. Superior Gold Inc. 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 increasing company value by better utilizing the existing Plutonic Operations infrastructure and primarily in consideration of the now favourable gold price.

The PEA is preliminary in nature and includes inferred mineral resources which are too speculative geologically to have the economic considerations applied to them and therefore cannot be classified as mineral reserves.

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

On December 2, 2020 Superior Gold Inc. announced the results from the independent PEA of a push-back of the previously producing Plutonic Main Pit and also provided an updated Mineral Resource estimate for the 100%-owned Plutonic Gold Operations.

The PEA demonstrated the potential of the Plutonic Main Pit to be a robust open pit gold mine with compelling project economics. In summary, the PEA for the Plutonic Main Pit push-back showed an estimated after-tax Net Present Value (5% discount rate) ($NPV_{5\%}$) of A$120 million and an after-tax Internal Rate of Return (IRR) of 35% at A$2,150 per ounce of gold ($1,505 per ounce). Based on the results of the PEA, the Company expects to proceed to a Pre-Feasibility Study ("PFS") for the Plutonic Main Pit push-back project.

Some of the mineralization now captured in the new expanded Plutonic Main Pit has been derived from some of the upper previously reported underground resource areas with the net result being an updated Measured and Indicated Mineral Resource estimate of 1.89 million ounces of gold (16.26 million tonnes at a 3.6 g/t Au grade) and an updated Inferred Mineral Resource estimate of 3.07 million ounces of gold (30.55 million tonnes at a 3.1 g/t Au grade).

Mineral Resources as at December 31, 2019 are summarised in Table 1-1. Mineral Resources are **inclusive** of those Resources converted to Mineral Reserves as presented in this document. Mineral Reserves as of December 31, 2019 are summarised in Table 1-2.

Table 1-1 ***Summary of Mineral Resources as at December 31 2019 – (Reporting Cut-Off Grade of 1.5g Au/t Underground & 0.4g Au/t Open Pit).***

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	3,340	5.3	570	4,970	4.5	720	8,310	4.8	1,280	14,130	4.2	1,900
Plutonic East	110	6.4	20	180	5.1	30	290	5.6	50	3,630	4.0	470
Plutonic West	-	-	-	-	-	-	-	-	-	390	2.8	40
All Underground Sub-total	**3,450**	**5.5**	**590**	**5,150**	**4.6**	**750**	**8,610**	**5.0**	**1,330**	**18,150**	**4.2**	**2,400**
Hermes Open Pit Complex												
Hermes	-	-	-	1,990	1.4	90	1,990	1.4	90	3,870	1.3	160
Hermes South (80% JV)	-	-	-	700	1.6	40	700	1.6	40	200	1.1	10
Plutonic Open Pit Areas												
Area 4	-	-	-	-	-	-	-	-	-	440	0.8	10
Perch	-	-	-	-	-	-	-	-	-	230	0.9	10
Plutonic Main Pit	1,640	3.9	210	3,330	2.2	230	4,970	2.7	440	7,670	2.0	490
All Open Pit Sub-total	**1,640**	**3.9**	**210**	**6,020**	**1.8**	**350**	**7,660**	**2.3**	**560**	**12,400**	**1.7**	**670**
Total	**5,100**	**4.9**	**790**	**11,170**	**3.1**	**1,100**	**16,260**	**3.6**	**1,890**	**30,550**	**3.1**	**3,070**

Notes:

1. Mineral Resources are quoted inclusive of those Mineral Resources converted to Mineral Reserves.
2. The reporting standard adopted for the reporting of the Mineral Resource estimate uses the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (Nov 2019) as required by NI-43-101.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages.
4. Mineral Resources are estimated at a cut-off grade of 1.50 g/t Au for the Plutonic Underground Gold Mine.
5. 'Plutonic Underground Resources based on Deswik Mining Stope Optimizations using generalized Reserve MSO input parameters and / or restricted 'grade shell' reported Resources. Open Pit Resources based on simplified pit optimization parameters.
6. Mineral Resources are estimated at a cut-off grade of 0.40 g/t Au for Hermes, Hermes South, Area4 & Perch Open Pits.
7. Mineral Resources are estimated using an average gold price of A$2,150 per troy ounce (~US$1,450 per ounce).
8. Rounding errors exist in this table and numbers may not add correctly.

Table 1-2 Summary of Plutonic Mineral Reserves as of December 31, 2019.

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				860	1.0	30	860	1.0	30
Hermes South (80% JV)				500	1.3	20	500	1.3	20
Open Pit Sub-total				**1,350**	**1.1**	**50**	**1,350**	**1.1**	**50**
Underground									
Plutonic East and Area 4	55	5.0	9	65	3.4	7	120	4.1	16
Plutonic	1,000	4.4	140	1,400	3.7	170	2,500	4.0	310
Underground Sub-total	**1,100**	**4.4**	**150**	**1,500**	**3.7**	**180**	**2,600**	**4.0**	**330**
Stockpiles									
31 December 2019 Total	**1,100**	**4.4**	**150**	**3,000**	**2.4**	**230**	**4,100**	**2.9**	**380**

Notes:

1. Open Pit Mineral Reserves are estimated at a cut-off grade of 0.4 g/t Au.
2. Underground Mineral Reserves are estimated at a stoping cut-off grade of 2-3 g/t Au dependent on mining area.
3. Mineral Reserve economics are estimated using an average long term gold price of US$1,348 per ounce (A$1,925).
4. 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

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.

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.

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 the Plutonic Mine Operations (Ge

Figure 1-1 Plutonic Operations – General Site Image – (Includes Main Open Cut Pit – Center).

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

1.1.2 Land tenure

The total Plutonic Gold Operations area is comprised of 77 granted tenements divided into three groups, namely the Plutonic Gold Mine, the Hermes Project and the Bryah Basin Joint Venture (JV). 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 project in the southwest. The Plutonic Mine group includes 29 granted exploration and mining tenements, covering approximately 355.8 km2 and 10 Miscellaneous Licences. A wholly-owned tenement south of the Plutonic Project covers an area of 5.6 km2. The Hermes Project comprises 9 granted exploration and mining tenements with an area of approximately 139.7 km2 (including one General Purpose Lease). There are 8 Miscellaneous Licences associated with the project. The Three Rivers Project tenement group comprises 37 granted exploration or mining tenements with an area of approximately 475 km2; however, of the Bryah Basin JV tenement holdings only about 257.8 km2, in 20 tenements, is held under the farm-in and joint venture agreement, including a wholly-owned Exploration Licence covering 11.2 km2. A single Miscellaneous Licence is associated with the project. The total exploration and mining tenure held by Billabong Gold, or as part of a joint venture, is approximately 759 km2 or 75,896 hectares. One Prospecting Licence application and a Miscellaneous Licence application are pending.

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.
  - The Plutonic Royalty payable to Northern Star comprises a 2% royalty on gold produced from all tenements between 300,000 Au oz and 600,000 Au oz produced, capped at US$7.4M.
  - 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. No quoted Mineral Resources held by Billabong are currently influenced by this royalty agreement.

Table 1-3 Grange agreement 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 Bryah Basin JV 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 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 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 E52/1723, E52/1730 and E52/3405, formerly held as P52/1316, P52/1321, P52/1322 and P52/1327.

— Jidi Jidi Aboriginal Corporation RNTBC 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 Aboriginal Corporation.

— The Plutonic Royalty payable to Northern Star applies to the Hermes tenements as stated above.

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 Plutonic Marymia Greenstone 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 (GCM). Resolute Resources Ltd 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.
- Joint venture partners Resolute and Titan purchased mining leases from Barrick in 1993.
- Marymia Triple P open-pit production started in 1993 with treatment at the Marymia Plant.
- Plutonic Gold Mine underground production started in 1997.
- In 1998, Homestake Mining Company acquired Plutonic Resources, and Homestake Gold of Australia Limited bought all of the Marymia property and assets from Resolute Resources.
- Homestake Mining (USA) merged with 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 (Plutonic Dome Project) in August 2010 which was purchased by Dampier Gold
- The Plutonic Gold Operation was sold by Barrick to Northern Star in February 2014.
- Hermes and the earn-in interest (JV) in the Bryah Basin tenements were acquired by Northern Star in February 2015 from ALY.
- The Plutonic Gold Operations tenements and operations was sold by Northern Star to Billabong in October 2016.
- Mining at Hermes open pit commenced in December 2017 and ended in 2019.

1.1.5 Regional Geology

Plutonic Gold Operations is located within the Archaean Plutonic-Marymia Greenstone 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 Plutonic-Marymia Greenstone Belt extends over an 80 km strike length and is up to 10 km in width. 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 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 Plutonic-Marymia Greenstone 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 Plutonic-Marymia Greenstone 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 alteration minerals associated with gold mineralisation.

1.1.6 Local Geology and Mineralisation

Mineralisation at Plutonic Gold Mine is characterised by a series of moderately-dipping to very 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 intimately associated with 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 Hermes, the lodes are hosted in biotite schist and extend into a mafic footwall unit. The mineralization occurs in stacked lodes from 1m to 10m wide in 6 distinct zones. The lode strike north east, dip from 50 to 80 degrees to the north-west with a shadow north plunge.

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

1.1.7 Exploration status

Billabong has current and planned exploration programmes which cover the current life of mine (2020–2024). The primary aim is to increase the Resource base and convert mining Resources to Reserves by targeting areas from both underground and from surface.

An annual expenditure of approximately $6.5M is envisaged for 2020. Subject to results, this amount may be varied as required.

The exploration budget will be used for increasing Inferred Resources (extensions to known 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 Bryah Basin JV tenements.

1.1.8 Mineral Resources

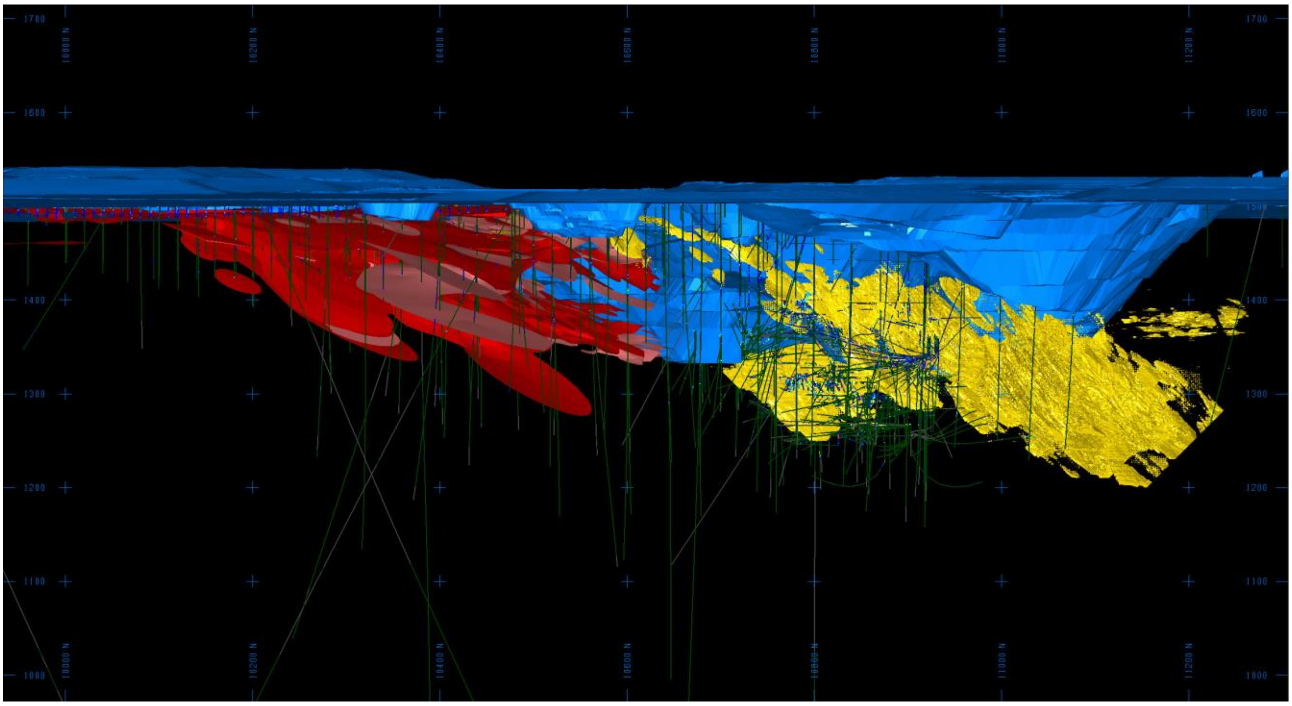
The Mineral Resource estimate for Plutonic Gold Operations, inclusive of Mineral Reserves, as of 31 December 2019 is summarised above in Table 1-1. The Mineral Resources are based on a gold price of A$2,150 per ounce.

During 2019, a newly developed set of wireframe constrained Resource models using Ordinary Kriging estimation methods were introduced. The new models are based on areas bounded by major identified structural or fault boundaries. For most areas, a series of block models or 'sub-set' block models replace the earlier and / or outdated Resource models. The areas for which new Resource models were developed is the Caribbean, A134, Baltic, Indian, Timor areas. In addition, various component models (Grade Control and Preliminary Block Models for mine planning and production were added in to these earlier Resource models where necessary for refining Resource estimation or 'depleting' mined Resources from some areas. Some of the Plutonic Resource models used for resource estimation (from the Caspian, Cortez and Pacific areas) were models that were prepared by the Northern Star personnel as reported at 30 June 2016 and also those inherited from Barrick's sale of Plutonic to Norther Star (MY 2015 models). All models have been verified and mining depleted to 31 December 2019 by Billabong.

Due to favourable gold price conditions, 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 2.1 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 – Pluton Main Pit Mineralization Distribution



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

The databases used for Resource estimation are broken down per model area from a centralised project database. For each Resource area, wireframe models are generated for geological features such as the mine mafic, dolerites and faults. Geological and structural domains are segregated and unfold planes generated to drive mineralisation interpolation for each domain. All work is done in either Leapfrog^{tm} and / or Vulcan™ software. The use of Deswick Mining Shape Optimizers in conjunction with Vulcan™ Mineable Shape Optimiser tools have been applied to the block models to define areas capable of being potentially economic based on defined mining and recovery parameters and have been used to guide Resource Estimation and Reporting. Areas above a defined gold cut-off grade and a minimum size are then summed to derive a total Mineral Resource.

Plutonic is divided into ten Resource zones (not counting open pit areas) based on the Fault Block boundary designation within the geologic setting. The Resource zones are generally defined by the well-established and mapped major faults and dolerite dykes. The mine mafic (mineralised unit) is updated for each Resource zone using the most recent drill hole and face sample data at the time that modelling is undertaken. For the Resource estimates shown, the reporting lower cut-off grade has been determined for the majority of the Underground and Open Pit zones based on the current gold price, estimated stope optimization recoveries and also metallurgical recoveries.

Mineral Resource estimates have been prepared utilising industry accepted estimation methodologies. The classification of Measured, Indicated and Inferred Resources conform to CIM (2014) definitions. Both drill hole sample data and underground face sample data have been used as part of the Resource modelling process for better mineralization geometry definition and therefore better Resource estimation.

Billabong 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 31 December 2019 is shown in Table 1-2. The estimate is based upon the Mineral Reserve estimate prepared for and depleted to 31 December 2019. The estimate includes modifications to account for un-mineable material, dilution, and inferred metal within the mining shapes. Mineral Reserves are based on a gold price of A$1,925 ($1,348/oz and fx=0.70 USD/AUD).

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 Reserves conform to CIM (2014) definitions.

Plutonic has a long history of mining “outside of 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 Reserve reporting date.

All mineral Reserves are shown on a 100% ownership basis except the Bryah Basin JV portion in open pits where stated at 80% ownership.

1.1.10 Mining Method

Plutonic Gold Operations 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 open pits was completed a number of years ago. The low-grade stockpile from underground development operations remains in production.

Ore feed to the mill during 2019 was from mining operations at the Plutonic Underground, Hermes open pit operation and mineralized waste stockpiles. The life-of-mine plan anticipates continued ore feed from these mining operations and other open pit sources from Plutonic and Bryah Basin JV.

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 and Billabong does not believe there are any significant issues.

1.1.11 Mineral processing

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.

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 have been 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, electrowinning, 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 71% to 90%, and an average recovery in 2019 of 86.3%.

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.

The LOM plan forecasts improved average gold recoveries, which reflects the better recoveries achieved during test work conducted on the Hermes ore.

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

1.1.12 General site infrastructure

The Plutonic 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.
- 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 or the Main Pit.
- 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 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, permitting, and social considerations

Monitoring programs are conducted so as to satisfy key license components.

Billabong operates under the Department of Environment and Conservation (DEC) Licence L6868/1989/11 in accordance with the Environmental Protection Act WA 1986.

Plutonic Gold Operations holds three groundwater licences; GWL 151450(4), GWL 183063(2) and GWL 182889(4) for mine dewatering from open pit and underground, and to abstract production and potable water from Borefields 1 and 2 located 30 km and 15 km west of the Plutonic plant.

1.1.14 Native title

The Commonwealth *Native Title Act 1993* 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 *Native Title Act 1993* 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 lodged with the Western Australian Government in 2003. This application is being managed by the Ngaanvatjarra Council (Aboriginal Corporation). Billabong has 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 Gold. It does not cover the potential requirements to conduct cultural heritage surveys for the purposes of exploration or mining activities.

Superior Gold is currently negotiating a Negotiation Protocol with the Marputu Aboriginal Corporation, the Registered Native Title Body Corporate (RNTBC) for the Gingirana People.

The Hermes and Bryah Basin JV tenure lies wholly within the consent determination area of the Nharnuwangga, Wajarri and Ngarlawangga Indigenous Land Use (NWN ILUA) agreement between the common law holders of Native Title, the Nharnuwangga, Wajarri and Ngarlawangga 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 Project. These agreements were executed by both parties on 22 June 2016. The agreements 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 the Jidi Jidi Aboriginal Corporation in 2019, enabling the terms of the Heritage Deed to apply to all tenements in which Billabong has a beneficial interest, including the Bryah Basin JV tenure. The Deed of Variation provides for the negotiation of a Further Productive Mining Agreement for any deposits discovered within the Bryah Basin JV tenure.

1.1.15 Mine closure

The objective of the Plutonic Gold Mine 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 Department of Mines, Industry Regulation and Safety (DMIRS) Guidelines.

A Mine Closure Plan (MCP) has been prepared for the Plutonic gold mine and lodged with the Department of Mines, Industry Regulation and Safety (DMIRS; formerly the Department of Mines and Petroleum) in January 2019. The next update will be due in August 2020. For Hermes a MCP was lodged in March 2019 and requires annual updates.

The mine closure provision at year end 2019 for the Plutonic operations, including Hermes, was estimated at $25.9 million, with a relinquishment date of 10 years from the date of closure.

1.1.16 Preliminary Economic Analysis

The PEA mine planning and discounted cash flow (DCF) includes Inferred Mineral Resources. Inferred Mineral Resources are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the results of the preliminary economic assessment will be realised.

The technical data used in the PEA study was based on historical operating records, earlier technical studies and recent operational knowledge from the current mining operations. Estimation of capital and operating costs are based on RPM's internal industry cost database. All capital costs, operating costs and revenues were input into the RPM Financial Model. A gold price of A$2,150 per ounce of gold ($1,505 per ounce) was utilized.

1.1.17 Capital and Operating Costs

A life-of-mine open cut schedule was completed, and capital and operating costs estimated assuming a mining contractor operation. Capital costs were estimated by RPM with support from Superior site engineers. A summary of estimated capital expenditure is set out in Table 1-4.

Table 1-4 Project Capital Costs (A$'000)

CAPITAL	Y1	Y2	Y3	Sustaining	Total
Capitalized mining costs	64,167*	0	0	0	64,167
Definition Drilling	5,000	3,000	0	0	8,000
Contractor Mobilisation, setup	2,000	0	0	0	2,000
PP1 Process Plant Upgrade	3,150	0	0	450	3,600
Tailings Dam Expansion	172	946	881	2,599	4,598
Underground Mine Infrastructure	5,000	0	0	0	5,000
Site Infrastructure Relocation (workshop area)	600	0	0	0	600
Contingency @ 15%	2,388	592	132	457	3,569
Total Capital Cost	**82,477**	**4,538**	**1,013**	**3,506**	**91,534**

Notes: capitalised mining costs estimated by difference of A$86.3M less pre-production revenue of A$22.1 M

A 15% contingency has been applied to the capital costs commensurate with the level of engineering applied to the PEA.

The operating cost estimates are set out in Table 1-5. The contractor mining costs were estimated using a first principles costing approach based on the selected mining fleet and allowance for contractor margin. The average contractor mining unit rate is estimated at A$ 3.52/t rock mined. The process plant operating costs were estimated by evaluating current PP1 operating costs and then modifying these based on the upgrade to a throughput of 2.0 Mtpa. The mine administration costs are estimated with assistance from Superior and are based on current site costs, adjusted for an assumed 2.0 Mtpa plant throughput.

Table 1-5 Project Operating Cost

Cost Centre	Y2-EOL (A$M)	Y2-EOL ROM Feed (kt)	Y2-EOL Ounces (koz)	A$/t ROM feed	A$/oz.	US$/oz. (0.70 AUD:USD)
Contractor Mining	271			44	758	531
Processing Plant	119			19	334	234
Mine Admin & Development	25			4	69	48
Transport and Refining	1			0	3	2
Sub Total Excluding Royalty	**415**	6,147	357	**68**	**1,163**	**814**
Royalty	19			3	54	38
Total Operating	435			71	1,217	852
Sustaining Capital	9			1	25	18
AISC	**444**			**72**	**1,242**	**870**

No contingency has been applied to the operating costs.

1.1.18 Key Economic Outcomes

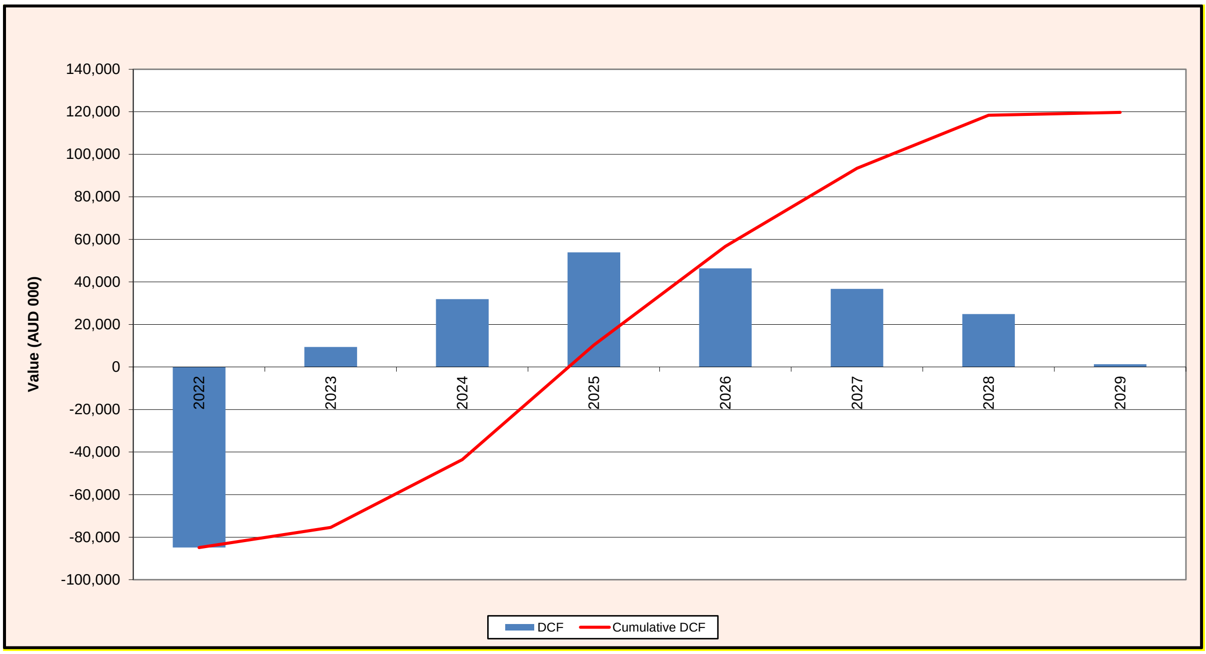
Results of the cash flow analysis are set out in Table 1-6. The $NPV_{5\%}$ is estimated at A$120 million with an IRR of 35% and payback period of 2.6 years post investment.

Table 1-6 Key Economic Indicators

Economics		**Pre-Tax**	**Post-Tax**
Net present value (NPV5%)	A$ millions	177	120
Net present value (NPV5%)	US$ millions	124	84
Internal rate of return (IRR)	%	45	35
Payback (undiscounted)	years	2.5	2.6
LOM avg. annual cash flow after capital	A$ millions	55	43
Total cash flow (undiscounted)	A$ millions	242	169
Forecasts			
Gold price assumption	US$/oz	1,505	1,505
AUD to USD assumption	AUD/USD	0.7	0.7
Production			
Average annual gold production	ounces/yr	60,000	
Total LOM recovered gold (excl. pre-production)	ounces	357,000	
Mine life(2)	years	6	
Average annual mining rate	million tonnes/yr	11.6	
LOM strip ratio	waste:ore	10.3	
Average mill grade	g/t gold	2.1	
Average recoveries	%	86.4	
Capital Expenditures			
Initial capital costs (net of pre-production revenue)	A$ millions	82.5	
LOM sustaining capital costs	A$ millions	9.0	
Costs (Y2-EOL)			
Mining cost	A$/tonne mined	3.89	
Processing cost	A$ /tonne milled	19.38	
G&A cost	A$ /tonne milled	4.15	
Royalty	%	2.50%	
Total cash cost	$/oz.	852	
AISC	$/oz.	870	

Discounted cumulative cash flows over time are given in Figure 1-3.

Figure 1-3 Discounted Cash Flow Analysis



The sensitivity of the economic outcomes (post-tax) to gold price are set out in Table 1-7. The base case gold price is highlighted in the table.

Table 1-7 Gold Price Sensitivity

Gold Price Per ounce	(NPV5%) A$ M	IRR%
$1,300	59	20%
$1,350	74	24%
$1,505	120	35%
$1,800	206	57%
$1,900	236	64%
$2,000	265	72%

1.1.19 Recommendations

The PEA 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. Several opportunities to potentially improve the economics and accuracy of the proposed PFS have been identified, including but not limited to:

- Investigate the potential removal of one or more surface constraints currently limiting the size of the open pit;
- Complete infill drilling to convert Inferred Resources to Measured and Indicated Resources and update Mineral Resource models;
- Complete on-strike step-out drilling to potentially expand resources;
- Investigate existing exploration targets southeast of the Main Pit;
- Geotechnical drilling to confirm opportunities to steepen current pit walls;
- Further optimize mining strategy resulting in operating cost savings;
- Further optimize mine designs and scheduling resulting in fully-utilized contractor fleet; and
- Investigate interaction with the underground operations to identify optimization opportunities at the overall operation.

Contents

Tables

Figures

2 Introduction

This Technical Report on the Plutonic Gold Mine (Plutonic) in Western Australia has been prepared for Superior and edited in accordance with the requirements of National Instrument 43-101 (NI 43-101), “Standards of Disclosure for Mineral Project”, of the Canadian Securities Administrators (CSA) for lodgement on CSA’s “System for Electronic Document Analysis and Retrieval” (SEDAR).

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						
Stephen Hyland	Principal Geologist Consultant	[1]HGMC	Yes	Sept 28, 2020	BSc (Geol), FAusIMM, CIM	Responsible for all Sections of the Technical Report other than sections 15, 16 & 18, 19, 21 & 22 which the other two Qualified Persons are responsible for.
Matthew Keenan	Senior Mining Engineer	[2]Entech Pty Ltd	Yes	Feb 19, 2018	BEng, BCom, MSc, MAusIMM (CP)	Sections, 15, 16, 18, 19, 21, 22 and underground contributions to sections 25, 26.
Ashutosh Srivastava	Alternate Quarry Manager	*Billabong	No	Sept 1, 2020	B. Tech. (Mining Engineering) FAusIMM	Sections 15, 16 & 18.

* Mr. Srivastava ceased being an employee at Billabong Gold on September 1, 2020. Since no changes were made to the open pit reserves in this update, Mr. Srivastava has remained QP.

1. The scope of the personal inspection of the property undertaken by HGMC as independent Qualified Persons covered:

- 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 Resource estimation procedures and assumptions, Block Model generation processes, Resource reporting modifying factors and Resource-Reserves reconciliation processes.

2. The scope of the personal inspection of the property undertaken by Entech as independent Qualified Persons covered:

- 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 similar to previous reporting in 2019.

2.1 Sources of information

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

- Mr Ashutosh Srivastava, Alternate Quarry Manager, Billabong
- Mr Matthew Keenan, Senior Mining Engineer, Entech.
- Mr Alan McKellar, Underground Manager, Superior Gold
- Mr Marcus Neville, Process Manager, Superior Gold
- Mr Ettienne Du Plessis, Chief Geologist, Superior Gold
- Mr Stephen Hyland, Principal Consultant Geologist, HGMC
- Mr Jerram Robinson, Senior Resource Geologist (UG), Superior Gold
- Mr Amandus Bagayana, Project Geologist (UG), Superior Gold
- Mr Kevin Selingue, Senior Minex / Exploration Geologist, Superior Gold
- Mr Wanderly Basso, Senior /Exploration, Superior Gold
- Ms Erica Bonsall, Tenement Manager, Superior Gold

Additional source reports include:

- Superior Gold Inc. 2018: National Instrument 43-101 Report on Plutonic Gold Mine, Western Australia, Australia, 15 May 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, 20 June 2019
- 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)
- RPM Advisory Services Limited: Plutonic Gold Mine Preliminary Economic Assessment, 15 December 2020

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 Australian dollars (A$) unless otherwise noted. The assumed exchange rate for conversion is 0.70 A$ to the US$. Prices of gold are stated in US$ per troy ounce (US$/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.

The PEA was prepared under the supervision of the Qualified Person, Mr. Hyland by the following individuals at RPM Global, all of whom are Qualified Persons under the terms of NI 43-101:

- Mining: Mr Igor Bojanic, FAusIMM
- Processing and Infrastructure: Dr Andrew Newell, MAusIMM (CP), MIE(CP)

Though the RPM Global team were not designated Qualified Persons for the purposes of this report as per Table 2-1, they do meet the requirements for Qualified Persons under the terms of NI 43-101.

4 Property description and location

The Plutonic project area (which includes the operating Plutonic underground gold mine, the Hermes open pit gold Resource and the Bryah Basin farm-in with Alchemy Resources Limited) 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 4-11).

Billabong acquired 100% legal and beneficial interest in the Northern Star Plutonic and Hermes projects, and rights to earn-in to the Bryah Basin JV tenements, under the Sale and Purchase Agreement between Billabong, Northern Star Mining Services Pty Ltd and Northern Star Resources Limited dated 12 August 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 the Western Australian Department of Mines, Industry Regulation and Safety (DMIRS) for registration on 12 May 2020.

Ministerial consent and cabinet approval are required for the transfer of the pastoral leases and this process is also underway. Billabong anticipates that they will receive final approval for the transfer of the pastoral leases, but it is anticipated to be a lengthy process.

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 project area encompasses 77 tenements divided into three groups namely the Plutonic and Hermes projects, and Bryah Basin JV. The project area extends over two mining centres — one around the Plutonic Mine in the northeast and one at the Hermes project in the southwest. The Plutonic Mine group includes 29 granted exploration and mining tenements, covering approximately 355.8 km2, and 10 Miscellaneous Licences. The Hermes Project comprises 9 granted exploration and mining tenements with an area of approximately 139.7 km2 (including one General Purpose Lease). There are 8 Miscellaneous Licences associated with the project. The Three Rivers Project tenement group comprises 37 granted exploration or mining tenements with an area of approximately 475 km2; however, of the Bryah Basin JV tenement holdings only about 257.8 km2, in 20 tenements, is held under the farm-in and joint venture agreement, including a wholly-owned Exploration Licence covering 11.2 km2. A single Miscellaneous Licence is associated with the project. The total exploration and mining tenure held by Billabong Gold, or as part of a joint venture, is approximately 759 km2 or 75,896 hectares. One Prospecting Licence application and a Miscellaneous Licence application are pending.

The Plutonic 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 project 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.

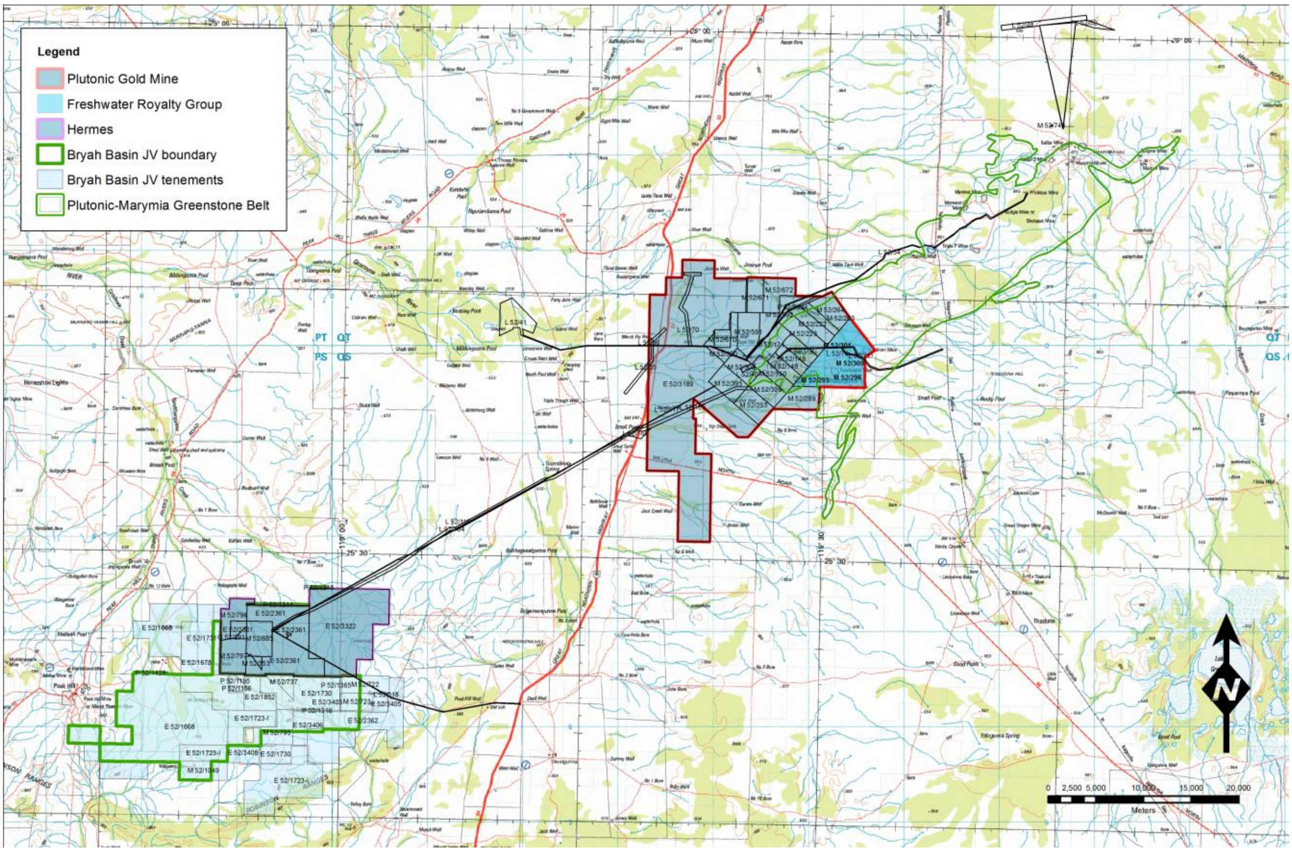
Table 4-2 Grid transformation Three Rivers to AMG

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, and Bryah Basin JV project areas showing pastoral and tenement boundaries



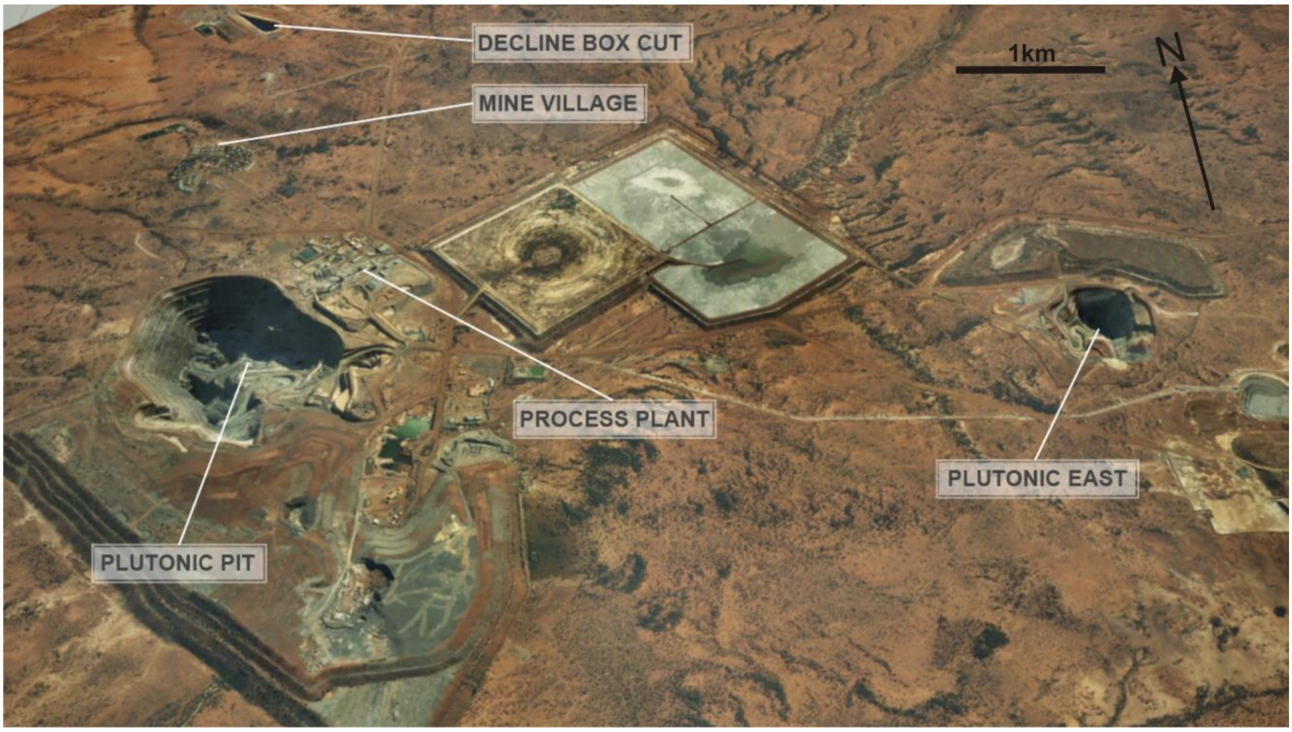
4.1 Plutonic Mine group

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.

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 are the Western Australian State Government gold royalty, the 'Grange' royalty and the Northern Star Royalty, the latter follows execution of the Sale Purchase Agreement (SPA) and collateral Royalty Deed (Plutonic Royalty) executed 12 October 2016.

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. There are no quoted Mineral Resources held by Billabong that are currently influenced by this royalty agreement.

The Plutonic Royalty payable to Northern Star comprises a 2% royalty on gold produced from all tenements between 300,000 Au oz and 600,000 Au oz produced, capped at US$7.8M. The Plutonic group tenement list and notes are included in

Table 4-3 Plutonic group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Commitment (US$)	Tenement note
E52/3189	Billabong	18,480 (66 Blocks)	07/04/16	06/04/21	$99,000	$69,300	
L52/40	Billabong	58.17	27/09/89	26/09/24	Nil	Nil	P7
L52/41	Billabong	1,194	27/09/89	26/09/24	Nil	Nil	P7, P11
L52/48	Billabong	472	10/09/91	09/09/21	Nil	Nil	P7, P8
L52/52	Billabong	210	16/01/92	15/01/22	Nil	Nil	P7, P8
L52/54	Billabong	110	13/05/92	12/05/22	Nil	Nil	P7
L52/55	Billabong	234.5	15/04/92	14/04/22	Nil	Nil	P7, P9
L52/56	Billabong	31.54	13/05/92	12/05/22	Nil	Nil	P7, P11
L52/70	Billabong	292	31/01/97	30/01/22	Nil	Nil	P7
L52/71	Billabong	191	23/06/97	22/06/22	Nil	Nil	P7, P12
L52/74	Billabong	20.6	16/09/99	15/09/24	Nil	Nil	P7
L52/203	Billabong	22.2288	Pending				
M52/148	Billabong	448.05	14/03/89	13/03/31	$44,900	$31,430	P7
M52/149	Billabong	449.9	14/03/89	13/03/31	$45,000	$31,500	P7
M52/150	Billabong	567.3	14/03/89	13/03/31	$56,800	$39,760	P7
M52/170	Billabong	540.6	9/10/89	08/10/31	$54,100	$37,870	P7
M52/171	Billabong	777.4	9/10/89	08/10/31	$77,800	$54,460	P7
M52/222	Billabong	621.9	4/02/91	03/02/33	$62,200	$43,540	P7
M52/223	Billabong	840.45	4/02/91	03/02/33	$84,100	$58,870	P7
M52/253	Billabong	840.7	11/09/91	10/09/33	$84,100	$58,870	
M52/263	Billabong	360.2	4/11/91	03/11/33	$36,100	$25,270	P7
M52/264	Billabong	816.3	4/11/91	03/11/33	$81,700	$57,190	P7
M52/289	Billabong	919.45	20/03/92	19/03/34	$92,000	$64,400	P7
M52/295	Billabong	647.8	17/03/92	16/03/34	$64,800	$45,360	P1, P7, P14, P15
M52/296	Billabong	732.6	17/03/92	16/03/34	$73,300	$51,310	P1, P7, P14, P15
M52/300	Billabong	928.15	17/03/92	16/03/34	$92,900	$65,030	P1, P7, P14, P15
M52/301	Billabong	991	17/03/92	16/03/34	$99,100	$69,370	P1, P7, P14, P15
M52/308	Billabong	725.05	3/09/92	02/09/34	$72,600	$50,820	P7
M52/309	Billabong	701.95	3/09/92	02/09/34	$70,200	$49,140	P7
M52/395	Billabong	840.1	10/08/93	09/08/35	$84,100	$58,870	
M52/590	Billabong	626.55	27/09/96	26/09/38	$62,700	$43,890	
M52/591	Billabong	950.1	27/09/96	26/09/38	$95,100	$66,570	P7
M52/592	Billabong	836.45	27/09/96	26/09/38	$83,700	$58,590	P7
M52/670	Billabong	309.20	03/07/98	02/07/40	$31,000	$21,700	
M52/671	Billabong	621.60	03/07/98	02/07/40	$62,200	$43,540	
M52/672	Billabong	934.80	03/07/98	02/07/40	$93,500	$65,450	
P52/1560	Billabong	3.67598	06/03/20	05/03/24	$2,000	$1,400	
P52/1561	Billabong	23.6573	06/03/20	05/03/24	$2,000	$1,400	
P52/1562	Billabong	48.84971	06/03/20	05/03/24	$2,000	$1,400	
P52/1563	Billabong	26.2646	16/01/2019	15/01/2023	$2,000	$1,400	
P52/1606	Billabong	103.82	Pending				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 Great Central Mines (ACN 007 066 766) created under the Freshwater Royalty Agreement dated 5 December 1991 between Plutonic Gold Pty Ltd (ACN 006 697 418) and Great Central Mines Limited. 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 17 June 1996 between Plutonic Gold Pty Ltd, Great Central Mines Limited 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 13 November 1992 between the same parties, under which Plutonic Gold acquires all the 49% interest of Great Central Mines Limited in the Freshwater Joint Venture Agreement dated 5 December 1991 between the same parties subject to this royalty obligation retained by Great Central Mines Limited. Under clause 8 of the Agreement dated 13 November 1992, Billabong requires the consent of Great Central Mines Limited to assign its interest in this tenement the subject of the royalty obligation. Great Central Mines Limited is now called Newmont Yandal Operations Pty Ltd.
P7	Plutonic	Northern Star Resources Limited acquired 100% legal and beneficial interest in this tenement under the Sale and Purchase Agreement between Northern Star Resources Limited and Barrick (Australia Pacific) Limited dated 21 December 2013. Billabong acquired 100% of the Northern Star Resources Limited interest through the Sale and Purchase Agreement Plutonic Gold Operations (12/08/2016). The Agreement and the transfers have been lodged for assessment to duty, still undergoing assessment, and accordingly the transfers cannot be registered at DMIRS yet. A 1% net smelter return royalty is payable by Northern Star Resources Limited on the refined gold derived from the Tenements (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 Resources Limited and Cosmopolitan Minerals Ltd for E52/3190 over existing L52/55 dated 8 March 2016.
P11	Plutonic	Access Deed between Northern Star Resources Limited and Cosmopolitan Minerals Ltd affecting application for E52/3087 over existing L52/41 and L52/56 dated 8 March 2016.
P12	Plutonic	Access Deed between Northern Star Resources Limited and Cosmopolitan Minerals Ltd affecting application for E52/3346 over existing L52/71 dated 8 March 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 13 November 1992 between Plutonic Gold Pty Ltd (ACN 006 697 418) and Great Central Mines Limited (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 1 July 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 the 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 is transported via road train and treated at the Plutonic processing plant.

The WA state government royalty of 2.5% for gold revenues has been applied to the Mineral Reserve estimations.

The Plutonic Royalty is also applicable to the Hermes group.

The Troy Royalty – 1% royalty on net smelter return is payable on gold production from 50,000 ounces to 70,000 ounces to Troy Resources NL 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.

Figure 4-4 Hermes and Bryah Basin JV tenement and farm-in location map

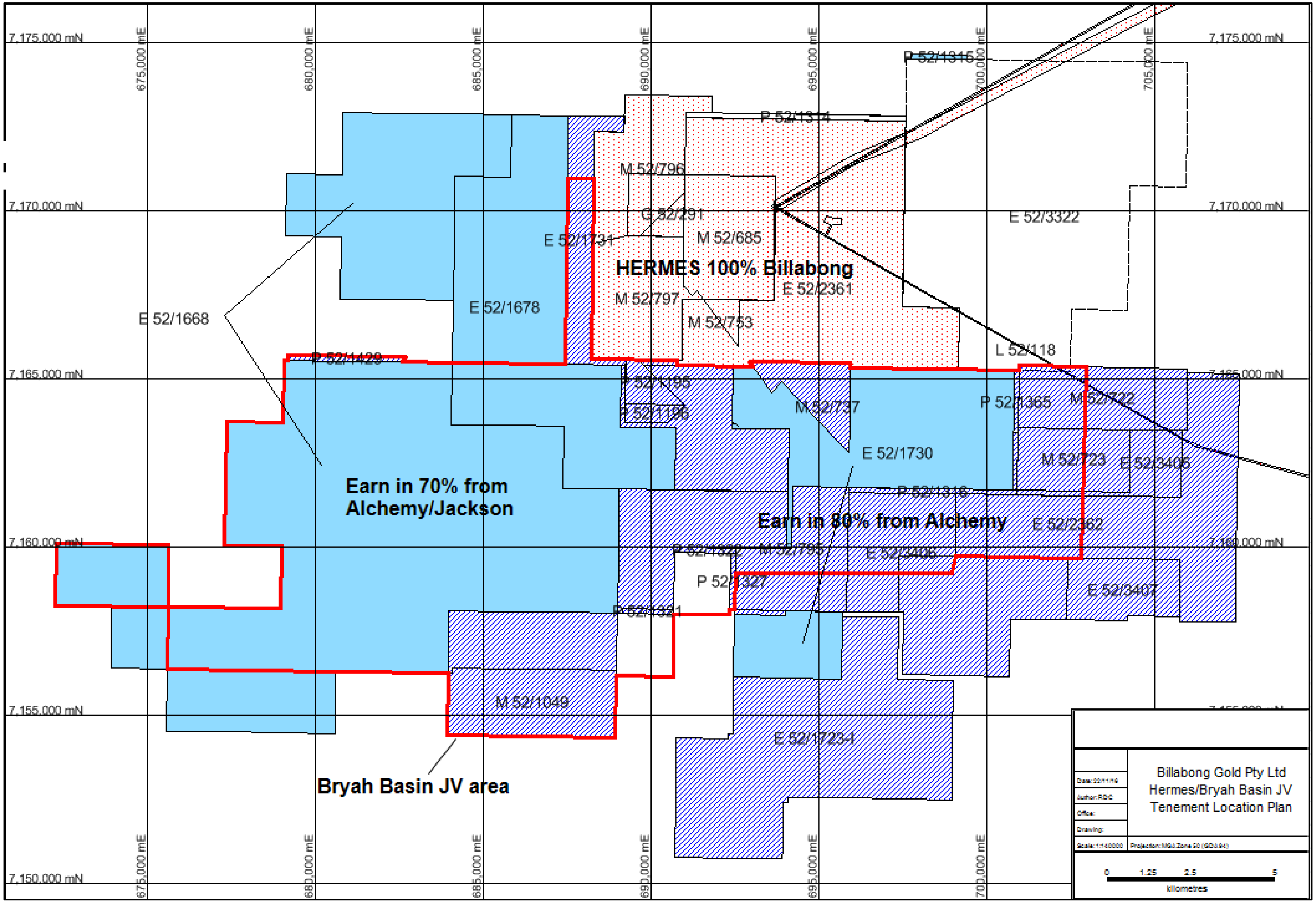


Table 4-5 Hermes group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Commitment (US$)	Notes
E52/2361	Billabong	5,320 (19 Blocks)	17/04/09	16/04/21	$70,000	$49,000	P6
E52/3322	Billabong	5,600(20 Blocks)	14/11/17	13/11/22	$20,000	$14,000	
G52/291	Billabong	85.69	16/09/16	15/09/37	Nil	Nil	
L52/116	Billabong	253	09/07/10	08/07/31	Nil	Nil	P6, P13
L52/117	Billabong	53	09/07/10	08/07/31	Nil	Nil	P6, P13
L52/118	Billabong	159	09/07/10	08/07/31	Nil	Nil	P6
L52/164	Billabong	1,336	18/07/16	17/07/37	Nil	Nil	P10
L52/165	Billabong	387.884	31/03/17	30/03/38	Nil	Nil	P10
L52/166	Billabong	167.9	31/03/17	30/03/38	Nil	Nil	
L52/201	Billabong	13.7975	06/08/19	05/08/40	Nil	Nil	
L52/204	Billabong	14.281	06/08/19	05/08/40	Nil	Nil	
M52/685	Billabong	988.7	12/01/09	11/01/30	$98,900	$69,230	P6
M52/753	Billabong	73.04	13/01/09	12/01/30	$10,000	$7,000	P6
M52/796	Billabong	788.2	13/01/09	12/01/30	$78,900	$55,230	P6
M52/797	Billabong	999.65	13/01/09	12/01/30	$100,000	$70,000	P6
P52/1569	Billabong	95.2	28/02/2018	27/02/2022	$3,840	$2,688	P6
P52/1570	Billabong	24.317	28/02/2018	27/02/2022	$2,000	$1,400	P6

Table 4-6 Hermes group tenement list notes

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

4.3 Bryah Basin Joint Venture

The Bryah Basin farm-in between Billabong and Alchemy Resources (Three Rivers) Pty Ltd, a wholly owned subsidiary of Alchemy Resources Limited (ALY) is composed of two equity 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:

The equity parts are earnt by Billabong sole funding a total of US$888,000 (A$1,200,000) of expenditure on exploration during the earn-in period. The earn-in expenditure must be incurred at a rate of not less than US$296,000 (A$400,000) per year.

A letter of advice (dated 28 August 2018) indicating Billabong has met the required expenditure has been presented to Alchemy and an updated Joint Venture Agreement to reflect Billabong's interest in the Bryah Basin JV tenements. Alchemy has proposed that in conjunction with Billabong as per clause 4.5 of the standard AMPLA joint venture agreement, that formal joint venture meetings should be conducted as required to approve any current programs and budgets whilst the details of the formal joint venture agreement continue to be finalized.

Day to day tenement management and compliance, under the Acts and Regulations of WA, 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 the Department of Mines, Industry Regulation and Safety (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 Department of Environmental Regulation (DER)) in March 2017.
- Notify DBCA in Geraldton prior to any on-ground work and provide the Department 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 Resources NL 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 Bryah Basin JV tenements and farm-in area are shown on Figure ***4-4*** and detailed in .

Table 4-7.

Table 4-7 Bryah Basin JV group tenement list

Lease	Beneficial Owner	Area (ha)	Grant date	Expiry date	Commitment (A$)	Commitment (US$)	Notes
E52/1668	ALY 80% JAK 20%	11,480 (41 Blocks)	23/02/04	22/02/21	$123,000	$86,100	P2, P4
E52/1678	ALY 80% JAK 20%	3,360 (12 Blocks)	23/02/04	22/02/21	$70,000	$49,000	P2, P4
E52/1723	ALY 100%	5,600 (20 Blocks)	01/12/04	30/11/20	$70,000	$49,000	P3, P4, P5
E52/1730	ALY 80% JAK 20%	3,640 (13 Blocks)	01/12/04	30/11/20	$70,000	$49,000	P2, P4
E52/1731	ALY 100%	1,400 (5 Blocks)	30/01/09	29/01/21	$50,000	$35,000	P3, P4
E52/1852	ALY 100%	1,120 (4 Blocks)	14/06/05	13/06/20 Renewal lodged 27/05/2020	$50,000	$35,000	P3
E52/2362	ALY 100%	3,640 (13 Blocks)	17/04/09	16/04/21	$70,000	$49,000	P3, P4
E52/3405	ALY 100%	1,120 (4 Blocks)	22/04/16	21/04/21	$20,000	$14,000	P20
E52/3406	ALY 100%	840 (3 Blocks)	22/04/16	21/04/21	$20,000	$14,000	P20
E52/3408	ALY 100%	840 (3 Blocks)	22/04/16	21/04/21	$20,000	$14,000	P18
L52/208	Billabong 100%	554.48	23/08/19	22/08/40	Nil	Nil	
M52/1049	ALY 100%	997.65	23/09/10	22/09/31	$99,800	$69,860	P3
M52/722	ALY 100%	927.4	16/01/09	15/01/30	$92,800	$64,960	P3, P4

M52/723	ALY 100%	618.15	16/01/09	15/01/30	$61,900	$43,330	P3, P4
M52/737	ALY 100%	382.9	16/01/09	15/01/30	$38,300	$26,810	P3
M52/795	ALY 100%	928.4	13/01/09	12/01/30	$92,900	$65,030	P3, P4
P52/1429	ALY 100%	50.05	26/07/12	25/07/20	$2,040	$1,428	P3
P52/1538	ALY 80% JAK 20%	139.985	27/04/17	26/04/21	$5,600	$3,920	P2, P3
P52/1539	ALY 80% JAK 20%	81.9411	01/05/17	30/04/21	$3,280	$2,296	P2, P3
P52/1577	ALY 100%	25.6434	19/07/18	18/07/22	$2,000	$1,400	P3

Table 4-8 Bryah Basin JV group tenement list notes

Note	Project	Comment
P2	Bryah Basin JV	Northern Star Resources 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 23 February 2015 between Northern Star Resources Limited and Alchemy Resources Limited (Three Rivers) Pty Limited 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 Gold Pty Ltd acquired all of Northern Star Resources rights in August 2016.
P3	Bryah Basin JV	Northern Star Resources acquired a right to earn an 80% legal and beneficial interest in certain blocks within this tenement as detailed in Schedule 1 under the Bryah Basin Farm-in Agreement dated 23 February 2015 between Northern Star Resources Limited, Alchemy Resources Limited and Alchemy Resources (Three Rivers) Pty Limited. 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 Gold Pty Ltd acquired all of Northern Star Resources rights in August 2016.
P4	Bryah Basin JV	Under an agreement between Independence Group NL and Alchemy Resources Limited, 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 Resources Limited is earning an interest under either note P2 or P3. The relevant blocks are also detailed in Schedule 1 under the Bryah Basin Farmin Agreement dated 23 February 2015 between Northern Star Resources Limited and Alchemy Resources Limited Billabong Gold Pty Ltd acquired all of Northern Star Resources rights in August 2016.
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 Resources Ltd dated 29 March 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 31 August 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	E52/3405 and E52/3406 are tenements forming part of the farm-in agreement tenements, in substitution for part of E52/2362.

A stand-alone tenement adjacent to the Bryah Basin JV, 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 7 March 2017.

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 Plutonic has been established.

5.2 Climate

The region experiences an arid climate with long-term average rainfall of 234 mm per annum. Biannual rainfall events are the result of summer cyclone activity and northward moving depressions bringing rain in winter. Summer rains are commonly of higher intensity and shorter duration, whilst winter falls tend to be more frequent, but of lower intensity.

Diurnal maximum temperatures frequently exceed 40° C between December and March and drop to an average minimum of 6° C during July. The average January temperature range is 24° C to 39° C, whilst the average July temperature range is 15° C to 21° C.

Averages for evaporation at Meekatharra Weather Station, rainfall at Plutonic Gold Mine's Administration Office, and temperature at Three Rivers Weather Station are presented in Table 5-1.

Table 5-1 Rainfall and evaporation averages – Plutonic Mine

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	27.4	34.7	27.5	21.3	24.5	32.6	22	11.8	4.7	6.1	11.4	12
Evaporation (mm)	479.9	365.9	350	243.2	168.3	120.6	128	172.7	238.5	328.7	405.6	455.5
Temperature (°C)	39.6	37.5	35.5	30.3	25.0	21.3	22.9	27.8	31.9	35.1	37.7	39.6

5.3 Local resources

Plutonic Gold Mine is demographically isolated from major towns, or 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. A number of aboriginal settlements are found nearby.

5.4 Infrastructure

The treatment plant, mine camp, power plant, and office infrastructure are located in the vicinity of the Main Pit, approximately 12 km from the Great Northern Highway. The facilities are spread over an area of several kilometres and are connected by gravel roads.

There is a network of gravel roads on site connecting the various facilities and an unsealed hard surface airstrip at the site.

5.5 Physiography

The region is predominantly flat with minimal elevation variability from approximately 560 m above sea level. Several creeks and alluvial washes are present.

The vegetation is typical of the Gascoyne Region of the Ashburton Botanical District mapped as "Mulga Low Woodland" by Beard (1976). Sheep and cattle farming are the principal land uses in the vicinity of the project area and, although the area has been overgrazed, the leases support vegetation that is floristically and structurally similar to that found over large areas north of Meekatharra. The dominant species on the leases is *Acacia aneura* (Mulga). The plant families best represented are the *Fabaceae* (mulga, kurara, gidgee, senna), the *Amaranthaceae* (bluebush, mulla mulla), the *Myoporaceae* (poverty bush) and the *Scrophulariaceae* (turpentine bush). Ephemeral species, such as members of the family *Asteraceae* (daises), may be present during rainy periods. Drainage channels of the Gascoyne River support a dense tall-woodland dominated by *Eucalyptus camaldulensis* (River Red Gum).

5.6 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 Great Central Mines.
- 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.

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 Project area in 2016 (Kimber and Gonda, 2016). No sites of significant cultural heritage value were identified in the priority drilling areas.

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, International Nickel Company (Inco) undertook nickel exploration over the Plutonic Marymia Greenstone Belt and abandoned the area in 1976 after failing to identify an economic nickel deposit.
- In 1986, Redross Consultants Pty Ltd was granted an Exploration Licence over the southern portion of the Plutonic Mining Lease. Titan Resources NL commenced exploration in the area surrounding Marymia Hill.
- In 1987 Redross Consultants Pty Ltd optioned the Plutonic Exploration Lease to Great Central Mines Ltd. Resolute Resources Ltd and Titan Resources NL entered into a joint venture over the Marymia Hill leases. Battle Mountain Australia commenced exploration in the Plutonic Bore area. Stockdale Prospecting Ltd conducted a regional sampling program in the vicinity of Marymia Dome.
- In May 1998, Homestake Mining Company acquired Plutonic Resources and in late 1998, Homestake Gold of Australia Limited bought all of Resolute Resources Ltd Marymia property and assets.
- In 1989, Great Central Mines Ltd 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 Great Central Mines Ltd 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 Marymia K1 and K2 open pits.
- Joint venture partners Resolute Resources Ltd and Titan Resources NL purchased mining leases from Battle Mountain Australia 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.
- The Plutonic Gold Operation 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.
- The Plutonic Gold Operations 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.

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 2019 approximately 3.3 Moz of contained Au has been mined from the Plutonic underground mine as summarised in Table 6-1. In total over 5.4 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 Mining on a toll treatment basis. The production commenced in 2006 and was completed in 2013.

Table 6-1 Mining production from Plutonic Mine

Year	Surface Mining production			Underground Mining production		
	Tonnes (t)	**Head grade (g/t Au)**	**Produced Au (oz)**	**Tonnes (t)**	**Head grade (g/t Au)**	**Produced 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
Total	**30,212,058**	**2.19**	**2,124,441**	**22,052,087**	**4.64**	**3,293,733**

* Surface stockpiles # Hermes 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 reverse circulation (RC) drilling. Inco identified and recorded the greenstone rocks within the Plutonic Marymia Greenstone 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 (BLEG) 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 (IP) 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 Resources in the Plutonic underground mine. 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 Gold. 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 project area exploration success commenced with joint venture owners Troy Resources NL 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 Resources NL.

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 150m. An additional 133 aircore holes were drilled for 5,473 m for sterilisation purposes. In February 2015, Northern Star purchased the Hermes and Bryah JV Project from Alchemy Resources Ltd. Northern Star then completed two major phases of detailed in-fill RC drilling at the Hermes Project 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 both Hermes and the Bryah Basin JV Hermes South (Wilgeena prospect) project areas.

7 Geological setting and mineralisation

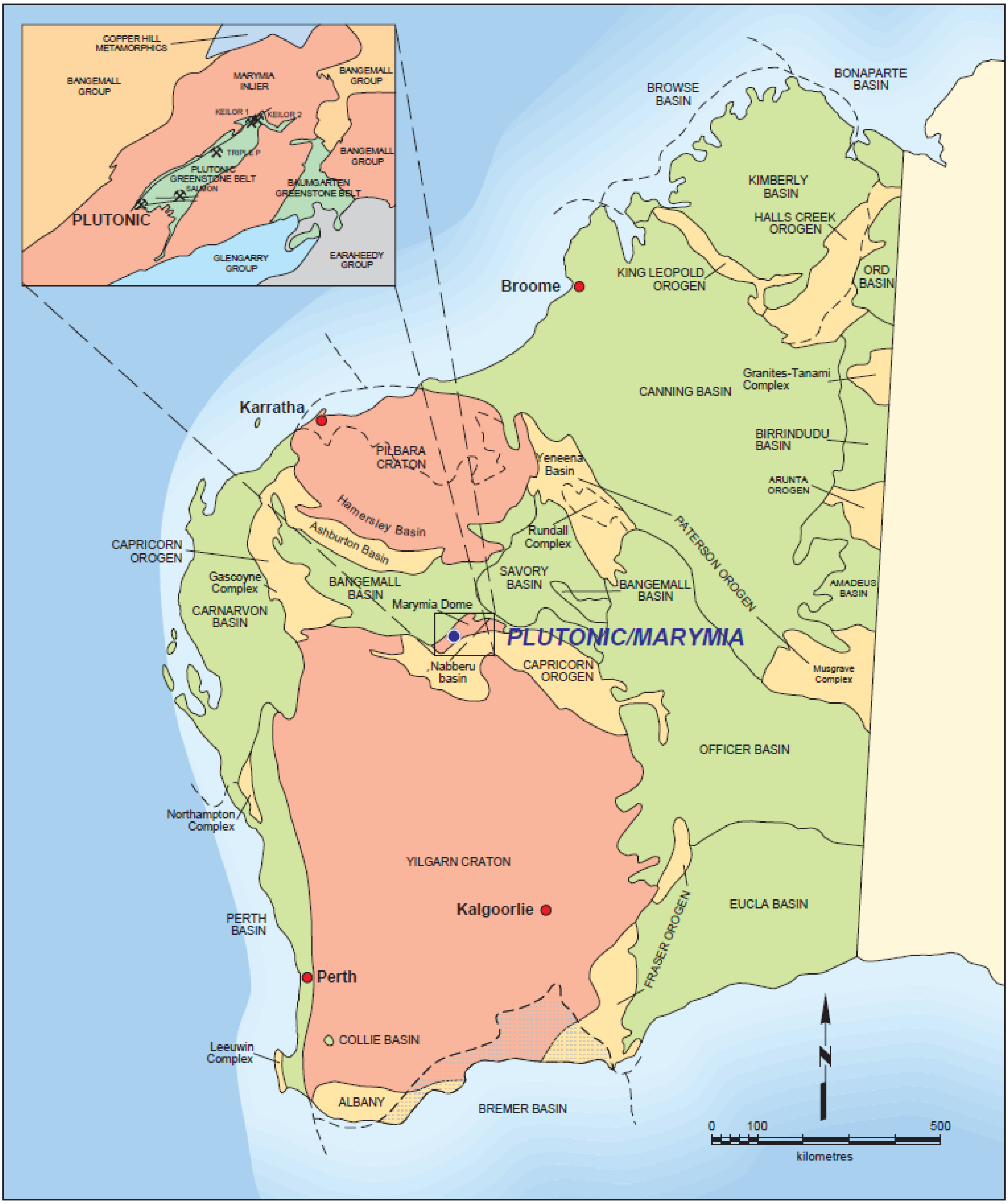
7.1 Regional geology

Plutonic is located within the Archaean Plutonic Marymia Greenstone 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.

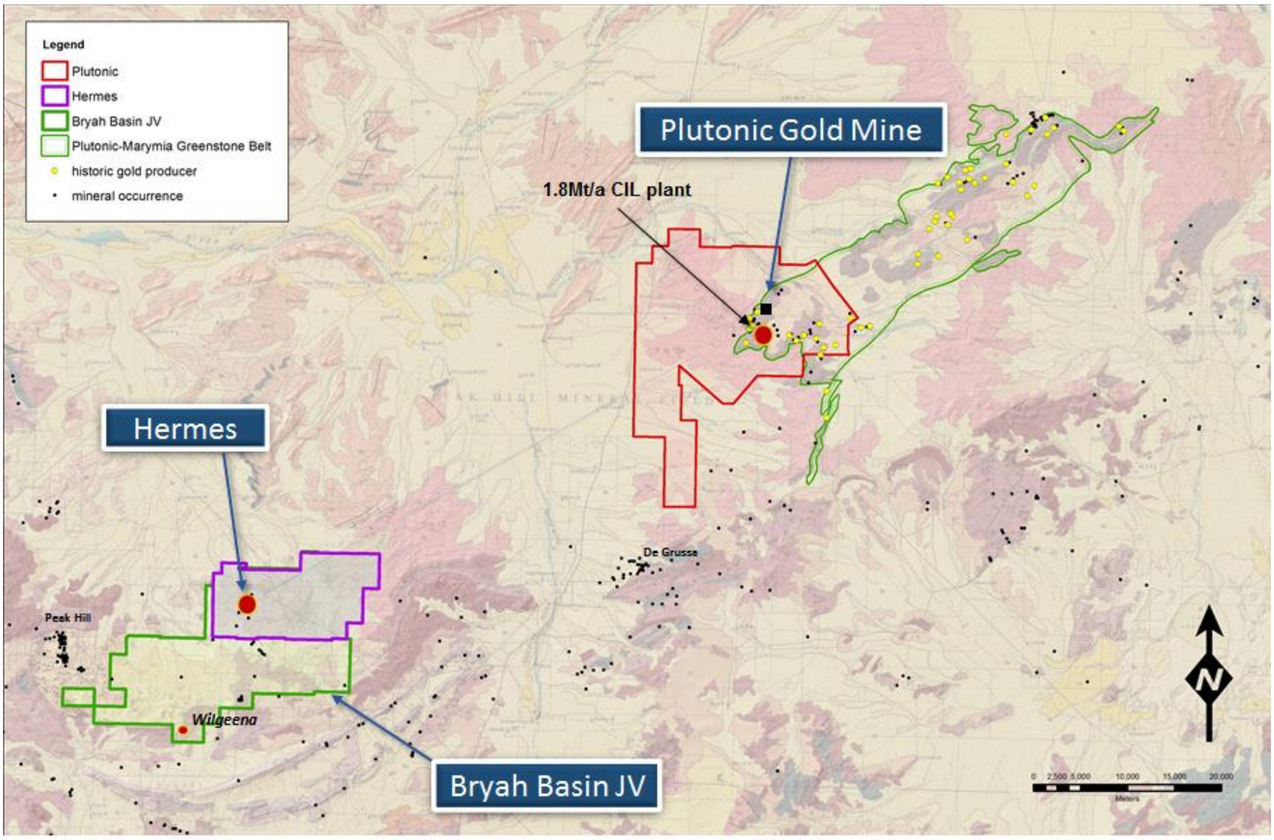
Figure 7-1 Regional geology plan



7.2 Local geology

The Plutonic Marymia Greenstone Belt (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 Plutonic Marymia Greenstone Belt was initially interpreted as consisting of two parallel, northeast-trending mafic/ultramafic sequences, separated by a sedimentary/ conglomeratic unit in the centre. Recent 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 too moderately to the northwest, parallel to the granite-greenstone contacts, and are cut by a number of east-westerly faults. Gently 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:

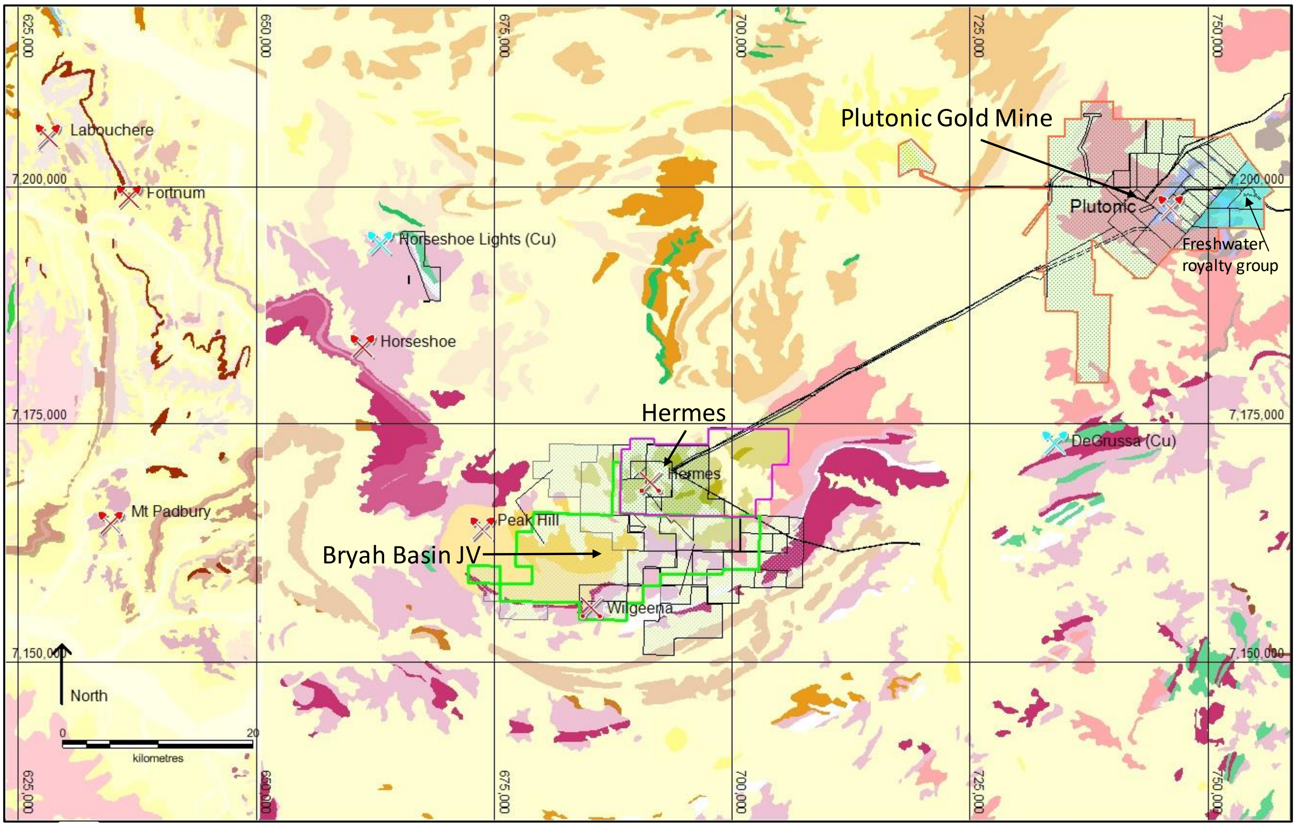
- Airstrip
- Albatross
- Apex
- Area 4*
- Barra
- Bass
- Bream*
- Brook*
- Callop*
- Carp
- Catfish*
- Channel South
- Cod
- Cutthroat*
- Cyclops
- Colossus
- Dingo
- Dogfish* (a.k.a. Trout North)
- Flamingo
- Gerbil
- Jiminya Pool
- John West
- Keilor (1 and 2)
- Kingston
- Orient Well
- Perch (North*,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

* Deposit within current Plutonic Gold Operations area and have been mined by open pit.

The Hermes project area lies 65 km to the southwest of Plutonic 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

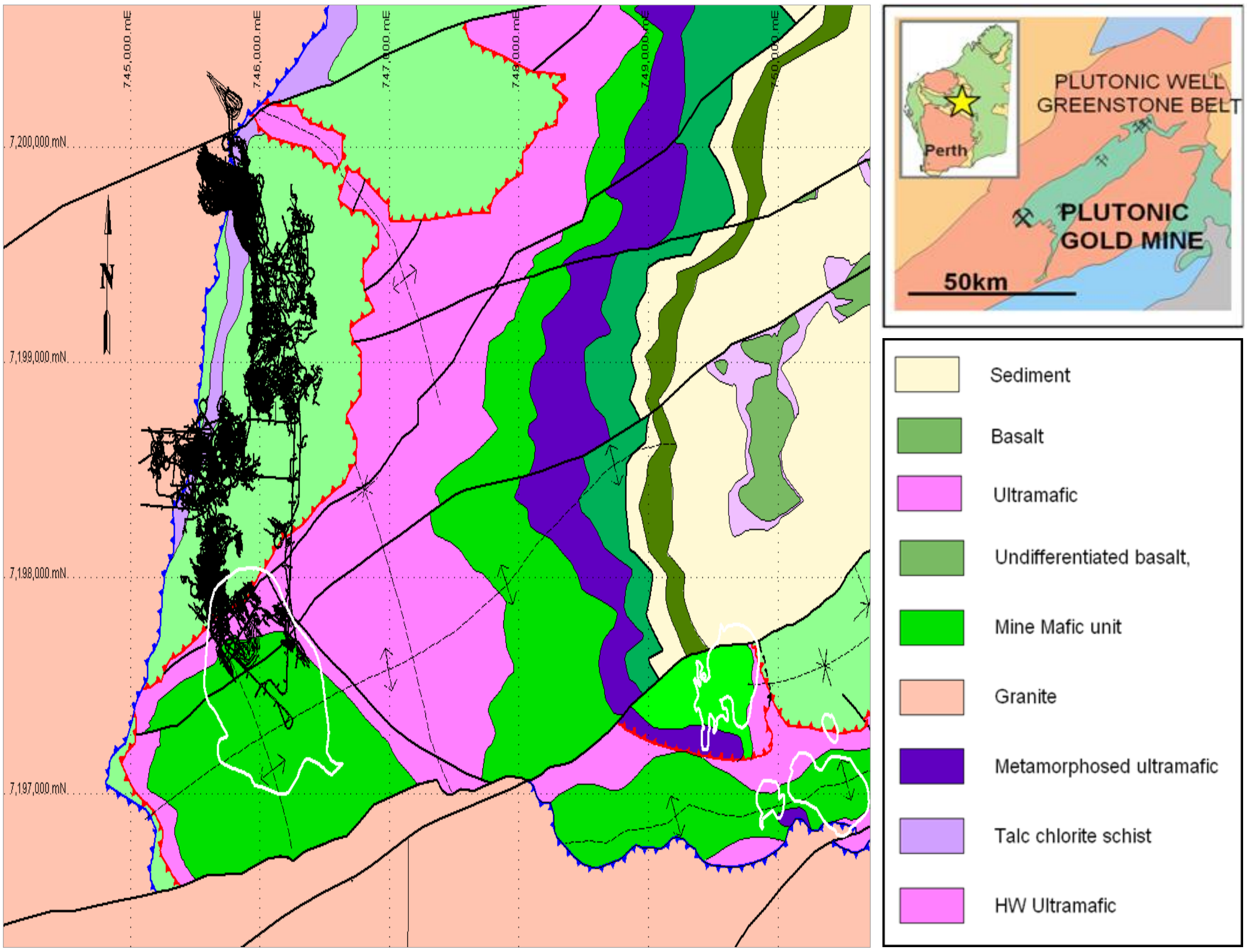
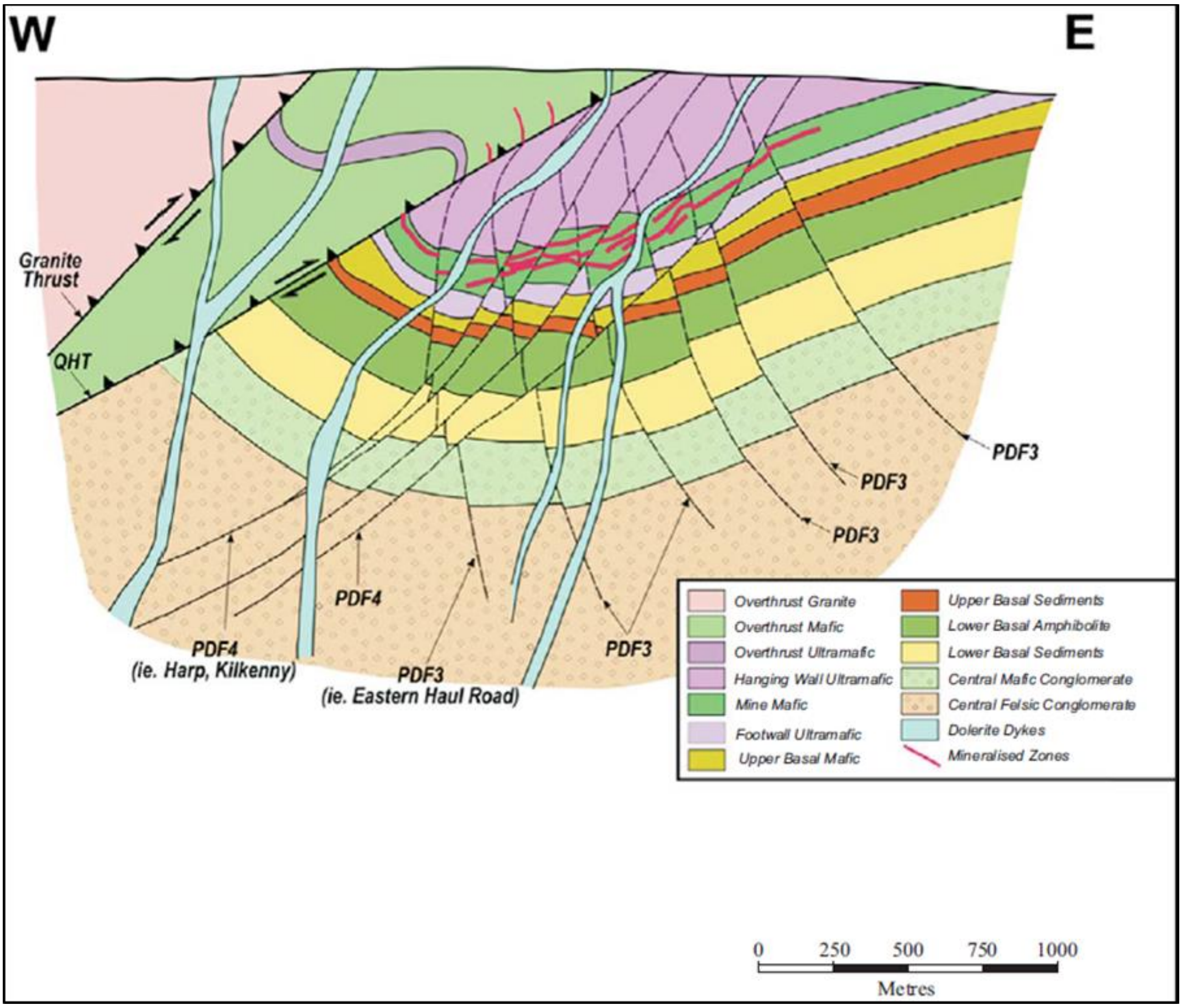


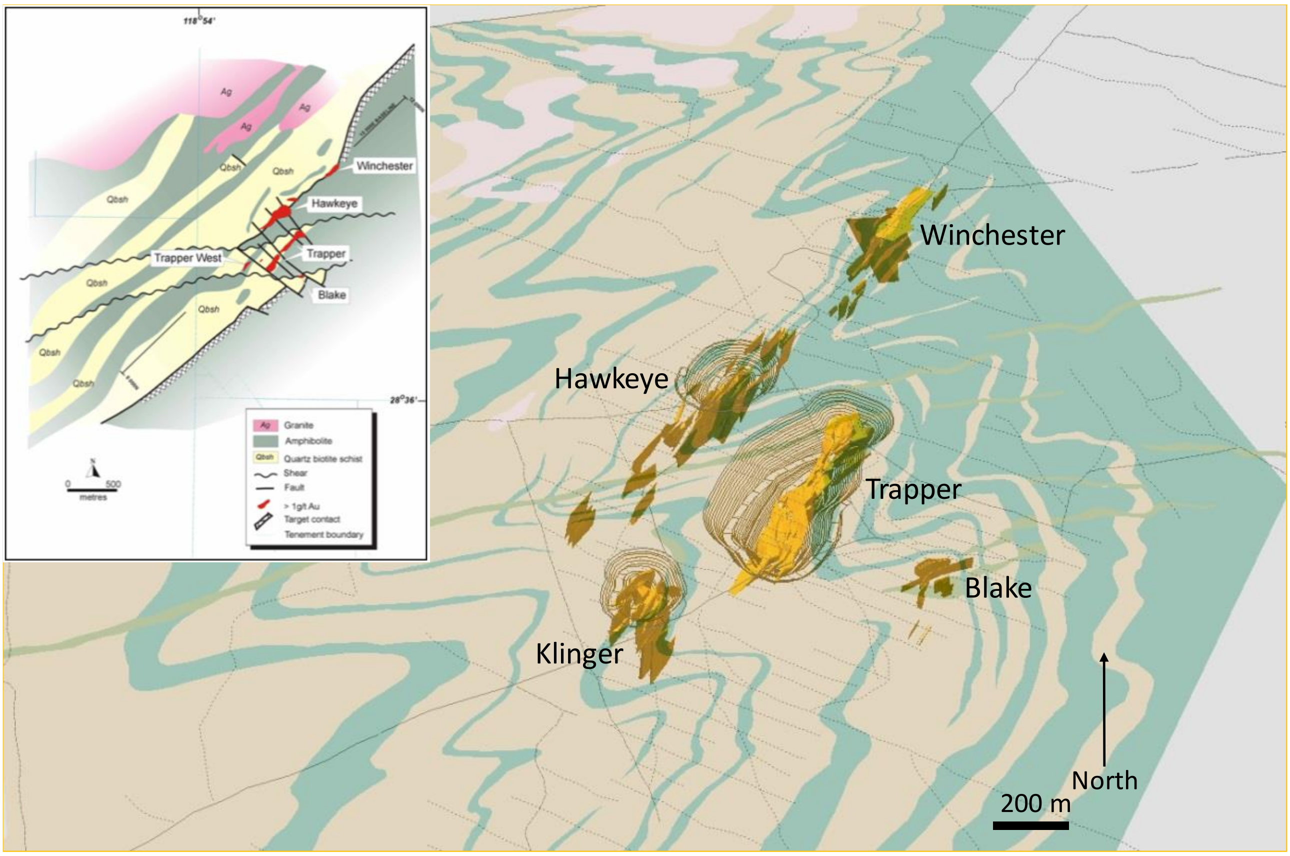
Figure 7-5 Plutonic diagrammatic cross section



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 Project 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).

7.3.3 Wilgeena - (Hermes South)

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 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 7-7 Hermes interpretative geological cross section

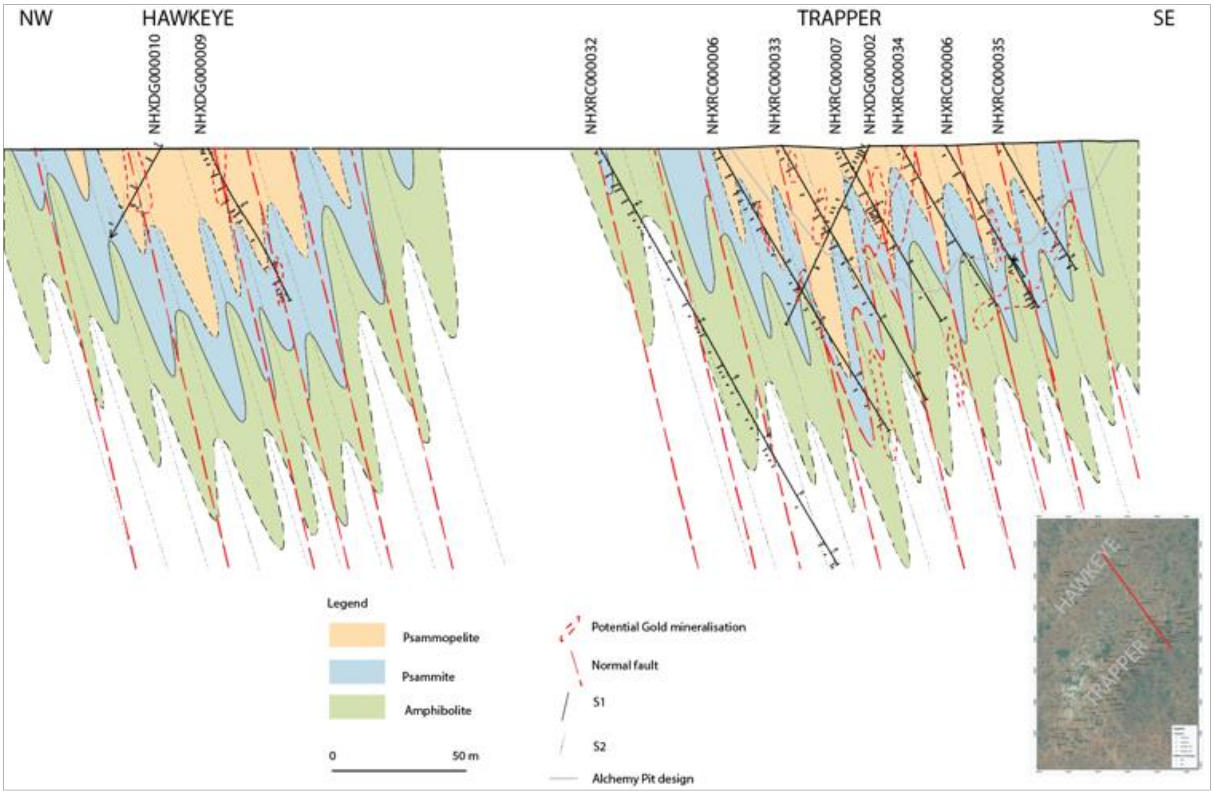
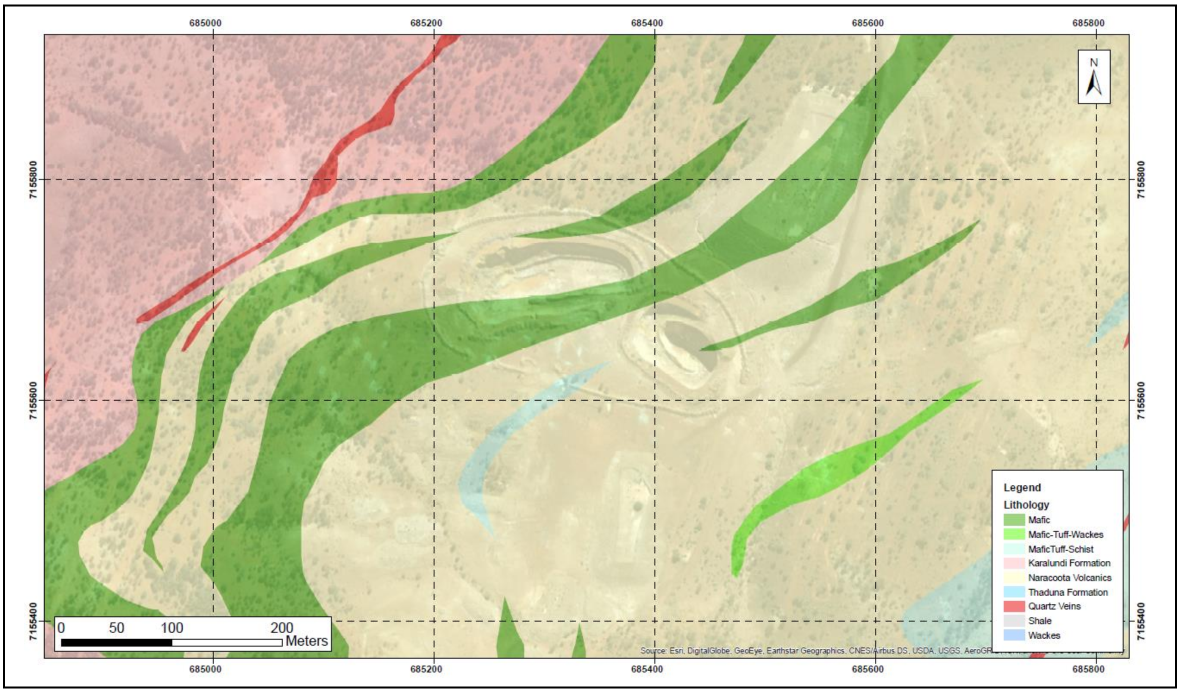


Figure 7-8 Geological Map of Hermes South



7.4 Mineralisation

7.4.1 Plutonic

The Plutonic 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 Resources being mined underground at Plutonic 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”
- Dilational 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 (rims) 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%.

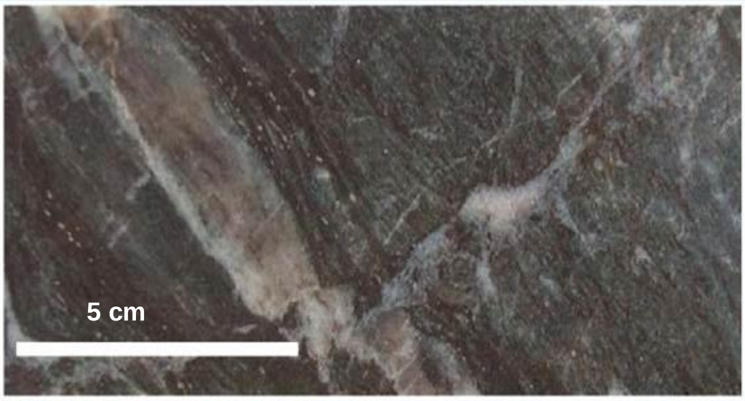
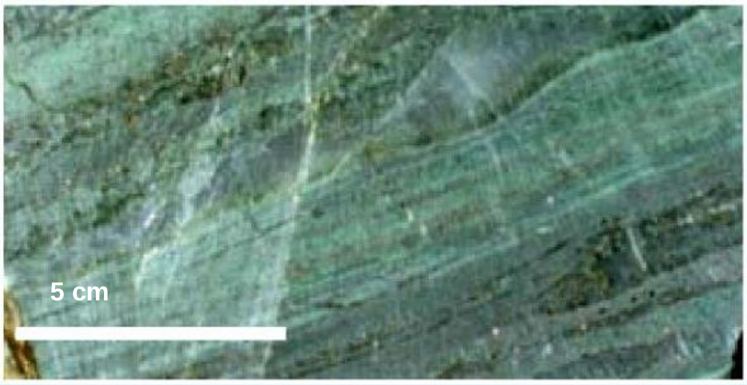
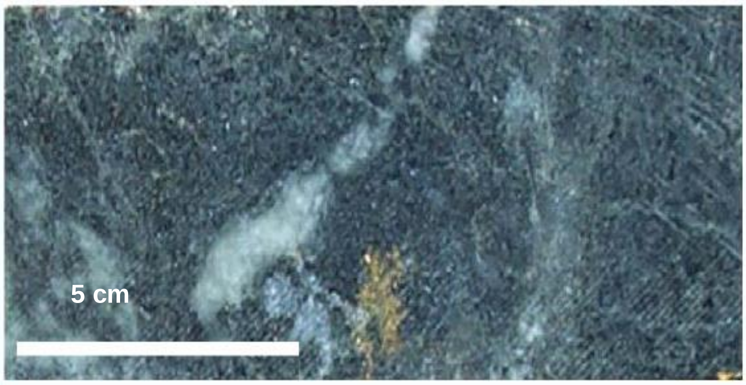
The Plutonic “Green lodes” are characterised by an amphibole-quartz-titanite-plagioclase-arsenopyrite-pyrite-visible gold-scheelite assemblage, generally confined to the upper portion of the Mine Mafic unit and commonly spatially associated with the Plutonic style “Brown” lodes. Both gold and arsenopyrite appear to overprint the layer parallel fabric where present. The 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. There 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 7-9 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
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 20m to 30m vertically below surface at Hawkeye & Winchester, and from 25m to 45m at Trapper, Klinger & Blake. Transition to fresh rock occurs at approximately 30m to 50m and 40m to 65m, respectively.

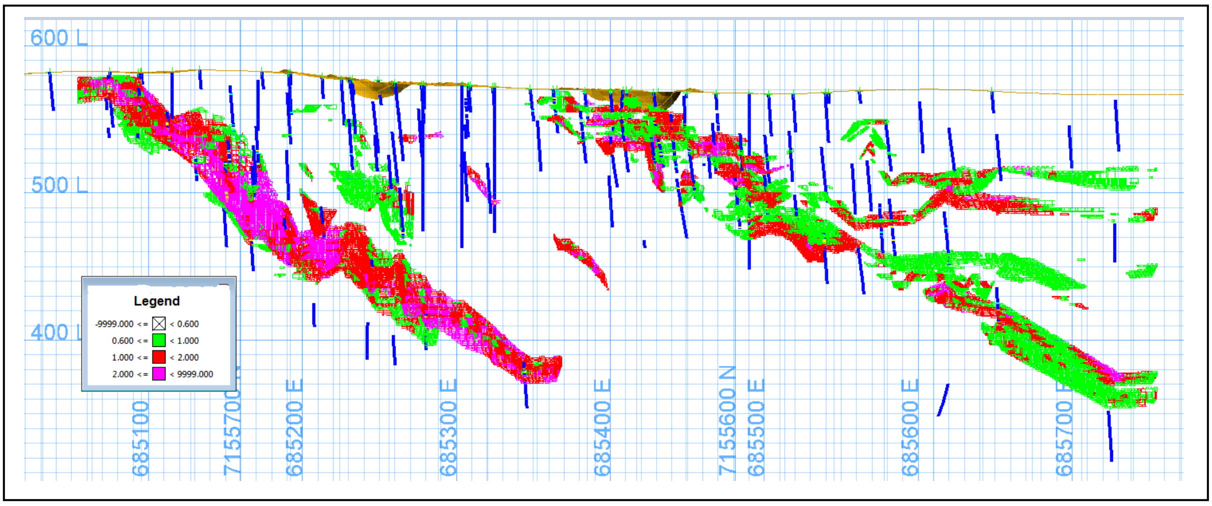
In general, the mineralised quartz veins, foliation and relict bedding are steeply NW-dipping to sub-vertical in both the Hawkeye and Trapper deposits and high-grade shoots are interpreted to plunge shallowly to the north within the mineralised plane.

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 7-10).

Figure 7-10 Hermes South oblique long section showing drilling and block model



8 Deposit types

The Plutonic 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 and Bryah JV 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 unmined mineralisation that belongs in this category.

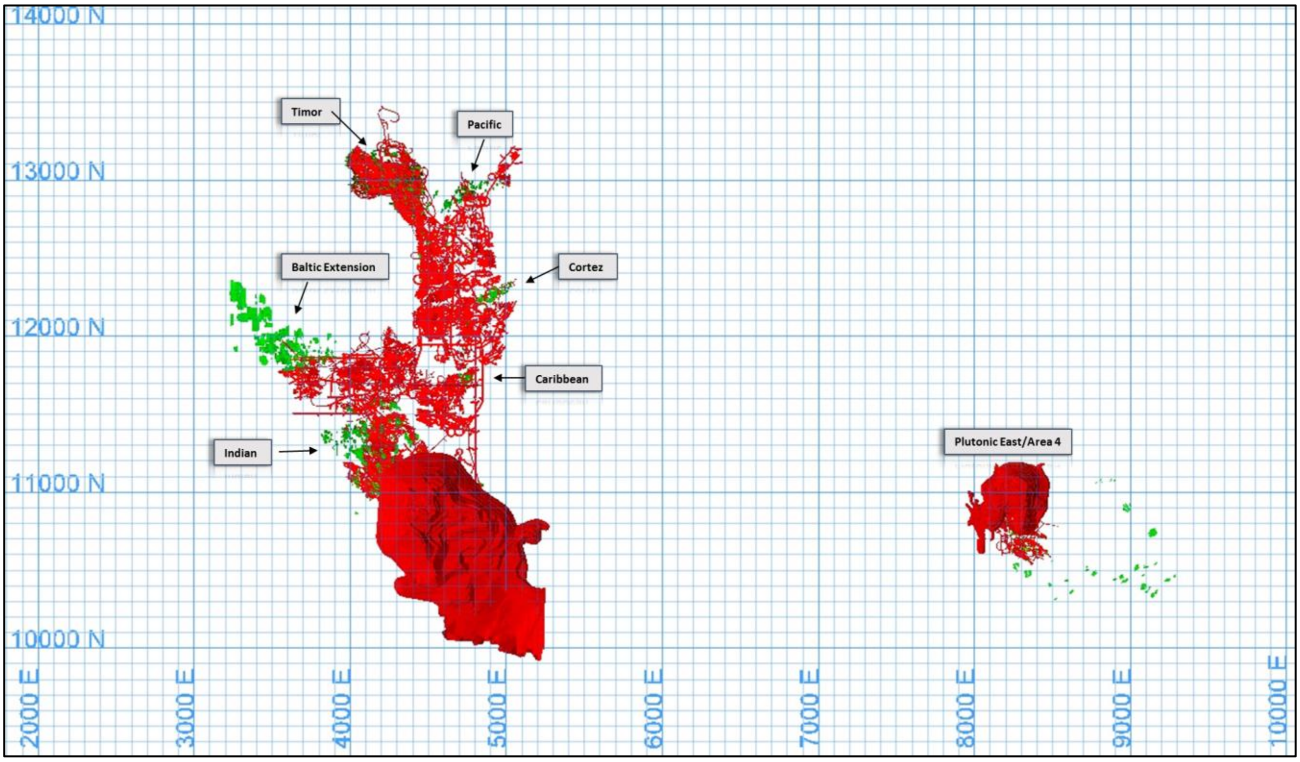
The local controls on this deposit class are difficult to identify, because of the effects of strong, post-mineralisation deformation, and probable remobilisation of Au. Despite this problem, some similarities between the deposits have been recognised:

- 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, Wilgeena, 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 mine, and location relative to surface features is shown in Figure 9-1.

Figure 9-1 Plutonic underground Resource location map plan



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

Prior to the ALY acquisition of the Hermes Gold Project, the majority of work had been completed by Troy Resources NL (Troy). Troy completed detailed geochemistry (stream sediment then soil geochemistry) followed by rotary air blast (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 80m. 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 47,624m 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 23,274m 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 petrographically, 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 Project, they completed a series of programs comprising data review, geological mapping, aircore (AC) and reverse circulation (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 Resource to JORC 2012 standard in an effort to advance the potential for satellite mining operations to be established, servicing the Plutonic Gold Operations. 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 1m 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.

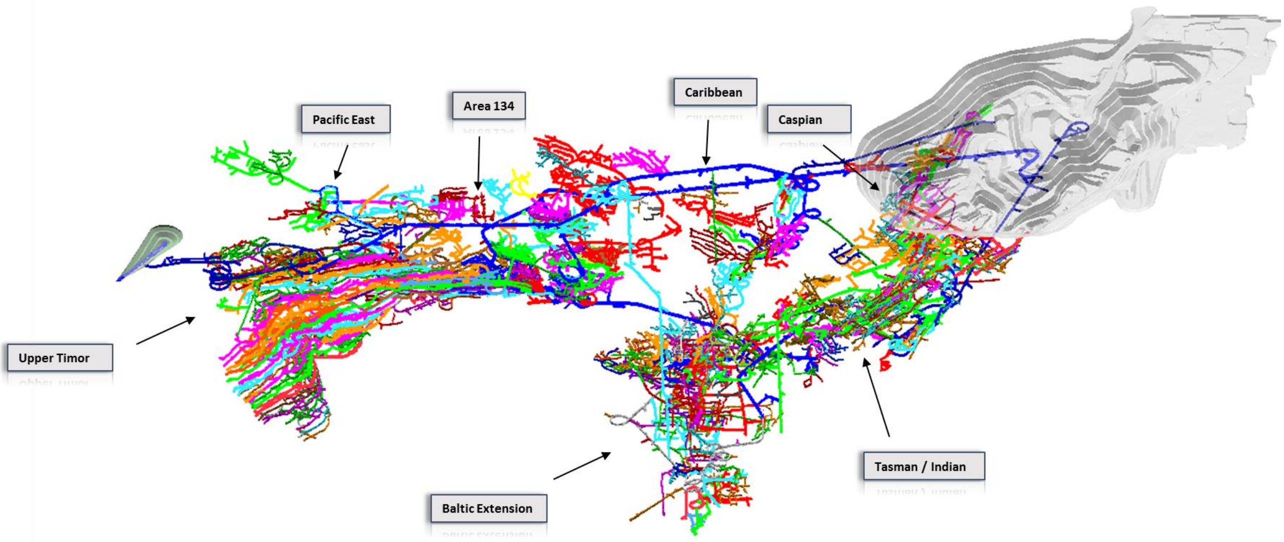
As a result of this work, the initial economic assessment of the Hermes project indicated a robust mining inventory of approximately 100k ounces recoverable. In conjunction with development studies and permitting, the requirement for additional drilling was identified for de-risking stage one and two 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 mine. This extensive network of declines and development drives affords the opportunity to test less well explored areas of the mine. These areas as shown in Figure 9-2 include the following target areas:

- Tasman/Indian West: Continued exploration following up results from 2018. Open along strike.
- Caribbean East: Exploration of up dip trend of existing ore zones.
- Baltic Extension: Resource expansion down-plunge from existing Resources.
- Area 134 Follow up drilling following recent drilling results.
- Upper Timor Follow up drilling on recent drilling expanding Timor up-dip.
- Caspian Follow up drilling on recent drilling results.
- Pacific East Follow up drilling linking Pacific and Pacific East.

Figure 9-2 Oblique view from above of Plutonic underground in-mine exploration targets



9.2 Near-mine exploration

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

- Atlantic (Z19): testing north of Baltic
- Caribbean East Testing Caribbean East extension
- Atlantis Geochem/ soil sampling testing

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

- Hermes South (Wilgeena) Metallurgical holes
- Papus, Flamel, Jones Geochem/soil sampling testing

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

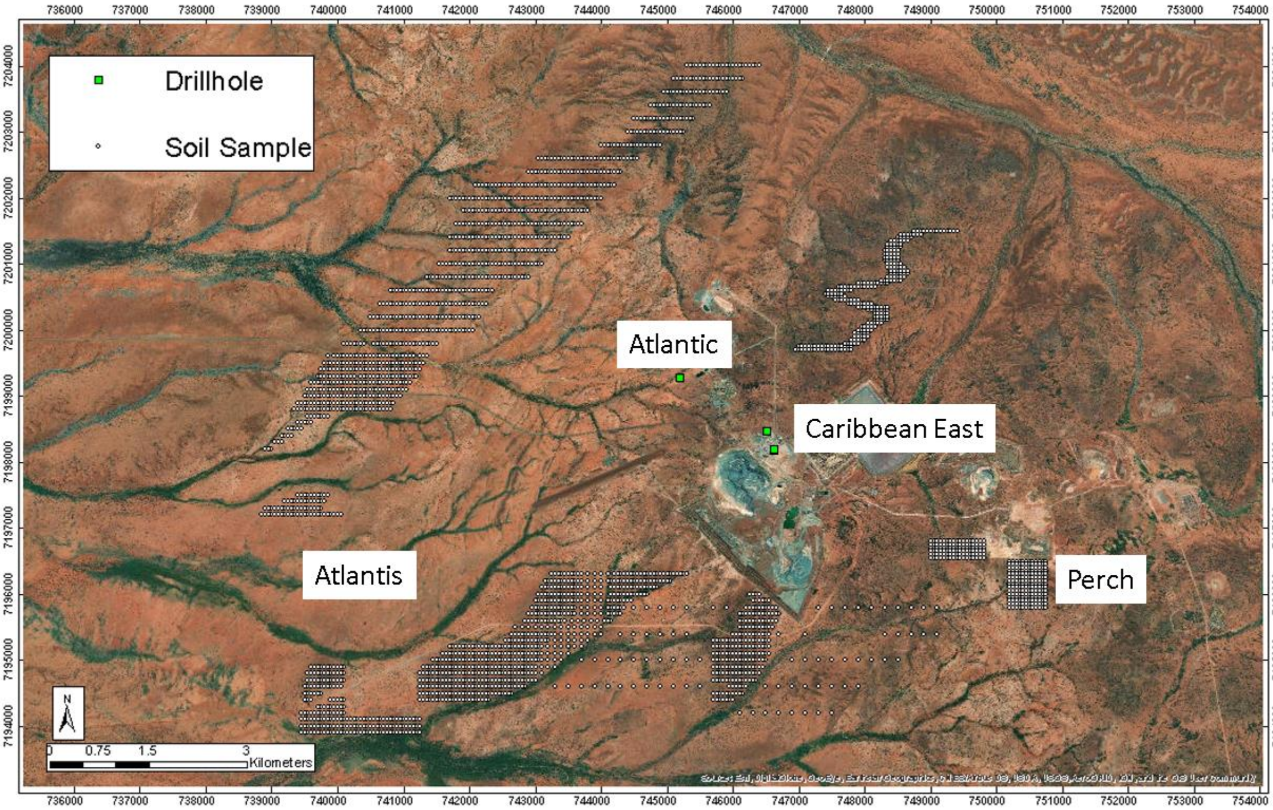
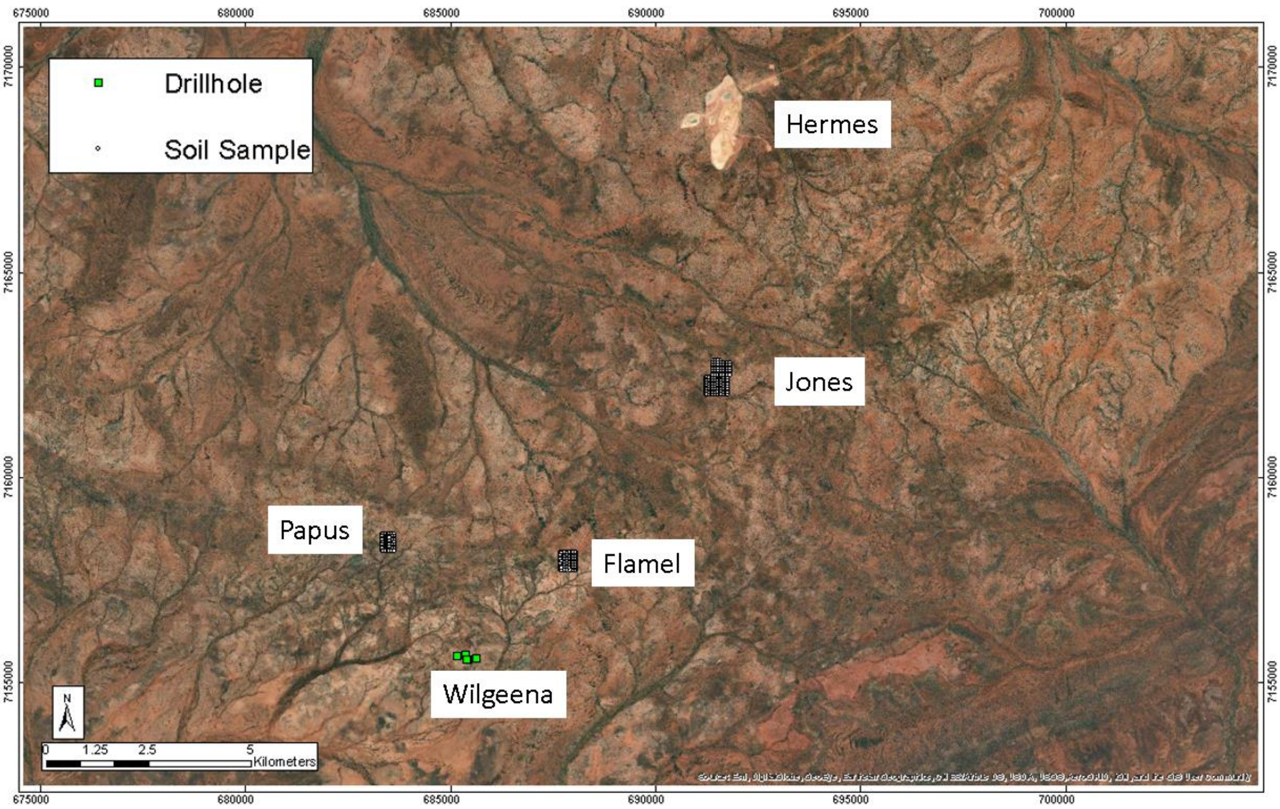


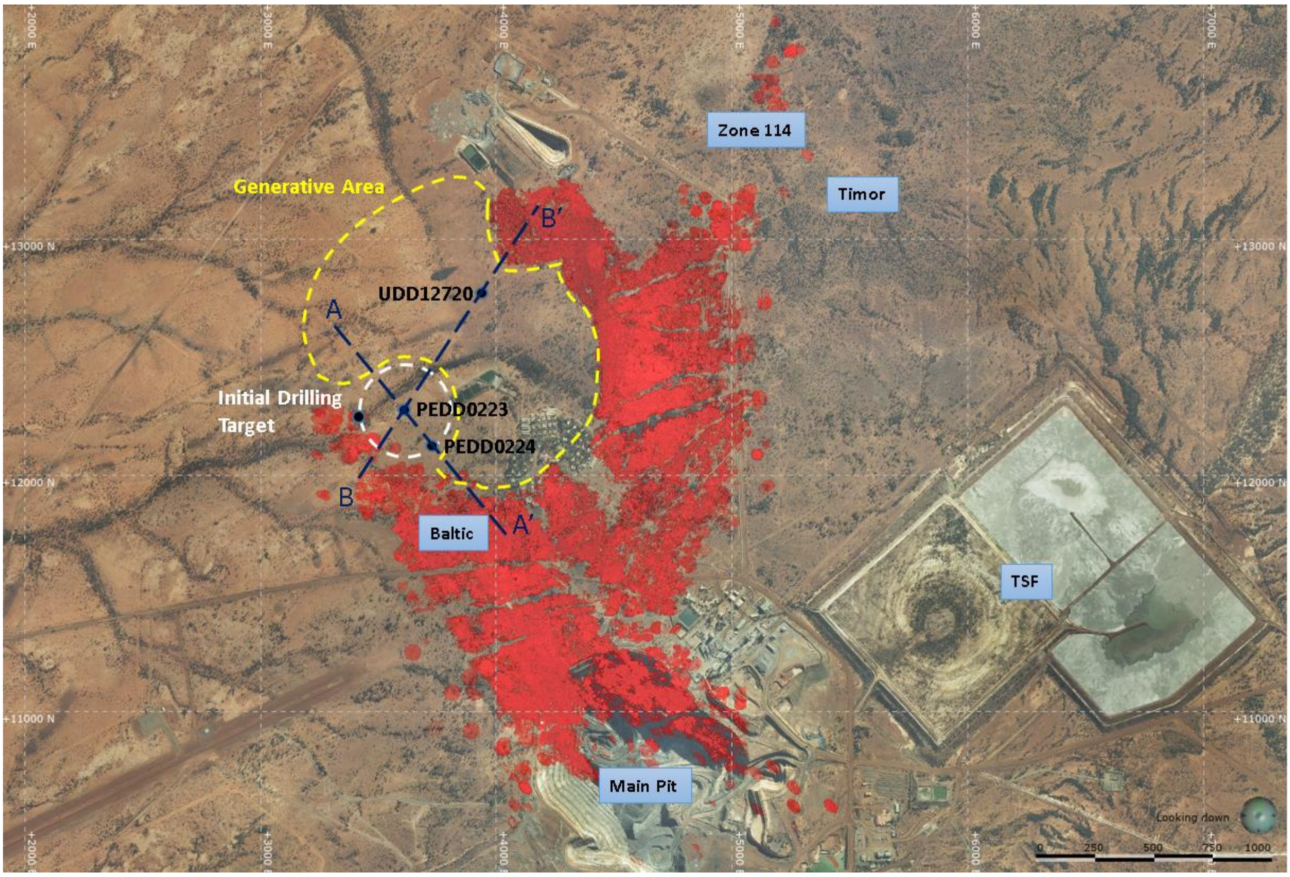
Figure 9-4 Location map for Hermes near mine Bryah basin JV exploration targets



9.2.1 Atlantic (Z19)

Atlantic (Z19) is located just north of Baltic deep between Baltic and Timor. An historical hole, PEDD0223 intercept 2m at 20.45g/t Au from 644m. The purpose of this drill program was to follow the intercept up with 2 wedge drillholes from the parent hole PEDD0223 and also confirm the geological unit where the gold anomalism was intersected. The total meters drilled is 1325.6m. The drilling result confirmed the mineralisation in the lower part of the Overthrust mafic and returned positive gold anomalism of 1.16m at 2.96g/t Au in wedge 1 and 1m at 4.36g/t Au in wedge 2. The mineralisation seems to be continue at the base of the Overthrust mafic. A cross section interpretation in provided in figure 9-4.

Figure 9-4 Location map for Atlantic in near mine exploration targets



The gap between Baltic and Timor is an area in middle of the Plutonic mine where no significant intercepts were found historically. The recent geological modelling suggests that the zone is a pseudo-isoclinal folding with Timor and Spur as the northern limb. The top of the isoclinal fold is now right way up and is truncated by the later Quartz Hill Thrust. As a result, the Mine Mafic is probably not present anymore in this area reducing the potential of finding a significant Resource.

However, the mineralised trend near the contact with the Quartz Hill trust has continuity over a large part of the mine. The mineralisation appears to be late with quartz veining present in shear zones. No visible gold was observed in the drill intercepts but this mineralisation style provides generally good recovery. Further testing needs to be undertaken to find and evaluate potential gold deposits.

9.2.2 Atlantis

Atlantis is a large zone west of Plutonic where no economic deposit has been found historically. Based on mapping and geophysic analysis, several zones were defined. Soil sampling and geochemical analysis were used to find gold anomalism, gold pathfinders and base metals. A total of 2171 soil sample were collected. West of Plutonic, the geology is commonly known as granite, but several mafic lenses were identified during mapping conflicting with the general geology description. To the south and the west of Plutonic, several gold anomalies were fund above 0.1g/t. Strong mineralised trends were identified in gold pathfinder elements. Future air core drilling should be considered to evaluate the anomalous zones at depth. To the north of Plutonic, a zone where the over thrust mafic is outcropping was targeted in order to follow the mineralisation trend identified in the surface expression of hole PEDD0223. No significant intercepts have been reported at this stage. East of Plutonic, two zones of interest for soil sampling were identified near Perch. The purpose is to follow historical drill intercepts near surface. The geology is interpreted to be the Mine Mafic which is the main geological host at Plutonic.

9.2.3 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 Bryah Basin JV 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.

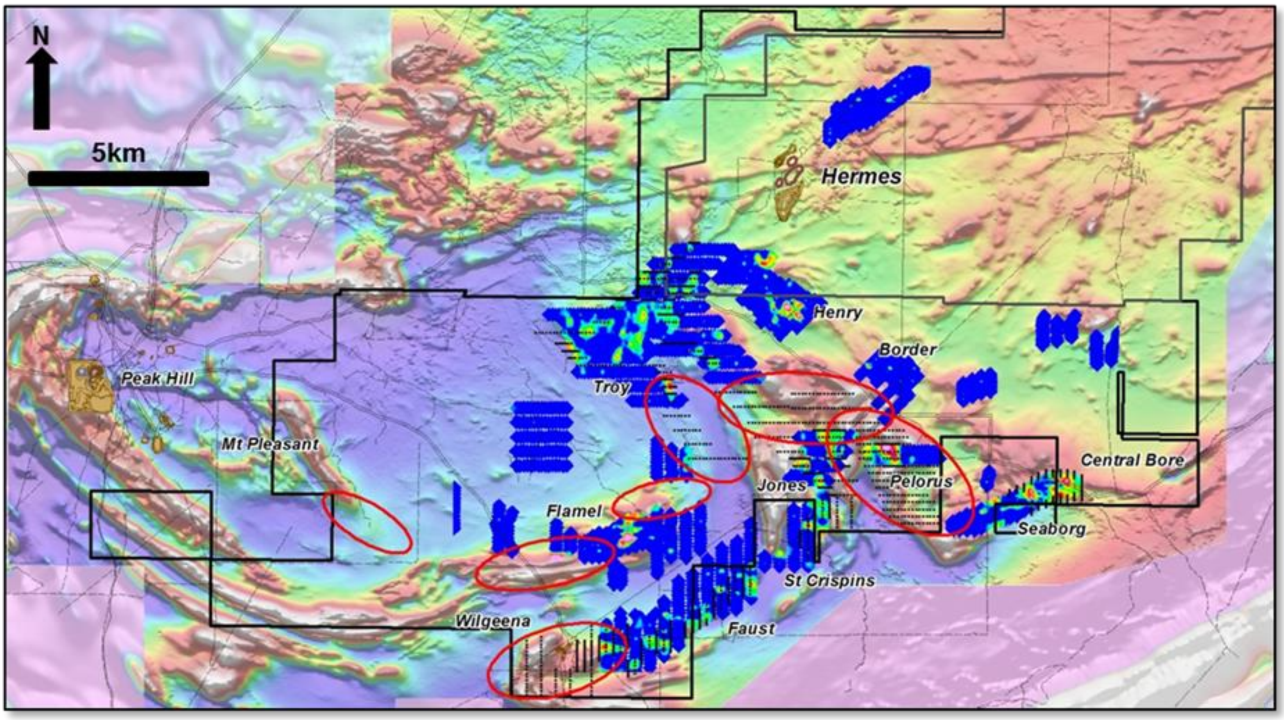
Previous explorers (ALY and Northern Star) embarked upon a campaign to test a number of priority targets with geochemical drill sampling (Figure 9-) to effectively see beneath this cover. It is proposed that Billabong will continue to roll-out this strategy across targeted areas of the Bryah Basin JV 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 Bryah Basin JV area exploration will comprise further in-fill and extension geochemical drilling as well as air core and reverse circulation drilling traverses to test anomalous trends identified historically.

Exploration activities in 2019 in the Bryah Basin JV area used geochemical survey to identify gold anomalism. The geochem 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 Wilgeena (Hermes South), east north east trend at Flamel and north east trend at Jones.

Next stage of exploration will include air core program to confirm the geochem anomalism at depth.

Figure 9-10 Geochemical drilling coverage map of Hermes/Bryah Basin JV area



Note: Red circles indicated areas of potential future exploration

Wilgeena - (Hermes South) The Hermes South project area (Wilgeena deposit) has had historical mining with production reported in early 1920s and in 1989. In 2018 Billabong Gold completed ninety-six RC holes (Figure 9-) for a total of 14,163m 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 Resource (refer 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 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. The results are presented in Table 13-1

Figure 9 -11 Plan of Hermes South 2018 drilling

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.

Table 10-1 Plutonic exploration drilling summary

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[3]	949	52,470
2014	4	1,473	0	0	0	0	1,128	74,501	39	800	3432[4]	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	79648	31	395	15,619	1,103	83,493
Total	**1,628**	**613,804**	**9,514**	**714,249**	**4,046**	**184,937**	**19,297**	**1,477,925**	**235**	**3,698**	**66,883**	**35,784**	**2,984,613**

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.

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

The Plutonic Gold Operations Mineral Resources and Mineral Reserves are based, primarily, on diamond drill data. Current Mineral Resource estimates, for the most part, are based on a 20 m by 20 m drill pattern or occasionally 10 m by 10 m, depending on geological complexity and mining method. Early estimates of Indicated Mineral Resources used a 40 m by 40 m pattern. 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, ~40m by 40m, are drilled with oriented core measuring devices.

Barminco Ltd. has performed the recent underground diamond drilling using Boart-Longyear JDD_Carrier Rig, LM08 electric hydraulic rigs.

All diamond drill core is digitally photographed. Logging notes lithology, alteration, mineralisation and structures. Structural readings were taken at five metre intervals or where the foliation was relatively consistent. More readings were required in more structurally complex intervals. Where possible, readings were 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. If the core was NQ2, it was 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 samples as whole core samples.

10.2 Hermes summary

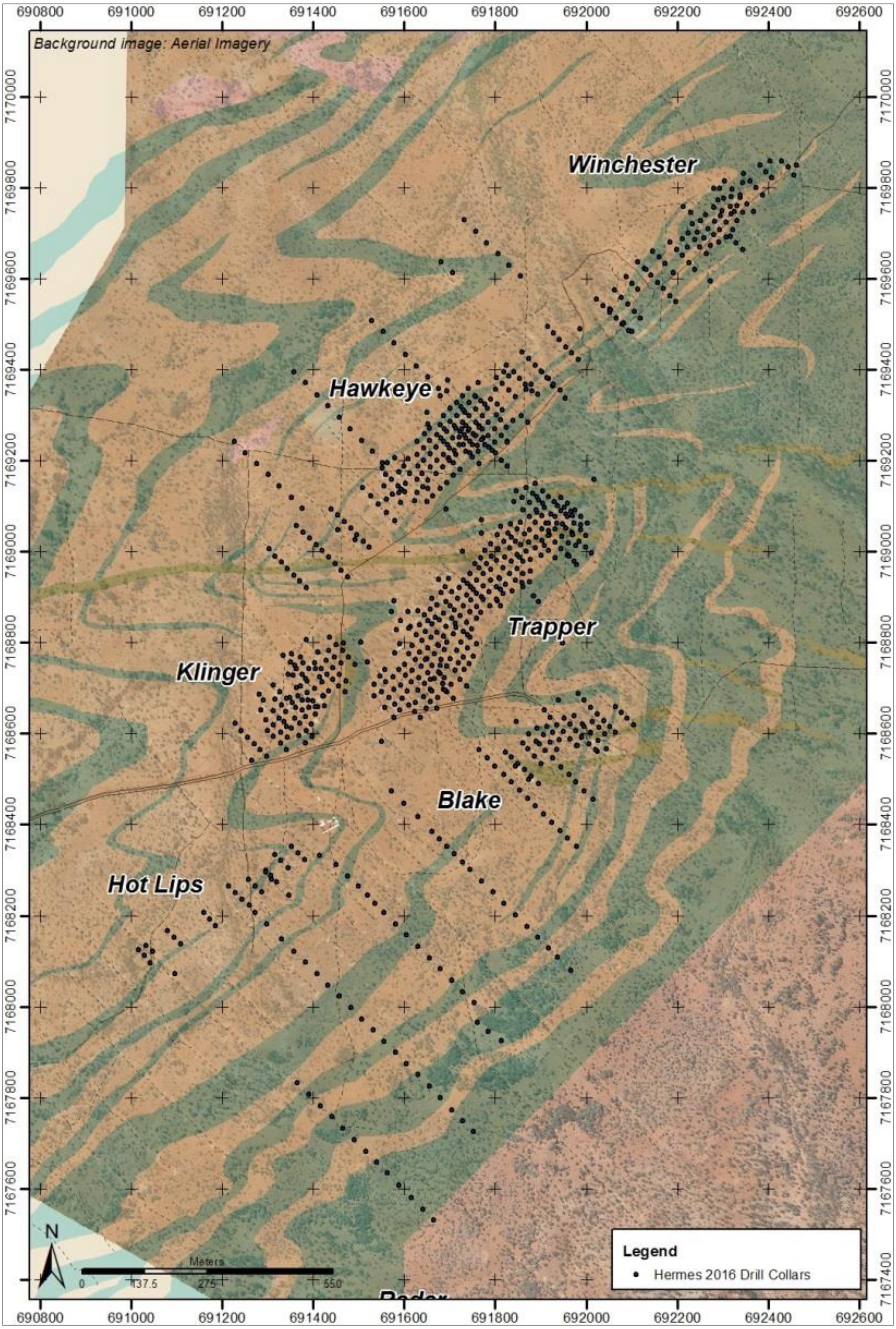
The Hermes (previously known variously as Three Rivers and Bryah Basin) area was first drilling in 1995 by Troy. Successive episodic campaigns by various companies (Table 10-2) resulted in a detailed drilling phase by Northern Star in 2016 that led to definition of the most recent Mineral Resource discussed in section 14.2.

Table 10-2 Hermes area exploration drilling summary

Drill type	Diamond	Diamond	Reverse circulation	Reverse circulation	Rotary air blast/aircore	Rotary air blast/aircore
Year	**No. of holes**	**Metres**	**No. of holes**	**Metres**	**No. of holes**	**Metres**
~1995 (Troy)	–	–	–	–	954	47,624
1996–1998 (Troy)	4	521	233	23,275	5	237
2003 (Barrick)	2	231	–	–	–	–
2009–2011 (Alchemy)	10	1,080	117	13,616	214	8,830
2015 (Northern Star)	16	1,573	113	13,091	–	–
2016 (Northern Star)	–	–	368	31,904	–	–
2016 (Northern Star) water bores	–	–	16	1,358	–	–
2017 (Billabong)	1	342	81	9,676	-	-
2017 (Billabong) water bores	-	-	39	1,645	-	-
2018	16	5,064	142	15,353	-	-
2019	-	-	-	-	-	-
Total	**49**	**8,811**	**1,109**	**109,918**	**1,173**	**56,691**

Note: RAB/AC drilling is not used in Resource estimates.

Figure 10-1 Hermes drill collar plan



The Hermes Mineral Resources and Mineral Reserves are based, primarily, on RC drill data. Current Mineral Resource estimates, for the most part, are based on a 20 m by 20 m drill pattern.

Drill collars are surveyed. RC holes were surveyed at 30m downhole intervals. The stainless-steel starter rod allowed dip and azimuth measurements to be recorded using a Reflex EZ-shot camera during drilling operations. Deviations to the drill hole path were monitored by the rig geologist.

RC drilling was conducted by Ranger Drilling services using both Hydco 350 (Ranger Drilling Rigs 2 and 3, on-board 350psi/1150cfm) and KWL 350 (Easternwell Rig 50, on board 500psi/1350cfm) RC rigs, with Air-Research boosters and Sullair auxiliaries. The barrel configuration for the drilling included a stainless-steel starter rod with stabilisers, down-hole hammer and 5.25" face sampling drill bit. A combination of front and back reamers/stabilisers were used to minimise hole deviation.

Sampling was completed from on-board rig-mounted static cone splitter was used directly from the cyclone. Approximately 12.5% of each meter sample was collected as a primary sample (from the primary splitter chute) into a pre-labelled calico bag while the remaining 87.5% was collected and retained at the drill site, either dumped directly in 1 m sample piles on the ground or in a green poly-bag. All Resource definition drill hole primary samples were 1 m composites taken directly from the primary chute of the splitter at the rig. All Resource targeting and sterilisation samples were collected as 4 m composite samples directly from the secondary splitter chute. The primary (1 m) sample was also retained at the drill site and the remaining drill spoil left on the ground.

Where assays indicated >0.1 g/t Au mineralised intervals the original appropriate pre-labelled 1 m primary samples were then taken for further 're-split' assays. Approximate recoveries were sometimes recorded as percentage ranges based on a visual and weight estimate of the sample. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray for later reference or re-logging.

All diamond drill core was digitally photographed. Logging noted lithology, alteration, mineralisation and structures. Structural readings were taken at five metre intervals or where the foliation was relatively consistent. More readings were required in more structurally complex intervals. Where possible, readings were 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.

All core was 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.

11 Sample preparation, analyses, and security

11.1 Sample security

All sampling and sample dispatch activities are supervised by the project or mine geologist. 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 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 Resource development drill core predominantly goes to ALS lab 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 Homestake 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 Global (NATA/ISO accredited in Perth).

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 ALS Global (NATA/ISO accredited in Perth).

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

Figure 11-1 Flowchart for site-based sample processing

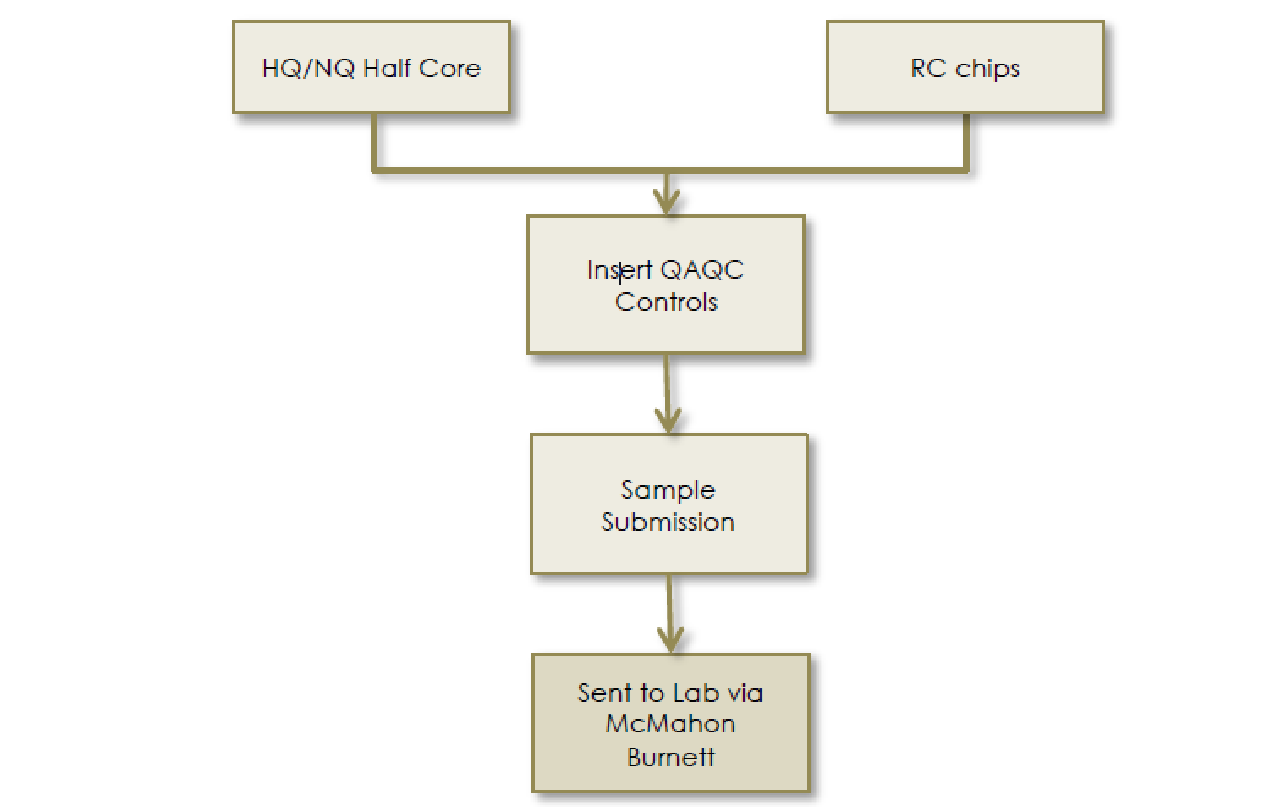


Figure 11-2 Flowchart for sample preparation at ALS Malaga facility

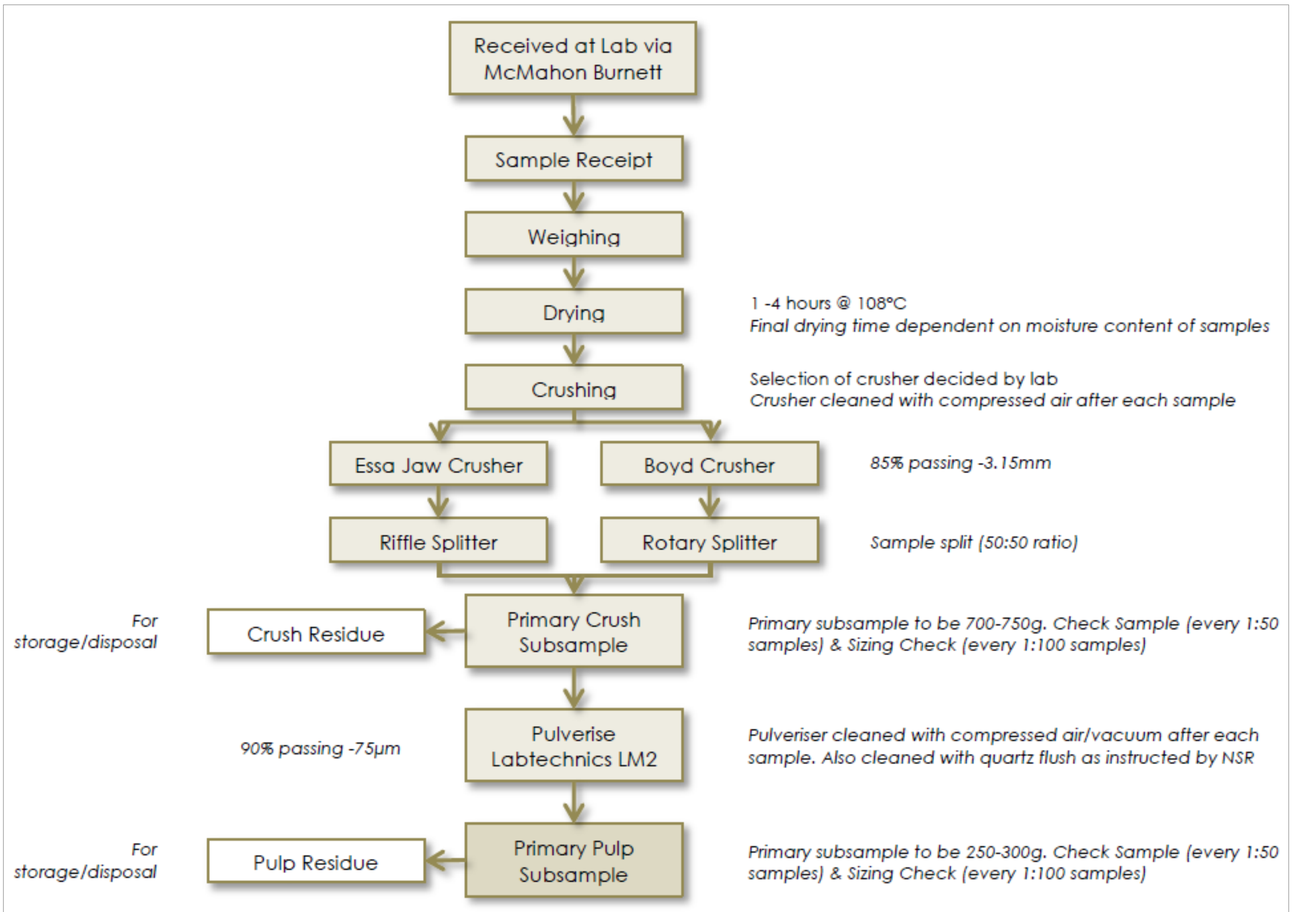
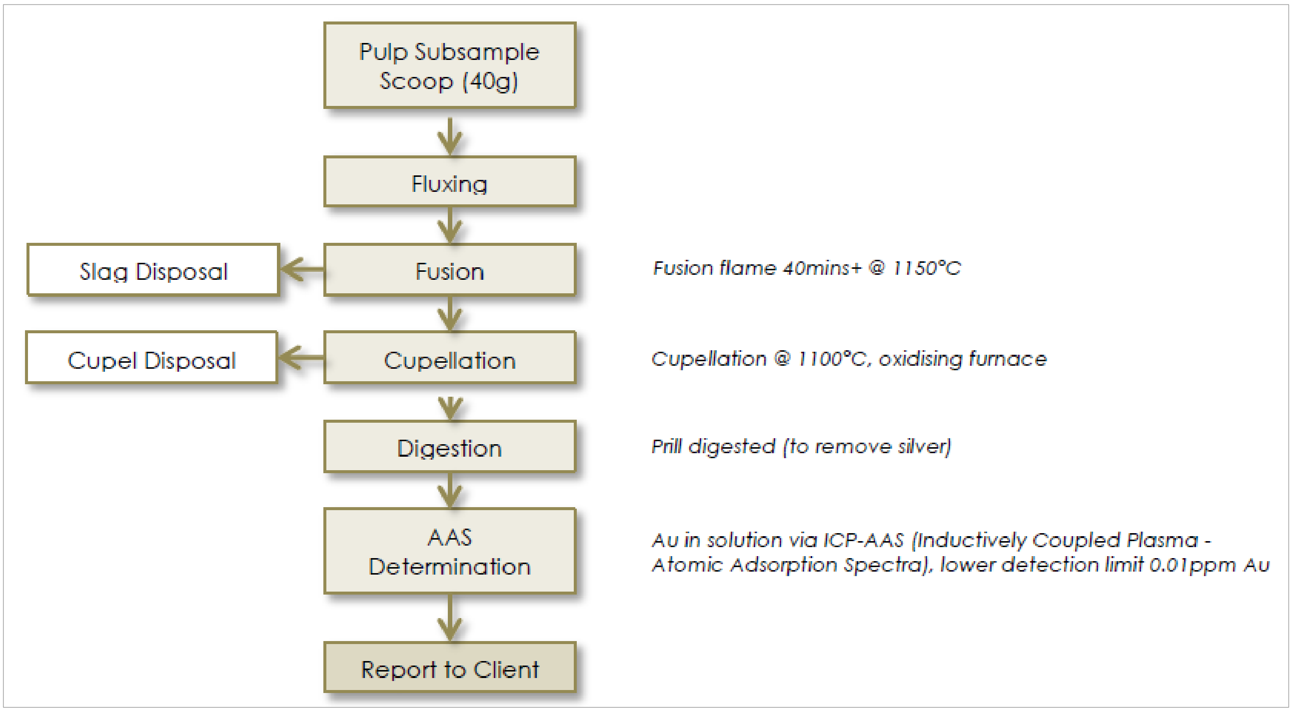


Figure 11-3 Fire assay flowchart for ALS Malaga facility



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 Northern Star involved a chain of custody managed by Northern Star Resources 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 laboratory. 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 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 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 laboratory. 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 reverse circulation (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 ALS Global Laboratories (National Association of Testing Authorities, Australia (NATA)/International Standards Organisation (ISO) 17025:1999 Accredited) in Perth. 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 Resources have been identified over a long period of time with a number of companies. All high confidence Resources are based dominantly on underground diamond drilling completed in the last 10 years.

Blanks are inserted within the diamond drill core after every ore sample following a blue metal wash. 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.

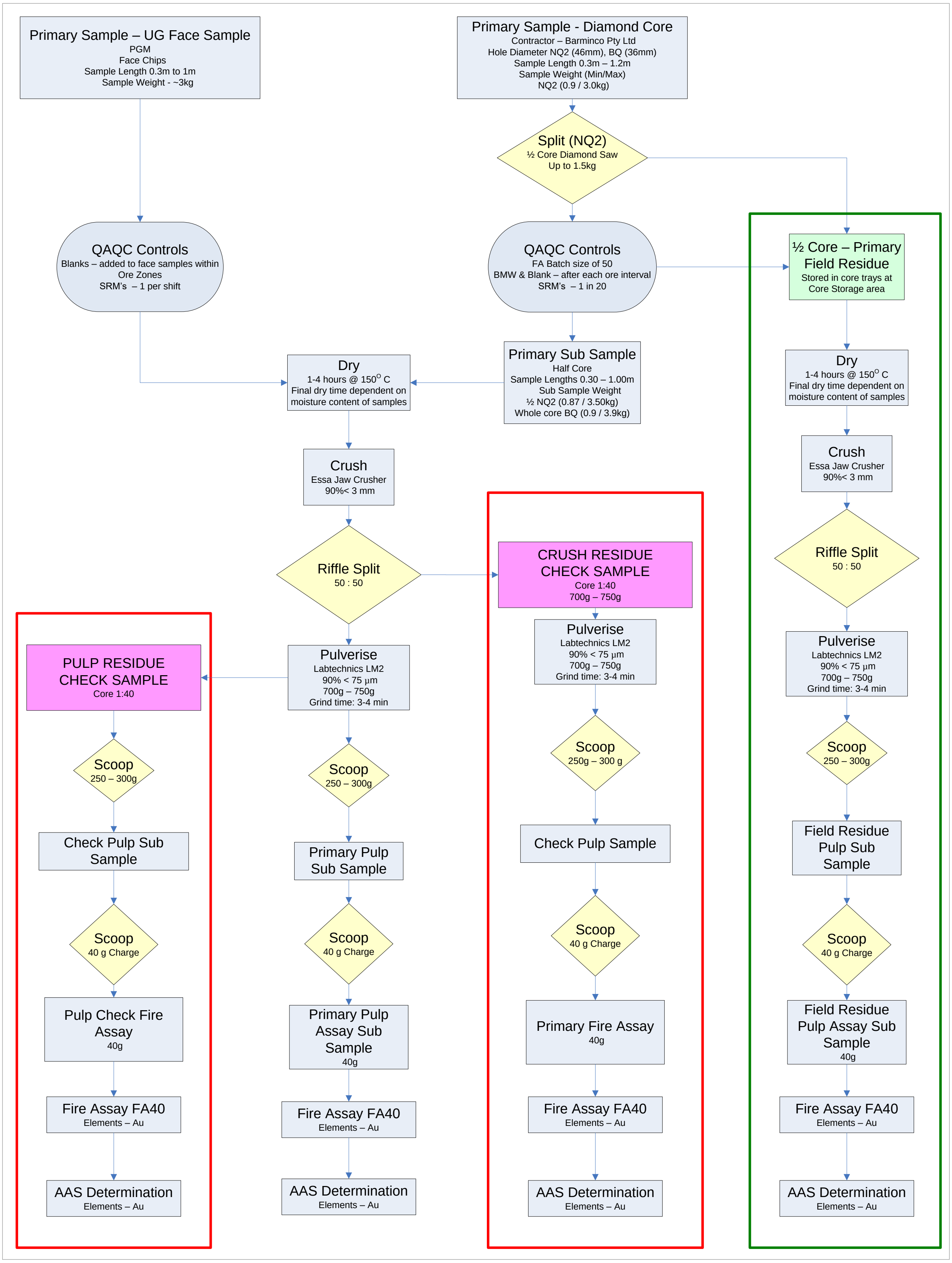
Grind checks or sizing is carried out on a frequency of 1 in 40 on both pulp residues and crush residues. The data is collected throughout the shift with results calculated at the end of shift. Pulp residues are expected to have 90% passing ≤75µm. the crush residue is expected to have 80% passing ≤3mm.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

Certified reference materials (CRM's) are inserted at a frequency of at least 1 in 20, as per the Plutonic assay 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

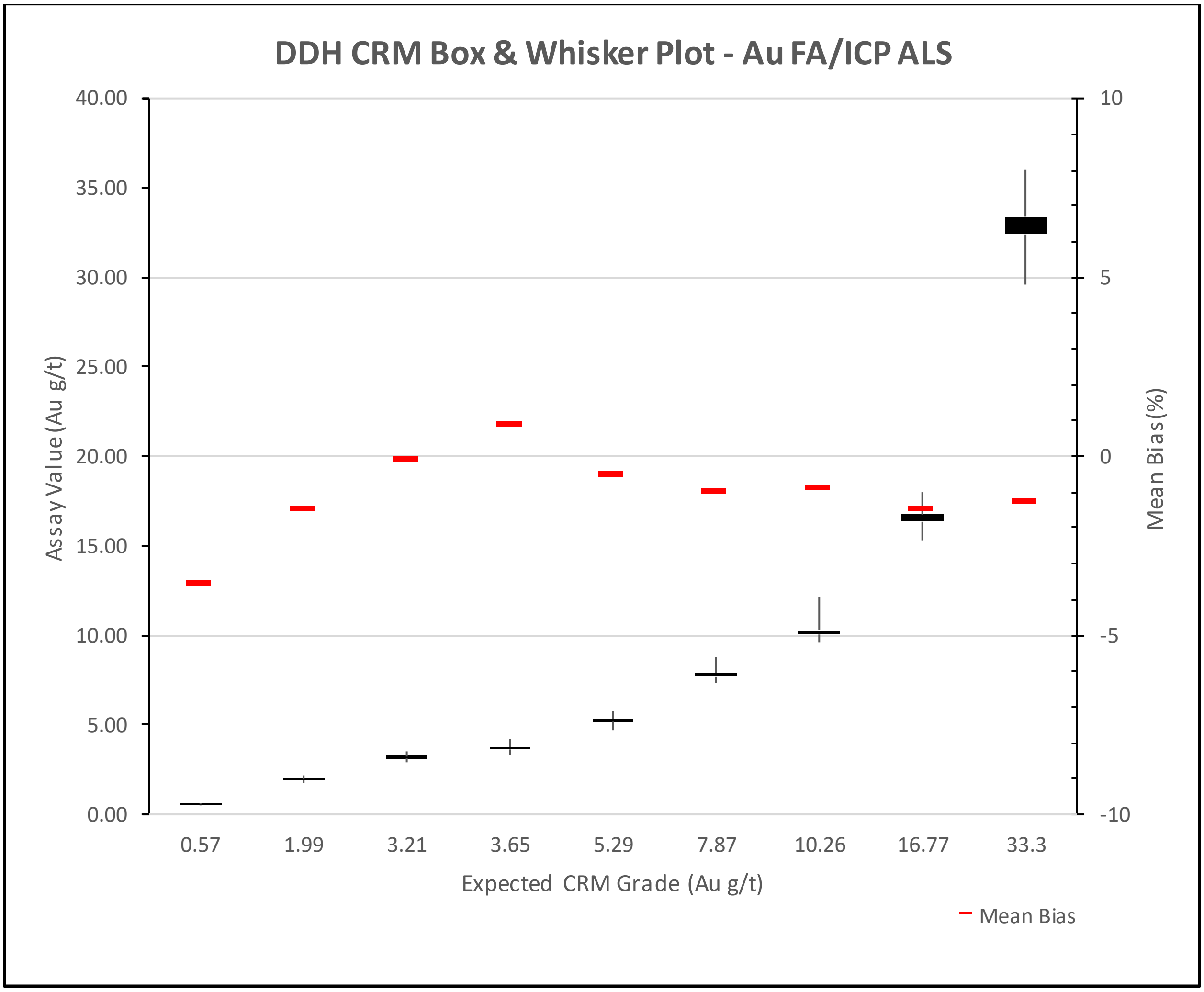
Data was examined for the period October 2016 to December 2017 to assess the quality of results returned by the analytical laboratories suppling results for Resource definition and grade control processes. Data was exported from the acQuire database and manipulated to exclude data previously flagged as being outside acceptable limits. Data was received for CRM's from three laboratories for the following time periods:

- ALS Limited – Perth (ALS) – 3,513 CRM assays
- Plutonic Gold Mine Laboratory (PGML) – 747 CRM samples

The CRM's were analysed as part of the submitted sample batch and were blind submissions. Analysis is by fire assay (30 g to 50 g charge weight) with analysis by AAS or ICP-OES.

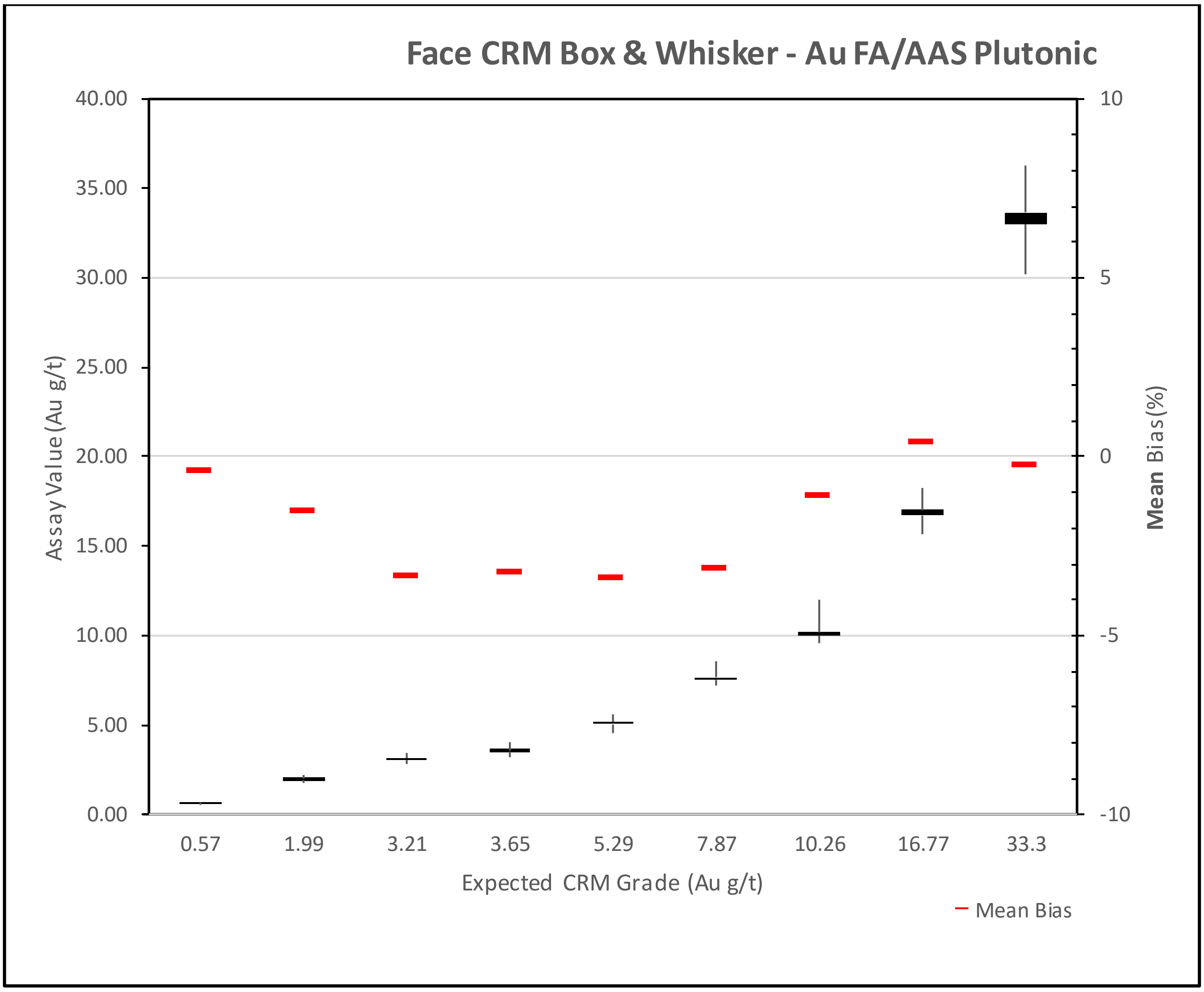
The results were examined using a box and whisker plots displaying expected gold grade, assay values and mean bias percentage on X, primary Y and secondary Y axes respectively for each CRM material. (Figure 11-5 to Figure 11-6). The ALS laboratory that has processed all the diamond drilling samples shows negligible bias in CRMs except for an apparent bias of 3.5% for CRM grades at 0.57 g/t Au. The Plutonic laboratory 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.

Figure 11-5 QA/QC – Box and whisker plot of CRM results from DDH batches to ALS



Note: Mean Bias% equals ((Mean of Measured Values – Expected Value)/Expected Value)*100

Figure 11-6 QA/QC – Box and whisker plot of CRM results from Face Sample Batches to Plutonic Laboratory



Blanks were examined and found to have <1% of samples outside of the error limit. No duplicate data was examined independently.

12 Data verification

12.1.1 Sample tracking

The Plutonic assay laboratory 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 .txt 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 result 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 was successful.
- If the process has failed or has contained 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.

12.1.2 Data verification

The Plutonic Resource database is regularly validated by Billabong staff using data validation modules of Vulcan 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. It is the opinion of the Qualified Person that the data verification systems are adequate for Mineral Resource estimation.

12.1.3 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 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 30 September 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.

13 Mineral processing and metallurgical testing

Plutonic has been in operation since August 1990 and is well understood. Various testwork 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 testwork was completed on Hermes in preparation for a new mine and ore source.

Mineral processing is covered in detail in Section 17.

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

A total of 5 bags of DDC samples to ALS to do the following test work:

- Head assays determination
- Ball mill work index determination
- Grind establishment to 75um
- CIL Cyanide leach with the following set points
  - pH – 10.5
  - CN at 200ppm
  - 40% solids with site water
  - Carbon 10g/l
  - Lead nitrate – 100g/t
  - Leach time – 24 hrs. (0 – 24hrs interval)

A summary of results with the aforementioned conditions examined are shown in Table 13-1 below.

Table 13-1 Summary of Metallurgical Testwork Results – Winleega (Herme South) - 2019.

SAMPLE ID	TEST #	GRIND SIZE (P80 um)	TOTAL GOLD EXTRACTION (%)	RESIDUE GRADE (Au g/t)	CALCULATED HEAD (Au g/t)	AVG ASSAYED HEAD (Au g/t)	NaCN CONSUMPTION (kg/t)	LIME CONSUMPTION (kg/t)
MET 1	KI1028	75	98.33	0.09	5.08	4.82 / 4.56	0.12	1.64
MET 2	KI1029	75	95.71	0.04	0.93	1.27 / 1.04	0.12	1.95
MET 3	KI1030	75	96.98	0.04	1.16	0.76 / 0.85	0.23	2.15
MET 4	KI1031	75	60.88	0.05	0.12	0.06 / 0.04	0.23	3.34

The conclusions the Plutonic Metallurgy team reached were that out of the 4 samples tested 3 reported above 95% recovery in the normal cyanide leaching conditions. The lower assay grade 'soft ore' examined (4.7kWh/t Ball mill work index) reported lower recovery and higher reagent consumption, probably due to more oxide content in the material.

14 Mineral Resource estimates

14.1 Summary

Mineral Resources as at December 31, 2019 are summarised in Table 14-1.

Table 14-1 Summary of Mineral Resources as at December 31 2019 – (Reporting Cut-Off Grade 1.5g Au/t Underground & 0.4g Au/t Open Pit).

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	3,340	5.3	570	4,970	4.5	720	8,310	4.8	1,280	14,130	4.2	1,900
Plutonic East	110	6.4	20	180	5.1	30	290	5.6	50	3,630	4.0	470
Plutonic West	-	-	-	-	-	-	-	-	-	390	2.8	40
All Underground Sub-total	**3,450**	**5.5**	**590**	**5,150**	**4.6**	**750**	**8,610**	**5.0**	**1,330**	**18,150**	**4.2**	**2,400**
Hermes Open Pit Complex												
Hermes	-	-	-	1,990	1.4	90	1,990	1.4	90	3,870	1.3	160
Hermes South (80% JV)	-	-	-	700	1.6	40	700	1.6	40	200	1.1	10
Plutonic Open Pit Areas												
Area 4	-	-	-	-	-	-	-	-	-	440	0.8	10
Perch	-	-	-	-	-	-	-	-	-	230	0.9	10
Plutonic Main Pit	1,640	3.9	210	3,330	2.2	230	4,970	2.7	440	7,670	2.0	490
All Open Pit Sub-total	**1,640**	**3.9**	**210**	**6,020**	**1.8**	**350**	**7,660**	**2.3**	**560**	**12,400**	**1.7**	**670**
Total	**5,100**	**4.9**	**790**	**11,170**	**3.1**	**1,100**	**16,260**	**3.6**	**1,890**	**30,550**	**3.1**	**3,070**

Notes:

1. Mineral Resources are quoted inclusive of those Mineral Resources converted to Mineral Reserves.
2. The reporting standard adopted for the reporting of the Mineral Resource estimate uses the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (Nov 2019) as required by NI-43-101.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages.
4. Mineral Resources are estimated at a cut-off grade of 1.50 g/t Au for the Plutonic Underground Gold Mine.

5. 'Plutonic Underground Resources based on Deswik Mining Stope Optimizations using generalized Reserve MSO input parameters and / or restricted 'grade shell' reported Resources. Open Pit Resources based on simplified pit optimization parameters.
6. Mineral Resources are estimated at a cut-off grade of 0.40 g/t Au for Hermes, Hermes South, Area4 & Perch Open Pits.
7. Mineral Resources are estimated using an average gold price of A$2,150 per troy ounce (~US$1,450 per ounce).
8. Rounding errors exist in this table and number may not add correctly.

14.2 Introduction

In 2019 Superior Gold commenced a large program to consolidate new Resource Estimates for the Plutonic Gold Mine Operations. The consolidation involved revision of historical block models and the development of new 'wire-frame constrained' Resource block models directed towards standardizing all current and future Resources estimation processes for all deposit areas within the project. A regular 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.

Superior had previously assessed that there was moderate risk associated with the estimation methodology applied to previous Plutonic Mineral Resource estimates due to the inclusion of some of the historical models that have not changed or been updated since 2014-15 when some mining operations in some areas were suspended, primarily due to economic conditions at the time.

When comparing Resources Estimation in 2019 to the new estimates in 2020, the major change has been the implementation of a standardized 'wire-frame constrained' Resource block models which are intended to replace information from all previous models including the 'Preliminary Block Models' (PBM's) used in short term operations planning. This rationalization means that modelling is now restricted to 'Resource Models' to define Resources within pre-defined 'fault block areas (Figure 14-1 below), and mine production or 'grade control' models used for short term (including day to day) production planning decisions. Another major change has been the use of a 1.5g Au/t for Resource reporting in 2020 as compared to a 2.0g Au/t lower cut-off used in 2019. This change is primarily a consequence of a more favourable gold price allowing more mineralization for be considered as potentially economic and thus having a significant increasing effect on the overall Resource base. Similarly, Open Pit Resources were aligned with a 0.4g Au/t reporting lower cut-off as compared to 0.6g Au/t used in 2019.

Various smaller changes were also incorporated during the construction of new Resource models including small refinements to the Resource Classification approach. Classification continues to use localized block model interpolation data which is used to define relative 'estimation confidence' in conjunction with associated 'modifying factors' to arrive at classification levels which meet the 'reasonable prospects for eventual economic extraction' Resource Reporting requirement.

14.3 Plutonic Underground Resource Models

The understanding of mineralization lode continuity continues to be an area requiring continuing close attention. There are areas in some parts of the Resource domains where interpretation from drill holes spaced at greater distances than the lode continuity at any given grade cut-off. 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. The Plutonic Geology Team has undertaken a detailed revision of many of these areas with high outlier gold grades areas in conjunction with the new 'constrained lode wire-frame' delineation approach thereby arriving at a locally more detailed interpolation regime. Examination of the high-grade outlier areas particularly in isolated areas have been given close attention and some of the zones that don't show sufficient continuity in some instances having been designated as Inferred Resource. 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 Resource estimations.

Some previous minor concerns the company had relating to modelling accuracy due to the bulk unfolding methodology applied to mineralization interpretation has been addressed by using the 'constrained mineralization lode' approach. In the new Resource block models, this risk has been mitigated by applying an 'un-folding tetra-surface' to each individual lode for block model interpolation. In addition to the main Resource drilling data-set, face sampling of development drives and from production stopes have also been used to provide detailed information for Resource modelling which has helped to improve mineralization volume definition and thus Mineral Resource estimation which should help with Resource Model – Grade Control Model – Mining and Mill Recovery reconciliation. Some questions still remain regarding the sensitivity criteria assigning the proportion of material that is classified as Measured Resources in the new constrained 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 Reserves estimation and associated mine planning.

Whilst a concerted effort was made to replace all block models with new 'constrained lode wire-frame' models, reporting once again for the old Caspian, Cortez and Pacific block models, with Resources reported from these after 'depletion' of material mined as per underground Survey during 2019. These pre-existing block models were first updated using existing Resource block models, preliminary block models and / or 'Measured Resource Models' (MRM's – which are effectively 'Grade Control Models'') and then depleted with the appropriate current 'as-built' development and stope survey in order to report the remaining Resources. (For the purposes of this report, PBM and MRM models are referred to as and may be considered as constrained block models).

Resource Reporting from all block models was further aligned with Deswick Stope Optimizations ("Long Hole" or "Air Leg") for underground Resource broadly based on similar costs and parameters as those used for Reserves estimates. Similarly, Open Pit 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. All material not defined as Measured or Indicated using wither the Deswick or pit optimization Resource estimation approach in the majority of block models was designated as Inferred Resources within overall block model constraints without extrapolation. The gold price assumed for the underground optimization runs and the Open Pit optimizations was A$2,150 per troy ounce.

The diagram below (Figure 14-1) shows the 'Fault Block' area designation regime describing the new Plutonic Underground block model construction areas developed for 2020 Resource Reporting. Figure 14-2 shows for comparison purposes the model areas designated for the 2019 Resource Reporting including the unchanged Plutonic East and Area 4 zones.

Figure 14-1 New 'Fault Block' Model Area Designation Regime used for 2020 Resource Estimation (Plan View)

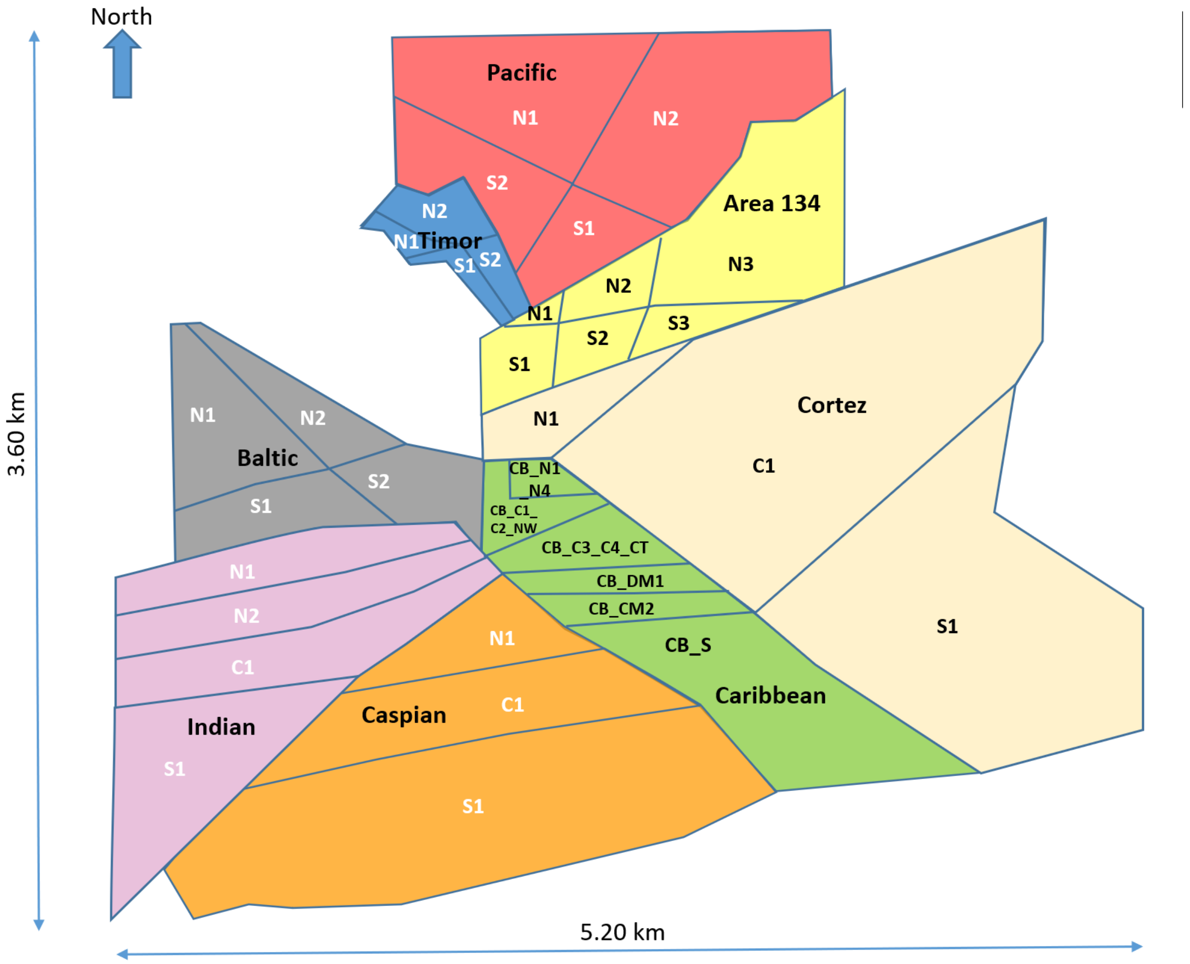
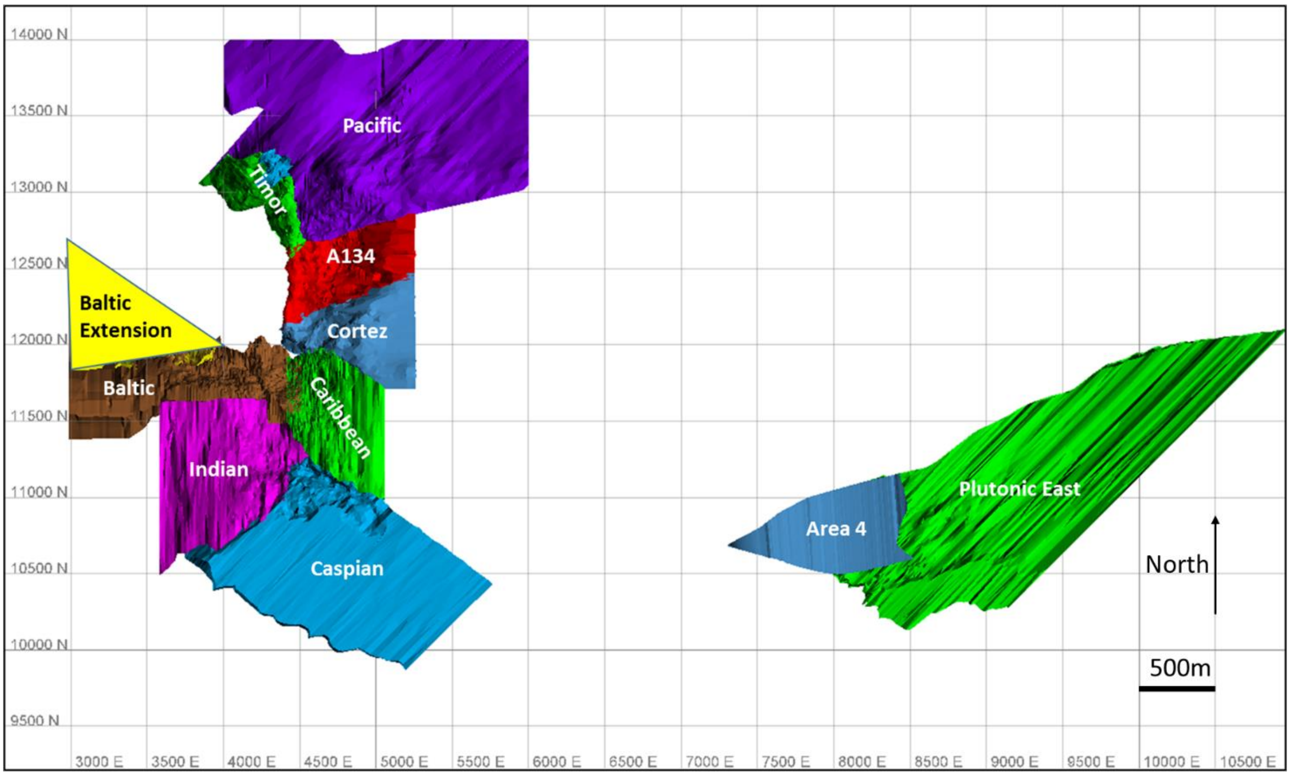


Figure 14-2 Plutonic Mine Resource Area Location Plan (Local Mine Grid) As Used in 2019 Resource Estimation and Reporting.



14.4 Open Pit Resource Models

Previous Open Pit Resource estimates as at December 31, 2019 were restricted to those deposit areas recently operated or updated. The largest of these Mineral Resources (Indicated and Inferred category) were reported from the Hermes Area and the Wilgeena deposit (‘also known as the Hermes South Area). A small Inferred Resource was also reported for open pit material within Plutonic operations areas referred to as Area 4 and Perch. The historically operated Plutonic Main Open Pit area ceased operation in 2005 and had not been considered for any resource re-estimation since that time mainly due to economic conditions. Whilst the Plutonic Main Pit produced approximately 2.5 million ounces, the majority of gold production since 2005 has been focused on the underground areas within the vicinity of this Open Pit area.

14.4.1 Plutonic Main Pit Resource Area and PEA Study.

A Preliminary Economic Assessment (PEA) study for the Plutonic Main Pit area has now been completed. Commencing in September 2020, RPM Global completed a PEA of a push-back of the Plutonic Main Pit. The PEA investigated a range of possible operational and economic aspects with a view to developing a significant pit ‘push-back’ to be supported by current higher gold prices. The favourable economic conditions allow Superior Gold to better utilize the existing Plutonic Gold Operations infrastructure.

The PEA is preliminary in nature and includes Inferred Mineral Resources which are too speculative geologically to have the economic considerations applied to them and therefore cannot be classified as Mineral Reserves. As cautionary note, there is no certainty that all of the PEA outcomes or findings will be realized since the demonstrated economic viability of mining and processing of certain parts of the mineralized resources may not allow the definition of mineralized reserves. Further detailed studies are still required to optimizing the interaction between the potential production from the open pit operations and the existing underground operations aimed to maximize gold production and value to the company.

14.4.2 Plutonic Main Pit Resource Area Resource Estimation.

Due to the historical nature of much of the Plutonic Main Pit information, a current single resource model, covering the entire Main Pit area and focused on near surface drilling and geological interpretation was not readily available for the PEA. However, a series of four (4) Underground Resource models of recent origin and historic Open Pit information, including from the 'Workshop' pit area were available that cover the Main Pit push-back. These model areas have been combined to amalgamate into a new Plutonic Main Pit Area Block Model. The model referred to as Underground models do have an area of coverage extending up to the current topographic surface. The amalgamation of all models required some small changes of underlying original block size ('re-blocking') in order to convert them into to the new 'combined' global Plutonic Main Pit model. As such there were some changes in the reported 're-blocked' model gold ounces but these were in the order of less than 1% in most areas.

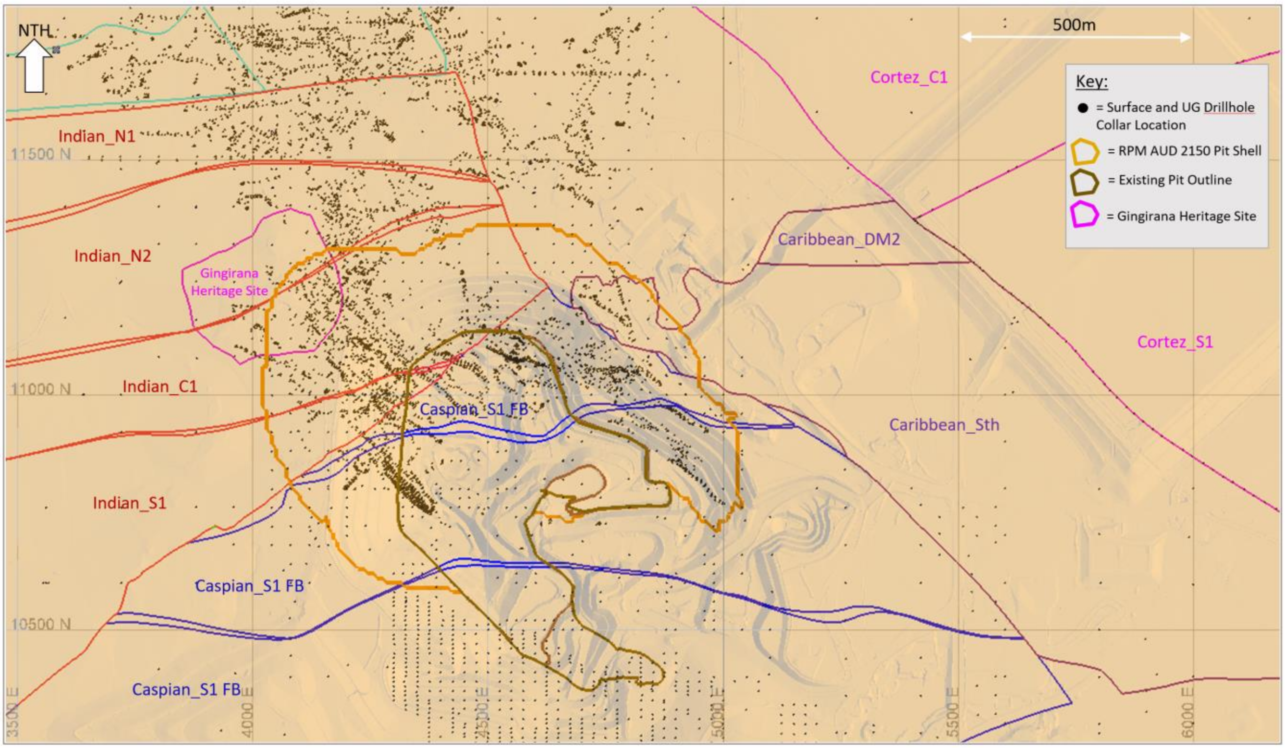
The four Underground Block models and one Workshop Pit surface block model were amalgamated into the Plutonic Main Pit combined model were:

Indian	- ID-C1 - ID-S1
Caspian	- CS-1
Caribbean	- CB-1
Workshop Model	- WS-1

The workshop surface model was considered preliminary in nature at the commencement of the PEA study as the historic surface drilling as well as the more recent resource drilling (underground) needed to be comprehensively amalgamated into an up-to-date model. Previous historic modelling did not capture many of the previously overlooked low grade mineralization zones as they were not considered prospective given the gold price utilized at the time.

Figure 14-3 below describes the location and coverage of the underlying Underground resource block models covering the Plutonic Main Pit area that were amalgamated to produce the new Main Pit 'combined' resource model used for Open Pit Resource estimation and subsequent economic analysis.

Figure 14-3 Plan View – Plutonic main Open Cut Pit Area and underlying Underground Resource Models Areas and Relevant Fault Blocks (sliced at 1405m RL) with Preliminary Optimized Resource Pit Shell based on Gold Price A$2,150



14.4.3 Plutonic Main Pit Optimization Input Parameters For Resource Estimation.

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 14-2 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 14-2 Summary of Parameters and Assumptions used for Preliminary Pit Optimization and Resource Reporting.

Description	Units	Amount / Level
Gold Price	A$/oz	2,150
ROM Grade	Au (g/t)	0.50
Incr. Ore Mining Cost	A$/t ROM	1.40
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%

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

The Plutonic Main Pit resources were reported at a 0.4g Au/t cut-off grade following preliminary pit optimization and also according to block model sub-area as presented in Table 14-3 below.

Table 14-3 Plutonic Main Pit Resource Summary According To Model Sub-Area Designation – Reporting Cut-Off at 0.40g Au/t.

Areas	Measured (at 0.4 g Au/t)			Indicated (at 0.4 g Au/t)			Meas + Ind (at 0.4 g Au/t)			Inferred (at 0.4 g Au/t)		
	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)
Workshop Area	28,400	2.20	2,000	507,300	1.40	22,570	535,800	1.40	24,570	269,500	1.60	14,210
Caspian-WS	1,352,100	3.40	146,290	1,811,000	2.20	126,320	3,163,200	2.70	272,600	7,004,200	2.00	451,950
Caribbean	0	0.00	0	643,600	1.30	26,810	643,600	1.30	26,810	234,200	0.90	6,640
Indian	262,000	6.90	58,270	366,300	4.70	55,300	628,300	5.60	113,570	158,500	*3.00*	15,120
Total	**1,642,500**	***3.90***	**206,560**	**3,328,200**	***2.20***	**230,990**	**4,970,800**	***2.70***	**437,500**	**7,666,300**	***2.00***	**487,920**

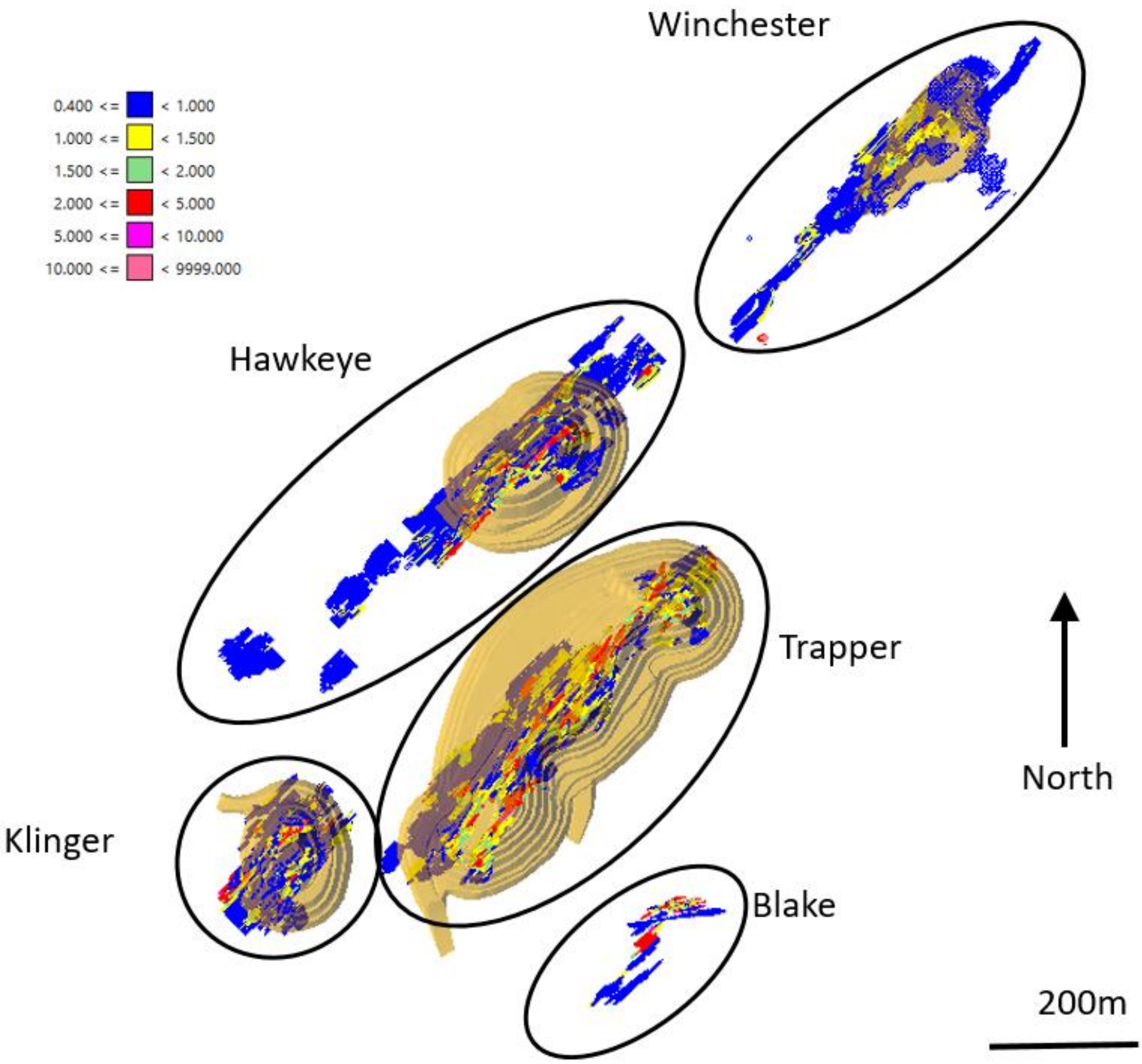
** Rounding errors exist in this table and number may not add correctly.*

14.4.5 Hermes and Wilgena Open Cut Pit Resource Areas.

At the Hermes Open Pit area, the Resource block model constructed in July 2018 was used for estimating remaining Resources. Mining ceased at this area in May 2019 and it was updated and depleted with grade control models information at that time. All remaining material in the models were depleted as at December 31, 2019 and this was used to define remnant Resources according to the new generalized pit optimizations

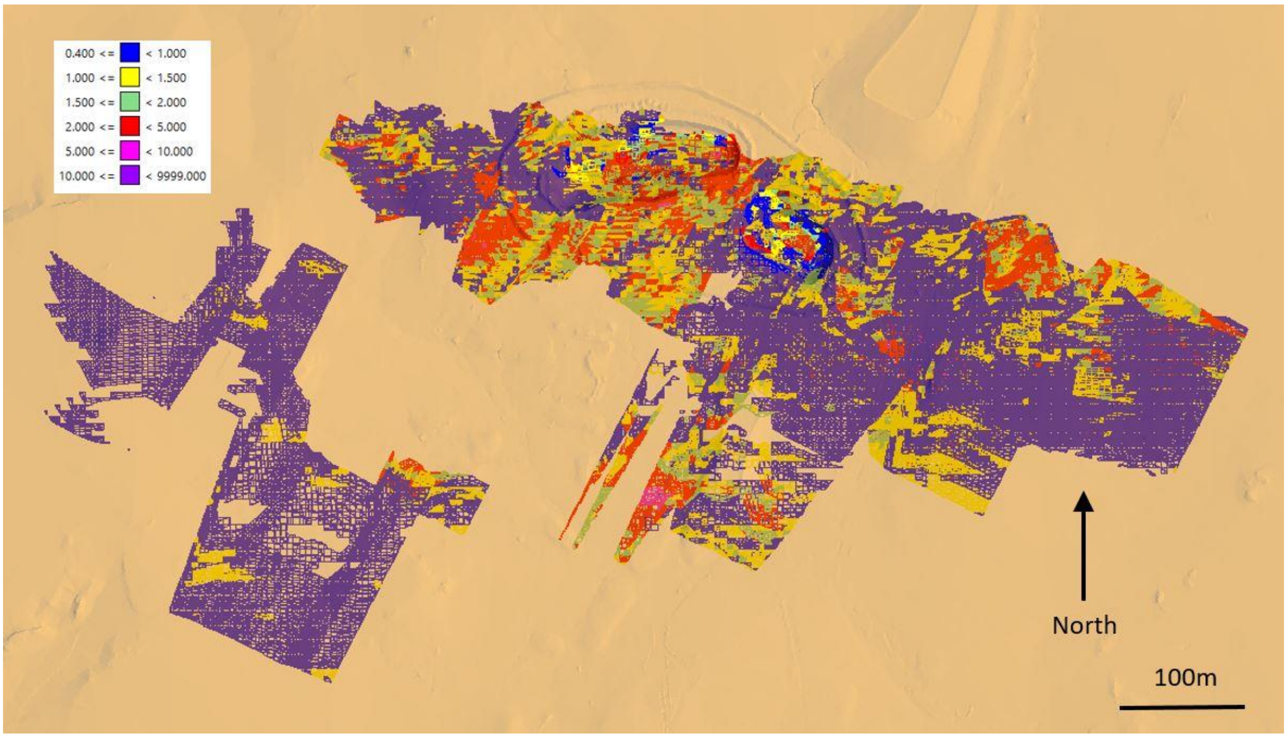
In summary, mining from December 31, 2018 until May 31, 2019 at the Hermes Project area, material was mined from the Hawkeye, Trapper and Winchester deposit areas for a combined total of 69,273t @ 1.04g/t for 23,246Oz. Figure 14-4 below is a plan view schematic showing remaining +0.4g Au/t mineralization (below pit surfaces) and describes the general Resource geometry present at Hermes.

Figure 14-4 Hermes Resource model (depleted) >0.4g/t with current pit surfaces.



At Wilgeena, the project area is subject to farm-in and joint venture arrangement with Billabong Gold Pty Ltd ("Billabong Gold JV" - subsidiary of Superior Gold Inc. and Alchemy Resources Ltd). The terms of the Billabong Gold JV require that Alchemy's interest is carried on an interest-free deferred basis to production, with Alchemy to repay the deferred amount from 50% of its share of free cash flow from production following the commencement of mining. The project is located approximately 20km south-southwest of the Hermes mining operation, and 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 Resource. Figure 14-5 below describes the general Resource geometry present at Wilgeena.

Figure 14-5 Wilgeena Resource model showing >0.4g/t with current pit surface.



14.5 Plutonic Mineral Resource Models Pit Resource Underground Block Models

The Plutonic Mineral Resource estimates were reported from a combination of mainly updated block models (2019), new block models (2020) and some old block models (2015-2019). The different generation of Resource block model used are summarised in Table 14-2 below.

Table 14-2 Block Model Summary as used for Resource Estimation and Reporting as at December 31, 2019

Parameter	Fault Block / Model Area	Model Generation ('New / Old')	New 'Lode Constrained' Wire-Frame Model	Block Model Construction Detail			
				Face Samples Used Model Development	Interpolation Method	Iso-Surface Folding Guided Search	Date Completed / Revised
Underground							
Timor	**TM**_N1	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
	TM_N2	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
	TM_S1	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
	TM_S2	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
Caspian *	**CS**	Updated 2019	No	Yes	Inverse Distance(2)	No	April-2020
Caribbean	CB	Updated 2019	Yes	No	Ordinary Kriging	No	Nov-2019
Baltic	**BA**_N1-N2	New 2020	Yes	Yes	Ordinary Kriging	Yes	March-2020
	BA_S1	New 2020	Yes	Yes	Ordinary Kriging	Yes	April-2020
	BA_S2	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
Indian	**ID**_C1	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
	ID_N1	New 2020	Yes	Yes	Ordinary Kriging	Yes	April-2020
	ID_N2	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
	ID_S1	New 2020	Yes	Yes	Ordinary Kriging	Yes	May-2020
Cortez *	**CT**	Updated 2019	No	Yes	Inverse Distance(2)	No	March-2020
Pacific *	PA	Updated 2019	No	Yes	Inverse Distance(2)	No	April-2020
Area 134	A134	Updated 2020	Yes	No	Ordinary Kriging	No	May-2020
Plutonic East	PE	Old 2019	No	No	Inverse Distance(2)	No	Jun-2019
Plutonic West	PW	Old 2019	No	No	Inverse Distance(2)	No	Jun-2019
Open Pit Areas							
Plutonic Main Pit	ID-C1, ID-S1, CS-1, CB-1 & WS-1	New 2020	Yes		Plutonic Main Pit	ID-C1, ID-S1, CS-1, CB-1 & WS-1	New 2020
Hermes	Hermes	Old 2019	Yes	N.A.	Ordinary Kriging	Yes	Feb-2020
Hermes South (80% JV)	Hermes South	Old 2019	Yes	N.A.	Ordinary Kriging	No	Mar-2020
Area 4	Area 4	Old 2019	Yes	N.A.	Ordinary Kriging	No	Dec-2019
Perch	Perch	Old 2019	Yes	N.A.	Ordinary Kriging	No	Dec-2019

14.5.1 Plutonic Underground Resource Models.

The process used for the majority of previous Resource estimates at the Plutonic Gold Mine Operations used Mineral Resource model generation methods that were standardised where possible in the majority of areas.

It was initially planned that all deposit areas were to be re-modelled using the wire-frame lode constrained approach, however, due to time and Resource geology team personnel constraints only the Timor, Indian, Baltic, A134 and Caribbean areas were updated in this manner. The Caspian, Cortez and Pacific area models were not updated using the constrained lode approach at this time. Instead, the Pre-existing (~2015) models were retained and where necessary were subject to a Resource depletion process using mining volume (as-built) subtraction after any new PBM or MRM models with new local Resource estimation information for those areas was 'pressed in'. Similarly, the previous Plutonic East and Plutonic West models were also retained. These models are essentially unchanged from 2019 and were used for re-reporting of the remaining Resources with a 1.5g Au/t reporting cut-off as compared to a 2.0g Au/t used in 2019.

The updated models for A134 and Caribbean models used oriented search ellipsoid orientation parameters on a deposit area domain basis.

The block model interpolation process at Timor, Indian and Baltic used a more refined 'dynamic' search guided by a set of tetra-surfaces assigned mostly on a lode by lode basis of by lode group if the mineralization geometry was variable or more complex. Composited and samples used for interpolation were both from Resource drilling (diamond core) and also face samples that were captured within the constraining wireframes or in close proximity to them accordingly.

A range of top-cuts were applied to outlier sample and composite grades to help mitigate any inadvertent high-grade model blocks and thereby help control reported Au metal content in localized areas. Due to the different grade populations present within the Resource drilling dataset as compared to the faces sample database a separate upper grade cut regime for applied by the Resource drilling team to outlier grades prior to block model interpolation. The outlier cut level was determined by probability plot and disintegration analysis on a lode by lode or lode group basis and was generally aligned to a 99.5th percentile level. Table 14-3 below describes the ranges of outlier cut-off levels used for Resource drilling and face sampling data in each fault block model area.

Table 14-3 - Underground Resources - Au Top-Cut Regime Used in Block Model Interpolation (Au g/t)

Deposit Area	Fault Block Sub-Area	Resource Drill Sample Top Cut (All Lodes) - Au g/t				Face Sample Top Cut (All Lodes) – Au g/t			
		Min	Max	Mean	Median	Min	Max	Mean	Median
Timor	**TM**_N1	140.0	140.0	140.0	140.0	510.0	510.0	510.0	510.0
	TM_N2	105.0	105.0	105.0	105.0	580.0	580.0	580.0	580.0
	TM_S1	110.0	110.0	110.0	110.0	1250.0	1250.0	1250.0	1250.0
	TM_S2	150.0	150.0	150.0	150.0	1150.0	1150.0	1150.0	1150.0
Caspian *	**CS**	45.0	45.0	45.0	45.0	N.A.	N.A.	N.A.	N.A.
Caribbean	CB	0.4	60.0	7.0	5.1	0.4	60.0	7.0	5.1
Baltic	**BA**_N1-N2	10.0	30.0	16.7	15.5	10.0	30.0	16.7	15.5
	BA_S1	1.5	70.0	14.3	7.5	1.5	70.0	14.3	7.5
	BA_S2	110.0	110.0	110.0	110.0	720.0	720.0	720.0	720.0
Indian	**ID**_C1	93.0	93.0	93.0	93.0	310.0	310.0	310.0	310.0
	ID_N1	18.0	80.0	39.1	40.0	18.0	80.0	39.1	40.0
	ID_N2	1.3	250.0	39.8	26.0	1.3	250.0	39.8	26.0
	ID_S1	3.0	25.0	9.3	8.0	3.0	25.0	9.3	8.0
Cortez *	**CT**	100.0	100.0	100.0	100.0	500.00	500.00	500.00	500.00
Pacific *	PA	4.0	80.0	33.7	35.0	4.0	80.0	33.7	35.0
Area 134	A134	0.8	50.0	11.8	10.0	0.8	50.0	11.8	10.0
Plutonic East	PE	120.0	120.0	120.0	120.0	850.0	850.0	850.0	850.0
Plutonic West	PW	1.2	11	6,1	6.6	N.A.	N.A.	N.A.	N.A.

* Previous 'Open Block Models'

The grade top-cuts as described in this table were used to process the available datasets to set up as a 'parallel' database item for block model interpolation. This database combined the Resource drilling dataset and also face sample database in order to run final block model interpolation as effectively a second 'overprint' run. The use of the underground development and stope face sampling assay data is intended to refine and assist with better local mineralization volume and grade estimation.

Bulk density assignment to each block model was essentially the same as that used for Resource reporting in 2019. All underground Resource model areas used a default bulk density of 2.9 tonnes / cubic metre with the exception of Plutonic East with retained the previously assigned bulk density of 2.8 tonnes / cubic metre. Bulk density assignment variations were applied to any relevant 'near surface' material at Plutonic and also at the Hermes and Wilgeena deposit areas as was assigned according to broad material type characteristics of 'Laterite', Oxide, Transition and Fresh material. These locally specific details are further described in the additional model description sections below.

Following interpolation, all newly constructed Resource models underwent a Resource classification process on a block basis using a standardized Resource classification script. The classification process coded a 'rescat' item in each block model that was used for guidance decisions towards final reporting of Resources. The 'rescat' model item had allowable integer values of 1, 2 and 3 which nominally represented initial candidate material in the block model may then be further modified to arrive at classified and reported Resources in the categories of 'Measured', Indicated and 'Inferred' respectively. Additional 'rescat' values of 0 or 4 were assigned for material that was deemed unclassified or of low estimation confidence. The Resource classification for the block models that were retained from 2019, specifically Caspian, Cortez and Pacific remained 'as is' and unchanged.

The classification coding method used a block coding script using a calculated distance / confidence item (normalized to 1) derived from composites distances within interpolation searches and coded to the block model during interpolation. The 'rescat' item process is basically formulated as follows:

if dist-conf >= 1 then rescat = 1

if dist-conf >= 0.57 and dist_conf_au < 1 then rescat = 2

if dist-conf_au >= 0.04 and dist-conf_au < 0.57 then rescat = 3

if dist-conf_au >= 0.00 and dist-conf < 0.04 then rescat = 4

Once classification was completed, material that has been mined from each deposit area was 'removed' or depleted from each block model using 'as-built underground survey volumes (Vulcan Tri-Blocking). The process involved writing a mined or un-mined integer code of '0' or '1' accordingly.

Following classification and mining depletion of the new Resource models, all models underwent a validation process and internal peer review by members of the Plutonic Resource geology team and the Qualified Person overseeing Resource reporting. Validation involved visual 'on-screen' checking of composite vs block grade comparison as well as lode basis statistical analysis as well as global trend analysis through the block model.

The new or updated block models after being checked and validated were transferred to Deswik Mining Consultants to carry out a series of stope optimization runs using generalized design and cost parameters aligned with Reserve estimation parameters as a way to rationalize a Resource reporting regime to satisfy the 'reasonable expectation of mining' Resource reporting requirement.

Table 14-4 below is a summary of the main design parameters used for Long Hole and Air-Leg optimization runs.

Table 14-4 Deswik Underground Long Hole and Air-Leg Stope Optimization Parameters

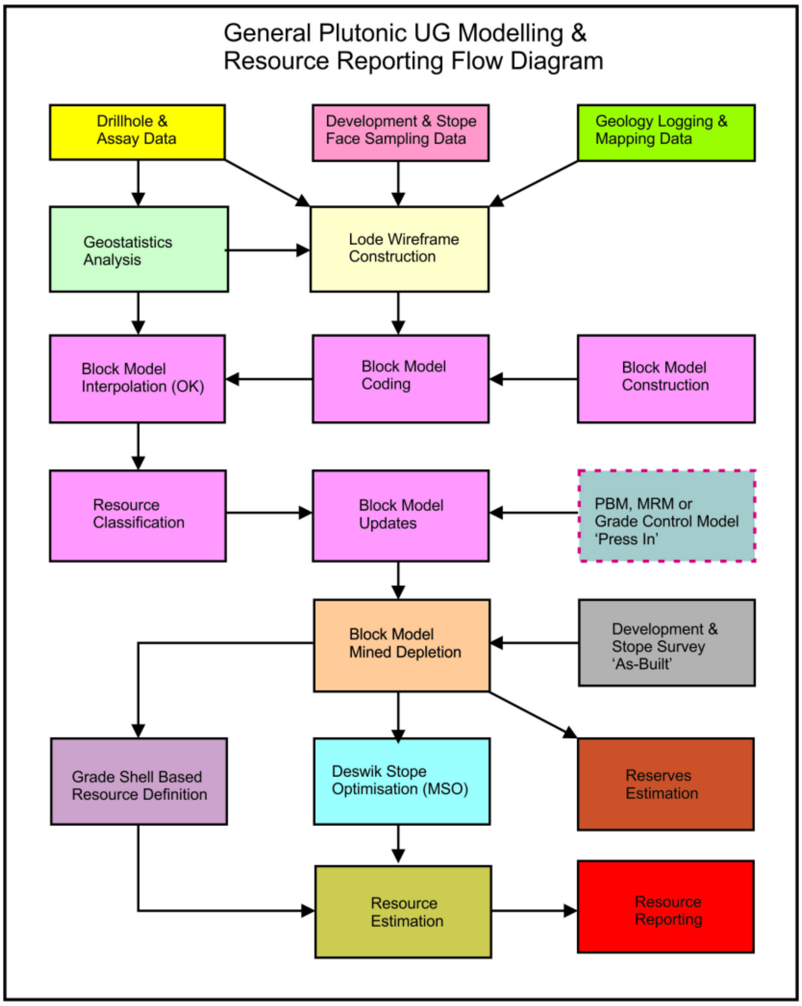
Parameter	Long Hole Stopes	Air-Leg Stopes
Gold Price	A$2150	A$2150
Cut-Off Grade	1.5g Au/t	1.5g Au/t
Orientation	Vertical	Horizontal
Min Mining Width	2.3m	1.8m
Max Mining Width	20m	3.5m
Min FW/HW dip	40 deg	-30 deg
Section Strike Length	10m	10m
Vertical sub-level	15m	10m
Min Pillar between stopes	0m	0m
Sub-Stoping (Vertical)	50%	N.A.
Sub-Stoping (Horizontal)	50%	N.A.
Dilution	0m	0m

The output product from these stope optimizations runs were a set of optimized stope wire-frame 'solids'. These stope wireframes were used to code the block models and extract Resource summaries contained within which were consolidated and tabulated for final reporting. Inferred Resources were derived as all remnant 'non-optimized' material, that was not designated as 'Measured' and 'Indicated' material according to the Deswik Optimizations.

14.5.2 Resource Estimation Process

Figure 14-5 below describes the general Plutonic Underground Resource Modelling, Resource Estimation and Reporting process as a schematic flow chart.

Figure 14-5 Plutonic UG – Resource Modelling, Estimation and Reporting process Flow Chart.



Other aspects of the modelling and reporting process are described in the model description sections below. Here described are various combinations of Resource definition considerations that were used to help define the Resource base according to current geological understanding and economic parameters.

Open Pit Resource estimation used similar process to those described for the Plutonic Underground area models, Table 14-8 in subsequent sections summarise of the Hermes, Wilgeena (Hermes South) and Plutonic Open Pit Resources.

14.6 Incorporation of PBM and MRM models

Information from PBM and MRM models that were generated and used for mine planning production from localized areas were used to update the Resource models and were incorporated into either the pre-existing or new Fault Block models as necessary to help improve the accuracy of Resource estimation. The contents of these models were 'copied across' or 'pressed in' to the new or old Resource models as a part of frequent updating of information for all operating mine areas. These grade control models were generated using a very similar process to that used for the new 'wire-frame constrained' Resource models although some differences remained such as:

- Grades in both PBM and MRM models were estimated using a 3-pass method of inverse distanced cubed beginning with an initial search of 10mx10mx1m for the major, semi major and minor axes respectively. It was followed by 20mxm20mx2m and 30mx30mx3m searches. If a block was informed during the first pass with a minimum of two samples, it was classified as Measured. If informed in the second pass with a minimum of one sample, it was classified as Indicated. If informed during the third pass with a minimum of one sample, it was classified as Inferred. Uniformed cells were not classified.
- MSOs were not routinely employed to sub-set material for re-classification or reporting as higher estimation confidence areas.

14.6.1 Resource database

AcQuire is the primary diamond drill hole database. All diamond drill information is obtained from this database. 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 is 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 is manually input from hardcopy face sheets that are produced underground. Assay values are exported from here to a corresponding digitised line within Vulcan.

From 2009 until August 2014 a Fusion^{tm} 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.

14.6.2 Geological models

Most of the geological models are constructed to constrain the block model grade estimate and facilitate mine planning using Vulcan™ software. For the new generation of 'wire-frame constrained' models, at the Timor, Indian and Baltic areas Leapfrog Geo™ software was used to develop the mineralization lode wire-frames using the 'vein modelling' tool. For each Resource area, wireframe models are updated for geological features such as the mine mafic, dolerites and faults.

Other data used in the creation of the unfold model surfaces include survey outlines for the longhole and airleg stopes, grade control shapes, structural data collected from un-oriented and oriented drill core samples, and geological mapping from drives. In Vulcan, all wireframe interpretations are completed in cross sections perpendicular to the strike of the orebody. Cross-sections were commonly spaced at 20 m or as close as five metres in areas of closely spaced drilling. The initial polygons and strings generated are linked between adjacent cross-sections to create three dimensional solids and tetra surfaces. All wireframes are then checked to ensure their validity. For the modelling done using Leapfrog, wireframing was carried out using the 'vein modelling tool' for dynamic surface generation by selecting appropriate drilling mineralization intervals in a Leapfrog process called interval 'painting'.

Plutonic is divided into ten Resource zones based on the complexity of the geologic setting. The Resource zones are generally defined by major faults and dolerite dykes. The mine mafic (mineralised unit) is updated for each Resource zone using the most recent drill hole and face sample databases. Where required, Resource zones are sub-divided into smaller domains by local faults or dykes or where there is a major shift in the geological interpretation.

14.6.3 Bulk Density data

Samples (736 in total) weighing between 0.5 kg to 2.0 kg were taken from active mining areas between 1998 and 2007. In 2012 a new program for density sampling measured a further 3,821 samples. Bulk density data is currently collected routinely during drill hole logging.

The samples are first weighed in air and then in water. The following equation was used to derive the bulk density:

Bulk Density = Weight dry / (Weight dry – Weight in water)

Average densities were tabulated for each Resource area and for the mine as a whole. For the purposes of estimating Mineral Resources a global bulk density of 2.9 t/m^3 was applied to all models, with the exception of Plutonic East, which uses 2.8 t/m^3.

14.6.4 Cut-off grades

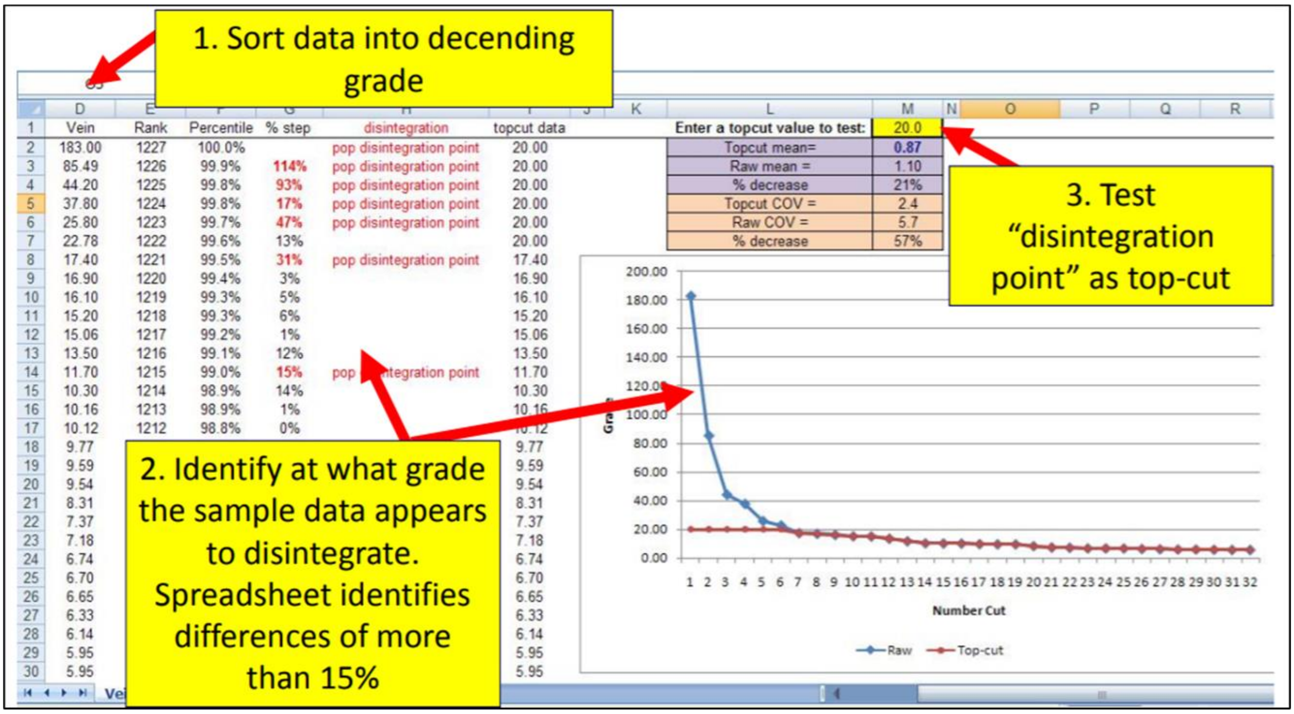
The Resource cut-off grade (RCOG) takes into account the following parameters: gold price, recovery, operating costs and royalties and as such, assuming a gold price of A$2,150 the lower cut-off chosen for reporting of UG Resources in 2020 is 1.5g Au/t which is notably lower than the 2.0g Au/t lower cut-of used in 2019 which was a universal RCOG based on operational performances of 2017 & 2018. In 2019, the majority of Open-Cut Resources were reported at 0.6g Au/t which has now been lowered accordingly to 0.4g Au/t for reporting in 2020.

14.6.5 Composites

The Resource estimation process uses a standardised composite length of either 0.5 or 1 m, which was reviewed statistically before proceeding. It should be noted that the majority of models used 1.0m. The relationship between length and gold grade by sample length is reviewed routinely. Top cutting is undertaken during the compositing process in Vulcan, with high grade samples being cut prior to the composite grade being determined.

The top-cut is determined by initially reviewing the de-surveyed raw sample file in Supervisor and Excel. The proportion of metal and number of samples top-cut are considered and reviewed in detail. Additionally, the entire sample population (Resource drill samples and face samples) or a sub-set according to mineralization lode group are sorted according to population percentile levels and plotted for analysis. Particular attention was given to the Timor, Baltic and Indian areas where separate analysis of the face and ddh samples as separate populations to determine two distinct top-cuts for each data type. By viewing these plots, it is possible to identify where the outlier level becomes a problem by examining the plot curve ‘disintegration point’. This level, for the majority of Plutonic deposits was determined using a nominal 15% step difference threshold limit between cumulative percentile bins. The observed plot usually shows a rapid change in the steepness of the plot curve (at approximately the 99^{th} to 99.5^{th} percentile level) when the numbers of samples affected by any given top-cut level are plotted against the average grade of samples in those upper grade bins. Figure 14-6 below shows a typical analysis of one of the Timor TM_S2 deposit. Using this example, a 20g Au/t cut-off level as this is the level where the ‘percentage step’ between bins began to exceed 15%.

Figure 14-6 Example of Disintegration Analysis for Top-cut Determination for Use in Interpolation within Plutonic UG.



After the top-cut analysis process is completed the top-cut values required for application to block model interpolation are recorded in the estimation log and the report document. Top-cuts are routinely applied during grade estimation of all models to mitigate the over influence of localized high-grade outlier samples.

Un-sampled intervals are assigned a grade of 0.005 g/t Au and missing intervals, being those submitted for analysis but lost in transit or during the assay process, are ignored during the compositing process in Vulcan. Analysis by Optiro (2015) indicated that top-cuts whether they are applied before or after compositing does not have a significant impact on the top-cut grade (from a study carried out relating to the 2014 Caribbean Resource estimate).

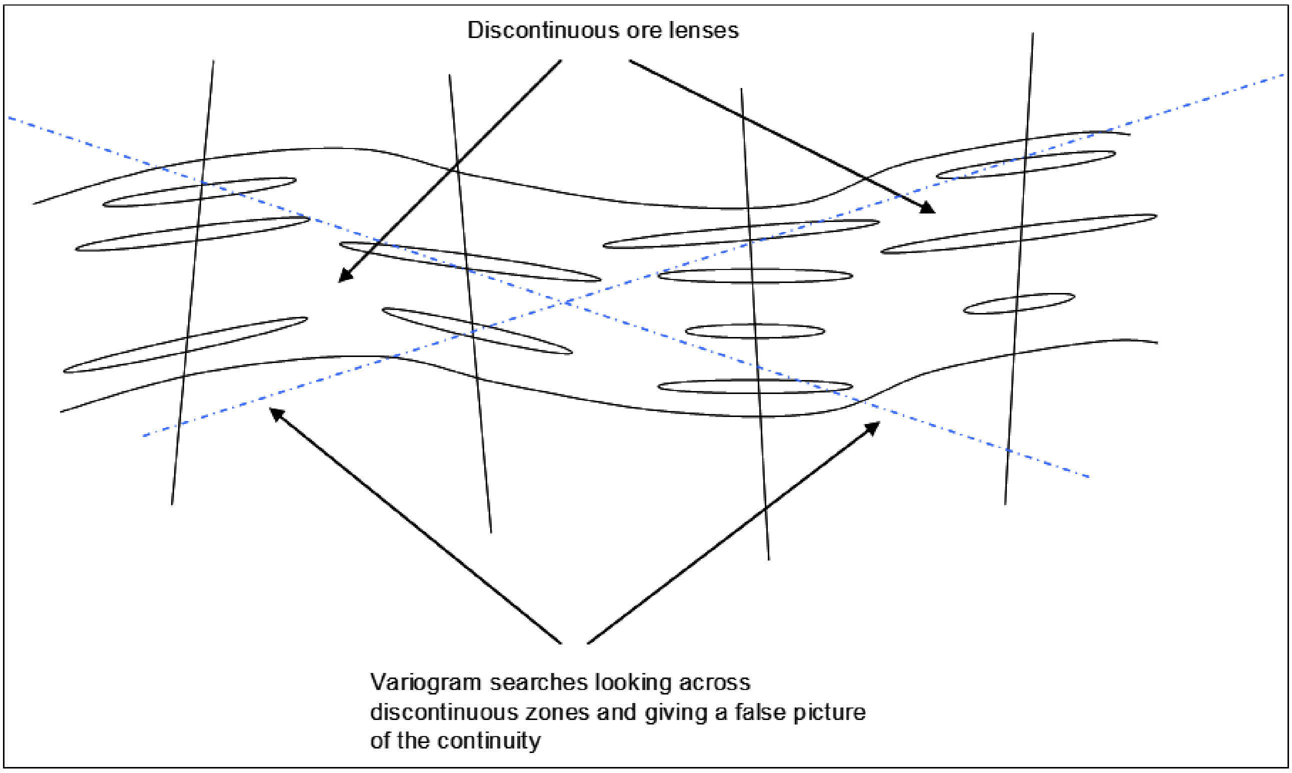
Additional details on the geostatistical aspects considered and applied to the various Plutonic deposit areas models are noted in each separate Resource model description section below (Section 1.4).

14.6.6 Spatial Geostatistics and Variography

The Resource models used for 2019 reporting including the majority of PBM and MRM models used inverse distance weighted interpolation methods. For the new 'constrained' block models constructed and used in 2020 a change to the Ordinary Kriging Interpolation method was implemented. Concerns with the previously used Inverse distance method was that this algorithm (and the arbitrarily chosen inverse distance weighting used) may tend to extrapolate composite grades (including difficulties with handling 'outlier' high grades) a little further than would be expected using the Ordinary Kriging interpolation method. Ordinary Kriging was also chosen as it is commonly used in industry, and is considered a superior interpolation method since the inherent interpolation weighting when using this technique is derived from the spatial statistics (from the semi-variogram) for the particular zone / deposit being modelled.

Interpolation methods aligned with shorter range locally variable mineralization is considered desirable since it is well known throughout the Plutonic Deposits that the geological conditions do not support long search distances that may be inadvertently derived from the variograms. The search distances derived from the variograms were often observed and considered to be too long due to the type of problems illustrated in Figure 14.7 below and may also be caused by a data support effect from the drill-hole grid spacing. Overall, such semi-variograms that are derived and modelled for the majority of the Plutonic Areas are not well structured or considered 'robust'

Figure 14-7 Diagrammatic example of incorrect or misinterpreted continuity analysis.



Instead of variography, lode continuity analysis was undertaken to determine the Indicated and Inferred search distances. This was completed by measuring the actual length of each mapped lode using hard copy plans and sections, and Vulcan digitised lode wireframes within each Resource zone.

The Indicated search distance corresponds to half the length of the cumulative value at the 80th percentile on a probability plot. The Inferred search distances are double the Indicated search distance.

14.7 Resource classification – Previous PBM and MRM Models

For current models (excluding Cortez, Pacific, Caspian), grade estimation is completed using three search sizes and three runs. The grade interpolated during the first search is classified as Measured, blocks interpolated during the second search are classified as Indicated and blocks interpolated during the third search are classified as Inferred.

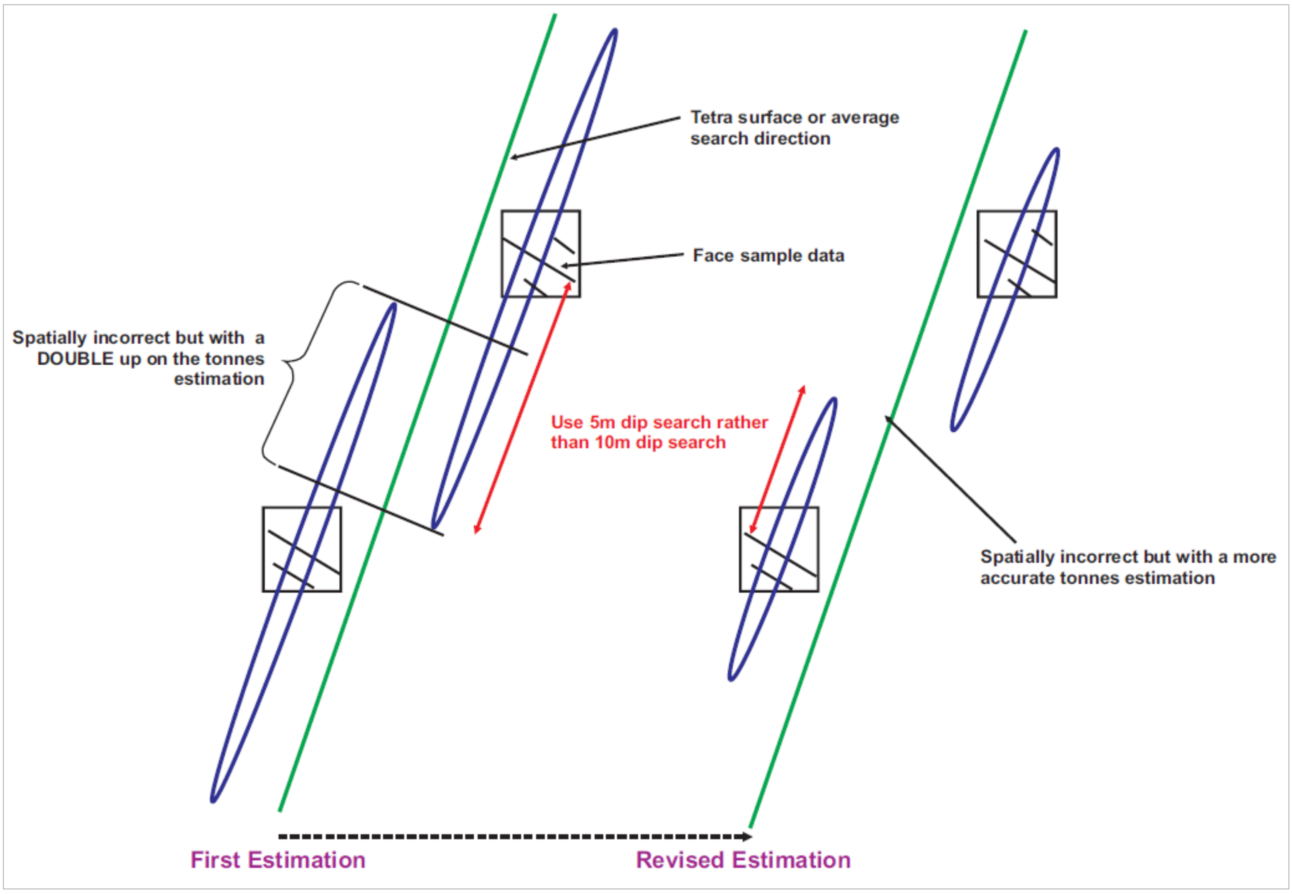
14.7.1 Resource Measured search parameters

In an attempt to restrict the influence of the high-grade face data values in the measured search estimation run, the following search parameters are used:

Horizontal Search: This is restricted to four metres to allow at least two face samples to influence the grade estimation of a block. Previously the horizontal searches were up to ten metres wide; therefore, many blocks outside the lode configuration where sample density is low may in some circumstances not have been optimally estimated.

Dip Search: For each particular sub-domain within the Resource area, the average centre line to centre line between ore development drives was estimated. Half of this average distance is then selected as the lode dip search length. The aim was to estimate all blocks between the drives as Measured. Due to the fact that the lode interpretation is based on a single unfold surface, it was accepted that it is very difficult to ensure the unfold surface informs blocks accurately spatially between every ore drive. Also, it is accepted that by using an average drive spacing distance, minor gaps and overlaps will occur in some parts of the model. By selecting half the determined distance, it is accepted that some spatial inaccuracy will occur, but this is traded off against a good estimation of the tonnes and contained metal. The inaccuracy is corrected at the Measured Resource model stage where actual individual lode wireframes were constructed. The objective of the dip search is shown in Figure 14-8.

Figure 14-8 Measured dip search



Across Strike Search: Depending on local wireframe geometry, this is set to a range of 0.001 - 0.5m, which is the "adjusted minor axis" value, which is essentially the product of the desired minor axis width (m) divided by the distance between the tetra surfaces and is set to match the data composite length and to restrict the tonnage estimate within the lode wireframes.

14.7.2 Indicated search parameters

The Indicated search distance is determined by measuring the length of the individual lodes. This is completed using both hard copy plans of backs mapping or mapping completed digitally using visualisation software. This is done for the main orebody sections. The cumulative value at the 80th percentile was determined and half this length was used as the Indicated search length for the major and semi-major axes. The minor axis, or Z search, retained the 0.001 - 0.5m search in the across strike direction.

14.7.3 Inferred search parameters

The Inferred search was set at double the Indicated search with 0.001 - 0.5m search in the Z direction. Except Baltic Deeps and A4 Resource areas.

14.7.4 Comparison with 2018 Mineral Resource

A comparison between the 31 December 2018 and the 31 December 2019 Mineral Resource is shown in Table 14-7. The comparison shows that approximately 521 Au koz (Measured and Indicated) was added to the 2019 Resource and a further 1526 Au koz added to the Inferred Resource. The key drivers for these gains are a result of reduced lower reporting cut-off grade of 1.5g Au/t and an improved cost structure based on a higher gold price of A$2,150 and also and some replenishing the Resources via additional drilling. This is in conjunction with a reported production of **68,696** Au koz in 2019.

Table 14-7 Plutonic 31 December 2018 Mineral Resource comparison to 31 December 2019 Mineral Resource

	2019 Measured and Indicated			Gold Oz Diff	2019 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	1,249	9.36	376	-96	1,022	6.21	204	-194
Caspian	277	5.84	52	48	95	5.9	18	362
Caribbean	32	6.8	7	93	575	4.99	92	138
Baltic	454	5.55	81	73	781	4.57	115	33
Baltic Extended	237	3.41	26	0	905	3.5	102	0
Indian	304	7.88	77	173	1,335	6.14	264	-34
Cortez	606	4.67	91	29	343	3.83	42	298
Pacific	122	5.61	22	188	682	4.71	103	267
Area 134	1,251	5.4	217	-37	1,030	4.48	148	182
Plutonic East UG and Area 4 UG	-	-	-	50	-	-	-	470
Plutonic West UG	-	-	-	0	122	6.66	26	14
Plutonic Underground total	**4,532**	**6.51**	**949**	**521**	**6,890**	**5.03**	**1114**	**1,526**

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

14.8 Resource Model Detail

14.8.1 Timor, Indian and Baltic Resource Models

The newly developed Timor, Indian, and Baltic Resource models were constructed using a standardized approach. Mineralization lode wire-frames were developed using Leapfrog using known fault block geology information in conjunction with Resource drilling and assay information. These lodes were used to 'constrain' interpolation into the block model during successive interpolation passes. These three models were based on the processes initially set up for A134 and Caribbean areas which here the first models to use the constrained wire-frame lode in conjunction with Ordinary Kriging interpolation methods.

The interpolation process also used 'tetra surfaces' (in Vulcan) on an individual lodes or where necessary lode group basis to optimize the block model interpolation geometry.

A second 'overprint' interpolation series was also added using underground development and stope face sampling assay data assist with better local mineralization volume and grade estimation.

Due to the different grade populations present within the Resource drilling as compared to the faces sample database. A separate upper grade cut regime for face and diamond drill samples was applied to outlier grades prior to block model interpolation. The outlier cut level was determined by probability plot and disintegration analysis on a lode by lode or lode group basis and was generally aligned to a 99.5th percentile level

The estimation process relating to the new Timor, Baltic and Indian Fault Block area block Models is described in the recently adopted Plutonic "Block Modelling Manual" and is summarised in selected steps as follows.

* Assess Block Model 'end user' requirements and the modelling Process flow – including regular back-up of data.

- Set up standardized working directories for modelling, including standardized File Structure and name convention types. Also include provision for 'working locally' on the desktop PC to minimize network congestion.
- Prepare Drill-Hole Data and load to Leapfrog and / or Vulcan as necessary.
- Commence Wireframing process including contingency for wireframe groups if necessary and across Fault block boundaries for continuity.
- Update major geological strings or wireframes for 'Rock Mass' Model to help adjust or modify mineralization wireframes.

- Digitising and Triangulating of tetra surfaces used for guiding the 'un-folding' of : wire-frames during block model interpolation and the 're-folding' resulting interpolated blocks back to the block model in 'true space'
- Selection of drillholes for Sample Compositing ('straight' or 'run-length') including the use of an appropriate ''Au_use Script' to apply high grade 'outlier' cut-off's
- Coding of composites with wire-frames – review geostatistics and sample spatial distribution analysis, including model semi-variograms using Supervisor™ or equivalent.
- Generate Block Model with appropriate block dimensions and block item codes.
- Carry out Block interpolation and Estimation
- Validate Block Model using visual tools, lode by lode comparison of composite versus block grades and / or by using localized 'trend analysis' of composite vs block grades locally.
- Run initial Resource Classification block calculation scripts. Re-classify Resource areas as necessary by using additional 'modifying factors'.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Run classification script and 'press in' PBM and MRM (grade-control) block model information from newly drilled and / or mined areas as necessary.
- Run Deswik Mining Stope Optimizer (MSO) on the final (depleted) block model to generate all potentially mineable shapes based on generalized current operating costs and current Resource cut-off grades.
- Select from resulting MSO shapes for Resource reporting that that have a defined category of Measured, Indicated and / or Inferred.
- Report out MSO defined Resources combining every MSO shape to summarize tonnage, grade, and according to each Resource classification category.
- Use Vulcan 'Advanced Reserves engine' to report Resources by category and Tabulate Resource Volume, Tonnes and Grades at required reporting lower cut-off.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Write up and formalize Resource Reporting – Sent Block Models to Mine Engineering Team and archive Block Model copies for future reference.
- Figure 14-9 to Figure 14-11 below describe the general layout of the Timor, Indian and Baltic block model areas showing the mine 'depleted' 1.5a Au/t 'grade shells' in conjunction with underground development survey 'as-built' information.

Figure 14-9 Timor Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions

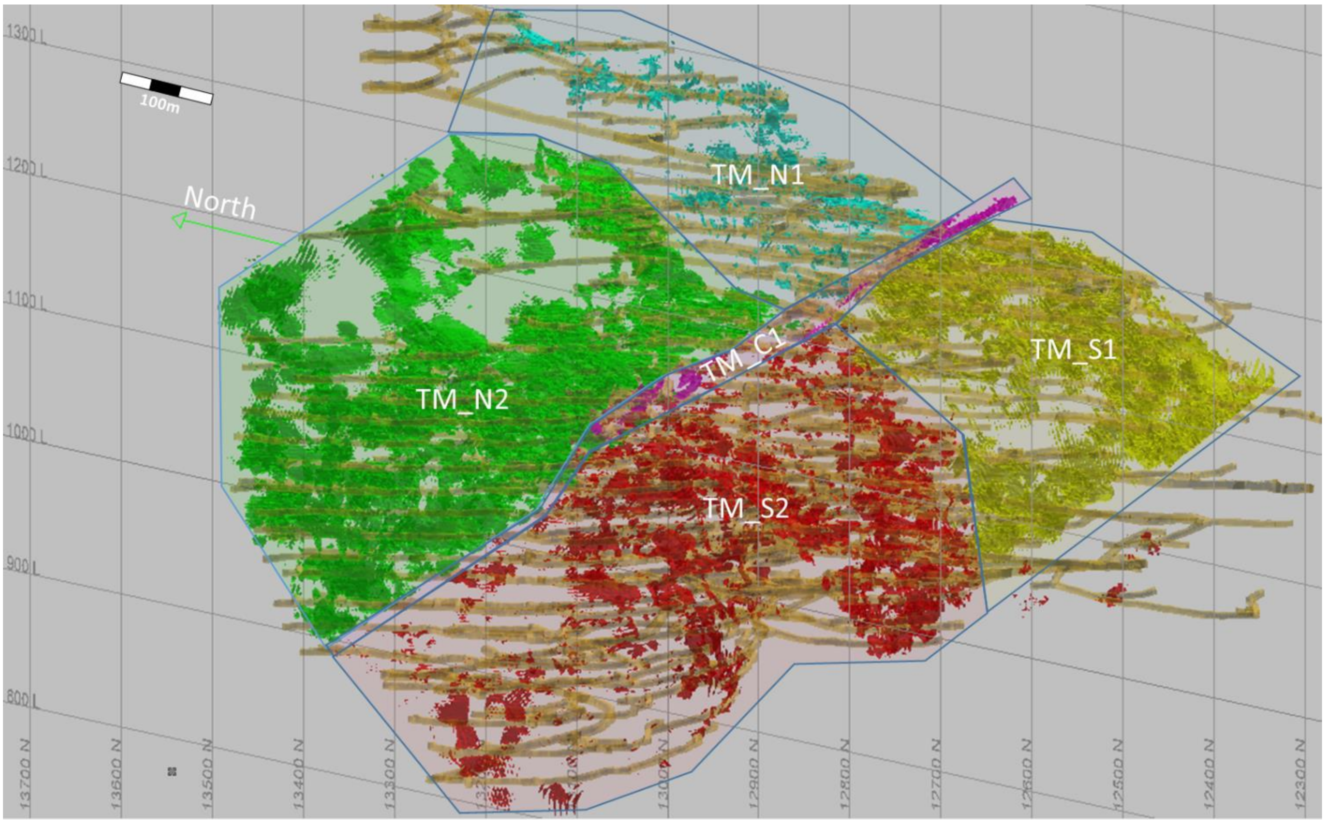


Figure 14-10 Indian Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions

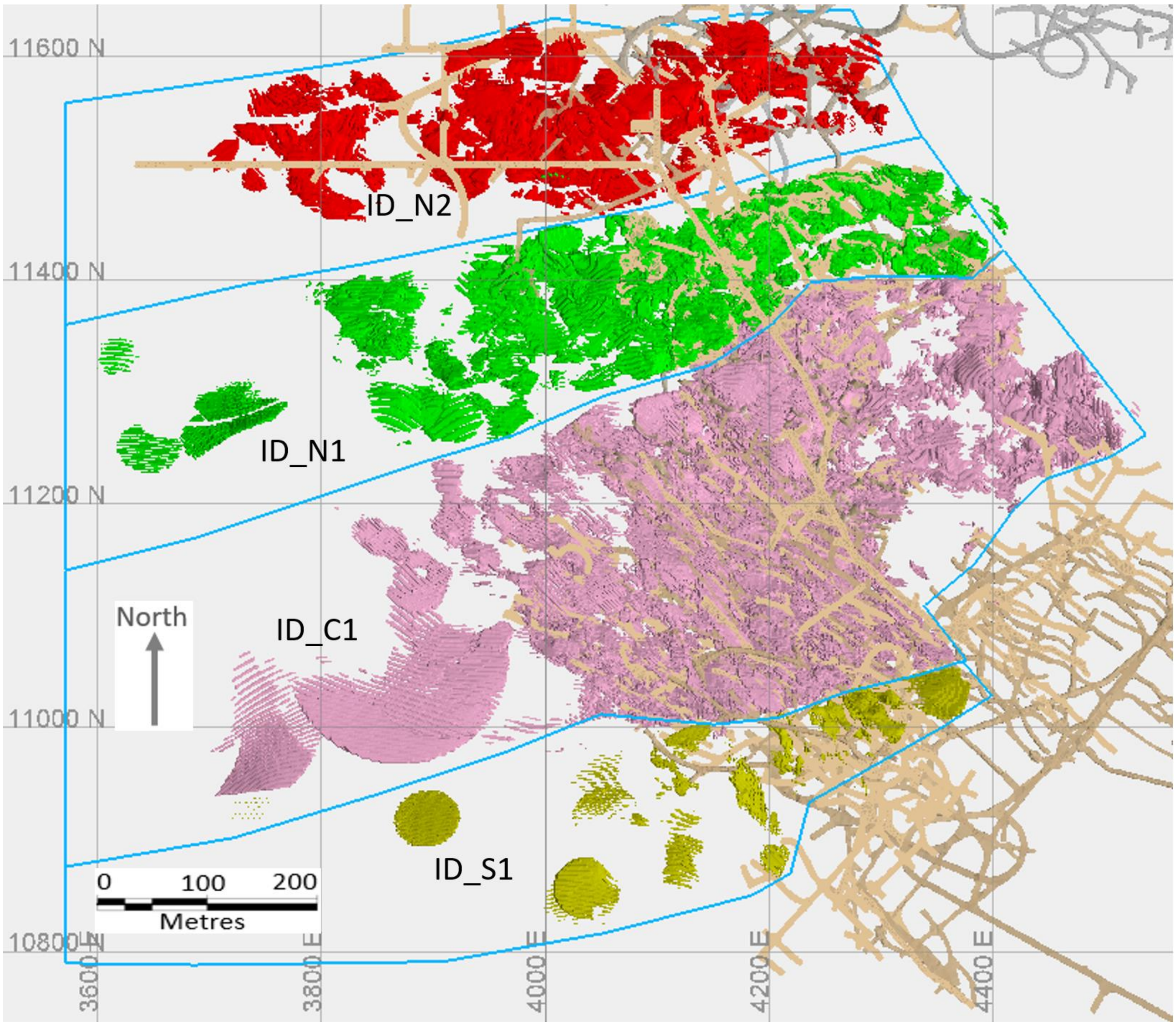


Figure 14-11 Baltic Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions

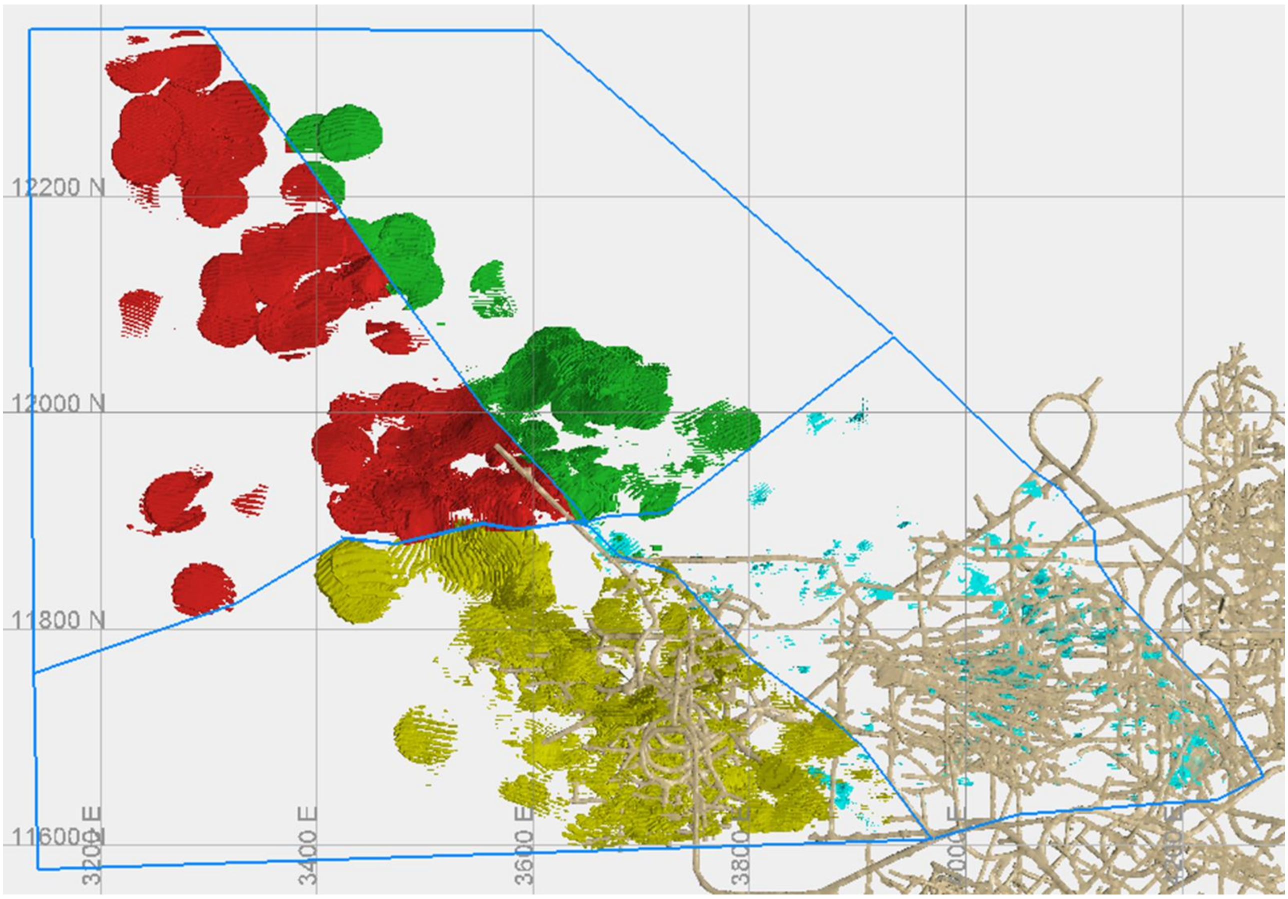


Table 14-8 below describes the main parameters used for Resource block model construction at the Timor, Resource Area.

Table 14-8 – General Resource Model Interpolation Parameters – Timor Area Block Models

Timor (Fault Block Area)	TN_N1	TM_N2	TM_S1	TM_S2
Estimation Type	Ordinary Kriging	Ordinary Kriging	Ordinary Kriging	Ordinary Kriging
Parent Block Size (X,Y,Z)m	2x2x2m	2x2x2m	2x2x2m	2x2x2m
Discretisation (X,Y,Z)	3x3x3	3x3x3	3x3x3	3x3x3
Search Type	ellipsoidal	ellipsoidal	ellipsoidal	ellipsoidal
Search Distances R1 (short)	10x10x1m	10x10x1m	10x10x1m	10x10x1m
Search Distances R2 (medium)	20x20x2m	20x20x2m	20x20x2m	20x20x2m
Search Distances R3 (long)	30x30x3m	30x30x3m	30x30x3m	30x30x3m
Octant Search	Yes	Yes	Yes	Yes
Min No of Samples in Search (R1,R2,R3)	5,5,1	5,5,1	5,5,1	5,5,1
Max No of Samples in Search	30	30	30	30
Max No of Samples per Octant	5	5	5	5
Max Samples per Drill-Hole Allowed	3	3	3	3
Top-Cut Threshold Used	Yes	Yes	Yes	Yes
Face Samples Used in Wire-framing	No	No	No	No
Face Samples Used in Interpolation Runs	Yes	Yes	Yes	Yes

Table 14-9 below describes the main parameters used for Resource block model construction at the Indian, Resource Area.

Table 14-9 – General Resource Model Interpolation Parameters – Indian Area Block Models

Indian (Fault Block Area)	ID_C1	ID_N1	ID_N2	ID_S1
Estimation Type	Ordinary Kriging	Ordinary Kriging	Ordinary Kriging	Ordinary Kriging
Parent Block Size (X,Y,Z)m	2x2x2m	2x2x2m	2x2x2m	2x2x2m
Discretisation (X,Y,Z)	3x3x3	3x3x3	3x3x3	3x3x3
Search Type	ellipsoidal	ellipsoidal	ellipsoidal	ellipsoidal
Search Distances R1 (short)	10x10x1m	10x10x1m	10x10x1m	10x10x1m
Search Distances R2 (medium)	20x20x2m	20x20x2m	20x20x2m	20x20x2m
Search Distances R3 (long)	30x30x3m	30x30x3m	30x30x3m	30x30x3m
Octant Search	Yes	Yes	Yes	Yes
Min No of Samples in Search (R1,R2,R3)	5,5,1	5,5,1	5,5,1	5,5,1
Max No of Samples in Search	30	30	30	30
Max No of Samples per Octant	5	5	5	5
Max Samples per Drill-Hole Allowed	3	3	3	3
Top-Cut Threshold Used	Yes	Yes	No	Yes
Face Samples Used in Wire-framing	Yes	Yes	Yes	Yes
Face Samples Used in Interpolation Runs	Yes	Yes	Yes	Yes

Table 14-10 below describes the main parameters used for Resource block model construction at the Baltic, Resource Area.

Table 14-10 – General Resource Model Interpolation Parameters – Baltic Area Block Models

Baltic (Fault Block Area)	BA_N1&N2	BA_S2
Estimation Type	Ordinary Kriging	Ordinary Kriging
Parent Block Size (X,Y,Z)m	2x2x2m	2x2x2m
Discretisation (X,Y,Z)	3x3x3	3x3x3
Search Type	ellipsoidal	ellipsoidal
Search Distances R1 (short)	10x10x1m	10x10x1m
Search Distances R2 (medium)	20x20x2m	20x20x2m
Search Distances R3 (long)	30x30x3m	30x30x3m
Octant Search	Yes	Yes
Min No of Samples in Search (R1,R2,R3)	5,5,1	5,5,1
Max No of Samples in Search	30	30
Max No of Samples per Octant	5	5
Max Samples per Drill-Hole Allowed	3	3
Top-Cut Threshold Used	Yes	Yes
Face Samples Used in Wire-framing	No	Yes
Face Samples Used in Interpolation Runs	No	Yes

14.8.2 Cortez, Areas 134 & Plutonic East-Area 4 Underground Resources

Figure 14-12 to Figure 14-14 below describe the general layout of the Cortez, Area 134 and Plutonic East-Area 4 (and Perch Open Cut) block model areas showing the mine 'depleted' 1.5g Au/t 'grade shells' in conjunction with underground development survey 'as-built' information.

Figure 14-12 Cortez Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions

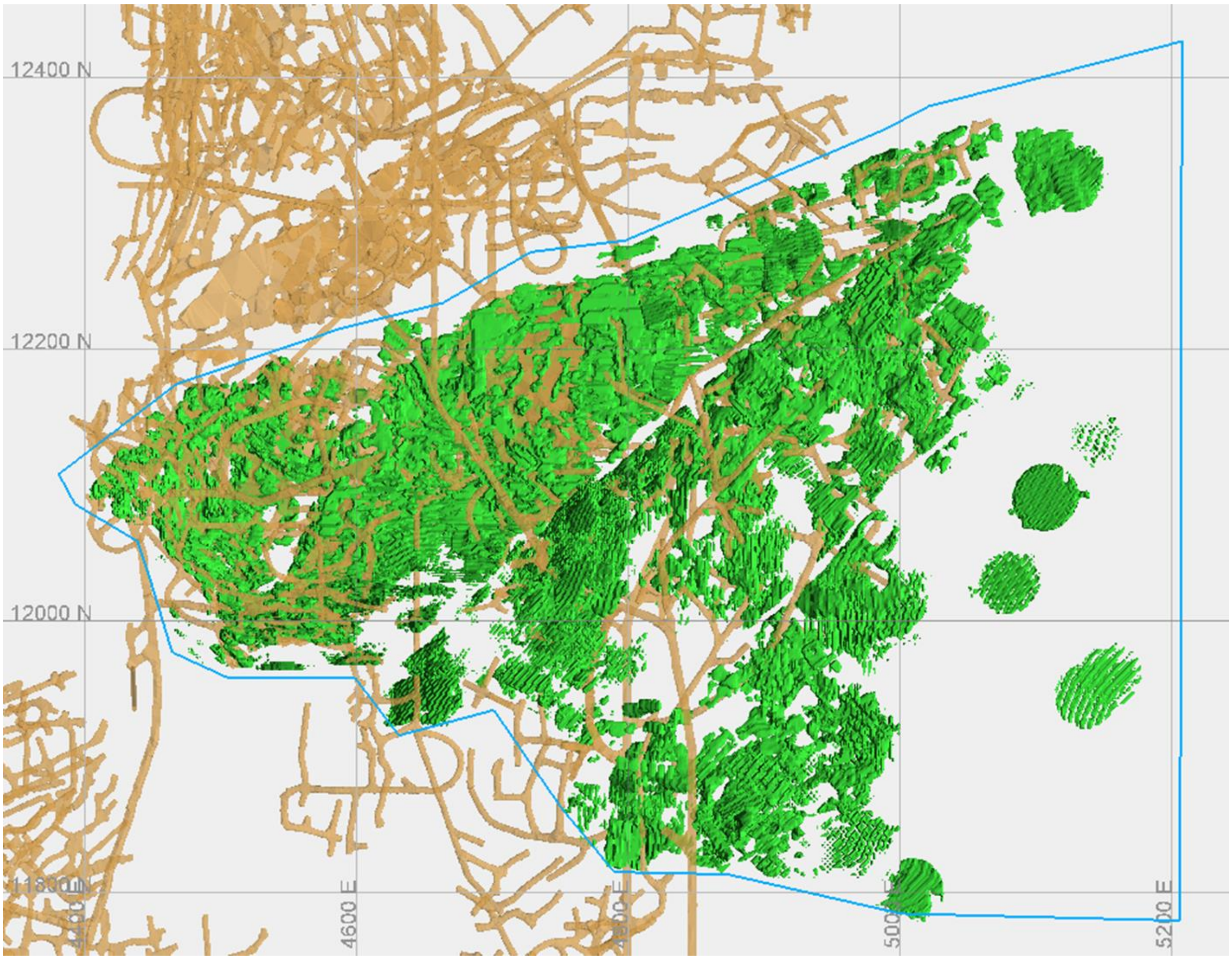


Figure 14-13 Area 134 – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions

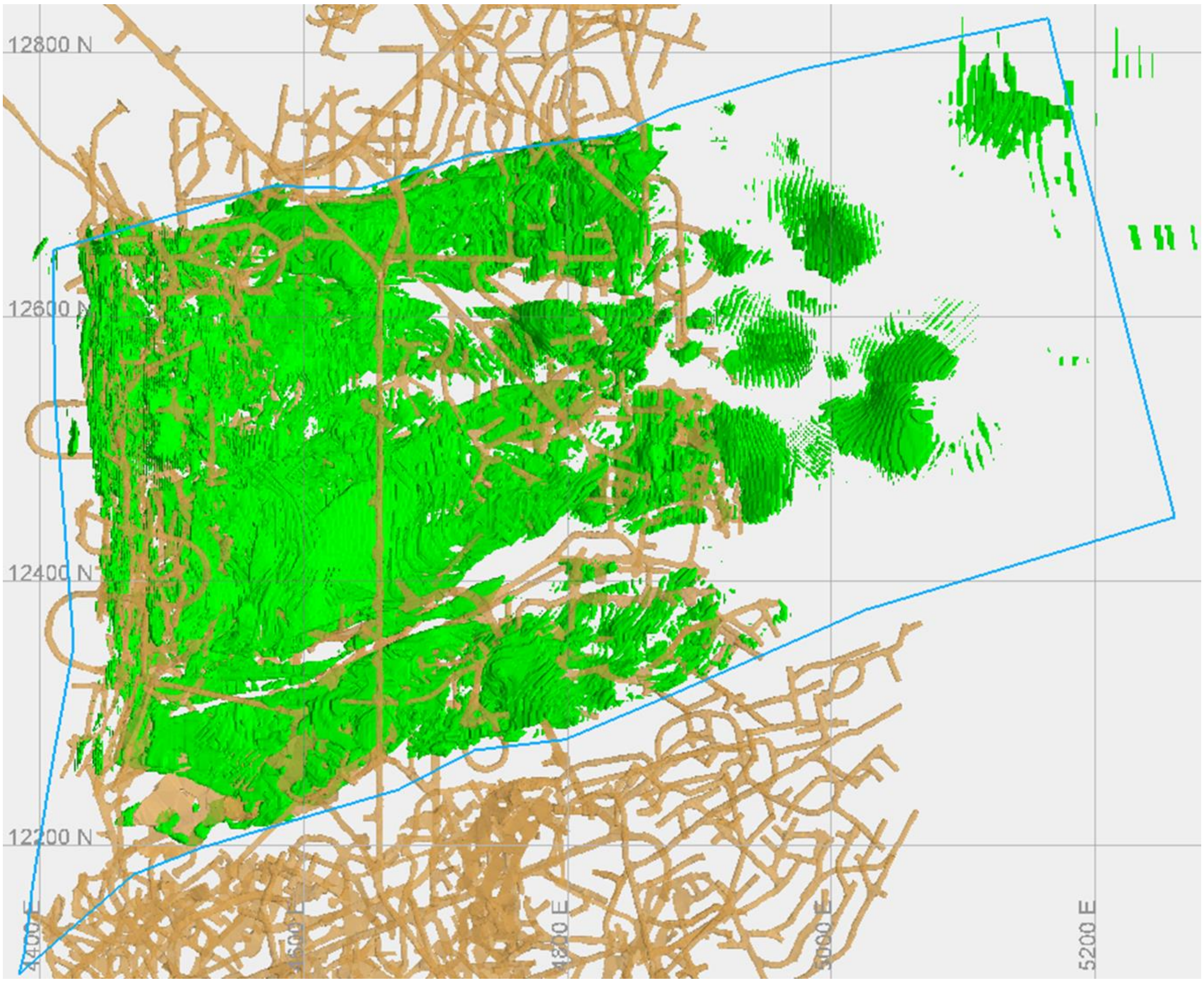
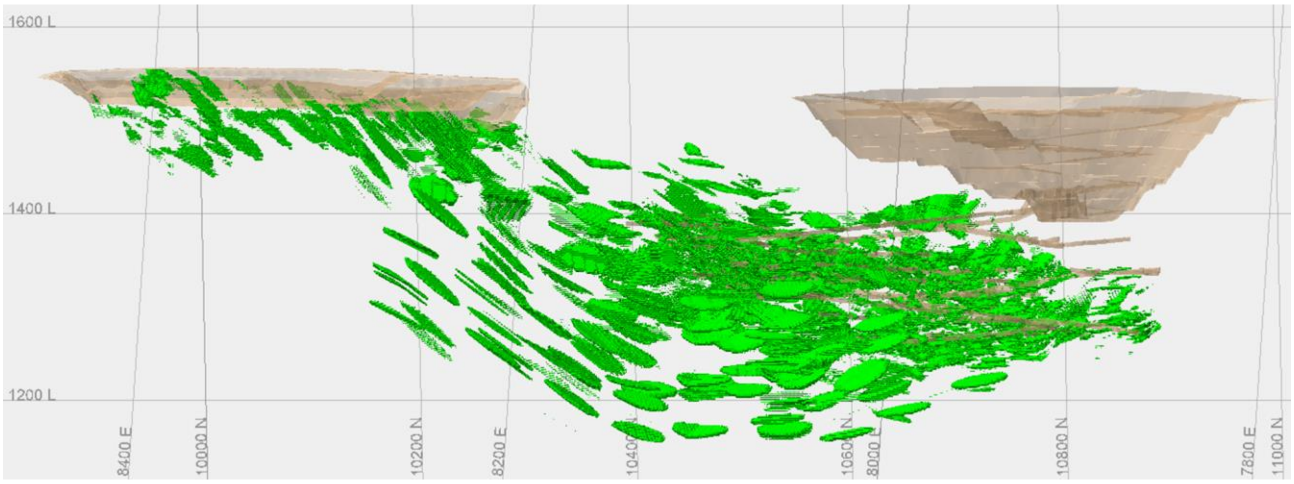


Figure 14-14 Area 4 Underground and Perch (Open Pit) Areas – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions



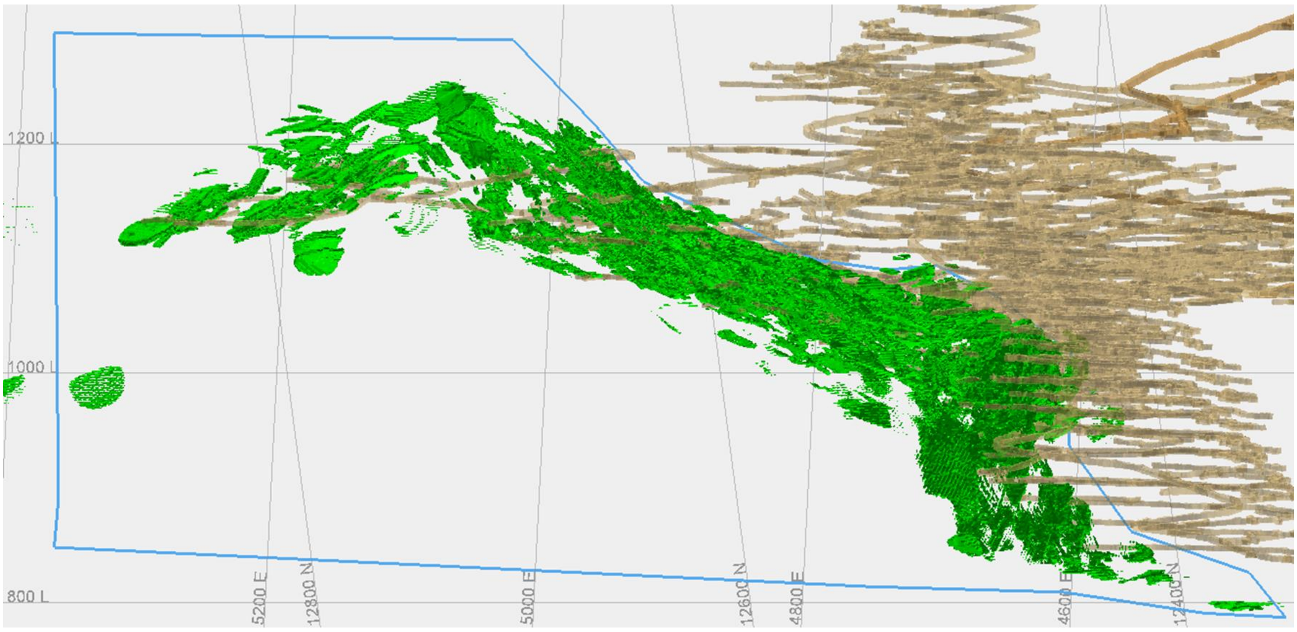
The Resource modelling and estimation process used for the Cortez, Area 134 and Plutonic East-Area 4 (and Perch Open Cut) block model areas is generally described as follows:

- Lithology bounding wireframes were defined (LITH=MineMafic) now called 'Fault Blocks' were sub domained where necessary for structural discontinuities such as dolerite dykes and minor faults.
- Selection of drilling (mine and exploration) and face data (3 different databases) within 'fault block' bounding wireframe.
- Exclusion of all sludge drilling and / or other unvalidated data.
- Import exploration drill holes where relevant.
- Merge all databases together and validate to ensure data integrity and quality.
- Create fields for numeric lithology codes, code for data inside or outside mine mafic rock unit, standardise missing or below detection grades.
- Remove all duplicate face data, face data not inside development wireframes or drill holes with suspect downhole survey data.
- Create straight composite files breaking on geology as domain boundaries (mine mafic).
- Export composite file for statistical assessment based on the grouped lithology field, focused on SCZ (sheared mafic) (100) and MZ (mine mafic) (200) codes.
- Run gold top-cut assessment of composite file by geology and subdomain for drilling and face data.
- Define search orientations, updating and generating unfold surfaces where required for each subdomain.
- Down-hole (length weight) composites to either 0.5 or 1m intervals. Break on geology (mine mafic unit) or domain boundaries retaining residuals and flag against domain boundaries as required.
- Create block model file with a 10 m x 10 m x 10 m parent block (for waste zones) with sub-cells of 2m x 2m x 2m and / or 1m x 1m x 1m for mineralized lodes where necessary.
- Use unfold surface to create grade interpolation within each domain using relevant search distances and 1m x 1m x 1m discretisation.
- Generate background "waste" model which is created and combined with the mineralization model. Cells within the mineralized lodes that are less than 0.3 g/t Au are removed from the reportable mineralization by re-coding as waste, thereby reducing the number of mineralized blocks in the final block model. In some of the initial models at A134 and Caribbean the 'un-estimated' blocks in the mineralized lode domains were re-coded as 0.005g Au/t, however, in the new models, the default block values of (-99) were retained.
- Use current or update oxidation state surfaces are used to code material, in block model for use in bulk density assignment. Any new pit or related surface mine depletions are also removed or flagged out.
- Deplete mined out areas from the block model using Underground Survey (development and stope volumes) with Vulcan 'Triblocking' process and visually checking depletion result is correct.
- Use Vulcan 'Advanced Reserves engine' to report Resources by category and Tabulate Resource Volume, Tonnes and Grades at required reporting lower cut-off.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Run classification script and 'press in' PBM and MRM (grade-control) block model information from newly drilled and / or mined areas as necessary.
- Run Deswik Mining Stope Optimizer (MSO) on the final (depleted) block model to generate all potentially mineable shapes based on generalized current operating costs and current Resource cut-off grades.
- Select from resulting MSO shapes for Resource reporting that that have a defined category of Measured, Indicated and / or Inferred.
- Report out MSO defined Resources combining every MSO shape to summarize tonnage, grade, and according to each Resource classification category.

14.8.3 Pacific Resources

Figure 14-15 below describes the general layout of the Pacific block model area showing the mine 'depleted' 1.5g Au/t 'grade shells' in conjunction with underground development survey 'as-built' information.

Figure 14-15 Pacific Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions



The Pacific, area Resources were estimated using a using an indicator kriging methodology. The process used is summarised below:

- Lithology boundary wireframes (LITH=MineMafic) and sub domain where necessary for structural discontinuities such as dolerite dykes and faults.
- Drilling (mine and exploration) and face data (2 different databases) selected for use in Pacific 'fault block' area, including standardization of treatment of missing or below detection grades.
- Add 2 m buffer intervals to the ends of face samples where Au>0.5ppm to limit spread of grade during estimation.
- Create fields for numeric lithology codes (GRPLTH and GRP2), code for data inside or outside mine mafic rock unit (MMAFLAG) and estimation domain (DOMAIN).
- Generate sample file using the buffered face samples and flag with ORE field based on location and CAPGRP based on spatial distribution and grouped lithology.
- Generate file containing drill hole samples and flag with ORE field based on location and CAPGRP based on spatial distribution and grouped lithology.
- Append face sample and drilling files for use in determining grade capping and analyse gold top-cut assessment on data file by grouped lithology domain and set capped values.
- Generate 1 m composites using the combined capped sample file for use in the high-grade indicator estimation.
- Generate 1 m composites inside quartz veins for use in the low-grade indicator estimation and final grade estimation.
- Generate 1 m composites outside the quartz veins for use in the final grade estimation.
- Define indicator grade thresholds (≥0.3 g/t Au, ≥2 g/t Au and ≥10 g/t Au) and generate appropriate fields in composite file.
- Define search orientations, based on groupings of the estimation domains into packages with similar mineralisation trends. Subdivisions were based on changes in strike and dip.
- Adopt search distances based on lode continuity analysis as variography not robust.
- Create preliminary block model file with a 2 m x 2 m x 2 m block size and run indicator estimations at ≥0.3 g/t Au, ≥2 g/t Au and ≥10 g/t Au using searches of 50 m x 50 m x 2 m and between 3 and 5 composites from at least 3 different drill holes/faces.
- A projection unfold modelling search was used in the western Pacific domains where data was sparse with a search distance set to 100 m x 100 m x 4 m.

- Use blocks with >15% probability at the 0.3 g/t Au indicator level were used to generate low grade wireframe constraints for use in the final grade estimation.
- The final block model was restricted to inside low-grade wireframes (1 m x 1 m x 1 m blocks sub-celled to 0.5 m x 0.5 m x 0.5 m at boundaries).
- For higher grade zones an indicator estimation at ≥10 g/t Au using searches of 50m x 50m x 2m and between 3 and 5 composites from at least 3 different drill holes or faces sample locations.
- Blocks with ≥50% probability at the 10 g/t Au indicator level were used as the basis for the very high-grade indicator zones in the grade estimation.
- The high-grade indicator estimation for ≥2 g/t Au zones used searches of 50 m x 50 m x 2 m with between 3 and 5 composites allowable from at least 3 different drill holes or faces sample locations.
- For all remaining low-grade zones an indicator estimation at ≥0.3 g/t Au used searches of 50 m x 50 m x 2 m with between 5 and 13 composites from at least 3 different drill holes or faces sample locations.
- Back flag composite file with appropriate high- and low-grade indicator values and assign sample weights to composites to simulate a soft boundary during grade estimation.
- Run a 5-pass grade estimate on each block using inverse distance. Pass 1 estimations were given higher priority than pass 5 estimations. The search distances, minimum samples, maximum samples, and maximum samples per hole were varied for each pass and were the same for each indicator domain as in Table 14-2. The search orientations were as those used for determination of the indicators.

Table 14-2 Pacific search parameters

Parameter		Indicator	Estimation pass				
			1	2	3	4	5
Search radius (m)	Major	50	0.5	15	4	30	15
	Semi-major	50	0.5	15	4	30	15
	Minor	2	0.5	1	1	1	1
Sample count	Minimum	–	1	2	1	2	1
	Maximum	–	99999	3	3	3	3
Maximum samples per drillhole		–	99999	1	1	1	1
Classification		–	Measured	Indicated	Indicated	Inferred	Inferred

- Use current or update oxidation state surfaces are used to code material, in block model for use in bulk density assignment. Any new pit or related surface mine depletions are also removed or flagged out
- Assign bulk density values based on oxidation state (Table 14-3).

Table 14-3 Pacific bulk density assignments

Description	Oxidation state	Bulk density
Laterite	1	2.1
Oxide	2	1.8
Transition	3	2.2
Fresh	4	2.9

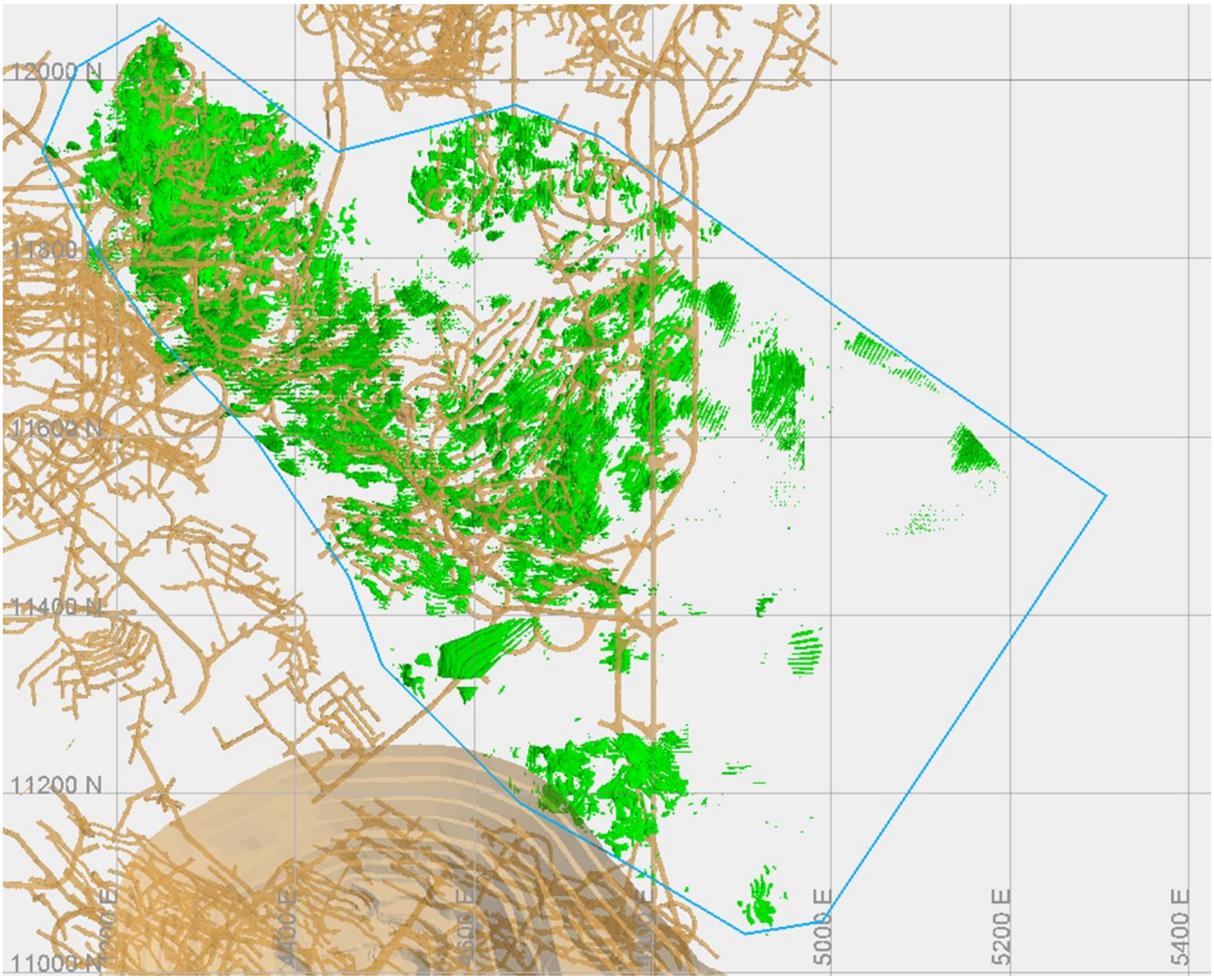
- Assign a tonnage to each block in the model based on assigned bulk density.
- Deplete mined out areas from the block model using Underground Survey (development and stope volumes) with Vulcan 'Triblocking' process and visually checking depletion result is correct.
- Use Vulcan 'Advanced Reserves engine' to report Resources by category and Tabulate Resource Volume, Tonnes and Grades at required reporting lower cut-off.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Run classification script and 'press in' PBM and MRM (grade-control) block model information from newly drilled and / or mined areas as necessary.
- Run Deswik Mining Stope Optimizer (MSO) on the final (depleted) block model to generate all potentially mineable shapes based on generalized current operating costs and current Resource cut-off grades.

- Select from resulting MSO shapes for Resource reporting that that have a defined category of Measured, Indicated and / or Inferred.
- Report out MSO defined Resources combining every MSO shape to summarize tonnage, grade, and according to each Resource classification category.

14.8.4 Caribbean Resources

Figure 14-16 below describes the general layout of the Caribbean block model area showing the mine 'depleted' 1.5g Au/t 'grade shells' in conjunction with underground development survey 'as-built' information.

Figure 14-16 Caribbean Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions



The process used for modelling and Resource estimation at the Caribbean area is described below

The process in a set of simplified steps is:

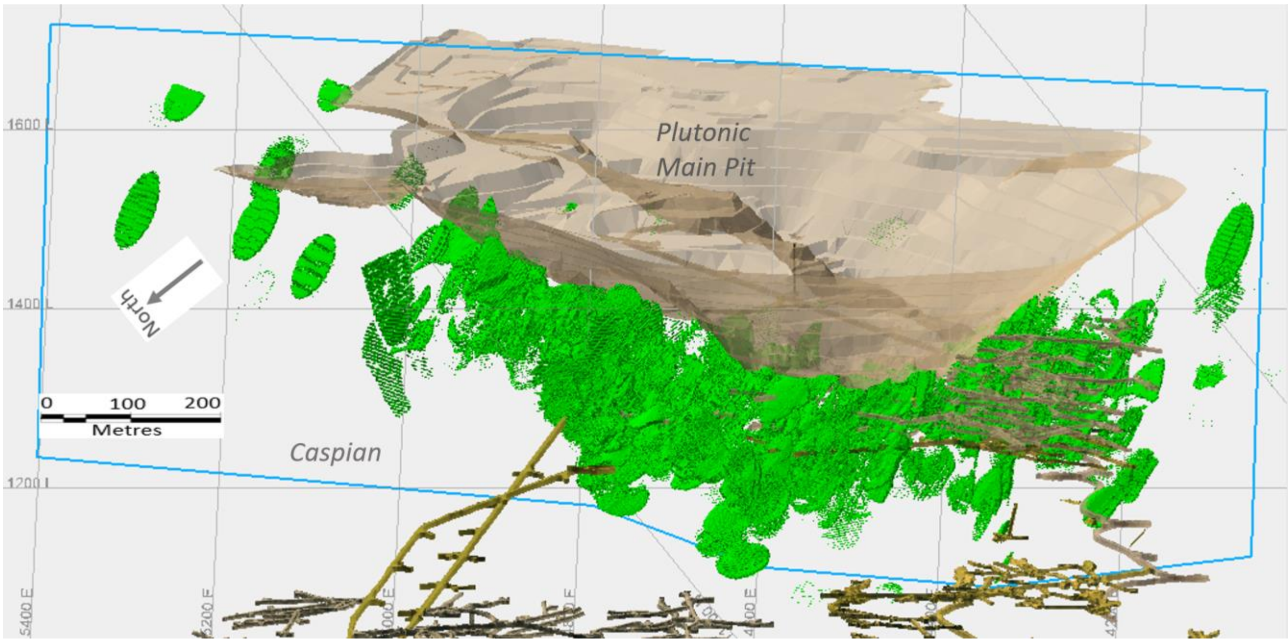
- Lithology boundary wireframes (LITH=MineMafic) were generated describing the overall Caribbean 'Fault Block' area which was also sub-domained as necessary to define the main observed structural discontinuities such as dolerite dykes and minor faults.
- Carry out selection of drilling data (mine and exploration) including face sample data (from 3 different databases) within bounding fault block wireframe.
- Import additional exploration drill holes where relevant.
- Merge all databases together and validate to ensure data integrity and quality.
- Create fields for numeric lithology codes, code for data inside or outside mine mafic rock unit, standardise missing or below detection grades.

- Remove all duplicate face data, face data not inside development wireframes or drill holes with suspect downhole survey data.
- Create straight composite files breaking on geology as domain boundaries (mine mafic).
- Export composite file for statistical assessment based on the grouped lithology field, focused on SCZ (sheared mafic) (100) and MZ (mine mafic) (200) codes.
- Run gold top-cut assessment of composite file by geology and subdomain for drilling and face data.
- Define search orientations, updating and generating unfold surfaces where required for each subdomain.
- Length weight composite assay data to 1m intervals breaking on geology boundaries (mine mafic) or domain boundaries with residuals retained.
- Generate new block model file with a 10 m x 10 m x 10 m parent block and 1m x 1m x 1m sub-block.
- Use unfold surface to create grade interpolation within each domain using relevant search distances and 1m x 1m x 1m discretisation. The search distances, minimum samples, maximum samples, and maximum samples per hole are defined for each domain. Run models without unfolding where insufficient information available and instead utilise an average domain orientation and search distance.
- The background "waste" model is created and combined with the ore model. It is created using mine mafic and dolerite solids with a block size of 10 m x10 m x10 m. These large cells effectively replace all the 1 m x 1 m x 1 m cells that are less than 0.3 g/t Au in the ore model and therefore reduce the size of the finished final model.
- Standardise background block values (waste & dyke material).
- Oxidation state is checked against model and surface depletions flagged out.
- Deplete mined out areas from the block model using Underground Survey (development and stope volumes) with Vulcan 'Triblocking' process and visually checking depletion result is correct.
- Use Vulcan 'Advanced Reserves engine' to report Resources by category and Tabulate Resource Volume, Tonnes and Grades at required reporting lower cut-off.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Run classification script and 'press in' PBM and MRM (grade-control) block model information from newly drilled and / or mined areas as necessary.
- Run Deswik Mining Stope Optimizer (MSO) on the final (depleted) block model to generate all potentially mineable shapes based on generalized current operating costs and current Resource cut-off grades.
- Select from resulting MSO shapes for Resource reporting that that have a defined category of Measured, Indicated and / or Inferred.
- Report out MSO defined Resources combining every MSO shape to summarize tonnage, grade, and according to each Resource classification category.

14.8.5 Caspian Resources

Figure 14-17 below describes the general layout of the Caspian block model area showing the mine 'depleted' 1.5g Au/t 'grade shells' in conjunction with underground development survey 'as-built' information.

Figure 14-17 Caspian Area – Grade Shells +1.5g Au/t and Main Fault Block Domain Sub-divisions



The estimation process used for the Caspian Mineral Resource model is based on a set of probability indicators which constrain the mineralisation. The process used is summarised as follows:

- Define lithology bounding wireframes (LITH=MineMafic) and sub domain where necessary for structural discontinuities such as dolerite dykes and faults.
- Select drilling (mine and exploration) and face data (2 different databases) within Caspian model area.
- Exclude all invalidated data and duplicate face data.
- Standardise missing or below detection grades.
- Add 2m buffer intervals to the ends of face samples where Au>0.5ppm to limit spread of grade during estimation.
- Complete 'get nearest' study to assess possible bias between face samples and exploration drilling. No bias was found.
- Create fields for numeric lithology codes (GRPLTH), code for data inside or outside mine mafic rock unit (MMAFLAG) and estimation domain (DOMAIN).
- Append face sample and drilling files for use in determining grade capping.
- Run gold top-cut assessment on data file by grouped lithology domain and set capped values.
- Generate 1m composites using the combined capped samples for use in the high-grade indicator estimation.
- Generate 1m composites inside quartz veins for use in the low-grade indicator estimation and final grade estimation.
- Generate 1m composites outside the quartz veins for use in the final grade estimation.
- Define indicator grade thresholds (≥0.3 g/t Au and ≥2 g/t Au) and generate appropriate fields in composite file.
- Define search orientations, based on groupings of the estimation domains into packages with similar mineralisation trends.
- Adopt search distances based on lode continuity analysis as variography not robust.
- Create preliminary block model file with a 2 m x 2 m x 2 m block size and run indicator estimations at ≥0.3 g/t Au and ≥2 g/t Au using searches of 75m x 75m x 2m and between 5 and 13 composites from at least 3 different drill holes/faces (Phase 1 model).
- Use blocks with >10% probability at the 0.3 g/t Au indicator to generate low grade wireframe constraints for use in the final grade estimation.

- Create final block model inside low-grade wireframes (1 m x 1 m x 1 m blocks sub-celled to 0.5m x 0.5m x 0.5m at boundaries). No grades were estimated outside the low-grade wireframes or within the laterite unit at surface.
- Run high-grade indicator estimation at ≥2 g/t Au using searches of 75m x 75m x 2m and between 3 and 5 composites from at least 3 different drill holes/faces.
- Use blocks with ≥40% probability at the 2 g/t Au indicator as the basis for the high-grade indicator zones in the grade estimation.
- Run low grade indicator estimation at ≥0.3 g/t Au using searches of 75m x 75m x 2m and between 5 and 13 composites from at least 3 different drill holes/faces.
- Use blocks with ≥50% probability at the ≥0.3 g/t Au indicator as the basis for the low-grade indicator zones in the grade estimation. Blocks with <50% probability at the ≥0.3 g/t Au indicator deemed outside low grade indicator zones.
- Back flag composite file with appropriate high- and low-grade indicator values and assign sample weights to composites to simulate a soft boundary during grade estimation.
- Run a 5-pass grade estimate on each block using inverse distance. Pass 1 estimations were given higher priority than pass 5 estimations. The search distances, minimum samples, maximum samples, and maximum samples per hole were varied for each pass and were the same for each indicator domain as in Table 14-4. The search orientations were as those used for determination of the indicators in the Phase 1 model.

Table 14-4 Caspian search parameters

Parameter		Indicator	Estimation pass				
			1	2	3	4	5
Search radius (m)	Major	75	0.5	18	4	36	18
	Semi-major	75	0.5	18	9	36	18
	Minor	2	0.5	2	2	2	2
Sample count	Minimum	5	1	2	1	2	1
	Maximum	13	999	3	3	3	3
Maximum samples per drill hole		3	999	1	1	1	1
Classification			Measured	Indicated		Inferred	

- Use current or update oxidation state surfaces are used to code material, in block model for use in bulk density assignment. Any new pit or related surface mine depletions are also removed or flagged out
- Assign bulk density values based on oxidation state (Table 14-5).

Table 14-5 Caspian bulk density

Description	Oxidation state	Bulk density
Laterite	1	2.1
Oxide	2	1.8
Transition	3	2.2
Fresh	4	2.9

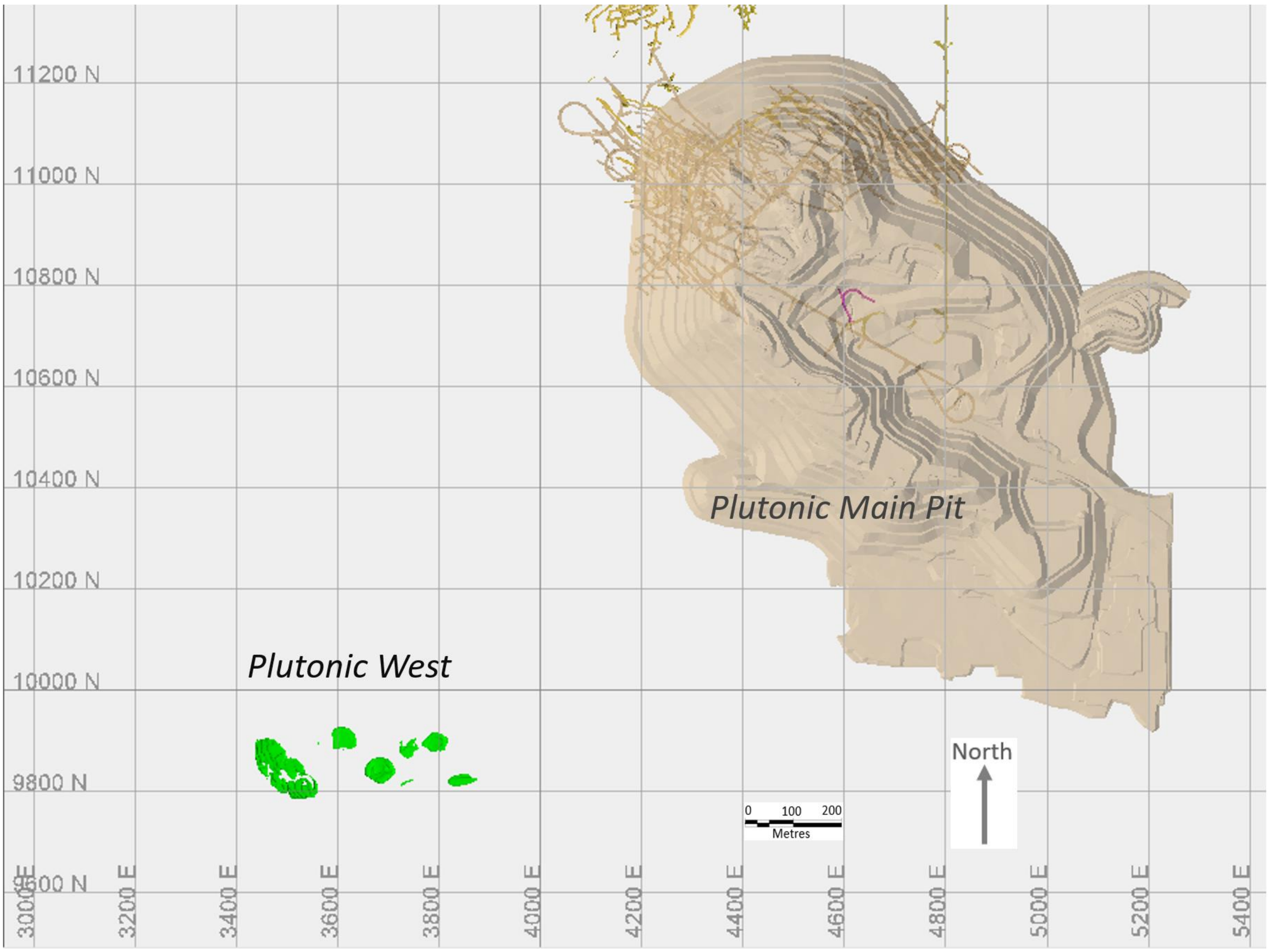
- Deplete mined out areas from the block model using Underground Survey (development and stope volumes) with Vulcan 'Triblocking' process and visually checking depletion result is correct.
- Use Vulcan 'Advanced Reserves engine' to report Resources by category and Tabulate Resource Volume, Tonnes and Grades at required reporting lower cut-off.
- Carry out Block Model Comparisons with previous models and Resource estimates and check tonnage and grade variations using Grade-Tonnage Curves and trend plot analysis
- Run classification script and 'press in' PBM and MRM (grade-control) block model information from newly drilled and / or mined areas as necessary.
- Run Deswik Mining Stope Optimizer (MSO) on the final (depleted) block model to generate all potentially mineable shapes based on generalized current operating costs and current Resource cut-off grades.
- Select from resulting MSO shapes for Resource reporting that that have a defined category of Measured, Indicated and / or Inferred.

- Report out MSO defined Resources combining every MSO shape to summarize tonnage, grade, and according to each Resource classification category.

14.8.6 Plutonic West Resources

As no additional drilling or mining activity has taken place at Plutonic West since the Resources were reported in 2019 the only reporting changes required was to move the reporting lower cut-off from 2.0g Au/t down to 1.5g Au/t now used for the 2020 Resource reporting. Figure 14-18 below describes the Plutonic West Resource areas as represented by 1.5g Au/t grade shells (green).

Figure 14-18 Plutonic West Area – Location in Relation to Plutonic Main Pit - Grade Shells +1.5g Au/t



14.9 Hermes and Hermes South Mineral Resources

The Hermes, Wilgeena (Hermes South) and Plutonic Areas Mineral Resource is summarised in Table 14-6 below.

Table 14-6 Hermes, Wilgeena and Plutonic Area Open Pit Mineral Resources by area as at 31 December 2019

	Nominal Cut-off grade (Au g/t)	Measured			Indicated			Measured and Indicated			Inferred		
		Tonnes (000's)	Gold		Tonnes (000's)	Gold		Tonnes (000's)	Gold		Tonnes (000's)	Gold	
			Grade (g/t)	Ounces (koz)		Grade (g/t)	Ounces (koz)		Grade (g/t)	Ounces (koz)		Grade (g/t)	Ounces (koz)
Hermes Open Pit Areas													
Hermes	0.40	-	-	-	1,990	1.4	90	1,990	1.4	90	3,870	1.3	160
Hermes South (80% JV)	0.40	-	-	-	700	1.6	40	700	1.6	40	200	1.1	10
Plutonic Open Pit Areas													
Area 4	0.40	-	-	-	-	-	-	-	-	-	440	0.8	10
Perch	0.40	-	-	-	-	-	-	-	-	-	230	0.9	10
Plutonic Main Pit	0.40	1,640	3.9	210	3,330	2.2	230	4,970	2.7	440	7,670	2.0	490
All Open Pit Sub-total	**0.40**	**1,640**	**3.9**	**210**	**6,020**	**1.8**	**350**	**7,660**	**2.3**	**560**	**12,400**	**1.7**	**670**

Notes:

1. Mineral Resources are quoted inclusive of those Mineral Resources converted to Mineral Reserves.
2. The reporting standard adopted for the reporting of the Mineral Resource estimate uses the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (May 2014) as required by NI-43-101.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages.
4. Mineral Resources are estimated at a cut-off grade of 1.50 g/t Au for the Plutonic Underground Gold Mine.
5. 'Plutonic Underground Resources based on Deswik Mining Stope Optimizations using generalized Reserve MSO input parameters and / or restricted 'grade shell' reported Resources. Open Pit Resources based on simplified pit optimization parameters.
6. Mineral Resources are estimated using an average gold price of A$2,150 per troy ounce (~US$1,450 per ounce).
7. Rounding errors exist in this table and number may not add correctly.

14.9.1 Hermes Resources

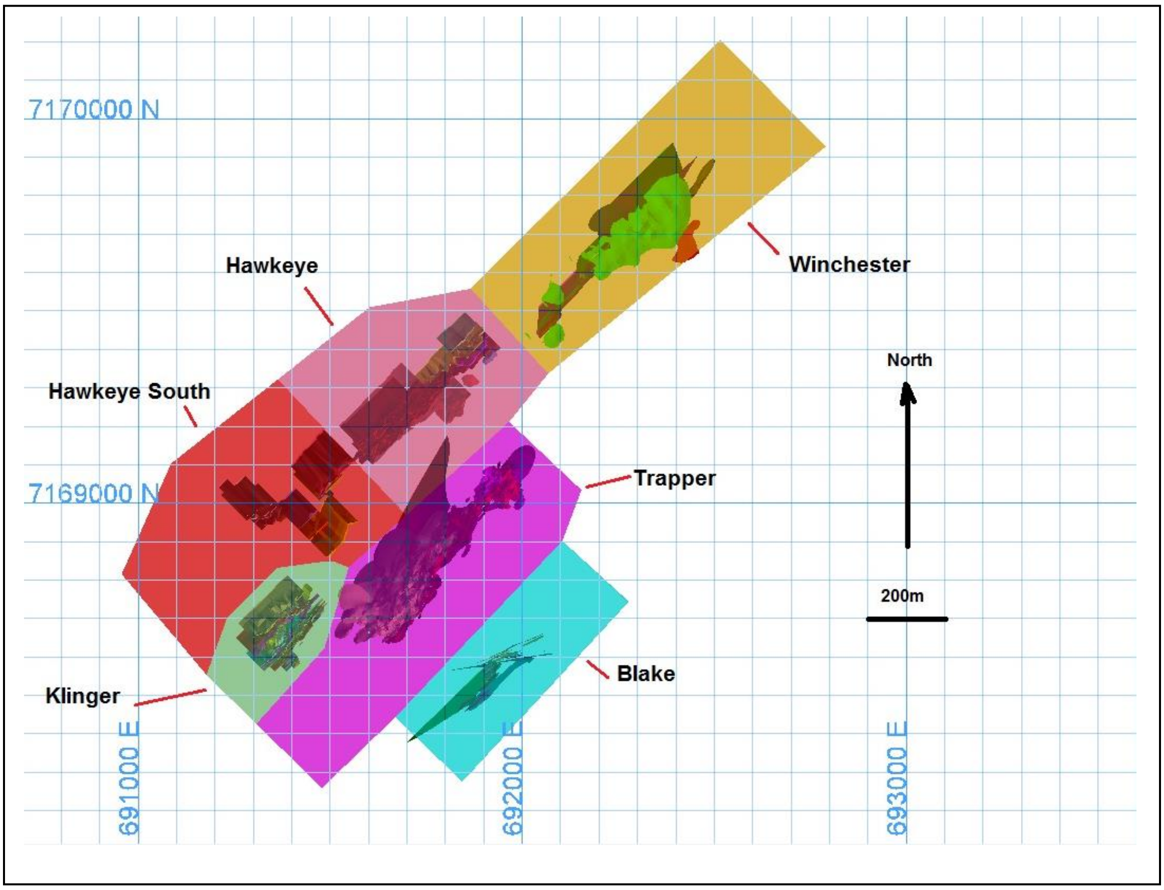
The Resource modelling and estimation process used for the Hermes Open Cut Project block model areas is generally described as follows:

The process in a set of simplified steps is:

- Define project area and import the latest validated drill hole database with any drill hole database errors detected being corrected.
- Update mineralization lode interpretations; (Klinger, Hawkeye, Hawkeye South, Trapper, Blake and Winchester areas). All lode triangulations were manually checked and compared with previous interpretations on a section by section basis.
- Created a separate triangulation for each of the six Resource areas and one for waste.
- Assigned lode priorities fir interpolation in each area. (Blake ranged from 111 to 199, Trapper from 200 to 299, Klinger from 300 to 399, Hawkeye from 400 to 499, Hawkeye South from 500 to 599 and Winchester from 600 to 699).
- Generate composite file for ore and waste to undertake analysis on sample lengths showing nearly all sample intervals are 1m or less thus leading to decision for 1m composite length being used for spatial analysis and block model interpolation.
- Coded a unique BOUND code prior to reviewing classical statistics on uncut drill hole composites for each lode.
- Completed topcut analysis on each lode using 1m composites to detect the upper inflection point on lognormal probability plots in Supervisor.
- Visually compared cut composite drill hole composites against lode triangulations to ensure that the drill holes were correctly flagged for each of the six Resource areas.
- Variography was completed for lodes with a significant number of composites to derive estimation parameters taken from the major, semi-major and minor ranges and orientations of the variograms.
- Created a rotated empty block model with 5m x 5m x 5m parent block size and 1m x 1m x1m sub-blocks using latest lode interpretations and any 2016 to 2019 interpretations for mafic footwall, top of fresh and base of complete oxidation.
- Used up-to-date Grade Control block model information to ‘press in’ and up-date key Resource Model item fields for mined (mine period), lithology, weathering, Resource area, density.
- Using current semi-variogram models to check the search distances and orientations used for interpolation were generally aligned with the lode triangulations for geometric integrity.
- Using Vulcan™ software, Ordinary Kriged grades (and inverse distance cubed estimates for parallel check purposes) were interpolated using cut-drill hole composites using a 2 pass approach for both lodes and waste zones. During the first pass, cells were informed using search distances from the variogram ranges. A maximum of 40 samples were allowed with the minimum set at 10 samples with a simultaneous limit of no more than 9 samples from any single drill-hole to ensure that samples were taken from at least 2 separate holes.
- Cells not informed during the first pass were re-estimated using search distances 30% greater than the major and semi-major ranges and 50% greater than the minor range. The maximum number of allowable samples for this ‘long range’ pass was set at 40 and a minimum of 5, with no more than 4 samples allowable from one hole.
- Weighted kriged estimates interpolated during the first pass at a cut-off of 0 g/t Au were compared against the average cut drill hole composite for each lode. Any identified block vs composite grade differences greater than ± 10% were investigated. Results showed that estimates outside ± 10% are usually due to zones having characteristic grades less than 1 g/t Au or relatively low number of composites. Only 4 lodes had estimates greater than expected and this was most likely due to local clustering effects that can occur during kriging particularly in zones with relatively low numbers of composites and / or where they are sparsely distributed.
- Resources were classified in a 3-step process. Initially waste was set to not classified and all lodes classified as Inferred. Secondly, lodes that had kriging efficiencies greater than 0.5 and which are surrounded by reasonably close spaced drilling were classified as Indicated. Finally, lodes that were initially classified as Indicated were sometimes reclassified as Inferred if they contained less than 10 composites. All classifications were visually checked using drill holes, kriging efficiencies and lode triangulations.

- Combinations of values in key fields were checked to ensure no features were incorrectly coded.

Figure 14-19 Hermes Resource Lode Triangulations and Resource Areas



14.9.2 Hermes South Resources

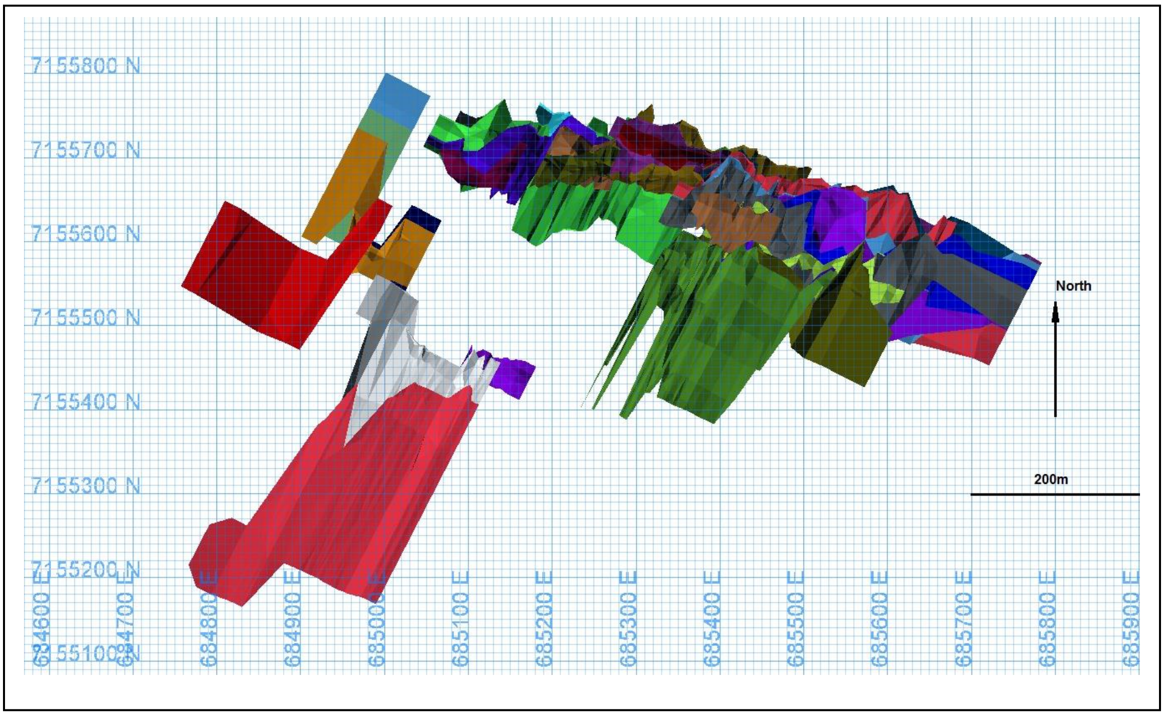
The Resource modelling and estimation process used for the Wilgeena (Hermes South) Open Cut Project block model areas are generally described as follows:

The process in a set of simplified steps is:

- Check defined project area including assessing previous work.
- Obtain the latest validated drill hole database and pre mined and post mined surfaces and loaded to Project working area.
- Using new DH data carry out new or updated lode interpretations as 2D strings on 5m to 10m spaced oblique cross-sections using a nominal 0.16 g/t Au delineation lower cut-off.
- The newly developed 2D strings were then 'linked' together to for 3D triangulation geometries for each lode. All lode interpretations were peer reviewed by the Senior Exploration Geologist. (Figure 14-).
- Weathering surfaces for the base of transported cover, base of complete oxidation and top of fresh were also interpreted and updated using Leapfrog^{tm}.
- All completed mineralization lodes were assigned lode priorities from the lowest value assigned to those positioned at the bottom of the stratigraphy and the highest value to the lode at the top of the stratigraphy.
- Created composite files (for assessing composite length) within mineralization and waste zones to undertake analysis on sample lengths to decide on the optimal drill hole compositing interval lengths. Results showed 97.1% of the sample intervals are 1m or less. Thus, a decision was made to composite sample intervals over 1m.
- Coded composite drill hole intervals using 1m down-hole lengths to flag each mineralization lode with a unique code number.

- Completed topcut analysis on each lode using 1m composites to detect the upper inflection point on lognormal probability plots in Supervisor.
- Used a script to apply derived topcuts for each lode, populating an “AU_CAP” item field in the composite database.
- Created a rotated empty cell block model with 5m x 5m x 5m parent block size and 1m x 1m x1m sub-blocks using latest lode interpretations and interpretations of ‘base of transported cover’, ‘base of complete oxidation’ and ‘top of fresh’ surfaces. Pre-mined and post mined surfaces were also employed.
- This block model was checked to ensure complete coverage of the interpreted areas and that key fields for classification, mined, weathering, lode and density.
- The lode triangulation volumes were checked and compared with the lode volumes as coded in the block model.
- Variography was completed for lodes with a significant number of composites to derive estimation parameters taken from the major, semi-major and minor ranges and orientations of the variograms. If necessary, these derived parameters were used for adjacent similar lode types where insufficient contained composite data was available to generate usable variograms.
- The search distances and orientations were compared against the lode triangulations to ensure realistic parameters were present.
- Ordinary kriged estimation runs (and a parallel inverse distance cubed estimate used for cross-checking) were carried out using the cut-drill hole composites set. A 2-pass approach for both lodes and waste was used in which blocks for the first pass were informed using search distances from the derived variogram ranges. A minimum of 10 and a maximum of 30 samples with no more than 9 samples from one hole were used to ensure that samples were taken from at least 2 holes during interpolation. Cells not informed during the first pass were re-estimated using search distances 30% greater than the major and semi-major ranges and 50% greater than the minor range, with a minimum of 5 and maximum of 30 samples, where no more than 4 samples were allowed from one hole. Sub-cells were estimated as if a parent cell.
- Weighted kriged estimates interpolated during the first pass at a cut-off of 0 g/t Au were compared against the average cut drill hole composite for each lode. And overage composite vs block grade differences of more than ± 10% were interrogated. Results showed that estimates outside ± 10% range tended to be due to lodes with grades generally less than 1 g/t Au. Visually comparison of 1m drill hole composites with kriged estimated grades were also carried out on a cross-section basis. Results showed that the composites and estimates compared adequately.
- Resources were classified in a 3-step process. Initially waste was set to not classified and all lodes classified as Inferred. A second step designated lodes as Indicated if they occurred in a contiguous zone on mineralization which was informed during the kriging where at least 4 drill holes and 5 composites were available in the during the first kriging interpolation pass. Finally, lodes that were initially classified as Indicated may necessarily need to be reclassified as Inferred if they had less than 20 contained composites overall. All classifications were visually checked using drill holes and lode triangulations.
- Combinations of values in key fields were checked to ensure no features were incorrectly coded.

Figure 14-20 Hermes South Resource Lode Triangulations



14.9.3 Area 4 Surface (Open Cut).

- The Area 4 (Open Cut) Resources were estimated using a using the ordinary kriging method using Leapfrog software 4.5.1, Vulcan software version 11.0.4 and Supervisor software 8.11

. The process used for building the Resource block model is summarised below:

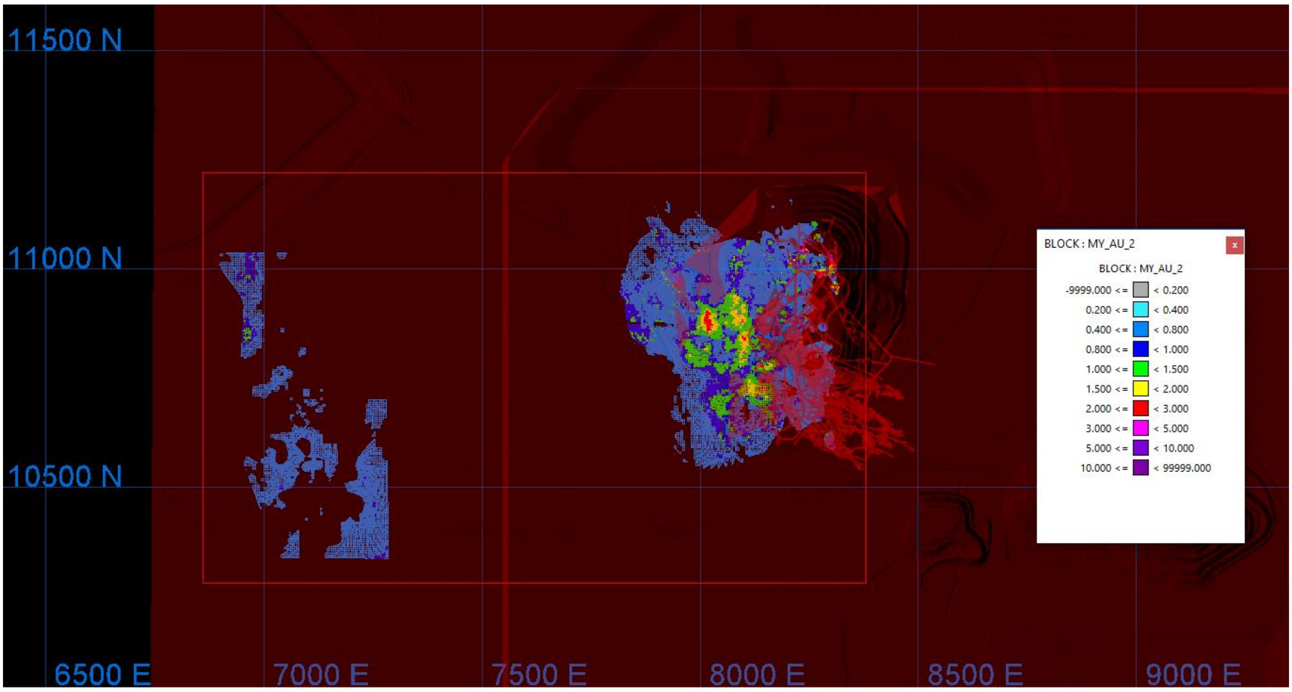
- The Plutonic drill hole database for Area 4 was extracted and checked against previous model work.
- The lode triangulation interpretations were extended down where necessary to approximately the 1400mR. mineralization was interpreted to have an overall easterly dip consistent with that of the "Over Thrust Mafic" package.
- A total of 33 mineralized lodes were interpreted, with some segregated according to material type as defined by weathering profile information generated by the Exploration department. Zones were designated as 'oxidized' or 'fresh rock' domains giving final zone count of 41 used in deposit statistical analysis and block model interpolation.
- Lithology domains were also encoded into the block model where possible.
- A 'backfill solid' (waste material) was also created and named *"Fill_Area4_clean.00t"* and given a mined-out value = 6 in the block model.
- The current open pit survey cut surface was used for determining mined out and remaining Resource areas.
- Density values used in the new Area 4 (Open Cut) block model are shown below and were adopted from a table in pre-existing Resources Report titled "2003 Vol 2 ug.doc" (Barrack 2003). The bulk densities adopted are considered reasonable vales given the recent production information from which they were derived

Table 14 Density Values by Weathering Profile for Area 4

Weathering Profile	Density
Laterite	2.1
Oxide	1.8
Transition	2.2
Primary	2.8

- A geological model and lode model were created separately then merged together to produce the final Resource model.
- Triangulations were filled with cells to create various component models that were added together in the correct priority sequence to create an empty cell block model whose parent cell size within lodes is a maximum of 5m x 5m x 5m representing approximately one quarter the drill hole spacing.
- Drill hole data within the triangulations were selected, composited over 1m intervals at an average sample length of 1.007m.
- Composited samples were statistically analysed to determine top cuts for each lode to reduce the effect of outlier composites on the estimates.
- Semi-Variogram models were then generated on selected major lodes in each domain to help guide the appropriate parameters used for block model interpolation.
- Some variogram parameters were exported and adopted for other lodes with similar characteristics if appropriate in localized domain areas or if variogram model generation was difficult due to low numbers of available composites present within any given mineralization lode.
- Three (3) main domains lode groups were designated - described as:
  + East dipping lodes (domain A).
  + West dipping lodes (domain B).
  + Lodes that were in fresh that impact on grade distribution (domain C).
- Kriged estimates were interpolated for each lode in three passes. During the first pass, cells were informed using search distance equal to the range of the variogram. A minimum of 8 and up to a maximum of 20 samples was allowable in a typical search with the added constraint of no more than 7 samples from any single hole to ensure that samples were taken from at least 2 holes.
- Cells not informed during the first pass were re-estimated in second pass using search distance 30% greater than the major and semi major ranges and 50% greater than the minor range. The second pass used a minimum of 5 samples with a maximum of 20 and where no more than 4 samples from one hole was allowed.
- Cells not informed during the second pass were re-estimated in third pass using a very large search distance when compared to the first pass of 10 times greater for each of the major, semi major and minor axis directions. The third pass also used a minimum of 3 up to a maximum of 20 samples with no more than 2 samples allowed from one hole.
- Lode defined cells were classified as Indicated based on creating triangulations using pass one as a guide. All other lode cells outside the indicated triangulations within ore lodes were set as Inferred.
- Lodes that had less than a count of 20 composites that were classed as indicated were downgraded to Inferred.
- Any “Over Thrust” and Dolerites cells were specifically classified as Inferred.
- Waste cells were not classified (even though they may contain some estimated values).

Figure 14-21 Area 4 (Open Cut) Model Area – Plan view of grade blocks above 0.40g/t showing only 'unmined blocks' (code : 'mined = 0')



14.9.4 Grade Control Models Open Cut Areas

These are generated using the same process employed for generating the Resource block models. The only change is that the database is updated for grade control drilling and the lode interpretations are modified to account for the new drilling. The Top cuts values and estimation parameters are not changed from those used for the Resource block models. The mine geologists were responsibility for compiling data and generating all grade control models.

14.9.5 Resource database

AcQuire is the primary diamond drill hole database. All drill information is obtained from this database. Initial data is obtained from the drill hole instruction list for the planned program. Additional information is added to the database as the drill core is logged, sampled, and assays returned. Drill programs are later validated to eliminate the risk of data errors. Once validated, AcQuire data is exported into Vulcan or Leapfrog for 3D viewing and subsequent modelling and Resource estimation.

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 values that indicates why the assay was not generated or received.

14.9.6 Geological models

For Hermes, the contact between the mafic amphibolite footwall and hangingwall quartz biotite-sericite schists was modelled. At Wilgeena (Hermes South) the host rock is predominantly weathered metasedimentary sequence of Proterozoic Peak Hill schist and mafic units. Due to the weathering, it was not possible to differentiate lithologies.

14.9.7 Density data - Hermes

Density values of 1.8 t/m^3, 2.1 t/m^3 and 2.75 t/m^3 were assigned to the oxide, transition and fresh parts so the mafic areas respectively. A global density of 2.9 t/m^3 was employed for the underlying schist.

14.9.8 Density data – (Wilgeena) Hermes South

Bulk densities were determined using the water displacement method Archimedes method. In 2010, Amdel completed density work using 35 diamond core samples consolidated as 5m composites from various materials which were averaged to derive the assigned bulk densities used in Resource estimation. In 2017, Billabong tested 27 drill core samples from different materials that had not been tested previously and obtained different values compared to those determined by Amdel. In 2018, Billabong tested 694 samples from RC drill hole spoils and obtained results that compared to the 2017 work and were subsequently used to update the density values in the block model as shown below (Table 14-).

Table 14-8 Comparison of Density Values

Material		2017	2018
Transported Cover	Transported Cover	N/A	2.24
Oxide	Waste	1.6	2.49
Oxide	Ore	1.6	2.71
Transition Zone	Waste	1.7	2.54
Transition Zone	Ore	1.7	2.67
Fresh	Waste	2.3	2.55
Fresh	Ore	2.3	2.6

Billabongs assessment is that the methods used in 2017 and 2018 adequately account for void spaces as there is a very good correlation of the results for different material types given different sample types were used. Based on review work completed by Billabong in 2017 and 2018, the assumption is the drill core samples and samples from RC drill hole samples can both be used to determine density for different material types.

14.9.9 Cut-off grades

The Resource cut-off grade (RCOG) takes into account the following parameters: gold price, recovery, operating costs and royalties. In 2019 a universal RCOG of 0.4g/t was used based on operational performances of 2017, 2018 and 2019 as well as a higher gold price.

14.9.10 Composites

Drill hole samples were composited down hole at 1m intervals for uniform sample support, which were then used for geostatistical analysis and grade estimation. This length was selected based on statistical assessment of majority 'raw' sample length and reviews of population distribution and related variance measurements.

Top–cutting of high-grade values was undertaken after compositing and prior to variography and grade interpolation. Topcuts were determined by detecting the upper inflection point on lognormal probability plots using uncut composite drill hole data for each lode in Supervisor.

14.9.11 Variography

The Resource Block Models in the Hermes and Wilgeena (Hermes South) areas were generated using local variography analysis which was incorporated into the ordinary kriging interpolation runs used for grade estimation. The Ordinary Kriging approach was chosen because;

- The geology of the narrow vein linear lodes is relatively well understood and
- The results of the variography are commensurate with the geology; the ranges and orientation of the variograms for modelled lodes compare well with the visually observed information.

The initial variogram analysis involved generating and modelling downhole variograms to determine the 'nugget' level.

Then modelling of normal score variograms involved generating variogram fans in the horizontal direction to determine the strike of mineralisation. Variogram fans were then created perpendicular to the main identified strike direction to ascertain the apparent dip of mineralisation. Once the strike and apparent dip were established, a variogram fan was generated in the plane passing through the strike and apparent dip directions to determine the plunge and the major and semi-major directions. These directions were recognised by examining and selecting orientations with the most regular and continuous contours on the variogram fan for that plane.

Most of the variogram fans were created using a horizontal and vertical window of ± 5-degree horizontal increments and lags between 5m and 20m depending on drill hole spacing. On some occasions, the size of this window and lags were increased to improve the structure of the plotted variograms.

The best experimental variogram for each of the three directions was selected and either a single or double spherical model was fitted.

Due to normal score variograms being modelled, al variogram models were back transformed to obtain the necessary estimation parameters.

Variogram models were draped on the lode they represented to ensure that they were geologically consistent.

14.9.12 Resource classification

For current models, grade estimation is completed using two search sizes. Only cells informed during the first pass have the potential to be classified as Indicated.

14.9.13 Measured search parameters

No Resources were classified as Measured due to the lack of analytical data. For example, as production blast cones are not sampled, it is not possible to reliably confirm the precision of grade and continuity between points of observation.

14.9.14 Indicated search parameters

These were determined by looking at cells informed during the first pass and drill hole samples.

For Hermes, the criteria used was kriging efficiencies greater than 0.5 and the density of the drilling.

For Wligeena (Hermes South), the criteria used was a continuous area that was informed by using at least 4 drill holes and 5 composites on a lode by lode basis.

14.9.15 Inferred search parameters

Cells informed in the first and second passes not classified as Indicated were coded as Inferred.

At Hermes, lodes with cells classified as Indicated but only had 10 composites, were re-coded as Inferred.

At Wilgeena (Hermes South), lodes with cells classified as Indicated but only had 20 composites, were re-coded as Inferred.

14.9.16 Comparison with 2018 Mineral Resource

A comparison between the 31 December 2018 and new 31 December 2019 Mineral Resource for Hermes and Wilgeena (Hermes South) is shown below in Table 14-10. The comparison shows that about 82,000 Au oz (Indicate) was depleted from the 63,000 Au oz (Inferred) was added.

Further investigation shows that for Hermes 141,000 Au oz (Indicated) was depleted and 93,000 Au oz added due to mining and new discoveries respectively. For Hermes South, 59,000 Au oz (Indicated) was added and 37,000 Au oz (Inferred) removed due to the conversion to the higher category.

Table 14-7 Hermes and Wilgeena (Hermes South) 31 December 2018 Mineral Resource comparison to 31 December 2019 Mineral Resource.

	2018 Measured and Indicated			Gold Oz Diff	2018 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)
Hermes	3,700	1.3	160	-70	3,200	1.4	150	10
Wilgeena	1,000	1.9	60	-10	800	1.4	30	-20
Hermes Area Sub-total	**4,700**	**1.5**	**220**	**-80**	**4,000**	**1.4**	**180**	**-10**
Area 4	-	-	-	-	-	-	-	10
Perch	-	-	-	-	-	-	-	10
Stockpiles	220	0.9	7	-7	-	-	-	-
Plutonic Area Sub-total	**220**	**0.9**	**7**	**-7**	-	-	-	**-**
Open Pit Total	**4,920**	**1.5**	**227**	**-87**	**4,000**	**1.4**	**180**	**0**

15 Mineral Reserve estimates

The Mineral Reserve estimate for Plutonic as at 31 December 2019 is shown in Table 15-1. This estimate is based on open pit design work completed for Hermes and other grade control models completed by Billabong and underground mine design work undertaken by Entech Pty Ltd (Entech). 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 except for Hermes South which is 80% JV.

Table 15-1 Summary of Mineral Reserves – 31 December 2019

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	860	1.0	30	–	–	–	860	1.0	30
Hermes South (80% JV)	500	1.3	20	–	–	–	500	1.3	20
Open Pit Sub-total	**1,350**	**1.1**	**50**	–	–	–	**1,350**	**1.1**	**50**
Plutonic East UG and Area 4 UG	120	4.1	16	55	5.0	9	65	3.4	7
Plutonic	2,500	4.0	310	1,000	4.4	140	1,400	3.7	170
Underground Sub-total	**2,600**	**4.0**	**330**	**1,100**	**4.4**	**150**	**1,500**	**3.7**	**180**
31 December 2019 Total	**4,100**	**2.9**	**380**	**1,100**	**4.4**	**150**	**3,000**	**2.4**	**230**

* *All physicals rounded to two significant figures. Some apparent summation errors may exist due to rounding*
Hermes Reserves includes ore stockpiled at Hermes mine

15.1 Entech opinion

Entech considers that the Mineral Reserve estimates are based on processes considered reasonable for the style of mineralisation and the mining methods employed. There is substantial history and knowledge of the deposit and mining methods that provide sufficient confidence in the ability to convert the Mineral Reserves into production.

A preliminary mine plan assuming mining of Mineral Reserve material only was shown to be economically viable with a reasonable degree of margin to buffer against unfavourable input movements. It should, however, be noted that sufficient negative movements in the assumed gold prices and/or exchange rates, metallurgical recoveries and/or costs could potentially render portions or the whole of the Mineral Reserves mine plan uneconomic.

15.2 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.

Independent mining consultants Entech undertook the work to determine the Plutonic Underground Mineral Reserve estimates.

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 Reserve statement.

Table 15-2 shows the diluted tonnages, grades, and contained ounces excluding un-mineable shapes and Inferred Resources.

Table 15-2 Plutonic Underground Mineral Reserves – 31 December 2019

Area	Total			Proven			Probable		
	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
	kt	g/t	koz	kt	g/t	koz	kt	g/t	koz
Plutonic East UG and Area 4 UG	120	4.1	16	55	5.0	9	65	3.4	7
Plutonic	2,500	4.0	310	1,000	4.4	140	1,400	3.7	170
Total	**2,600**	**4.0**	**330**	**1,100**	**4.4**	**150**	**1,500**	**3.7**	**180**

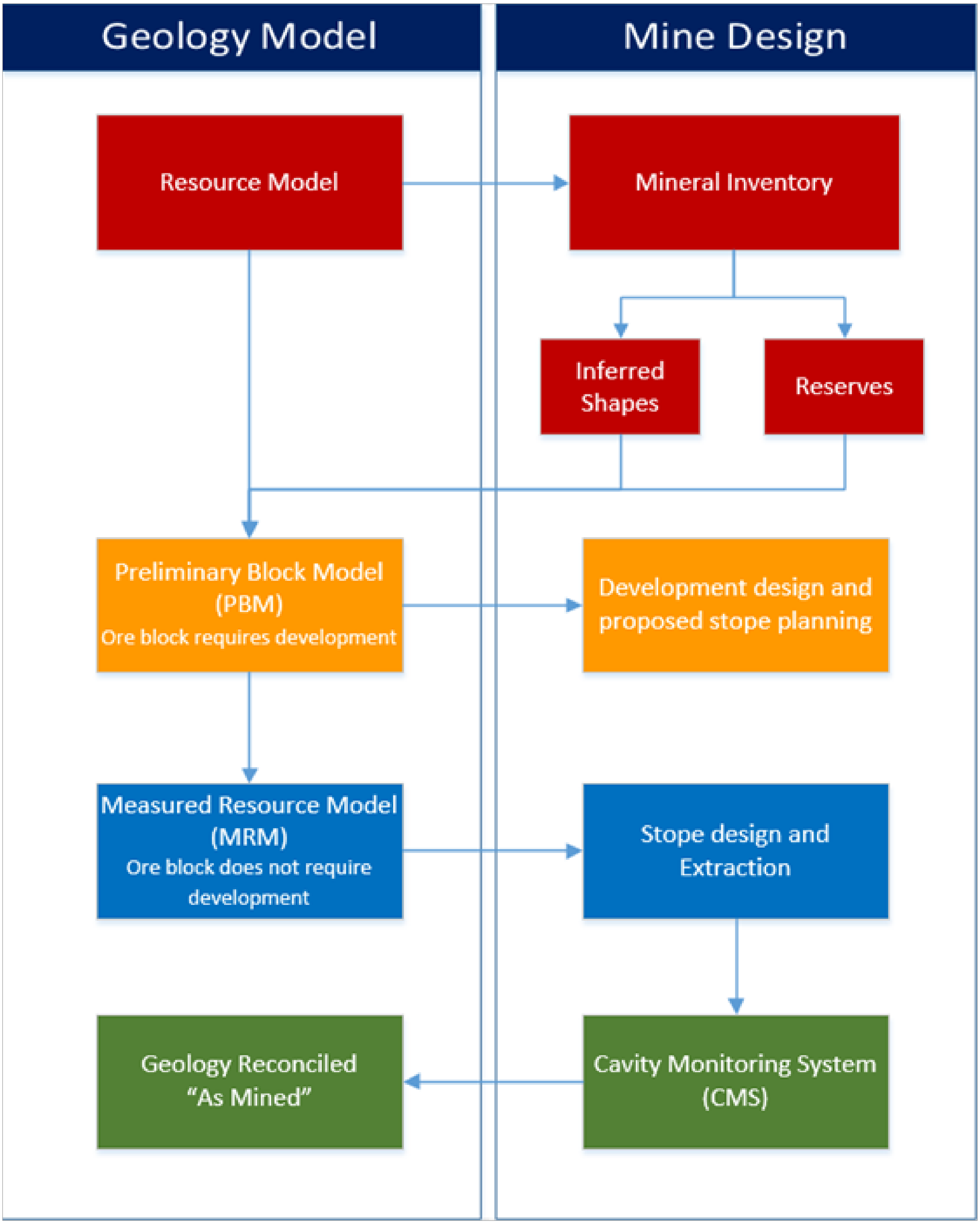
* *All physicals rounded to two significant figures. Some apparent summation errors may exist due to rounding.*

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

The geology and mineralisation in Plutonic Underground is complex and requires the constant gathering and reinterpretation of information. Due to these complexities and the constantly expanding knowledge base, the planning processes for converting Mineral Resources to Mineral Reserves is also complex. The planning process is applied to all material regardless of Resource category, and the results is referred to as the "potential mining inventory". A summary of this planning process is:

- The Mineral Resource is estimated in a number of separate models for the Plutonic Underground. This forms the basis of the Mineral Resource estimate. Approximately 96% of the reported Mineral Reserves metal comes directly from the Mineral Resource model inputs.
- Part of the Mineral Reserve estimate in localised areas is generated from additional data. This is called the PBM: it is a subset of the Resource model that is then reinterpreted. The PBM draws on information from the Resource model and additional drilling, development, and reinterpretation. Approximately 3% of the reported Mineral Reserves metal comes from PBM models.
- Part of the Mineral Reserve estimate is generated using detailed grade control drilling and face sample data into another model that is created for a local area. This is called the MRM: it is a subset of both the Resource model and PBM that is then reinterpreted. The MRM draws on all information available. Approximately 1% of the reported Mineral Reserves metal comes from MRM models.
- The fundamental sequence of geological interpretation and mine design of the Plutonic Resource follows the process model shown in Figure 15-1.

Figure 15-1 Mineral Resource and Mineral Reserve planning systems



The approaches used to generate the Mining Reserve stope shapes were as follows;

1. Stope optimisations were run using Datamine Software's Mineable Shape Optimiser® (MSO) on the new Mineral Resource models using updated inputs including gold price and mining costs. The optimiser shapes were then reviewed to ensure mineability. The reviews ensured there was no counting of material already extracted. The mining areas where this approach generated Mining Reserve material included in this estimate were;
    a. Baltic (S1, S2 and N1/N2 lodes);
    b. Indian (C1, N1 and N2 lodes);
    c. Timor (S1, S2, N1 and N2 lodes);
    d. Cortez; and
    e. A134.
2. Plutonic site staff provided current site stope designs which were evaluated against the new Mineral Resource models and included if economic under the 2020 Mining Reserve requirements.
3. Several Mineral Resource, PBM and MRM models reported in the Mineral Resource estimate were materially unchanged from the previous year, the 2019 Mining Reserve shapes were used with the 2020 cut-off grade and economic parameters applied. The mining areas where this approach generated Mining Reserve material included in this estimate were
    a. Caspian area (cs_2015_2020_tb)
    b. Timor area (tm_2015_2018_tb, ugd_ta28-ta29_mrm models);
    c. Baltic area (ba_my2014 model);
    d. Indian area (ugd_wd20l_mrm_v2 model);
    e. Pacific area (ugdpa_east_pbm_t, ugdsargasso_pbm_1811, ugdsargasso_pbm_t models);
    f. A134 area (a134_my2014, ugd_1811_ci25_nd32l_pbm models); and
    g. Plutonic East (pe_my2015reclss model).

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 mining dilution of 15% (at dilution grade 0.1 g/t) and mining recovery of 95% 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 80% applied to reflect the difficulty associated with rolling of blasted material down to bogging levels on these reduced footwall angle surfaces;
- Airleg stoping (~4% 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 AU$1,925/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 15-3.

Table 15-3 Cut-off Grade Estimation Cost and Revenue Inputs

Factor	Unit	Assumption	Source
Gold Price	A$/oz	$1,925	Market
State Royalty	%	2.5%	Site Actuals
Op Development	$/m	$2,135	Site Actuals
Capital Lat Development	$/m	$3,335	Site Actuals
Development Rehabilitation	$/m	$600	Entech Estimate from Site Actuals
Escapeway Rises	$/m	$1,166	Site Actuals
Return Air Rises	$/m	$1,590	Site Actuals
Longhole Stope	$/t stope	$34.94	Site Actuals
Airleg Stope	$/t stope	$115.00	Site Actuals
Jumbo Stope	$/t stope	$48.45	Site Actuals
Geology	$/t ore	$11.20	Site Actuals
Mill Cost	$/t ore	$20.89	Site Actuals
G&A	$/t ore	$4.55	Site Actuals
Sustaining Capex	$/t ore	$7.25	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 15-4.

Table 15-4 Metallurgical Recovery Assumptions for Cut-off Grade Estimation

Mining Area	Met. Recovery
A134	90.90%
Baltic	94.00%
Caspian	81.50%
Cortez	86.20%
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 15-5.

Table 15-5 Mineral Reserve Cut-off Grades by Mineral Resource Model

Mining Area	Resource Model	Stoping COG (g/t Au)	Ore Dev COG
A134	pu_ot_00_1909_v1	2.0	2.0
	a134_my2014_mii	2.0	2.0
	ugd_1811_ci25_nd32l_pbm_mii	2.0	2.0
Baltic	ugd_2003_ba_n1_n2	2.0	1.8
	ugd_2006_baltic_s2_res	2.0	1.8
	ugd_2003_ba_s1	2.0	3.0
	ba_my2014_mii	2.0	3.0
Caspian	cs_2015_2020_tb	2.0	1.8
Cortez	ct_2015_2020_tb	2.0	1.8
Indian	id_n1_2020407	2.0	1.8
	id_n2_20200530_res	2.0	1.8
	ugd2005_ID_C1_res	2.0	1.8
	ugd_wd20l_mrm_v2_mii	2.0	1.8
Pacific	ugdpa_east_pbm_t_mii	3.0	3.0
	ugdsargasso_pbm_1811_mii	2.0	2.0
	ugdsargasso_pbm_t_mii	2.0	2.0
Plutonic East	pe_my2015reclss_mii	2.0	2.0
Timor	tm_n1_20200524_res	3.0	3.0
	ugd20200522_timor_n2_res	2.0	1.8
	ugd2005_tm_s1_pbm_res	2.0	1.8
	tm_s2_20200521_res	2.0	1.8
	tm_2015_2018_tb_mii	2.0	1.8
	ugd_ta28-ta29_mrm_mii	2.0	1.8

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 7.5m (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 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.;

15.2.2 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 mine life and short turnaround time of identifying new ore and bringing it into production prior to the yearly Reserve and Resources 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 15-6 below.

Table 15-6 Declared Ore Mined v Grade Control (planned mining)

Mine Call Factors		Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
- Ore Tonnes	t	0%	-4%	1%	-1%	-2%	1%	-5%	-1%	-2%	-1%	-7%	-2%
- Grade	g/t	-18%	14%	2%	-2%	-2%	-6%	-9%	-18%	-12%	-6%	1%	12%
- Contained Au Variance	oz.	-18%	11%	3%	-3%	-4%	-5%	-14%	-20%	-14%	-7%	-6%	10%

15.2.3 Hermes Open Pit

The Hermes and Hermes South Mineral Reserve are outlined below.

15.2.4 Open pit Mineral Reserve

The Hermes open pit Mineral Reserve at 31 December 2019 is shown below in Table 15-7.

Table 15-7 Hermes Mineral Reserve Estimate at 31 December 2019

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	860	1.0	30	-	-	-	860	1.0	30
Hermes South (80% JV)	500	1.3	20	–	–	–	500	1.3	20
Total	**1,350**	**1.1**	**50**				**1,350**	**1.1**	**50**

Notes:

1. The Mineral Reserve estimate is reported on a 100% ownership basis. Hermes and 80% JV basis for Hermes South
2. Pit optimisation was conducted. Using a long term gold price of A$1,925 per ounce (U$1,348 per ounce)
3. An incremental gold cut-off grade of 0.40 g/t Au was used to define ore, which was calculated using variable costs only, with the fixed costs to be covered by underground mining operation.
4. The tonnes and grades are stated to a number of significant digits reflecting the confidence of the estimate. Since each number is rounded individually, the table may show apparent inconsistencies between the sum of rounded components and the corresponding rounded total.

15.3 Plutonic stockpiles

All open pit stockpiles are completed.

15.4 Changes in the Mineral Reserve estimate over time

The tonnes and ounces changes between 31 December 2018 and 31 December 2019 (NI 43 101) result from:

- Plutonic Underground Mineral Resources have changed significantly since the last Reserve update as detailed in Section 15, as summarised in Figure 15-2. This is mainly related to significant changes in Mineral Resource estimation methodologies.

Figure 15-2: 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 2019 UG Mineral Reserve	2,600	4.0	330	1,100	4.4	150	1,500	3.7	180
Dec 2018 UG Mineral Reserve	2,300	4.7	340	1,200	4.9	190	1,000	4.5	150
Variance	**300**	**-0.7**	**-10**	**-100**	**-0.5**	**-40**	**500**	**-0.8**	**30**
Variance %	**13%**	**-16%**	**-3%**	**-8%**	**-10%**	**-21%**	**50%**	**-19%**	**20%**

- Plutonic Open pit Mineral Resources have also changed significantly since the last Reserve update as detailed in Section 15, as summarised in Figure 15-2. This is mainly related to mining depletion, significant changes cost parameters and Mineral Resource estimation methodologies.

Table 15-3 Hermes Open Pit Mineral Reserve Variance to Previous

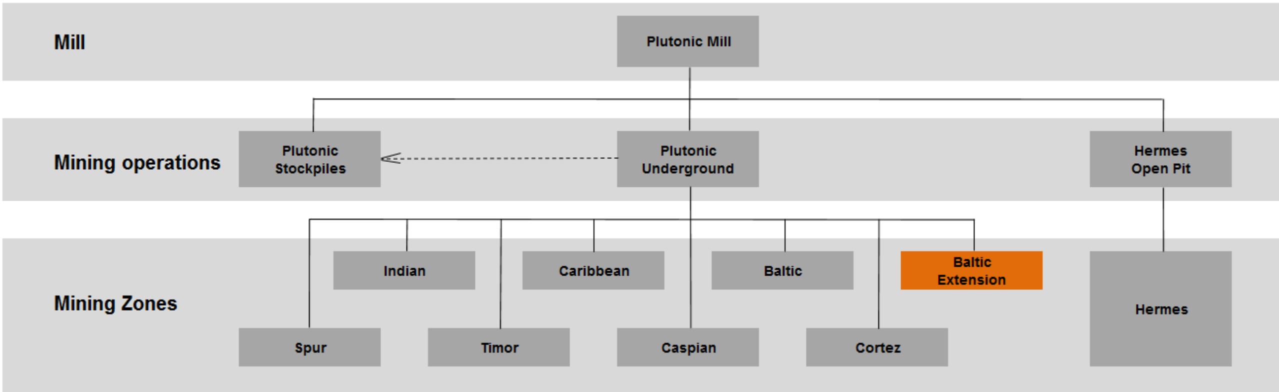
	Total			Proven			Probable		
	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz	Tonnes kt	Grade g/t	Ounces koz
Dec 2019 OP Mineral Reserve	1,350	1.1	50	-	-	-	1,350	1.1	50
Dec 2018 OP Mineral Reserve	1,740	1.3	71	230	0.9	7	1,510	1.3	64
Variance	**-390**	**-0.2**	**-21**	**-230**	**-0.9**	**-7**	**-160**	**-0.2**	**-14**
Variance %	**-22%**	**-16%**	**-30%**	**-100%**	**-100%**	**-100%**	**-11%**	**-16%**	**-22%**

- 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 2019 was from mining operations at Plutonic Underground (underground mining methods) and the Hermes Open Pit which commenced in December 2017. The life-of-mine plan anticipates continued ore feed from these mining operations. Figure 16-1 shows the relationship between the mill, mining operations, and mining zones feeding the mill: items shown in brown are previously unmined areas.

Figure 16-1 Mining operations and deposits feeding the Plutonic Mill



There is substantial site history and experience with the underground mining methods employed. The only previously unmined area in the underground Reserve mine plan is the Baltic N1/N2 Extension area, which is envisaged to continue to employ those mining methods.

Open pit mining has been undertaken by Billabong at Hermes over the last few years and the open pit Mineral Reserve is based on 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 eight active mining zones as shown in Figure 16-2. Seven of these mining zones are well-established having been active for a number of years (Established Areas). The eighth zone, Baltic N1/N2 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 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 located 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 a number of internal ramps in place to access the mining zones. A mine schematic of the main Plutonic area is shown in Figure 16-2, with the separate Plutonic East underground workings shown in Figure 16-3.

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 – 84%;
- Airleg stoping – 4%; and
- Ore development – 12%.

Figure 16-2 Plutonic Main Underground Reserves plan

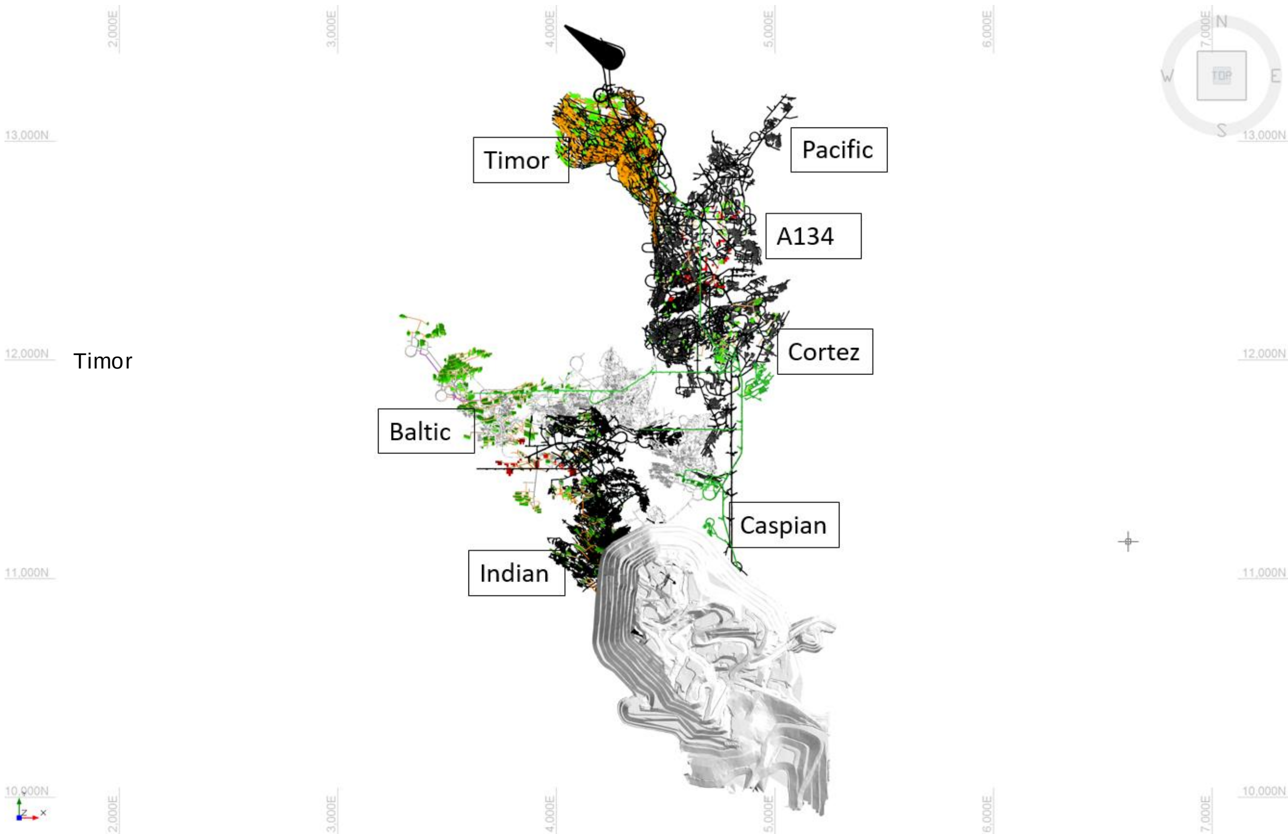
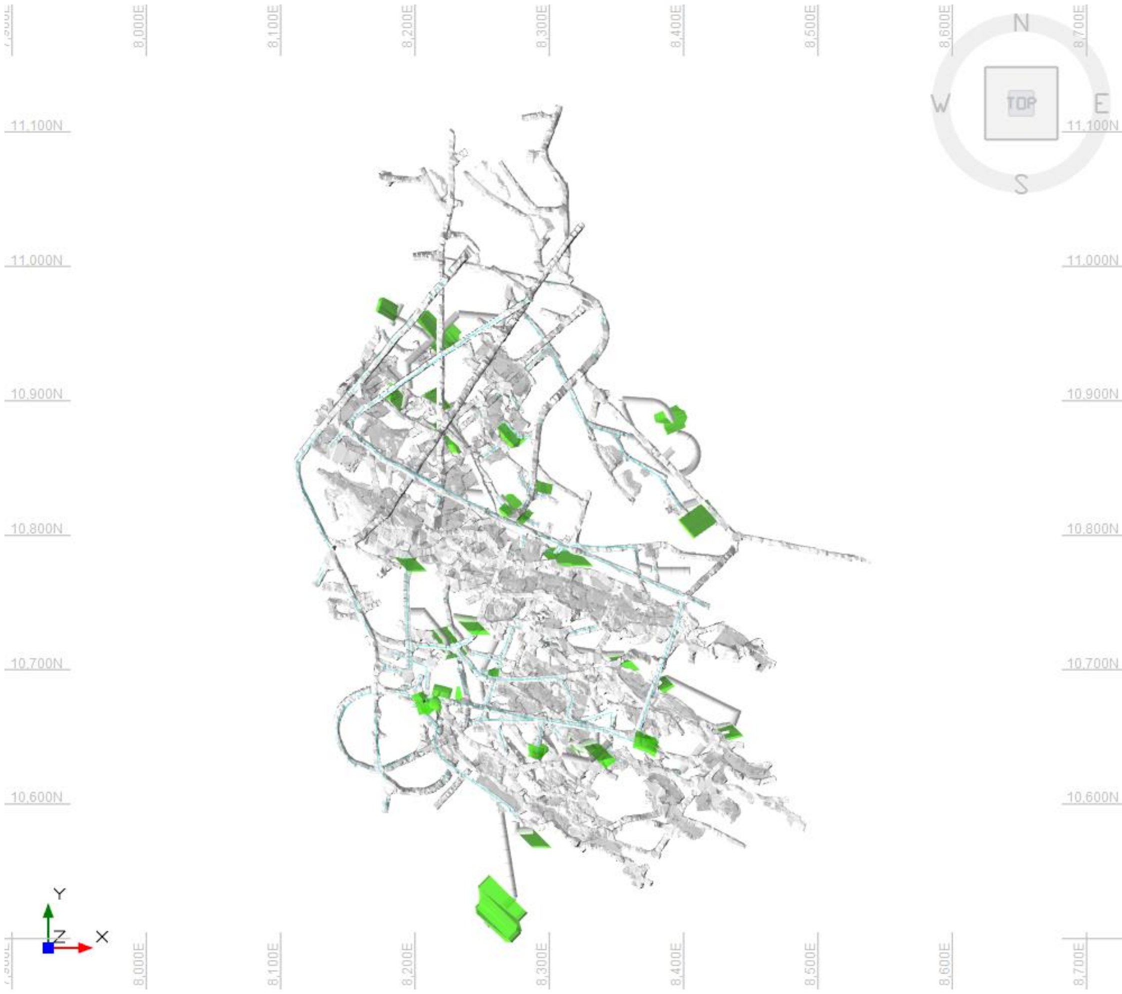


Figure 16-3 Plutonic East Underground Reserves plan



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 with the generation of a PBM which is based on the Resource block model and modified to reflect localised geological features, and any infill drilling. Development designs are based upon the PBM. Stope designs are prepared based upon the MRM. 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 15 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	LH517 Loader	2014
	LH517 Loader	2017
	LH517 Loader	2018
	LH514 Loader	2015
	LH514 Loader	2017
	LH514 Loader	2018
	R1300G Loader	2005
Truck	TH663 Truck	2014
	TH663 Truck	2014
	TH663 Truck	2014
	TH663i Truck	2018
	TH663i Truck	2018
Support	IT62i Integrated tool carrier	2008
	WA250 Integrated tool carrier	2006
	WA250 Integrated tool carrier	2006
	IT930H Integrated tool carrier	2008
	IT908H Integrated tool carrier	2010
	Getman Anfo charger	2013
	Getman Anfo charger	2003
	12H Grader	2006

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 5.5 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 4.3 m high by 4.5 m wide headings in Timor and Plutonic East and 4.3 m high by 4.0 m wide headings in Spur and Baltic. Current mining of ore drives is done at 4.5m high and 4.5m 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 ~520 m3/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 work places. 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 pastefill 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 ~~o~~ of 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

Open Pit Mining at Billabong is at Hermes Complex, which is about 65 kilometres from Plutonic. The Hermes Complex consists of two project areas (see ***Figure 16-4 Hermes Complex Layout***) –

- **Hermes Project** – It has following four open pit cutbacks (see ***Figure 16-5 Hermes Project Layout***)–
  - Trapper
  - Klinger
  - Hawkeye
  - Winchester

- **Hermes South Project** – It has following one open pit (see ***Figure 16-6 Hermes South Project Proposed Layout***) –
  - Wilgeena

Figure 16-4 Hermes Complex Layout

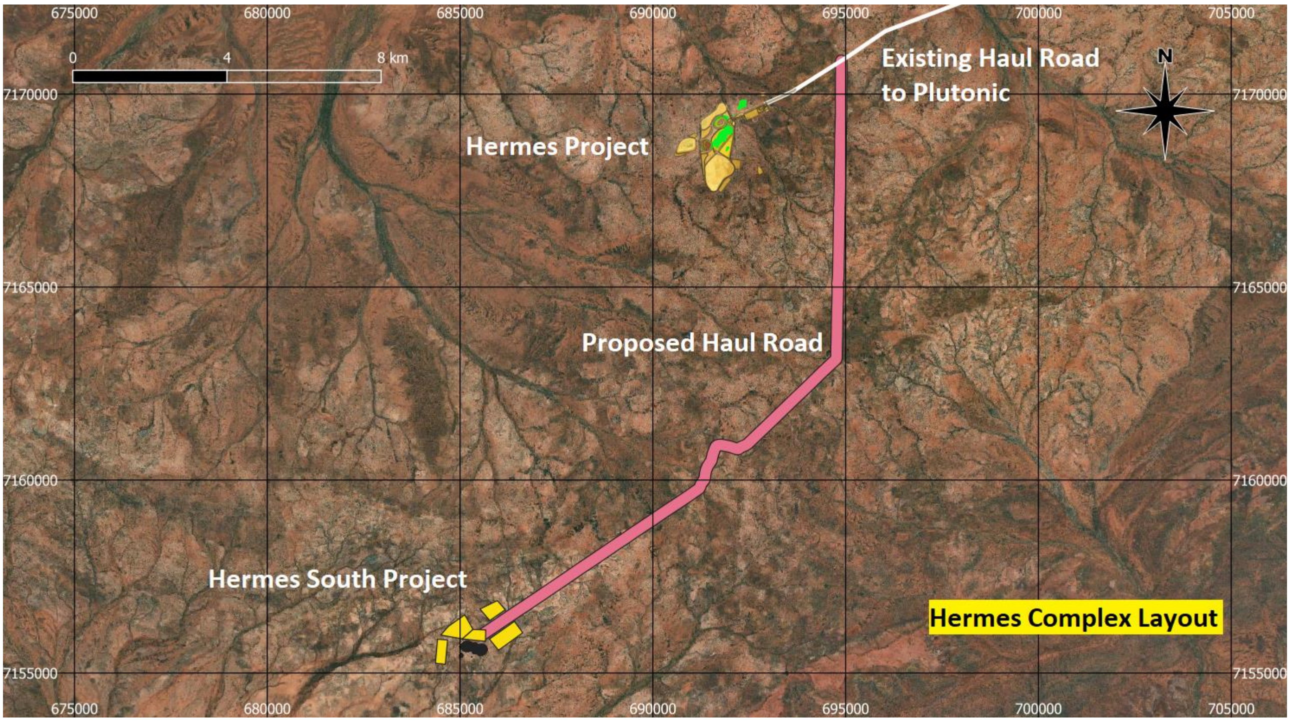


Figure 16-5 Hermes Project Layout

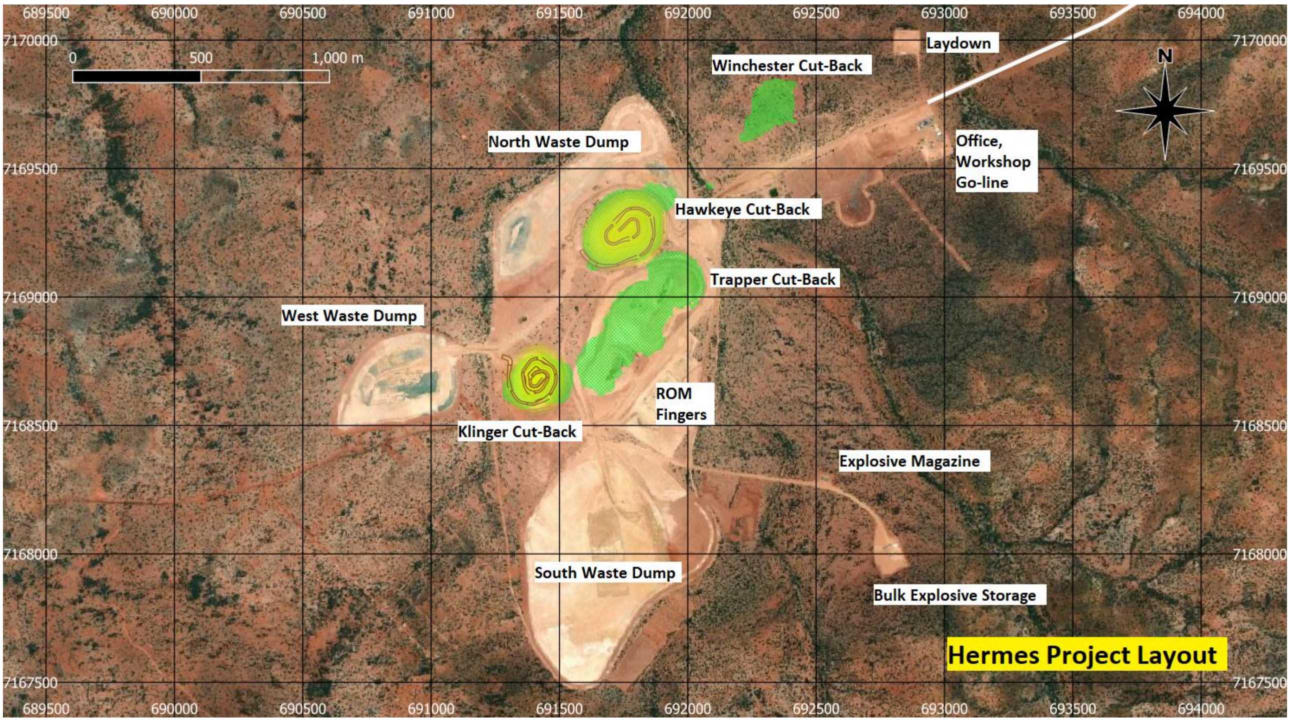
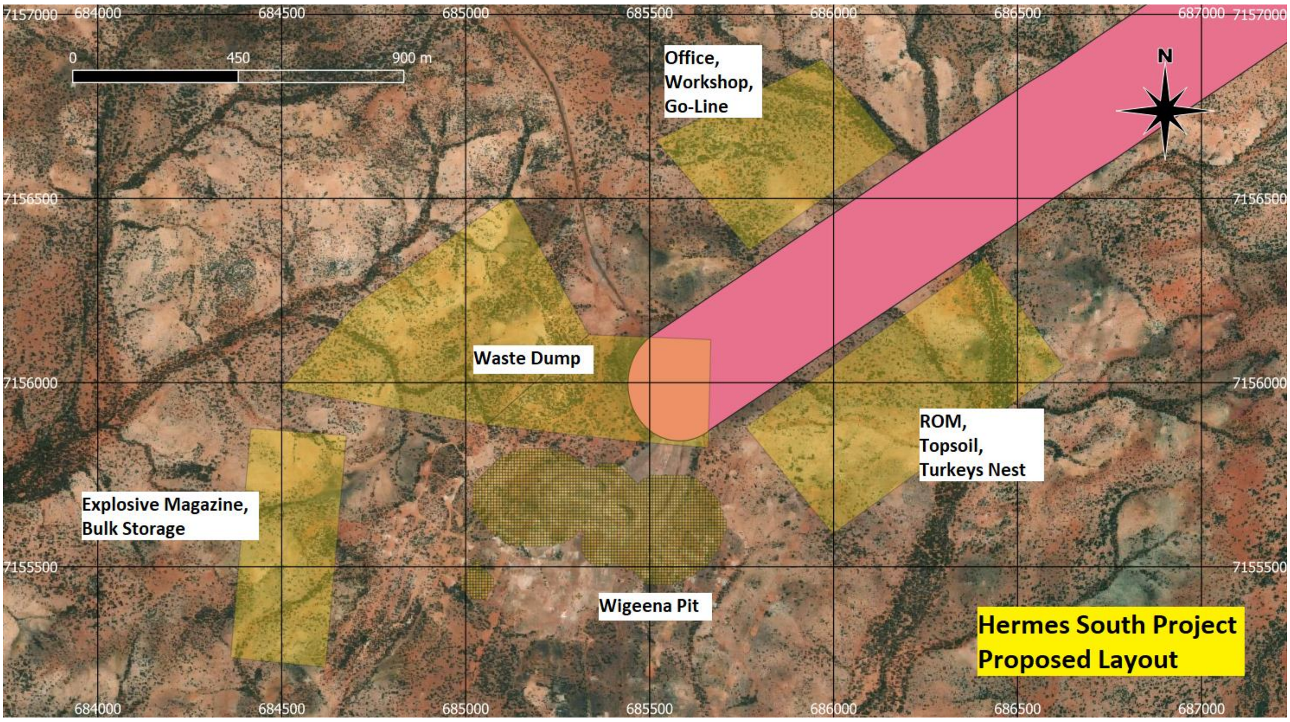


Figure 16-6 Hermes South Project Proposed Layout



The Hermes Project commenced being mined in December-2017 and paused in May-2019, as below –

- Trapper Pit started in December-2017 & paused in April-2019. Trapper was mined in four stages
- Hawkeye Pit started in December-2017 & paused in January-2019
- Klinger Pit started in April-2018 & paused in December-2018
- Winchester Pit ran for a month in May-2019, contour mining near surface deposit only.

During this period, a total of about 62,000 ounces of saleable gold is produced from Hermes Project.

The Hermes South Project is about 20 kilometres south of Hermes Project. Historically, prior to Billabong take-over, contour mining very near to surface is done in Wilgeena Pit.

All four pits in the Hermes Project area 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 being stockpiled adjacent to each pit exit before being loaded onto road trains for transport along the haul road to Plutonic 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. The water table at Hermes is estimated at a nominal 29 m below the pit crest. 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 is stockpiled according to grade and rock type on stockpiles within the Hermes Complex area. Highway-style side-tipping road trains with a nominal payload of 220 t are loaded with ore from stockpiles at Hermes for transportation to the Plutonic ROM pad and stockpiled separately by material type and grade via the Billabong's owned 64 km haul road. The frontend loader (FEL) on the Plutonic ROM pad maintains stockpiles. A rock breaker is maintained at both Hermes Complex stockpiles and 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.

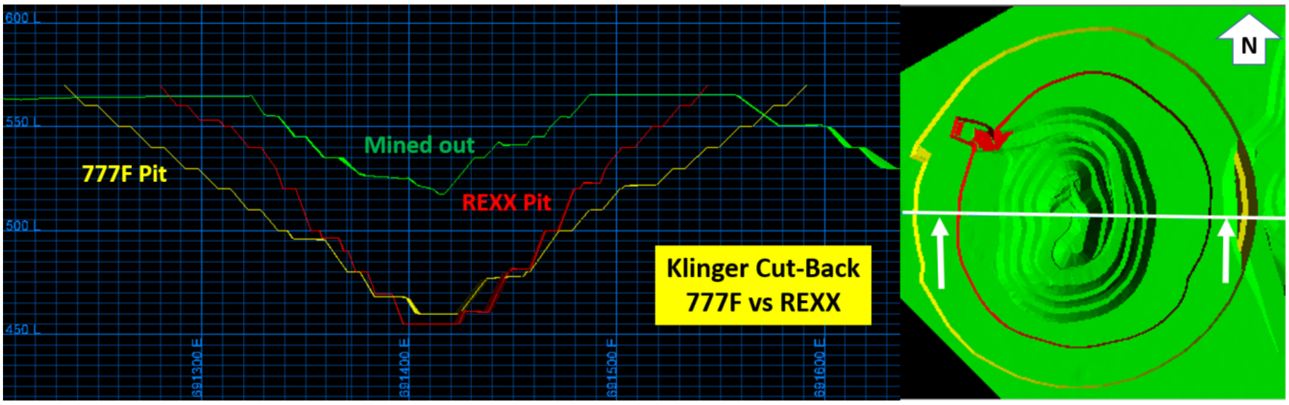
Waste rock dump sides are progressively battered down to the final design slope at the completion of each segment. Topsoil is placed using the ancillary equipment on the crest of these walls in readiness for spreading over the slopes. At the completion of mining, stockpiled topsoil will be re-spread 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.

Hermes Project Open Pit mining is paused in May-2019 to re-asses the pit economics. Hermes Expansion study is done to improve pit economics. Different combination of mining excavators and haul trucks are considered to continue mining further cutbacks of the open pits. The aim is twofold –

- improve mining precision, thus reducing ore loss & ore dilution
- reduce the quantity of waste to be mined, thus reducing strip ratio.

BIS's REXX 160 t trucks and 120 t class hydraulic excavators in a backhoe configuration is selected. As the ore body is near vertical, REXX trucks brings in the cut back walls, thus reducing quantity of waste to be mined and still reach the ore bottom safely, as shown below in ***Figure 16-7 CAT 777F vs BIS REXX trucks***. REXX trucks have reduced quantity of waste mining up to 50% as compare to CAT 777F trucks.

Figure 16-7 CAT 777F vs BIS REXX trucks



BIS REXX trucks have higher load carrying capacity and smaller footprint in the open pits as compared to CAT 777F, as shown below in ***Table 16-2 CAT 777F vs BIS REXX trucks***.

Table 16-2 CAT 777F vs BIS REXX trucks

		CAT 777F	BIS REXX
Rated Payload	t	90	160
Equipment Dimensions	m	10.6 L x 5.2 H x 6.5 W	14.3 L x 4.9 H x 4.8 W
Turning Circle	m	25.3	13.6
Haul Road Gradient	%	10%	12%
Single Lane Width	m	15	8
Dual Lane Width	m	22	15

Klinger cut-back (see ***Figure 16-8 Klinger Cut-Back***) & Hawkeye cut-back (see ***Figure 16-9 Hawkeye Cut-Back***) study is complete and Hermes Reserves in this report is based on them. There is also potential Trapper cut-back & Winchester cut-back, which is included in Hermes Resources in this report. Study to convert them to Reserves is currently underway.

Figure 16-8 Klinger Cut-Back

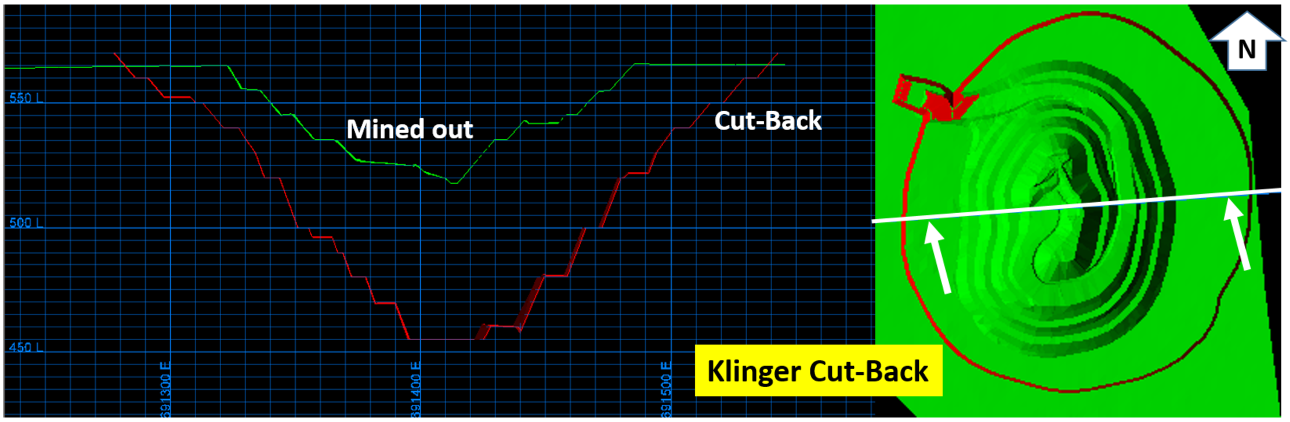
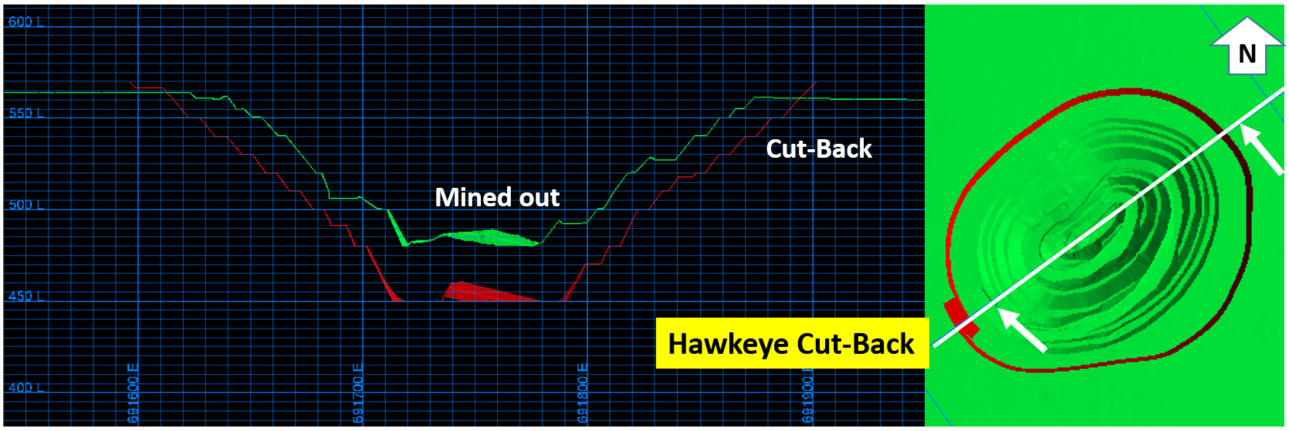


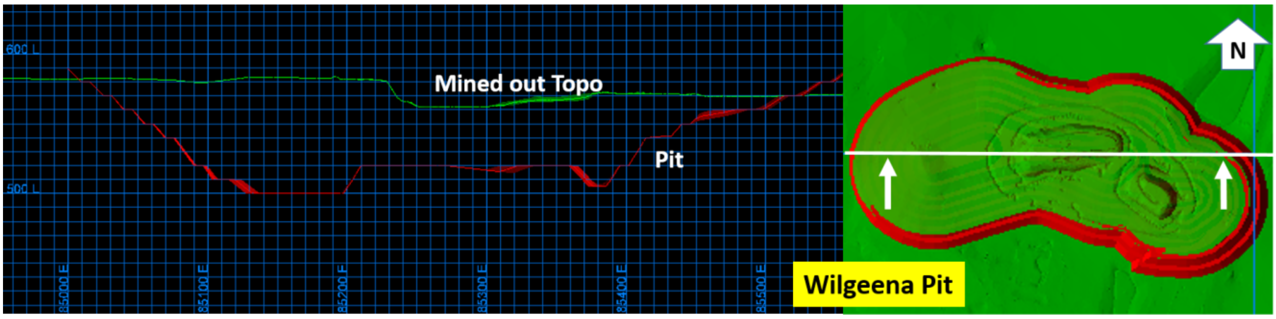
Figure 16-9 Hawkeye Cut-Back



Hermes South Project study also compared pit economics for both CAT 777F and REXX trucks and for the Wilgeena Pit (see ***Figure 16-10 Wilgeena Pit***) also REXX trucks and 120 t class hydraulic excavators in a backhoe configuration are selected.

Mining Permissions for access & mining Wilgeena Pit is under process and is estimated to take 4 months. Thereafter, construction of the haul road from Hermes to Hermes South is expected to take 2 months. Once mining approvals are received, pre-stripping of Wilgeena pit can start in parallel with haul road construction, aligning start of ore mining to ore haulage to Plutonic for processing.

Figure 16-10 Wilgeena Pit



16.2.2 Waste rock placement

Approximately 45–70% of the mined waste rock volumes will be isolated within the WRD landforms for geochemical and erosion control. The WRD landforms are designed as rainfall store and release systems, due to the high evaporation and evapotranspiration rate in the region and to encapsulate the erosive saprolite material (30-60%) around the potentially acid forming (PAF) material (5-15%).

16.2.3 Site layout

The office and workshop area are near the entry to the mine site to control vehicle entry to the mine, minimise traffic interaction with the mining fleet, and 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.

An overview of the site layout is shown in ***Figure 16-4 Hermes Complex Layout***, ***Figure 16-5 Hermes Project Layout*** & ***Figure 16-6 Hermes South Project Proposed Layout***

16.2.4 Mining equipment fleet

The primary mining fleet for Hermes Complex consists of:

- 2 x 120-t hydraulic backhoe excavator (such as Hitachi EX1250) with 6.7 m3 sized bucket
- 4x 160-t REXX haul truck (from BIS)
- 2 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.

16.2.5 Mining infrastructure

The major Hermes Complex 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)
- Microwave link back to Plutonic for voice and data communications

Power is provided by 1 x 150kva portable generator and water from a borefield. A small “under-sink” reverse osmosis plant is used to provide potable water and a lined turkeys-nest dam with water standpipe is used for dust suppression. In-pit communications is by UHF radio repeater.

16.3 Mining schedule

The Plutonic life-of-mine plan (LOM) 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 in spreadsheets. 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. From December-2017 to May-2019, Hermes Project produced 1.5 million tonnes of ore.

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 Resource that may not have formed part of the LOM schedule that then makes its way into the mine plan.

Billabong is undertaking a full mine review targeting a total production profile in excess of 100koz pa with a minimum five year LOM underpinned by the updated 2019 Reserves and Resource base.

17 Recovery methods

17.1 Summary

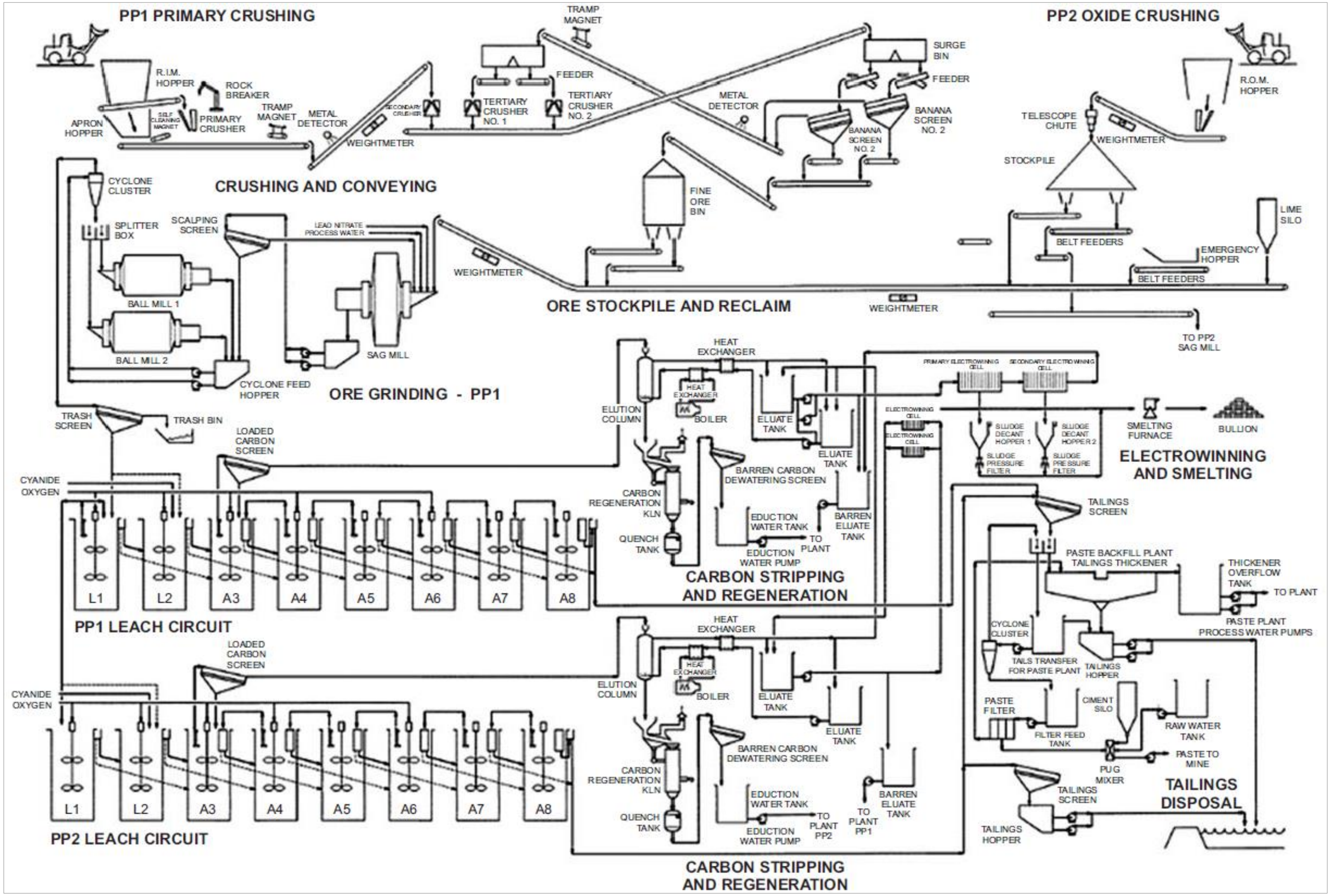
Plutonic Gold Mine has been in operation since August 1990. The original process plant (PP1) consisted of an open circuit jaw crusher, coarse ore stockpile, semi-autogenous grinding (SAG) mill and ball mill, two leach tanks, and six carbon adsorption tanks. A three-stage hard rock crushing circuit was 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.

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 4.5m diameter by 5.63m long primary mill and two Svenson 4.2m diameter by 5.63m 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). 78mm 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 165 tph with a primary mill and one ball mill configuration; this however can be increased to 230 tph by running the stand-by ball mill. 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 (1mm) 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 1,020m3 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 (Picagold A210 GS supplied by Jacobi) 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 (AARL) 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 (LNG) 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 (WAD) cyanide 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 cyanide analyser is used to continuously monitor the WAD cyanide 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 tailings storage facility (TSF). There are three paddock-style tailings storage facilities. TSF one is reclaimed, TSF two and three 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 TSF three 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% to 91%, with the average recovery over the four-year period at 84%.

Improved plant recovery since March 2018 corresponded with oxide/transitional ore processed sourced from Hermes

Figure 17-2 Plutonic - Process recoveries vs plant throughput

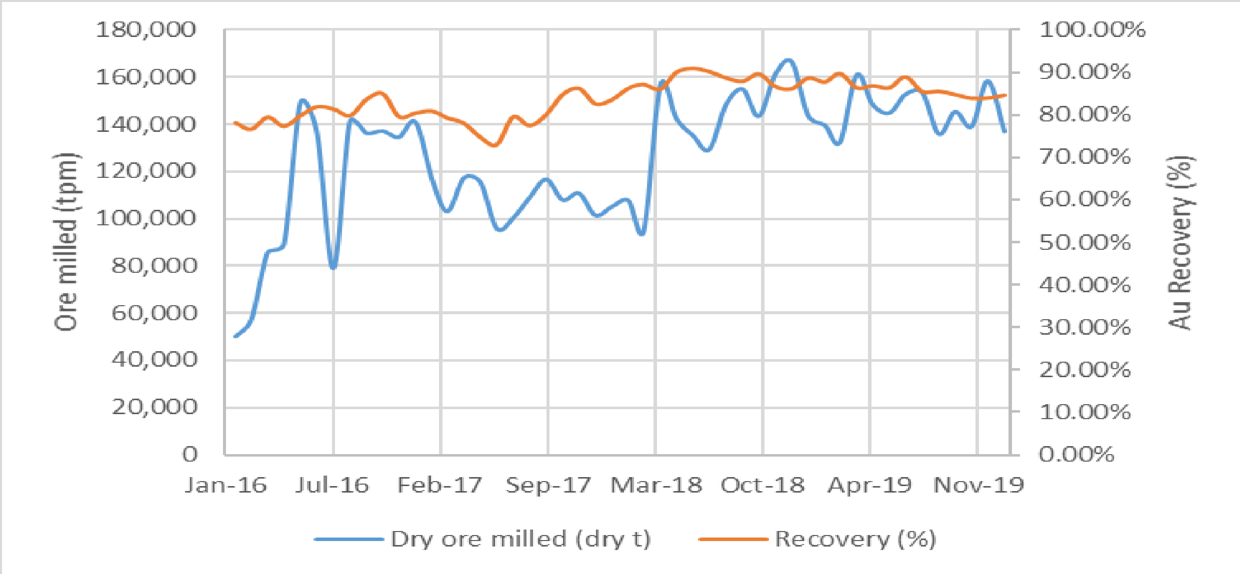


Figure 17-3 shows the historical processing recoveries against the calculated and assayed head grades, showing that there is no obvious correlation between head grade and recovery. The calculated and assayed head grades are in good agreement and have ranged from 1.34 g/t Au to 3.04 g/t Au during the observed period, with an average head grade of 2.04 g/t Au.

The tails grade during the same period of time has ranged from 0.18 g/t Au to 0.69 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

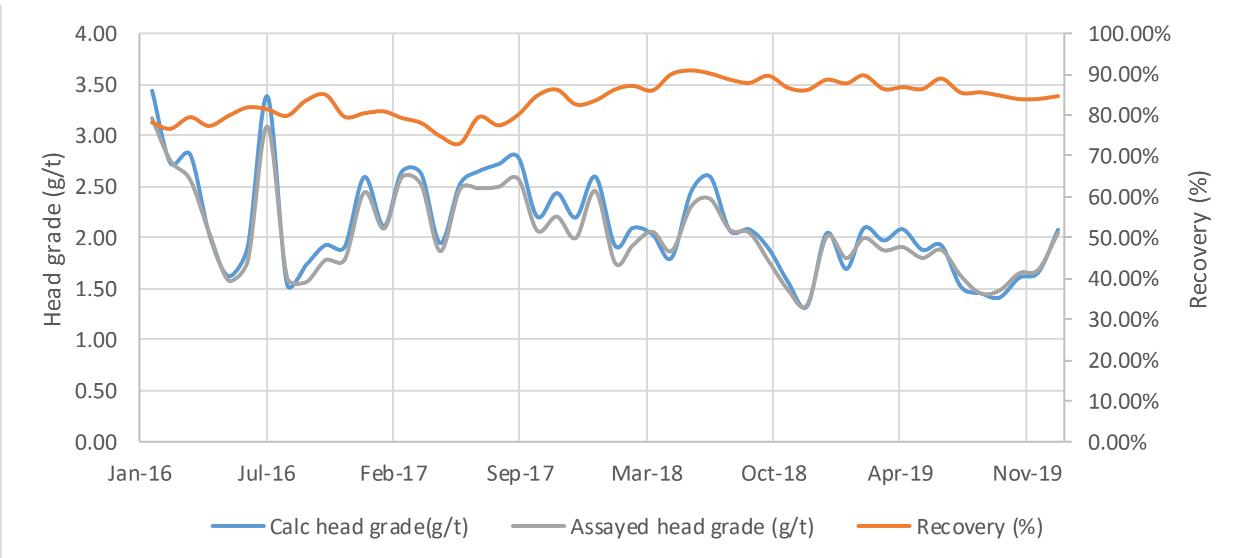
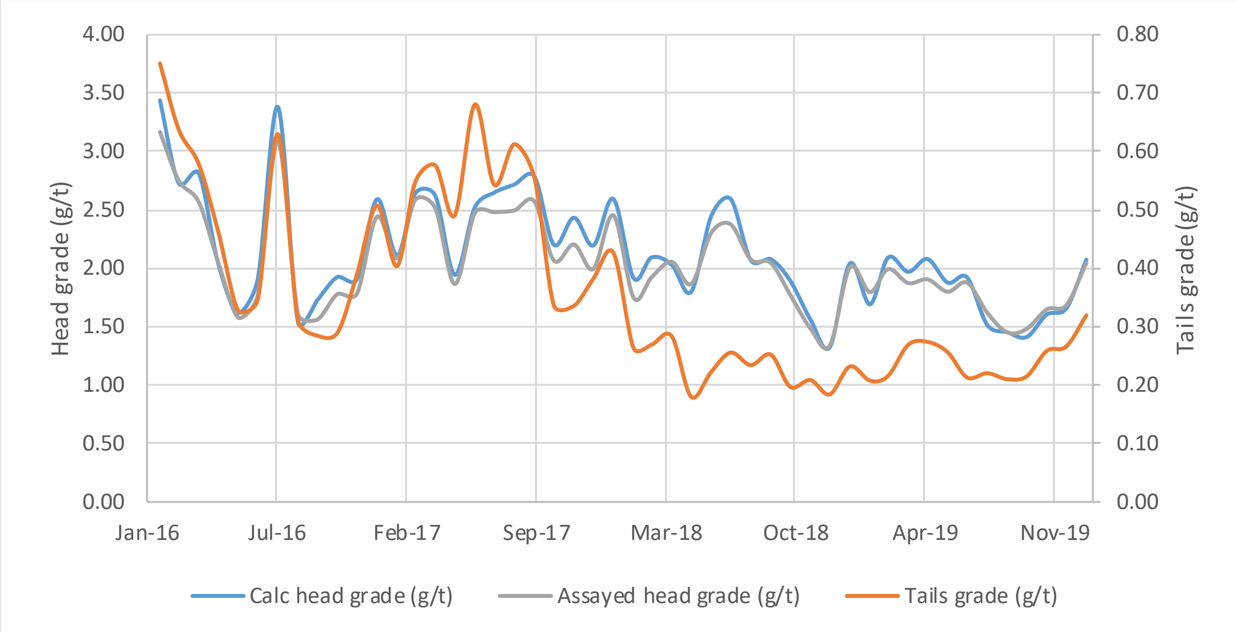


Figure 17-4 Plutonic Mill - Head grades vs tails grade



17.4 Process operating costs

Historical process operating costs have varied between A$15.37/t ore treated to A$32.46/t, with an average processing cost of US$17.76/t for the period reviewed. Average processing costs for 2019 were at A$19.25/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.

Tailings storage facilities (TSF) expansion is planned for 2020/2021.

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% to 91%, and the average recovery of 86% achieved in 2019.

Historical process operating costs varied between A$15.37/t ore treated to A$32.46/t, with an average processing cost of A$19.95/t for the past four years. Projected future operating costs are estimated at approximately A$22/t.

TSF expansion capital expenditure is expected in 2020 to cater for the remaining LOM plan.

18 Project infrastructure

The Plutonic 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 jet aircraft. There is an aircraft fuel tank and fuelling facility at the airstrip. From Perth, the flight time is approximately 90 minutes. There is also an all-weather 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 (four primary units, with an additional 4 units providing standby when servicing is required) 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 or the Main Pit.

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

There are three paddock-style tailings storage facilities, two of which are in operation (TSF2 and TSF3).

For TSF3, a 2.5m lift was completed in Q3 2018 and discharging of tailings into TSF3 commenced on Q4 2018. The final lift is planned for Q4 2020.

A further 2.5m lift on TSF2 was completed July 2019 with the final lift planned for 2020.

Construction of TSF4 is to commence in 2021

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. Billabong 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.

Billabong can then sell this pure gold and silver for cash and the doré bar becomes the property of the refiner.

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.

UG 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

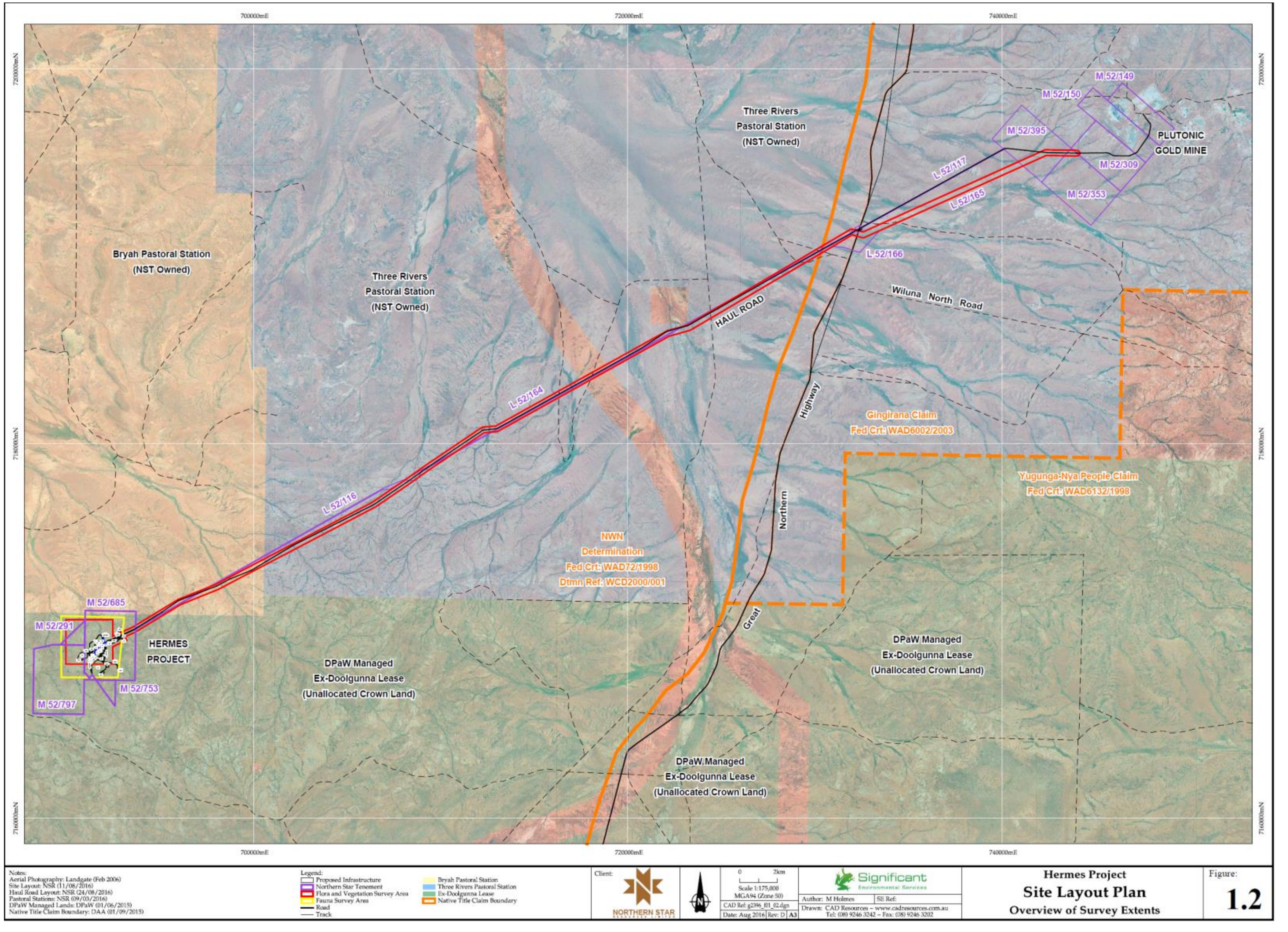
Mining projects in Australia typically require land access under three main forms of title:

- 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



Source: Significant Environmental Services 2016 (Hermes Project, Figure 1.2: Site Layout Plan).

20.2 Real property title

20.2.1 Introduction

The provisions of the (Western Australian) Mining Act 1978, 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 Northern Star. The lease will be transferred to Billabong as part of the sale of the lease.

Superior Gold has contracted with a pastoral management company to manage and work the land subject of the pastoral leases.

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 (WA) for operation of the pipeline for the use of natural gas for power generation purposes at the Plutonic Gold Operations. 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, and the proponent holds the pastoral lease.

20.2.3 Hermes

The Hermes project 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 project is also located partially within the Bryah pastoral lease (Lease no N049600) which is currently held by Northern Star. The transfer of the pastoral lease from Northern Star to Billabong is in process.

Billabong has hired a pastoral manager to manage the work and the land the subject of the pastoral leases.

Suitable real property land access is in place by way of the grant of existing mining tenure for the Hermes project. There is no compensation payable to the pastoral leaseholder as the operation does not affect any existing improvements on the lease, and the proponent holds the pastoral lease.

20.2.4 Wilgeena – (Hermes South)

The Bryah Basin joint venture 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 unincorporated joint venture by spending A$1.2 million (US$888) over three years beginning April 2015. In April 2018, the Company gave notice to the joint venture partner that it had incurred the required expenditures during the earn-in period.

20.2.4.1 Haul road corridor

The Haul Road Corridor traverses the following real property titles:

- The Three Rivers pastoral lease (Lease no N049591), held by NST, to be transferred to Billabong.

- The Bryah pastoral lease (Lease no N049600) held by NST, to be transferred to Billabong.
- 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.

20.2.5 Mineral tenure

Mineral tenure is discussed in Section 4.

20.2.6 Native title

20.2.6.1 Overview of native title and mining tenure

Billabong's native title adviser[5] 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 Native Title Act 1993 (CTH) (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 Department of Mines and Petroleum 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 1978 (WA) provides that holders of mining tenements are liable for compensation, where awarded, by reason of their mining tenements having affected native title.

20.2.6.2 Plutonic tenements and eastern section of the Haul Road Corridor

- The Plutonic Project tenements (Plutonic Project Tenements) lie inside the Gingirana registered native title application (WC2006/002 & WAD6002/2003) (Gingirana Native Title Claim), registered on 13 April 2006. The Gingirana native title claim was determined by way of consent on 7 December 2017 at a

[5] Matthew Hansen, Principal, Extent Legal Pty Ltd.

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.
- Superior Gold is currently negotiating a Negotiation Protocol with the Marputu Aboriginal Corporation, the Registered Native Title Body Corporation (RNTBC) for the Gingirana People.
- Those pending Plutonic Project Tenements, that are yet to be granted, being L52/203 and the recently applied for P52/1606 (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.

20.2.6.3 Hermes tenements and western section of the Haul Road Corridor

- The Hermes Project tenements (Hermes Project Tenements) lie inside the Nharnuwangga, Wajarri and Ngarlawangga Peoples (NWN People) native title consent determination (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 29 August 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 an Indigenous Land Use Agreement (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 the prescribed body corporate which will hold the native title rights in trust for the NWN People (Jidi Jidi Aboriginal Corporation or 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 (WA) which were, prior to 1994 enclosed or improved;
    - Mining leases and general purpose leases granted prior to 1994 under the Mining Act 1978 (WA) and gold mining leases and coal leases granted under the Mining Act 1904 (WA); and
    - Any interests that are wholly inconsistent with native title rights and interests.
- The Hermes Project 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 the Jidi Jidi and NWN People. In December 2015, Northern Star entered into terms with the 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 the areas of extinguishment existed within NWN Consent Determination area. Effectively, the NWN People disagreed with the provisions contained with 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 1978 (WA) 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 have executed those agreements on 22 June 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 12 October 2016.
- Billabong has now negotiated a Deed of Variation – Heritage Deed to include all tenure in which Billabong has a beneficial interest, including the Bryah Basin JV tenure. The Deed of Variation was executed by both Parties (Billabong and the Jidi Jidi Aboriginal Corporation) on 28 October 2019.
- The Deed of Variation provides for survey terms for Heritage Protection surveys to be conducted on the Bryah Basin JV tenure and for the negotiation of a Further Productive Mining Agreement for any deposits discovered within the Bryah Basin tenure.

20.3 Mining and environmental approvals

20.3.1 Overview of approvals requirements

The primary mining and environmental approvals for a mining project in Western Australia typically include:

- Mining Leases, Miscellaneous Licences and an approved Mining Proposal under the Mining Act 1978.
- Environmental assessment under the Environmental Protection Act 1986 (WA) (if required).
- Approval under the Environment Protection and Biodiversity Act 1999 (Cwlth) (if required).
- Works Approvals and operations licence under the Environmental Protection Act 1986.
- Permit to clear native vegetation under the Environmental Protection Act 1986.
- Permits and licences for water bores under the Rights in Water and Irrigation Act 1914.
- Approvals under the Aboriginal Heritage Act 1972.

Other secondary permits may also be required, however, these are excluded from consideration as they are typically lower risk, once primary mining and environmental approvals are in hand.

20.3.2 Mining approvals

20.3.2.1 Plutonic

The following approvals were in place during construction, or are currently in place for operation, for the Plutonic operation:

- Operational Licence under the Environmental Protection Act 1986 (valid 4/09/2014 – 17/09/2024)
- Plutonic Gold Project Notice of Intent (valid 7/08/1989 onwards)
- Plutonic Gold Project Addendum Notice of Intent for the development of the Area 4 Underground Project (October 1996) (valid 13/05/1997 onwards)

- Plutonic Gold Project Notice of Intent for the development of the Zone 550 Project (valid May 1996 onwards)
- Plutonic Gold Mine Mining Proposal (MP Reg. ID 84188) Area 4 and Perch Pit Expansions (11 March 2020)
- Plutonic Gold Project Tailings Dam Works Approval (valid 02/09/1991 onwards)
- Plutonic Gold Project Tailings Dam (TSF2) Works Approval (valid 16/09/1991 onwards)
- Plutonic Gold Project Notice of Intent/ Works approval for TSF3 (valid 07/01/1998 onwards)
- Mining Proposal (MP Reg ID 81643) Plutonic Gold Mines Tailings Storage Facility 4 and 5 (15 April 2020)
- Clearing Permit C8616/1 - Tailings Expansion for Mining Leases M52/148 and M52/170 (valid 5/10/19 to 04/10/2024)
- Clearing Permit C8651/1 - Area 4 and Perch for Mining Leases M52/148, M52/149, M52/170, M52/295, M52/301 (valid 16/11/19 to 15/11/2024)
- Department of Water and Environmental Regulation (DWER) construction and altering wells licences (CAW 202149)

In addition, the Corporation holds a groundwater licences for Plutonic which permits it to abstract production and potable water from Borefields 1 and 2 located 30 km and 15 km west of the Plutonic Gold Operations plant. The water extracted pursuant to the licence (GWL 151450(7) a) is permitted to be used for mineral ore processing and other mining purposes, mining camp purposes, earthworks and construction purposes, including dust suppression and mine dewatering from open pit and underground.

The Plutonic Mine Closure Plan (MCP Reg. ID 72068, dated 16 August 2018) is required to be updated and resubmitted to the Department of Mines, Industry Regulation and Safety every two years.

There are currently no outstanding approval requirements for the Plutonic operation other than for:

- Petroleum pipeline licence PL35 (valid from 14/05/97) – Ministerial consent for the transfer of petroleum pipeline licence PL35 is underway. The Department of Mines, Industry Regulation and Safety has requested further information from Billabong which has now been provided; and
- Three Rivers and Bryah pastoral leases – Ministerial consent for the transfer of the two pastoral leases is underway. Cabinet endorsement of the transfer of the pastoral leases is needed in addition to ministerial consent (as Billabong is a foreign controlled corporation) so this is expected to b e a lengthy process).

Secondary approvals and permits are also in place for the current operations.

20.3.2.2 Hermes and Hermes haul road corridor

The following approvals were in place during construction, or are currently in place for operation, for the Hermes operation:

- Mining Proposal (MP Reg. ID 64986) - Mining Proposal Hermes Gold Project dated 12 March 2017
- Mine Closure Plan (MCP Reg. ID 71993) - Mine Closure Plan Hermes Gold Project
- Mining Proposal (MP Reg. ID 74666) - Hermes Gold Project – Intent to Construct Bioremediation Area dated 30 July 2018
- Mining Proposal (MP Reg. ID 78678) and Mine Closure Plan (MCP Reg. ID 78678) dated 28 February 2019 and approved 3 May 2019.
- Clearing Permit CPS 7249/1
- Works approval (Dewatering) finalised and likely to be signed off by DMP by end of November 2016 – W5988_2016_1.
- Operating Licence application (Dewatering) has been completed and submitted to DMP for prescribed premises.
- Department of Water and Environmental Regulation (DWER) groundwater licences for the mine and haul road (GWL 183063(2) and GWL 182889 (5), respectively.

- Department of Water and Environmental Regulation (DWER) construction and altering wells licence for the mine (CAW 181683) and haul road (CAW182885). (CAW 203537(1) was granted in 2019 to allow bore construction on two miscellaneous licences for dust suppression on the Hermes haul road.

20.3.3 Compliance

20.3.3.1 Plutonic

An Annual Environmental Report is required to be submitted to the Department of Mines, Industry Regulation and Safety in March of each year.

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. In 2014 this system was integrated, and was used for incident investigations, tracking corrective actions and managing internal audit and inspections. A site based Environmental Legal Obligations Register is currently being uploaded into the system to allow review and tracking of all legal obligations.

As of December 2019, there were no outstanding legal requirements for the Plutonic project.

20.3.3.2 Hermes and the haul road corridor

An Annual Environmental Report is required to be submitted to the Department of Mines, Industry Regulation and Safety in June of each year.

During 2019, a bore for dust suppression on the Hermes haul road was installed 15 km from Plutonic, in non-compliance of the tenement conditions for the underlying tenure. The bore and infrastructure were decommissioned and the breach was reported to DMIRS by Billabong. The site was rehabilitated and the track scarified. Billabong was notified by DMIRS that no further investigation would ensue.

20.3.4 Environmental policy and management system

The Plutonic operation maintained an ISO 14001 Environmental Management System in 2015. The system was audited in October 2015. Highlights from the audit include:

- The company has made consistent progress in improving its environmental practices to meet the requirements of the ISO 14001 standard.
- Non-Conformities and other issues raised at the previous surveillance assessment were seen to have been fully or partially addressed.
- The Mine has again continued to meet its main legal obligations (its licence conditions), although most of the environmental controls are now internal targets. Annual reports to the various authorities were sighted, including exceedance notifications to the Department of Environmental Regulation and the other authorities.
- The environmental portfolio now incorporates social responsibility which includes communications with stakeholders.

20.3.5 Waste rock

20.3.5.1 Plutonic

Open pit mining ceased in 2007. Plutonic has multiple waste rock landforms (WRLs), 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.

20.3.5.2 Hermes

Mine waste-streams generated from the Hermes deposits include 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 Non-Acid-Forming (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 is identified in-situ and is encapsulated on the 513 m RL in the Hawkeye pit.

20.3.6 Tailings

20.3.6.1 Plutonic

Studies into tailings geochemistry at Plutonic have concluded that the tailings stream NAPP can be classified as Barren to Non-Acid Forming, due to low sulphur concentration and the presence of carbonates.

As per Plutonic's Department of Water and Environmental Regulation (DWER) operational licence, Plutonic is required to monitor groundwater quality for the area surrounding the tailing storage facility's (TSFs). Water samples are collected to monitor the pH, total dissolved solids (TDS), weak acid dissociable cyanide (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.

Tailings are currently disposed of in a paddock style TSF with upstream lifts.

20.3.6.2 Hermes

Tailings from the Hermes project are disposed of in the existing Plutonic TSF.

20.3.7 Land

20.3.7.1 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.

20.3.7.2 Hermes

The Hermes project 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.

20.3.8 Water management

20.3.8.1 Plutonic

In June 2016, the Plutonic Gold Mine prepared a Site Water Improvement Program, under the direction of former Department of Environmental Regulation (DER). The report addressed:

- An assessment of the site water balance including dewatering rates, water storage capacity, water usage rats 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.

Additional investigations are ongoing to improve on site water management practices to minimise off-site discharges and enhance water utilisation across the site.

20.3.8.2 Hermes

Open Pit mines at Hermes are dewatered with both bores and in-pit sumps. Excess water is discharged to a nearby creek over a 200-metre length of creek-bed to minimise erosion and waterlogging risks. Groundwater is potable quality (around 500 mg/L TDS), hence salinity is not an issue. Clean and dirty water streams are separated, with dirty water treated (settling ponds, oil/water separator if necessary) before discharge to the environment.

20.3.8.3 Haul road corridor

The haul road corridor traverses a number of drainage lines. Culverts have been developed to allow water to flow beneath the haul road.

20.3.8.4 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 millimetres. 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.

20.3.9 Groundwater

20.3.9.1 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). Water is pumped via surface pipelines to the process plant, and distributed across the site. 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. The total groundwater licence allocation is 4,750 million litres per year.

No groundwater dependent ecosystems have been identified within the immediate area of groundwater abstraction. Groundwater monitoring is carried out in accordance with licence conditions.

20.3.9.2 Hermes

The pre-mining groundwater level within the open pits area of the Project is 29 m below ground level (mbgl), and the water quality is suitable for potable water supply considering its freshwater salinity and neutral pH, with TDS measuring 500 mg/L and pH 7.5.

The upper 80 m have been identified as having the most potential to provide groundwater inflows, and within this oxidised unit the upper 40 m has the most significant permeability. Below around 100 mbgl the formation is mostly very tight and likely to yield only minor inflows. The predicted cone of drawdown, as defined by the 0.2 m drawdown contour, extends approximately 2.7 km from the mine in a north-west–south-east direction and approximately 3.7 km from the mine along orebody strike in a southwest–north-east direction.

The groundwater level drawdown from mine dewatering is 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.

It has been estimated that four production bores will be required for effective dewatering of the pits, with in-pit sump pumps used to maintain the water table below the base of pits following advanced dewatering and mining.

20.3.9.3 Haul road corridor

Groundwater is unlikely to be significantly affected by the haul road.

20.3.9.4 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.

20.3.10 Ecology

20.3.10.1 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, as has been the process historically. 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 computer-data-bank surveys and opportunistic field surveys have been conducted for flora and fauna species at Plutonic over the years. None of these 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.

20.3.10.2 Hermes and the Haul Road Corridor

No conservation-sensitive vegetation community or species have been impacted by the Hermes Project and haul road corridor impacted, 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 improbable.

Field survey indicates that stygofauna in the project area are not unique and are well-represented elsewhere in the region. The subterranean fauna assessment also determined that the groundwater level drawdown from mine dewatering will have a negligible impact on stygofauna populations due to only a small proportion of their potential habitats being impacted in the area, and findings not suggesting any threat to stygofauna conservation values or the persistence of any stygofauna species.

20.4 Community

20.4.1 Social context and nearest sensitive receptors

The Plutonic Gold Operation exists within the Doolgunna ex-pastoral lease, now managed by the Department of Biodiversity, Conservation and Attractions (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 project area.

The Plutonic Gold Operation will be appropriately secured prior to any minesite activities commencing to ensure public and livestock access is prevented into any active areas.

The workforce operate on a fly-in, fly-out roster, with accommodation on a mine site camp.

As such, there is limited interaction between the operation and the wider community.

20.4.2 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.

20.4.3 Aboriginal cultural heritage

20.3.3.1 Plutonic

No heritage protection agreement currently exists in regards to Plutonic project. Superior Gold is currently negotiating a Negotiation Protocol with the Marputu Aboriginal Corporation, the Registered Native Title Body Corporation (RNTBC) for the Gingirana People, to apply to the broader Plutonic project. A number of archaeological and ethnographic surveys have been undertaken during the life of the mine. A search list of the Department of Indigenous Affairs sites and databases in order to identify both previously recorded archaeological and ethnographical sites have been prepared, and is considered in mine planning and operations.

20.3.3.2 Hermes

Heritage surveys were completed over the mining area and haul road, with clearance provided by the NWN People (and Jidi Jidi) to undertake the required ground disturbing activities (mining and construction of the Hermes haul road).

20.4.4 Non-aboriginal cultural heritage

20.3.4.1 Plutonic

The Heritage Council of WA has a State register with heritage listings and in the database no results come up 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.

20.3.4.2 Hermes

The Hermes project will not impact on any European heritage sites, based on searches of the Heritage Council of Western Australia (HCWA) Places Database (inHerit).

The Hermes project area is remote with no existing or pre-existing (historic) human settlement nearby. The historic (1892 to 1933) Peak Hill town and gold mining centre is located approximately 30km east of the Hermes project area. It is registered by the HCWA inherit database (Place number 25196).

20.5 Mine closure and security bonds

20.5.1 Regulatory regime and closure costs

Tenement holders operating on Mining Act 1978 (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 US$37,000 must report disturbance data but are not required to pay into the fund.

The fund essentially replaced the need for 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 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.

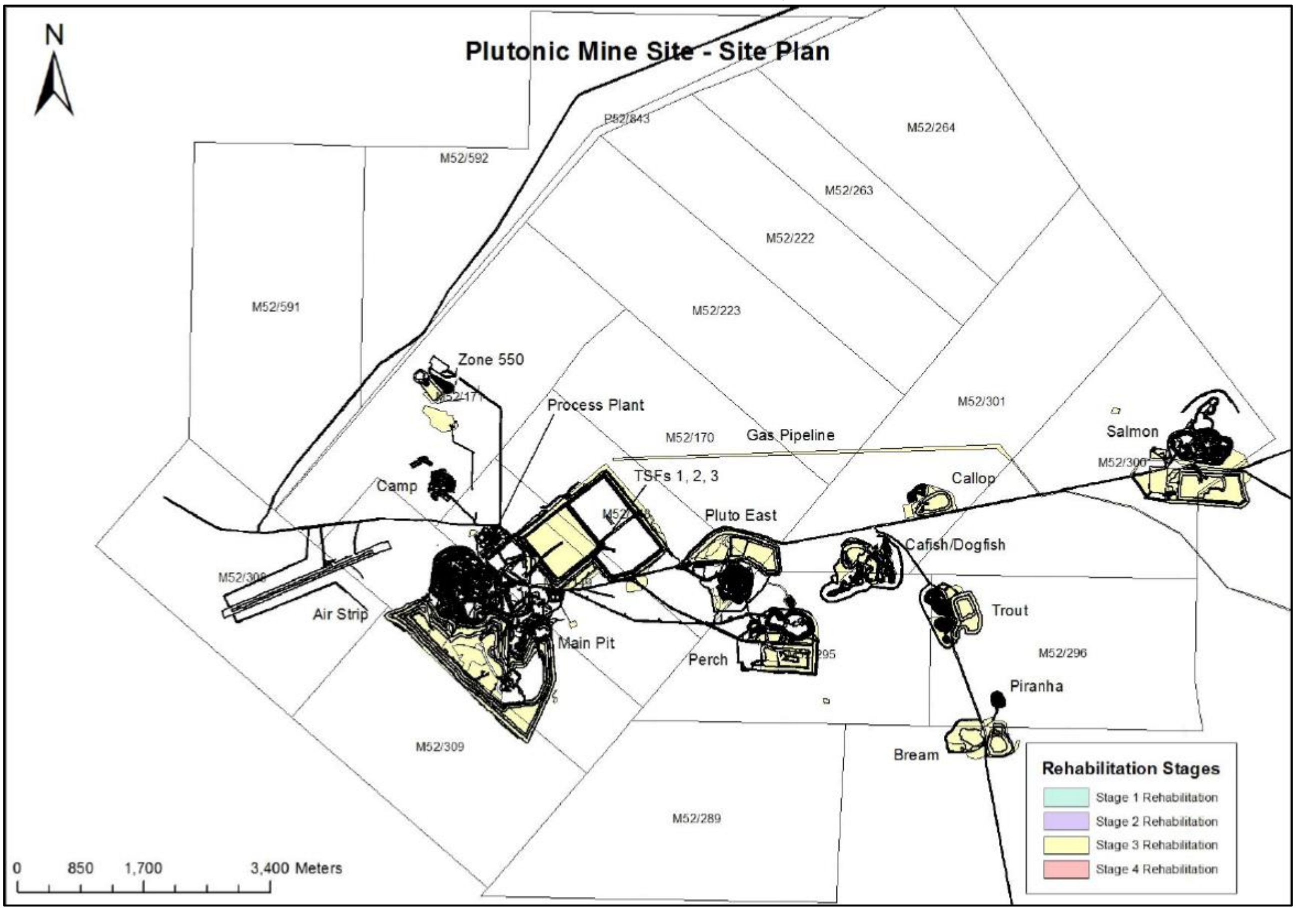
20.5.2 Rehabilitation Liability

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 2019 is A$276,844.58.

The 2014 Annual Environmental Report states that the:

- 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.

Figure 20-2 Rehabilitation status at the Plutonic operation



A Mine Closure Plan (MCP) was prepared for the Plutonic Gold Mine (Mine Closure Plan Plutonic Gold Mine Northern Star Murchison Mineral Field [51] Mining Lease 52) and approved by the Department of Mining and Petroleum in November 2015. An updated Mine Closure Plan submitted in August 2018 has been approved by the Department of Mines, Industry Regulation and Safety (DMIRS). DMIRS requires that the MCP is updated every two years.

A mine closure provision at year end 2019 for the Plutonic operations, including Hermes, is estimated at US$25.9 million with a relinquishment date 10 years after closure.

20.5.3 Hermes

A Mine Closure Plan (MCP) was updated for the Hermes project and submitted to DMP in March 2019. Due to the relatively short mine life of these small pits an updated MCP requires submission on a yearly basis.

Closure will involve progressive encapsulation of PAF and erodible material within waste stockpiles; no novel construction or monitoring strategies are required. After mining, the two pits excavated below water table will become groundwater sinks; equilibrium levels, tens of metres below pre-mining levels, are projected to be attained after 6-7 years. Evaporation will cause some concentration of dissolved salts in the pit water, but Livestock Water quality standards are unlikely to be exceeded.

Even if significant salinity did result, or water quality was impacted by oxidation of the small quantities of sulphides in exposed pit walls, regional groundwater quality would not be affected because the “sink” nature of the pit-lake – groundwater will flow into the pit, which will not be a “through-flow” system.

A mine closure cost estimate has not yet been prepared for the Hermes project. An allowance of US$0.4 million has been included for rehabilitation of the Hermes waste dumps.

The total disturbance area for the operation is anticipated to be 153.5 ha on M52/685.

20.5.4 Haul road corridor

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.

The disturbance area for the road is anticipated to be approximately 135 ha.

21 Capital and operating costs

21.1 Capital Costs

The Company has in February 2017, published a cost forecast and no material expansion capital expenditure is planned.

21.2 Operating Costs

The Company has in February 2017, published operating costs estimates and no adjustments were made to these 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 mine closure plan. Additions have been made for Hermes closure costs.

22 Economic analysis

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

23 Adjacent properties

23.1 Plutonic

The Plutonic Gold Mine is located in the south-western extremity of the Plutonic Marymia Greenstone Belt which extends over 70 km strike length and averages 20 km in width. Because of its remote location, the Plutonic Marymia Greenstone 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 currently has a reported total open pit and underground Mineral Resource[6] of 3.6Mt grading 6.4% copper and 2.1 g/t of gold for contained metal of 230,000t copper and 241,000oz of gold with an Ore Reserve[7] of 4.2Mt grading 4.9% copper and 1.6 g/t of gold for contained metal of 203,000t copper and 210,000oz of gold (refer ASX announcement on 17 April 2020: (https://www.sandfire.com.au/site/PDF/0ec9e569-99cc-485b-b0a3-86f7f6c6513b/DeGrussaOreReserveandMineralResourceUpdate)). The qualified person has been unable to verify this information and the information is not indicative of the mineralisation held by Plutonic Gold Operations.

The closest recently active gold mine is the Andy Well mine (formerly owned and operated by Doray Minerals Ltd, - now Silver Lake Resources Ltd) is located 120 km due south west from Plutonic. The mine ceased production in October 2017 and is now in care and maintenance. The mine has total remaining Mineral Resource of 127Kt grading 13.7 g/t Au Inferred for 56,000 oz Au, 1063Kt grading 9.2 g/t Au Indicated for 315,000 oz Au and 628Kt grading 6.6 g/t Au Indicated for 134,000 oz Au as reported by Silverlake Resources Ltd as part of their formal Resources statement as at June 2019 (https://www.silverlakeresources.com.au/projects/resources)). The qualified person has been unable to verify this information and the information is not necessarily indicative of the mineralisation held by Plutonic Gold Operations.

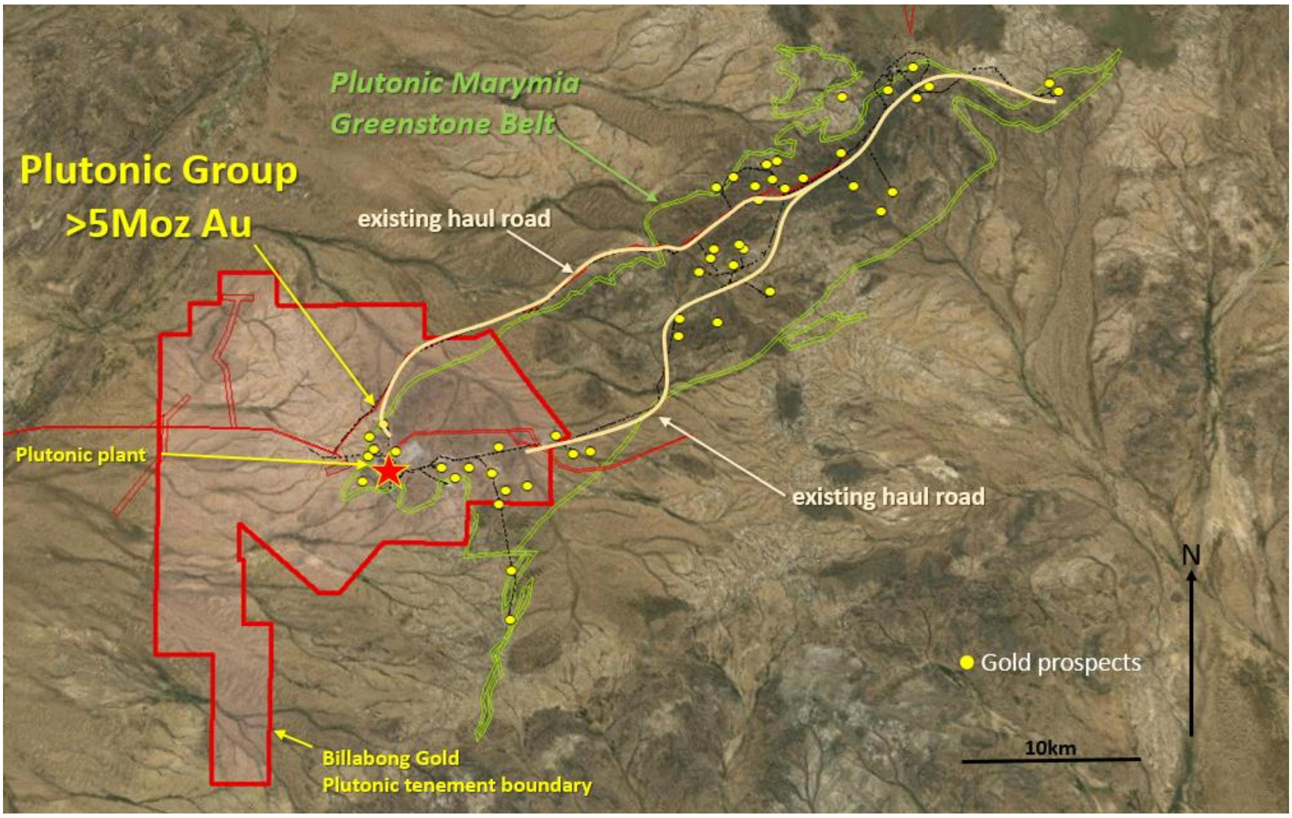
The historically mined Plutonic-Marymia Greenstone Belt extends in a north-easterly direction from the Plutonic tenements. This is an adjacent property in which Billabong has no commercial interest. However, the Company owns miscellaneous licence L52/054 which transects the northern half of the belt (Figure 23-1).

Production from the Marymia section of the Plutonic Marymia Greenstone Belt (Figure 23-1) amounts to approximately 682,000 gold ounces as reported by Dampier Gold Limited in an ASX announcement on 28 August 2012 (http://www.asx.com.au/asxpdf/20120828/pdf/428980z4prybj0.pdf accessed 15/12/2016). The qualified person has been unable to verify this information and the information is not necessarily indicative of the mineralisation held by Plutonic Gold Operations.

There are no other gold processing facilities within a 120 km radius of Plutonic.

[6] JORC
[7] 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 Project area. Other exploration targets possibly related to this mineralisation trend within the adjoining Bryah JV Project include Troy, Henry-Border, Jones, Pelorus, Seaborg, Central Bore, and Faust & Flamel.

The approximate sizes of the nearby gold deposits are summarised in the following Table 23-1, and include the previously estimated Wilgeena Resource (Coxhell, 2012b), which is situated within the Bryah JV Project, and the Peak Hill deposits are located within the Metals-X Peak Hill Project, adjacent to the Bryah JV Project. These targets and nearby deposits are shown in the plan in Figure 7-3. The Wilgeena (Hermes South) deposit area Resource is subject to an 80% JV agreement between Billabong Gold Pty Ltd and Alchemy Resource Ltd. Section 23.3 below describes the Resource and other relevant information relating to the JV agreement. The qualified person has been unable to verify the details relating to the information presented in Table 23-2 and as such the information is not necessarily indicative of the mineralisation held by Plutonic Gold Operations.

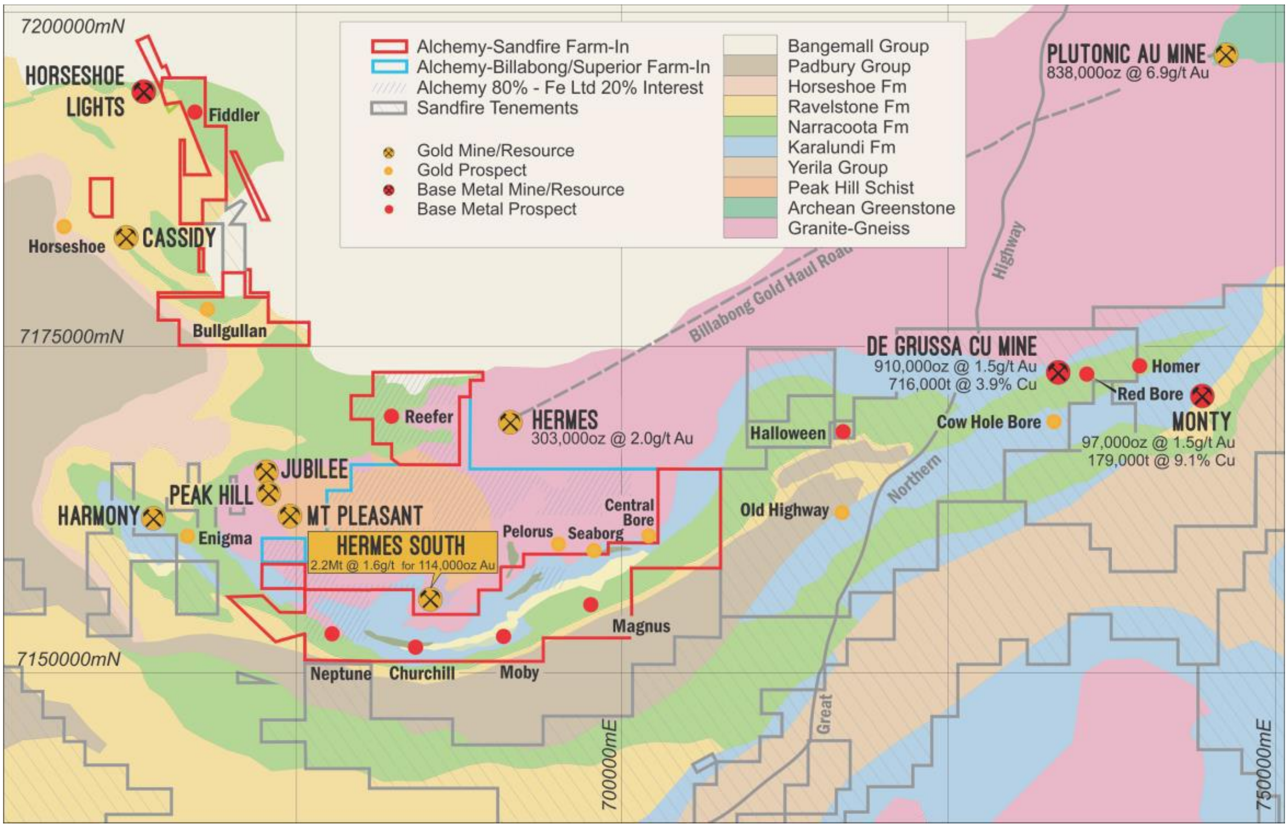
Table 23-1 Adjacent Resources to the Hermes Project area

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

23.3 Wilgeena – (Hermes South)

Hermes South forms part of the farm-in and joint venture agreement with Billabong Gold Pty Ltd, a subsidiary of Superior Gold Inc. (TSX-V: SGI). Alchemy retains a 20% interest in the Project and is carried on an interest-free deferred basis to production, with repayment from 50% of Alchemy's share of free cash flow from production.

Figure 23-2 Bryah Basin Project tenements, major deposits and Alchemy prospects over interpreted geology.



The Hermes South Resource modelling and Resource estimation was completed in May 2019 by Superior Gold Top-cuts were applied to the drill hole composite file prior to grades being interpolated. A lower cut-off of 0.6 g/t Au was used to report Resources. A summary of the updated Hermes South Resource estimate is shown in Table 23-3 below. (http://alchemyresources.com.au/alchemy/wpcontent/uploads/2019/05/190508_HermesSouth_Resource-Upgrade_Final_.pdf)

Table 23-3 Hermes South JORC Code 2012 Indicated and Inferred Mineral Resource Estimate – As at June 2019 (Alchemy Resources Ltd)

Wilgeena Resource	Tonnes (Kt)	Grade	Ounces (KOz)	Lower Cut-Off
Indicated	1,285	1.7	72	0.60g Au/t
Inferred	950	1.4	42	0.60g Au/t
Total	2235	1.6	114	0.60g Au/t

24 Other relevant data and information

24.1 Mine Plan

The following text has been prepared to support the reporting of PEA outcomes in Item 24 of the NI 43-101 Technical Report.

24.1.1 Study Background

RPM Advisory Services Limited ("RPM") was engaged by Superior Gold Inc. ("Superior.") to complete a preliminary economic assessment (hereafter referred to as the "PEA") for the main pit area of the Plutonic Gold Mine (the "Mine" or "Plutonic"). The purpose of the PEA is to investigate the potential of open cut mineable quantities by expanding the previously producing Plutonic Main Pit.

Open cut mining of the Main Pit commenced in mid-1990 and continued until 2005, when it was suspended at the completion of the pit wall cut-back. It is understood appropriately 14 Mt at a grade of 3.3 g/t was mined from the open pit. Underground mining is ongoing and the current production from the underground mine is approximately 800,000 tonnes per year at 3.0 g/t. The company's main ore treatment facility is Process Plant 1 (PP1) with current capacity of approximately 1.8 million tonnes per annum of fresh (primary) material. A second plant, Process Plant 2 (PP2) is located adjacent to PP1 and has a capacity of approximately 1.2 million tonne per annum of primarily oxide material and is currently on care and maintenance.

Recent improvements in the gold price has resulted in potential viability of an expansion to the Main Pit to access in situ mineralisation. The unutilised ore processing capacity (net of underground feed) provides an opportunity to fill the mill with open pit sources of ore.

Figure 24-1 below shows the current view of the Plutonic Main Pit – looking approximately South. The main cutback is planned for the left (east) wall of the pit.

Figure 24-1 Current View of Plutonic Main Pit Area

24.2 PEA Summary

The key outcomes of the PEA are set out in Table 24-1.Table 24-1 Plutonic Main Pit Project PEA Economics

Economics		**Pre-Tax**	**Post-Tax**
Net present value (NPV5%)	A$ millions	177	120
Net present value (NPV5%)	US$ millions	124	84
Internal rate of return (IRR)	%	45	35
Payback (undiscounted)	years	2.5	2.6
LOM avg. annual cash flow after capital	A$ millions	55	43
Total cash flow (undiscounted)	A$ millions	242	169
Forecasts			
Gold price assumption	US$/oz.	1,505	1,505
AUD to USD assumption	AUD/USD	0.7	0.7
Production			
Average annual gold production	ounces/yr	60,000	
Total LOM recovered gold (excl. pre-production)	ounces	357,000	
Mine life(2)	years	6	
Average annual mining rate	million tonnes/yr	11.6	
LOM strip ratio	waste:ore	10.3	
Average mill grade	g/t gold	2.1	
Average recoveries	%	86.4	
Capital Expenditures			
Initial capital costs (net of pre-production revenue)	A$ millions	82.5	
LOM sustaining capital costs	A$ millions	9.0	
Costs (Y2-EOL)			
Mining cost	A$/tonne mined	3.89	
Processing cost	A$/tonne milled	19.38	
G&A cost	A$/tonne milled	4.15	
Royalty	%	2.50%	
Total cash cost	US$/oz.	852	
AISC	US$/oz.	870	

Table 24-2 demonstrates the post-tax (@30% tax rate) sensitivities of NPV and IRR to gold price per ounce. The base case, highlighted in the table below, assumes a price of US$1,505 per ounce of gold:

Table 24-2 Metal Price Sensitivity Analysis

Gold Price Per ounce	(NPV5%) A$ M	IRR%
$1,300	59	20%
$1,350	74	24%
$1,505	120	35%
$1,800	206	57%
$1,900	236	64%
$2,000	265	72%

24.3 PEA Status

The PEA was prepared in accordance with NI 43-101 by RPM with the support of Mr Stephen Hyland, FAusIMM who is the "qualified person" as defined by NI 43-101 and Mr Keith Boyle, P.Eng. who is the Chief Operating Officer of Superior Gold. RPM's Study Team was led by Mr Igor Bojanic (F.AusIMM, General Manager – Metals Consulting ARC) and Mr Michael Yelf (Principal Mining Engineer).

The PEA mine planning and DCF includes Inferred Mineral Resources. Inferred Mineral Resources are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the results of the preliminary economic assessment will be realised. The technical data used in the PEA Study was based on historical operating records, earlier technical studies and recent operational knowledge from the current mining operations. Estimation of capital and operating costs are based on RPM's internal industry cost database.

The level of engineering is sufficient to meet the required +/35% target accuracy. Unless otherwise stated, measurements are in metric, other than reference to gold production which is reported in troy ounces.

24.4 Target Mining Area

The PEA Study area included Measured, Indicated and Inferred Resources from topographic surface to approximately 300 m depth and covers parts of the previously reported underground areas bounded by 'Fault Block' area designations or Caribbean, Caspian and two (2) of the Indian fault block model areas. It also includes the "Workshop" Resource model to the south of the Caribbean model. Most of the pit area is covered by the Caspian model, the Indian models are located to the north of the main pit and the Caribbean model is to the east of the main pit. The Workshop model covers a subset of the area covered by the models listed above and is located to the south-east of the main pit. The current Resource models have been depleted for both current and proposed underground mining areas.

Figure 24-2 presents the Resource model boundaries overlaid on the Main Pit. Figure 24-3 shows additional physical constraints applied to mining, being:

- Southern heritage area;
- Northern heritage area;
- 50 m buffer to the PP1 primary crusher, and
- Mining workshop infrastructure constraint.

Figure 24-2 Resource Model Boundaries

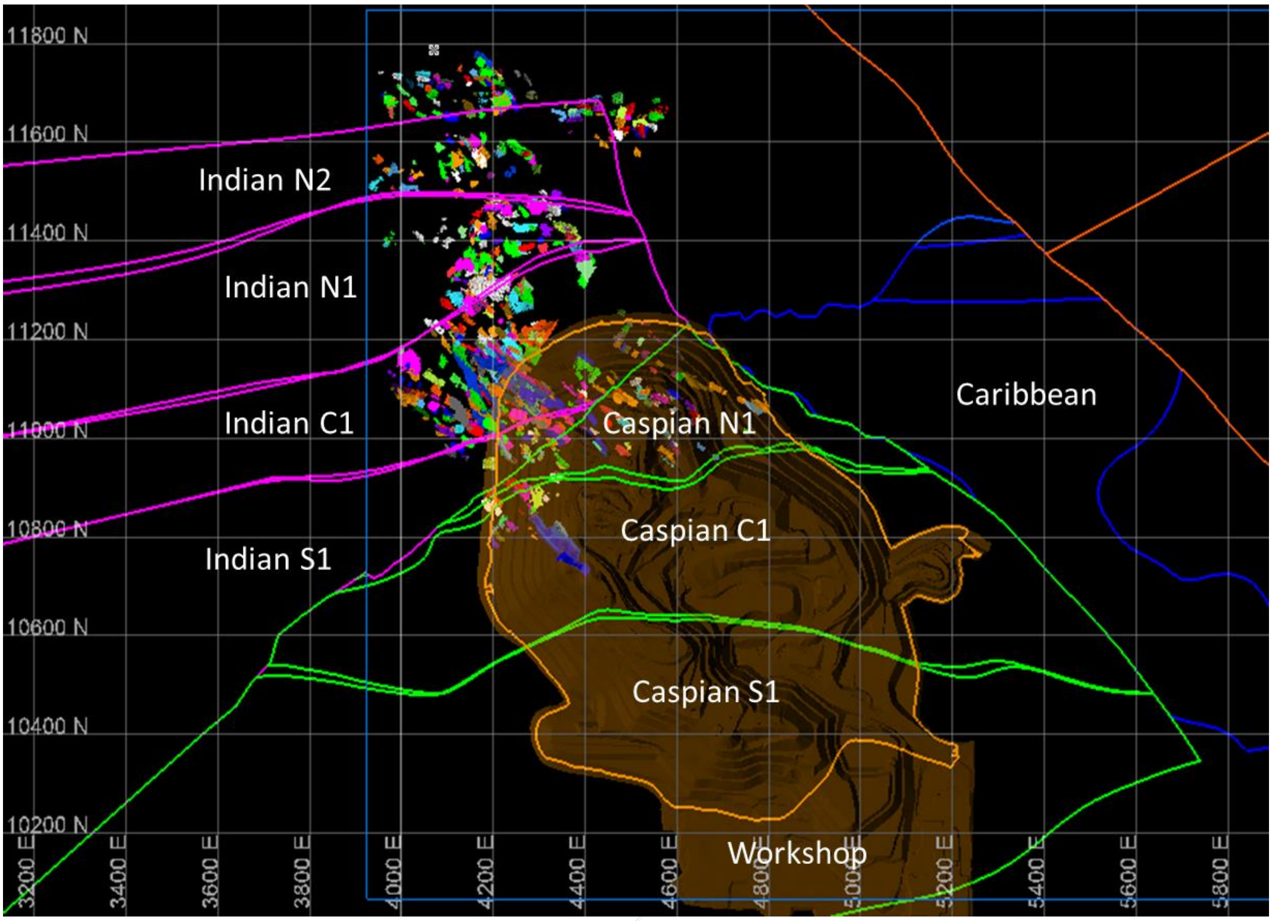
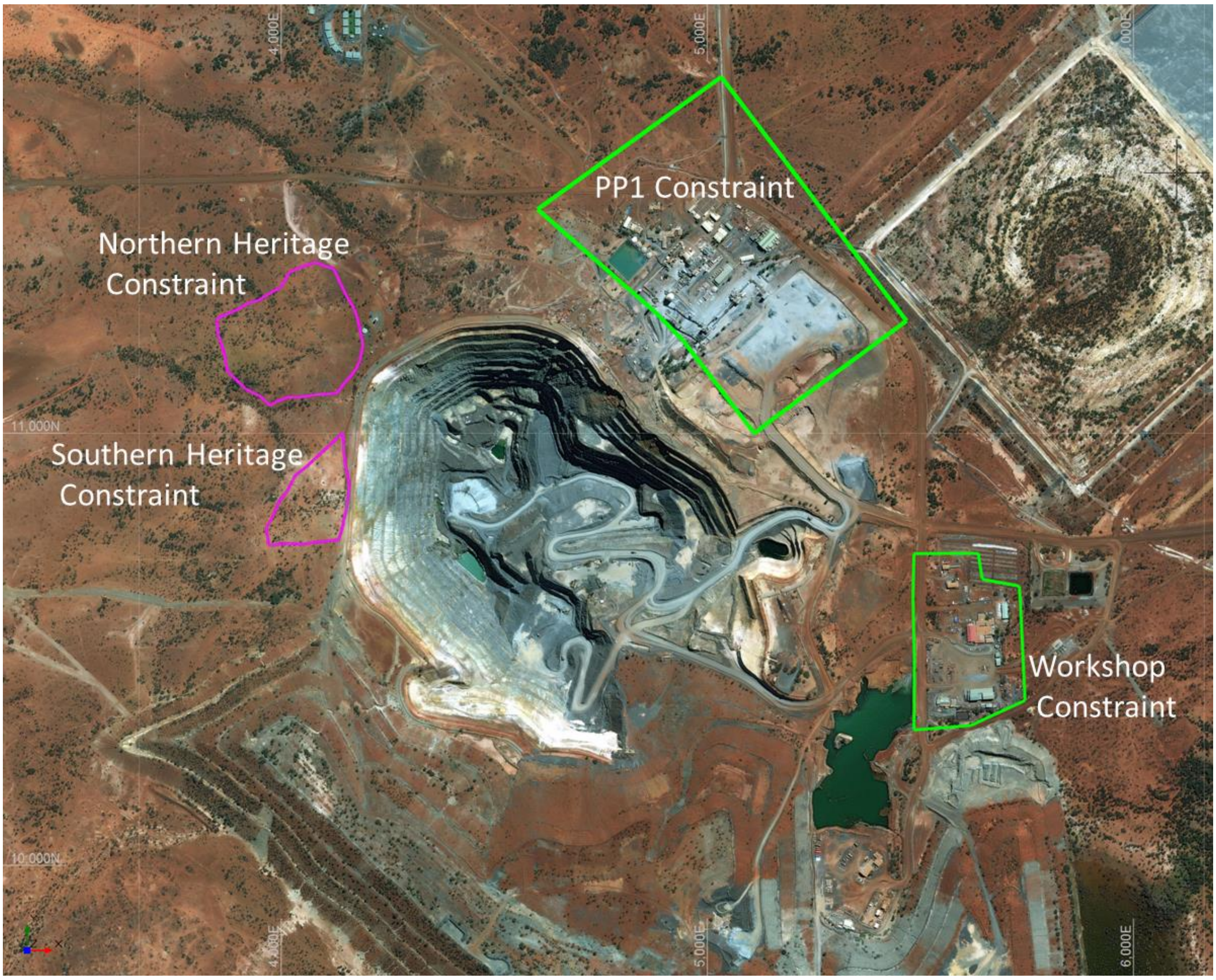


Figure 24-3 Constraints to Mining



The existing open pit Mineral Reserves have been estimated for the Hermes area, which is separate from the Main Pit and hence the target area for the PEA.

24.5 Open Cut Pit Limit Optimisation

The open cut pit limits were identified in order estimate the potential mineable quantities of plant feed and understand the characteristics and sensitivity of the potential to open cut mining.

The open cut pit limits were determined by considering both physical and economic constraints to mining. The economic pit limits were estimated using the GEOVIA Whittle 4X pit limit optimisation software (referred to hereafter as "Whittle 4X"). The physical constraints were described in Section 3.4.

The Whittle 4X software uses the industry-standard Lerchs-Grossman or equivalent Pseudoflow algorithm to define a three dimensional shape for the open cut pit which is considered the "optimal" economic shell for mining. Generally, a number of pit shells are defined based on a range of ore selling prices which aids in understanding the deposit's sensitivity to changes in economics and which areas deliver the greatest value. The "nested pit shells" are created by varying the metal price by applying a "Revenue Factor" (RF) to the base metal price. That is, a 100% revenue factor pit shell results from multiplying the selling metal price by 100%. A 70% RF pit shell indicates the shape of the pit and mineable quantities at 70% of the price.

24.5.1 Pit Limit Optimisation Input Data

Geological Model

The Mineral Resource models for Caribbean, Caspian, the two Indian fault block models (S1 and C1) were merged into a single entity and imported into Whittle 4X. The workshop block model was analysed separately and the results combined in the mine design stage. The workshop area overlaps the south area of the Caspian and Caribbean block models and provides a more recent interpretation of the geology of the area. The analysis included Measured, Indicated and Inferred Resources from topographic surface to approximately 300 m depth.

Physical Constraints

The base case approach was to apply surface physical constraints to prevent the optimisation process from extending into the potential heritage areas to the west and existing site infrastructure to the east of the main pit, as illustrated in Figure 24-23.

High-level strategic analyses were undertaken varying the physical constraints to understand how the characteristics of the potential open cut may change should the constraints change.

Geotechnical Design Parameters

The pit wall design criteria is based on historically applied criteria for the Main Pit for oxide and transition material, and an increase for the fresh zone (from a batter angle of 60 degrees (historical) to 70 degrees). The mine design parameters were confirmed as appropriate by the Plutonic mine geotechnical engineer, with appropriate controls for local batter scale failures. The recommended criteria were:

- Inter-ramp pit slope angles of 41-50 degrees, inclusive of berms;
- Bench height of 18 m (and 16 m above the 1496 RL);
- Berm width of 7 m for fresh (1424 bench and below) and transition (1460 bench and below) and 5 m for oxide; and
- Batter angle of 70 degrees for fresh rock, 55 degrees for transition rock and 50 degrees for oxide rock.

The main pit design makes use of the existing access into the pit on fill, so final ramps do not appear to be required for the east wall cut-back, except for the lower pit RLs. Note that the slope parameters used are the same as the 2007 Barrick Mining Study report, except for the increase in slope angle in fresh material from 60 degrees to 70 degrees. The overall slope angle for the main east pit cut-back is approximately 49 degrees and the pit depth between 150 and 300 metres.

Mining Modifying Factors

Based on the selected mining method and 100 tonne excavators used for ore, RPM assumed an ore overall loss of 5% and waste rock dilution of 15%. Whittle 4X software assumes the grade of the dilutant rock to be zero.

Metallurgical Modifying Factors

The metallurgical modifying factors are based on historical performance of the process plant. The metal recovery has been estimated based on historical recoveries for the underground ore types and naturally vary with grade. For grades between the cut-off and 2.5 g/t the recovery is assumed to be:

Metal Recovery = (79*feed grade^0.08)/100 + 0.75%

The addition of 0.75% is due to the recent installation of a gravity recovery circuit. A typical metal recovery at an average feed grade of 2.1 g/t is approximately 85%.

Mine Operating Cost Unit Rates

Unit rates for mine operating costs were estimated by RPM by referencing our in-house equipment cost database and costs provided by the site. The rates are intended to be "order of magnitude" only and do not represent results of detailed mine planning and detailed estimating.

The mine and mine related operating costs used for the Pit Limit Optimisation process are set out in **Table 24-3**. The optimisation assumed a feed rate of 2.0 Mtpa when estimating the mining and process costs assuming an upgrade of PP1, and 800 ktpa of feed from the underground.

Table 24-3 Pit Limit Optimisation Mine Operating Costs

Item	Units	Value
Rock Mining – Win Load and Dump	A$/t rock	2.70
Rock Mining - Vertical Lift	A$/t rock/m lift	0.0063
Additional Ore Mining Cost	A$/t ROM ore	1.10
Processing Cost + Site Power	A$/t Feed	20.00
Site Overheads	A$/t ROM ore	4.00
Refining and Transport	A$/oz.	2.5
Royalty	% of total revenue	2.5

Product Prices

The long-term gold price for pit limit optimisation was determined from the Energy & Metals Consensus forecast (August, 2020) at A$1,925/oz (US$1,348/oz. and foreign exchange rate (FX) of 0.70:1 USD:AUD).

A gold price of A$2,150/oz. (US$1,505/oz.) was recommended by the Company for the economic modelling based on updated price research. It was considered unnecessary to update the pit limit optimisation as the change to the pit shell was likely to be immaterial due to the physical constraints restricting the shell expansion.

Definition of Ore and Marginal Cut-Off Grade

From the above inputs, the marginal cut-off grade was defined as 0.6 g/t Au. Mineralised material of 0.4 to 0.6 g/t Au is mined separately and stockpiled in the mine schedule.

24.5.2 Metal Price Sensitivity Analysis Results

A sensitivity analysis was undertaken to ascertain how the open cut pit limits and mineable quantities change with metal price. The price sensitivity analysis was on sales values from 50% to 150% of the base case gold price.

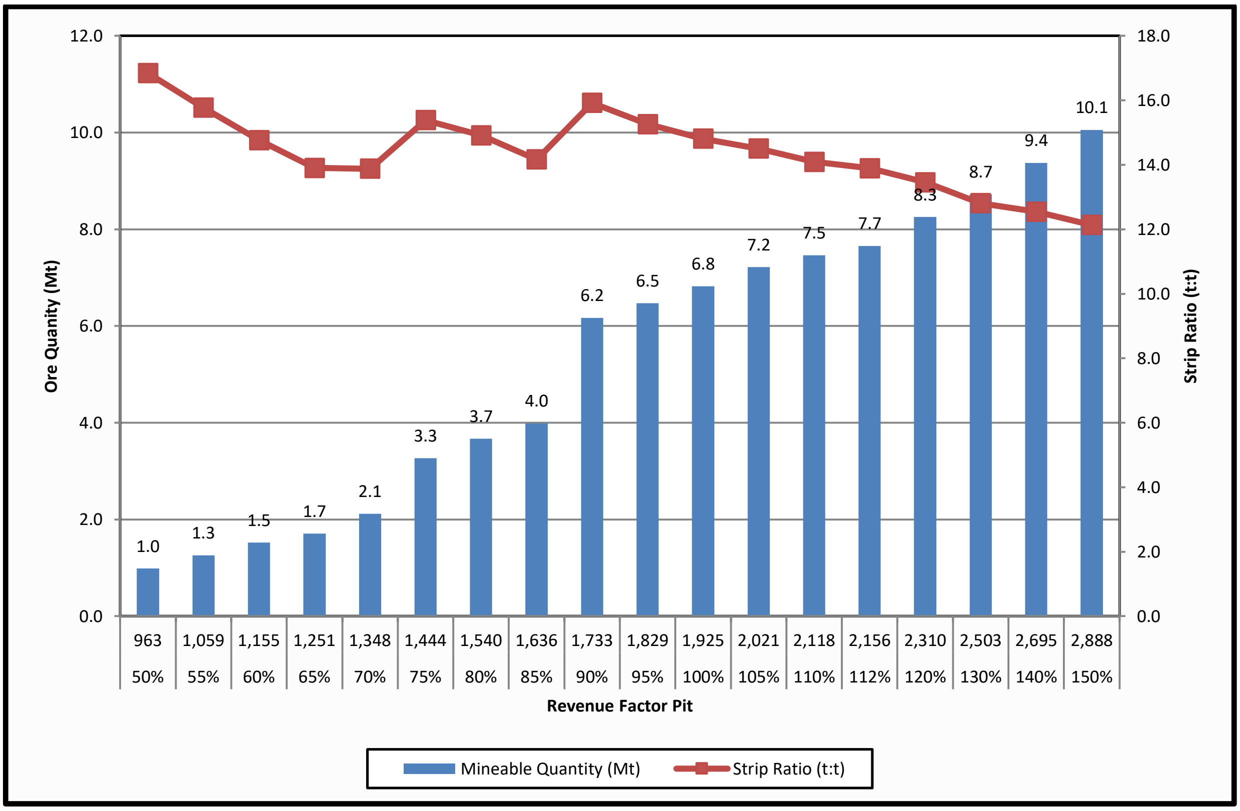
A summary of the pit limit optimisation results from the sensitivity analysis on metal price is set out in Table 24-4 and illustrated in Figure 24-4. The total potential mineable ore for the deposit, at the base price or 100% revenue factor, is estimated at 6.8 Mt at a grade of 2.29 g/t Au for 501 koz. and a strip ratio, inclusive of pre-production stripping, of 14.8:1.

Table 24-4 Metal Price Sensitivity Analysis Results

Pit	Revenue Factor	Au Price A$/t oz.	Ore Mt	Waste Mt	Total Pit Size Mt	Strip Ratio t:t	Au g/t	Cont. Au koz.	Metal Rec. %	Rec. Au koz.
9	50%	963	1.0	17	18	16.8	4.39	139	89%	124
10	55%	1,059	1.3	20	21	15.8	3.98	161	89%	143
11	60%	1,155	1.5	23	24	14.8	3.65	179	88%	158
12	65%	1,251	1.7	24	25	13.9	3.43	188	88%	166
13	70%	1,348	2.1	29	32	13.9	3.18	216	88%	189
14	75%	1,444	3.3	50	54	15.4	2.89	304	87%	264
15	80%	1,540	3.7	55	58	14.9	2.75	325	87%	282
16	85%	1,636	4.0	56	60	14.2	2.63	337	87%	291
17	90%	1,733	6.2	98	104	15.9	2.43	482	85%	409
18	95%	1,829	6.5	99	105	15.3	2.35	489	85%	414
19	**100%**	1,925	6.8	101	108	14.8	2.29	501	84%	423
20	105%	2,021	7.2	105	112	14.5	2.22	515	84%	434
21	110%	2,118	7.5	105	113	14.1	2.17	521	84%	438
22	112%	2,156	7.7	106	114	13.9	2.14	526	84%	442
24	120%	2,310	8.3	111	119	13.5	2.05	545	84%	456
26	130%	2,503	8.7	112	121	12.8	1.97	554	83%	462
28	140%	2,695	9.4	118	127	12.5	1.90	572	83%	476
30	150%	2,888	10.1	122	132	12.1	1.82	587	83%	486

As illustrated in Figure 24-4, the total pit size results indicate that the deposit has critical points of economic sensitivity with step changes from the 70 to 75% revenue factor (A$1,444/oz.) and 85% to 90% revenue factor (A$1,732/oz.).

Figure 24-4 Metal Price Sensitivity Analysis Results



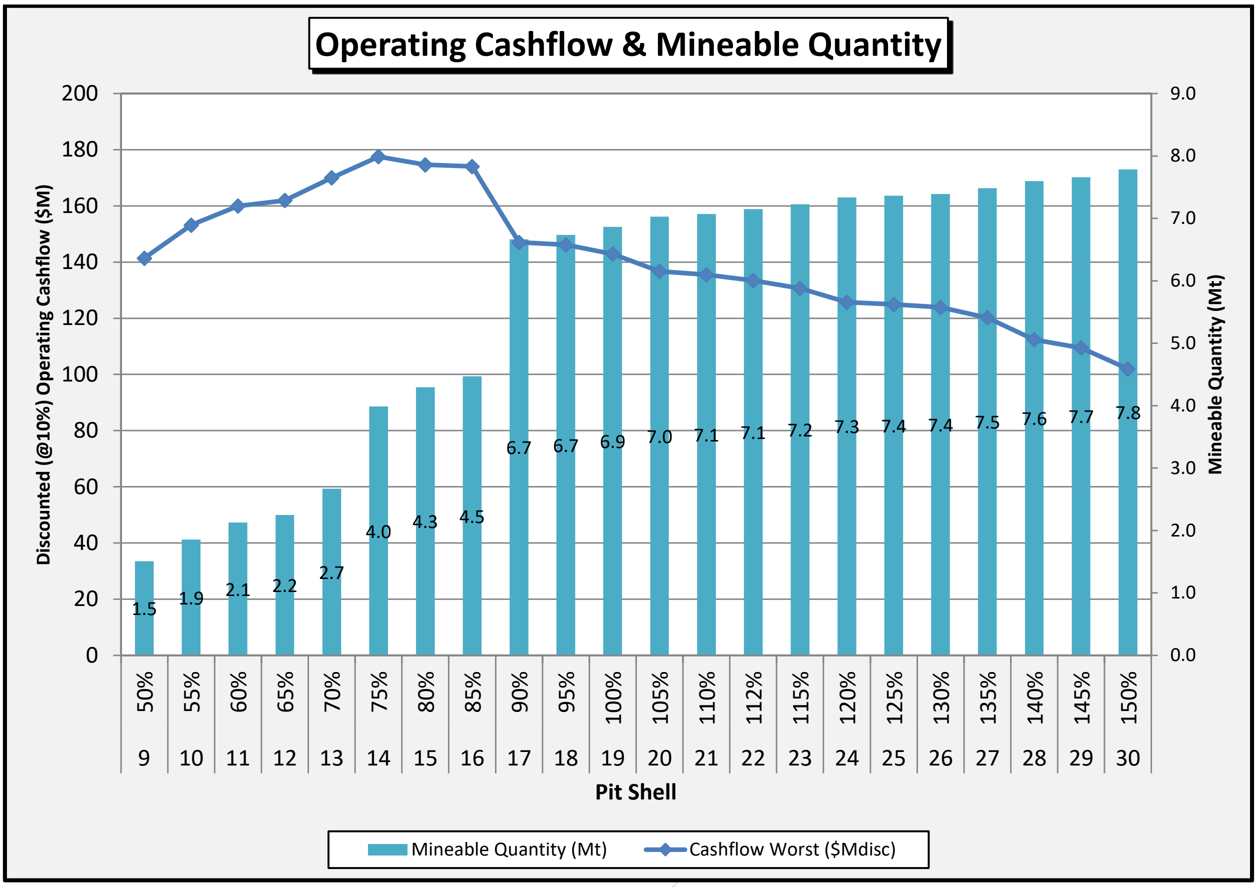
24.5.3 Cash flow Analysis

The basic Whittle 4X pit limit optimiser result defines the “optimal” pit shell for fixed mining, economic and physical constraints. This outcome, however, is not necessarily the “optimal” result as it does not account for possible changes in value over the mining life. To overcome this issue, Whittle 4X software undertakes a life-of-mine (LOM) cash flow analysis to assess which pit provides the highest economic return taking into account the time value of money. The results of the cash flow analysis for the “worst” production schedule are set out in Table 24-5 and illustrated in Figure 24-5. The “worst” case schedule results were selected, as the best reflects the likely cutback strategy of mining sequentially from upper to lower benches.

Table 24-5 Cash Flow Analysis Results

Pit	Factor	DCF (Worst) (A$M)	Feed Quantity (Mt)	Au g/t	Waste (Mt)	Strip Ratio	Cont. Au (koz.)	Rec. Au (koz.)
9	50%	141	1.5	3.14	16.1	10.7	152	135
10	55%	153	1.9	2.94	19.3	10.4	175	155
11	60%	160	2.1	2.82	21.9	10.3	193	170
12	65%	162	2.2	2.77	23.2	10.3	200	176
13	70%	170	2.7	2.65	28.8	10.8	228	200
14	75%	178	4.0	2.48	49.6	12.4	318	278
15	**80%**	**175**	**4.3**	**2.44**	**54.1**	**12.6**	**337**	**295**
16	85%	174	4.5	2.41	56.0	12.5	346	302
17	90%	147	6.7	2.29	97.7	14.7	491	427
18	95%	146	6.7	2.28	98.5	14.6	494	430
19	100%	143	6.9	2.28	101.0	14.7	502	437
20	105%	137	7.0	2.27	104.8	14.9	512	445
21	110%	136	7.1	2.26	105.6	14.9	514	447
22	112%	133	7.1	2.25	106.9	14.9	518	450
23	115%	131	7.2	2.25	108.6	15.0	522	454
24	120%	126	7.3	2.25	112.0	15.3	530	461
25	125%	125	7.4	2.24	112.4	15.3	531	462
26	130%	124	7.4	2.24	113.1	15.3	533	463
27	135%	120	7.5	2.23	114.9	15.3	537	466
28	140%	112	7.6	2.23	119.4	15.7	545	473
29	145%	109	7.7	2.22	120.8	15.8	548	476
30	150%	102	7.8	2.21	124.2	16.0	554	480

Figure 24-5 Cash Flow Analysis Results (A$M)



The selection of the preferred pit shell was undertaken in conjunction with Superior Gold. Key criteria used to select the pit shell included:

- High potential profitability;
- Large in-pit mining inventory;
- High discounted cash flow and IRR (minimise pre-strip capex), and
- Minimum mine life of 6 years.

The revenue factor 80% pit shell has been selected to undertake further mine planning. This pit has been selected noting the large fall in potential cash flow leading to the RF90% pit shell.

24.5.4 Workshop Resource Model Pit Limit Optimisation

An additional potential mining area was identified to the south of the Main Pit and trending beneath the existing workshop and site infrastructure. This shallow lateritic gold deposit was assessed as it potentially provides shallow, easily accessible plant feed which can be extracted as the Main Pit cutback is taking place.

A pit limit optimisation was undertaken on the Workshop geological model applying similar parameters used in the Main Pit limit optimisation. Much of the area of the workshop block model is covered by the combined model (i.e. block models overlap) and so it is uncertain what incremental quantities are generated in pit optimisation. The quantities in the workshop pit designs are listed in the section on mine design.

The selected shell for the Main Pit Optimisation and the Workshop Optimisations were used to guide the detailed pit design.

24.6 Mine Design

The ultimate pit design parameters used in the RPM mine design are set out in Table 24-6 with the waste dump parameters are set out in Table 24-7. RPM notes that the proposed angles for the pit design and waste dump will need to be confirmed through additional geotechnical studies.

Table 24-6 Pit Design Parameters

Pit Design Parameters	Units	Oxide (1478 m RL and above)	Transition (1460 and 1442 bench)	Fresh (1424 mRL bench and below)
Pit Slopes (inter-ramp)	degrees	41/42	42.6	53
Bench Height	m	16/18[8]	18	18
Mining Flitch Height (waste)	m	9	9	9
Mining Flitch Height (ore)	m	3	3	3
Batter Angle	degrees	50	55	70
Berm Width	m	5	7	7
Road Width (Double Lane)	m	25	25	25
Road Width (Single Lane)	m	18	18	18
Road Gradient	%	10	10	10

[8] 18 m bench height for 1478 mRL bench and 16 m bench height for 1496 mRL and above

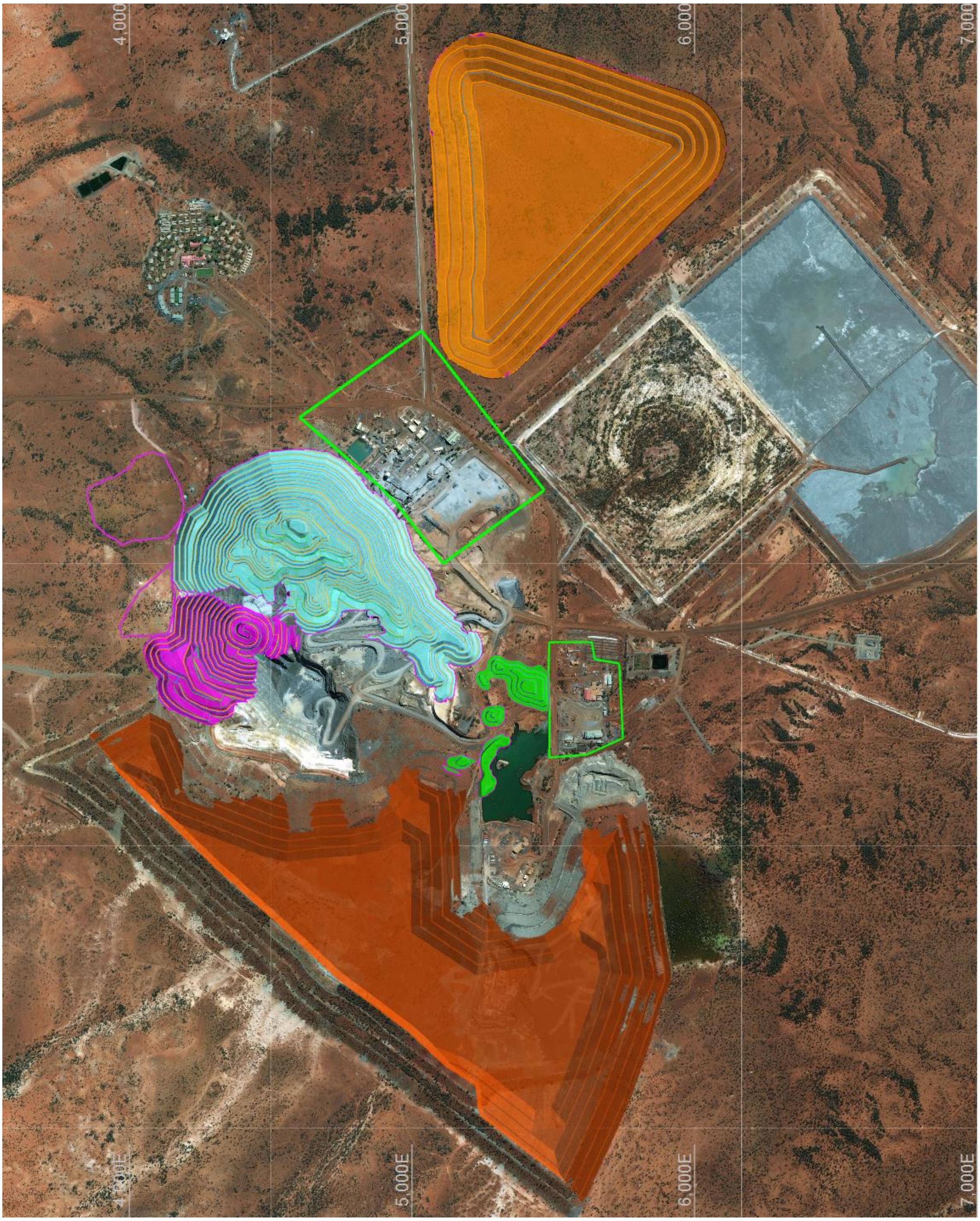
Table 24-7 Waste Dump Design Parameters

Waste Dump Design Parameters	Units	Value
Waste Dump batter	degrees	17
Batter height	m	10
Berm width	m	5
Resulting inter-ramp slope angle	Deg	15
Swell Factor	%	25

The ultimate pit design for the expansion for the Main Pit and proposed surface waste rock emplacements are illustrated in Figure 24-6.

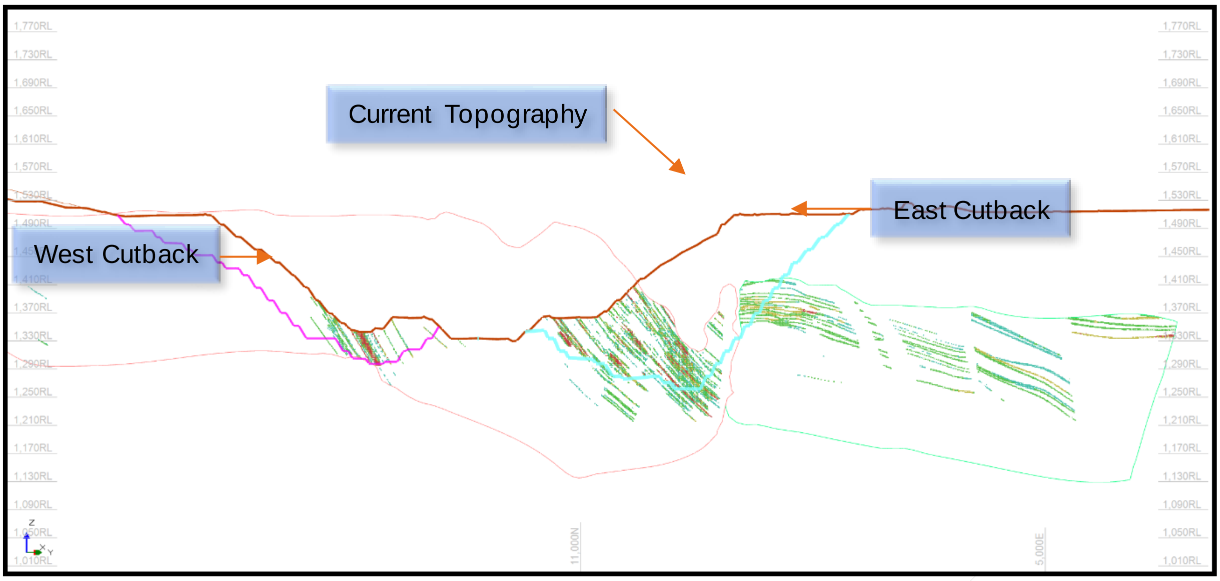
The final pit dimensions for the east cutback of the main pit are approximately 1,100 m x 600 m (length and breadth) and between 150 m and 300 m deep.

Figure 24-6 Ultimate Pit and Dump Design



* 18 m bench height for 1478 mRL bench and 16 m bench height for 1496 mRL and above

Figure 24-7 Cross-Section Through Ultimate Pit Cutback



24.7 Mineable Quantities

For scheduling purposes the pit was separated into three regions, the West Cutback, East Cutback and the Workshop area. The mineable quantities per mining area are summarised in Table 24-8.

Table 24-8 Mineable Quantities

Pit	Plant Feed (kt wet)	Grade (g/t wet)	Cont. Gold (koz.)
East Pit	5,868	2.2	385
West Pit	385	3.6	40
Workshop Pit	132	1.3	5
Total Plant Feed	**6,385**	**2.07**	**425**
Waste Rock	93,000		
Strip Ratio	15.0		

The mineable quantities comprise 0.8 Mt at 3.0 g/t of Measured Resources, 2.1 Mt at 1.9 g/t of Indicated Resources and 3.4 Mt at 2.1 g/t of Inferred Resources.

24.8 Mine Development Strategy

In conjunction with Superior, RPM examined a number of strategic options primarily involving the relocation or refurbishment of different components of the main process plant infrastructure. The scenarios are listed in order of highest to lowest cost/throughput. The current PP1 plant throughput limit is ~1.8 Mtpa. The key scenarios are described as follows:

- Scenario 1: Full Plant Relocation and Expansion

Relocate both processing plants (PP1 and PP2), the associated processing and mining infrastructure and offices to allow full development of the proposed east cutback. This would include removal of the PP2 crushing circuit and all associated infrastructure east of conveyor CV-01.

Both processing plants would be operated at a combined throughput of 3.2 Mtpa utilising a single crushing circuit (PP1).

This would require modifications to the PP1 crushing, milling and tailings circuits to increase capacity to handle harder and more abrasive blends (more energy intensive) as well as the refurbishment and upgrade of the PP2 milling and leaching circuits (and carbon regeneration kiln capacity).

The increased power requirements would be met by a Build, Own, Operate (BOO) contract with a suitable vendor.

The estimated capital and operating costs for Scenario 1 are:

— Plant CAPEX: A$360M.
— Plant OPEX: A$18/t feed.

- Scenario 2: Upgrade to 2.87 Mtpa capacity in current location

Remove the PP2 crushing circuit and all associated infrastructure east of conveyor CV-01. While this does limit the size of the pushback for the potential open cut, the relocation of PP1, PP2 and associated infrastructure is not required. This reflects a significant savings in costs and as well as non-productive time during the move.

Both processing plants would be operated at a combined throughput of 2.87 Mtpa utilising a single upgraded crushing circuit (PP1).

This would require modifications to the PP1 crushing, milling and tailings circuits to increase capacity to handle harder and more abrasive blends as well as the refurbishment and upgrade of the PP2 milling and leaching circuits (and carbon regeneration kiln capacity).

The increased power requirements would be met by a Build, Own, Operate (BOO) contract with a suitable vendor.

The estimated capital and operating costs for Scenario 2 are:

— Plant CAPEX: A$41M.
— Plant OPEX: A$19/t feed.

- Scenario 3: Upgrade PP1 to 2 Mtpa

Remove the PP2 crushing circuit and all associated infrastructure east of conveyor CV-01.

Operate one processing plant (PP1) and upgrade equipment to increase the capacity to 2.0 Mtpa. This would require modifications to the PP1 crushing, milling and leaching circuits to increase the capacity to handle the harder and more abrasive blends.

The estimated capital and operating costs for Scenario 3 are:

— Plant CAPEX: A$3.6M.
— Plant OPEX: A$19.4/t feed.

- Scenario 4 : Minimal change scenario

Remove the PP2 crushing circuit and all associated infrastructure east of conveyor CV-01 to allow expansion of the east pit cutback to be closer to the milling area.

Operate one processing plant (PP1) at 1.8 Mtpa.

This would not require any modifications to the PP1 processing circuit.

The estimated capital and operating costs for Scenario 4 are:

— Plant CAPEX: A$1M (removal of infrastructure)
— Plant OPEX: A$22/t feed

Scenario 1 and 2 were excluded as there was insufficient mine life (mineable resources) to offset the high capital investment to increase production above 3 Mtpa. Scenario 4 was excluded as it fails to take advantage of the improved economies of scale opportunities presented by the additional resources.

The strategic analysis selected Scenario 3 as the preferred development option as it is likely to generate the best cash flow as it reduces the plant operating costs by over 10% and increases throughput by 10%, for a low capital investment. Scenario 3 involves upgrading PP1 to process 2.0 Mtpa, comprising 1.2 Mtpa from the proposed open cut and 0.8 Mtpa from the underground mine.

24.9 Mine Schedule

A life-of-mine (LOM) production schedule was completed for the Main Pit using RPM's Open Pit Metals Solution ("OPMS") scheduler. OPMS is a comprehensive and detailed scheduling package that models equipment production, haulage networks and travel times and practical mining constraints to produce a detailed mining schedule.

The approach to using OPMS involved customising its set-up to consider both physical and practical extraction of ore and equipment requirements. The mining schedule was based on the following parameters and constraints:

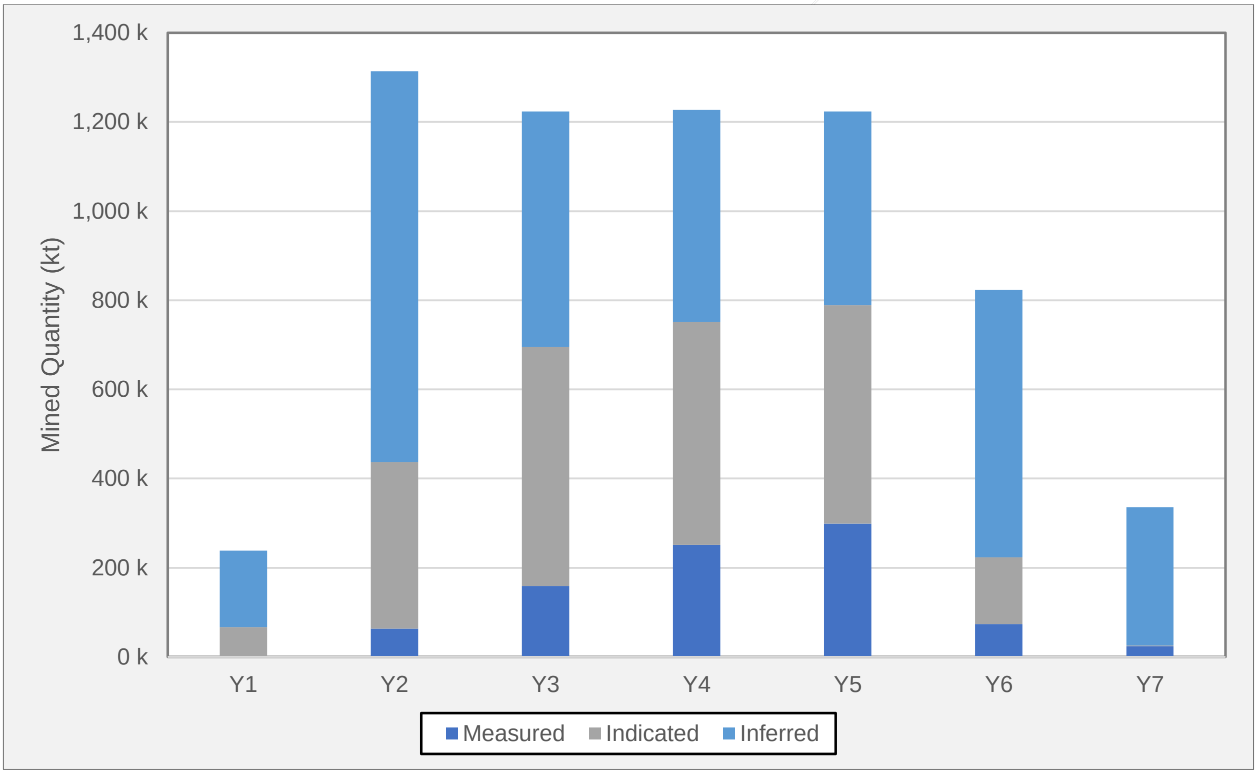
- Commence mining in both Main Pit Cutback and Workshop area;
- Mining development to focus on eastern cutback area to access plant feed earlier, then expand into Western Cutback area;
- The vertical advance rate is maximum 80 m per year in waste rock and 60 m per year in ore mining zones;
- Some stockpiling to balance mining rates and plant feed capacity;
- Annual production rates set to achieve 1.2 Mtpa process plant feed;
- ROM ore was hauled to the processing facility; and
- Waste rock was hauled to two potential dump locations, the main dump located adjacent to the pit at the west and a northern dump established adjacent to the tailings storage facility.

The Life-of-Mine schedule quantities and grades are presented in Table 24-9 and charts provided in Figure 24-8, Figure 24-9 and Figure 24-10.

Table 24-9 LOM Production Schedule Results

Year	Units	1	2	3	4	5	6	7	Total
Mined Grade									
Plant Feed Mined	kt (wet)	238	1,314	1,224	1,227	1,224	823	335	**6,385**
Mined Grade	g/t (wet)	1.59	1.61	1.79	2.29	2.18	2.37	3.35	**2.07**
Total Waste	kt (wet)	30,057	21,536	12,640	10,196	10,296	5,365	3,335	**93,425**
Total Material	kt (wet)	30,296	22,850	13,863	11,423	11,519	6,189	3,670	**99,810**
Strip Ratio	t:t	126.1	16.4	10.3	8.3	8.4	6.5	9.9	**14.6**
Processed Ore									
Feed Quantity	kt	238	1,200	1,200	1,203	1,200	1,010	335	**6,385**
Feed Grade	g/t (wet)	1.59	1.77	1.82	2.33	2.23	1.93	3.35	**2.07**
Contained Gold	oz.	12,184	68,087	70,222	90,183	85,853	62,795	62,060	**451,383**

Figure 24-8 Mined Quantity by Class



The key schedule results are:

- Target production rate of 1.2 Mtpa achieved from Year 2;
- Approximately 7 years of open pit mining;
- ROM strip ratio high in Year 1 due to large cutback requirement. From Year 2, strip ratio averages 10:1;
- Average ROM gold production from Year 2 of 73,200 oz. per year, and
- Gold grade increases with depth, rising from 1.59 g/t to 3.35 g/t in final year of mining.

Figure 24-9 Plant Feed Production

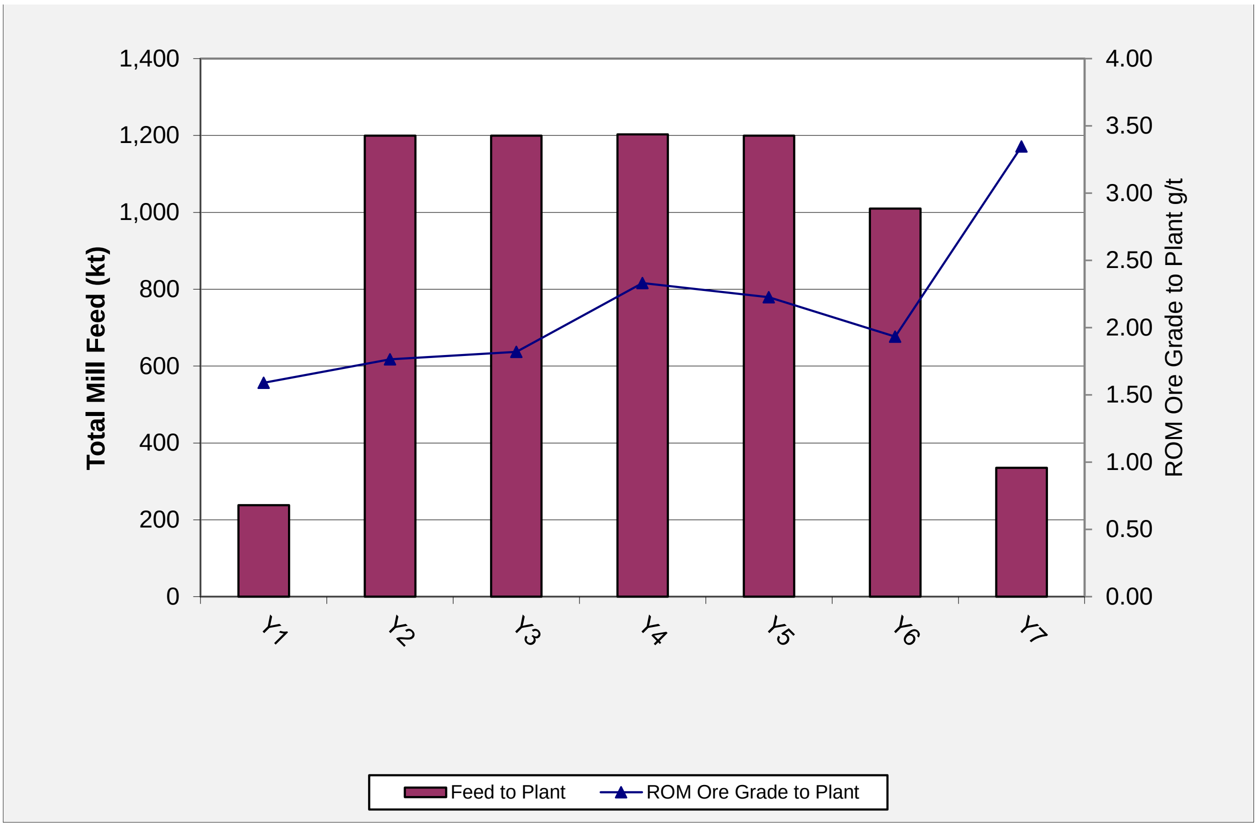
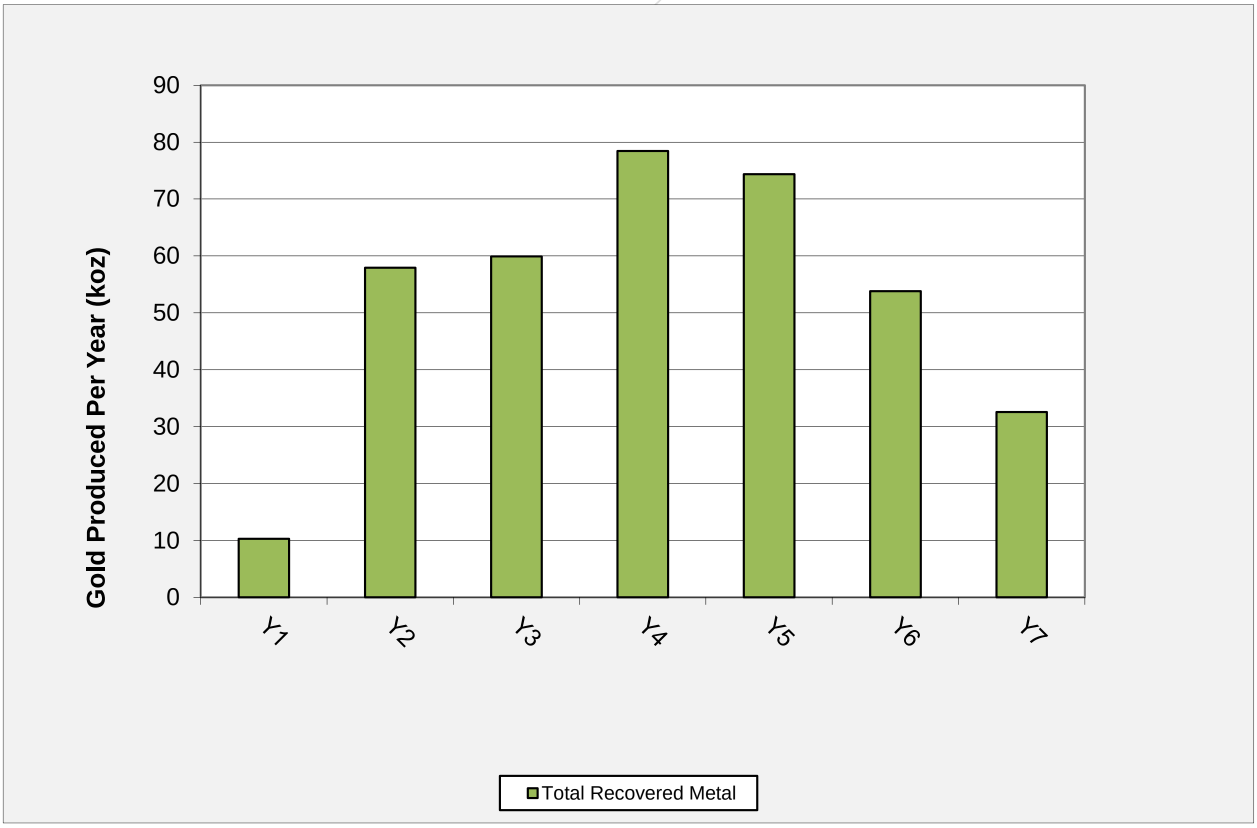


Figure 24-10 Gold Production



24.10 Fleet Estimation

The operation is highly likely to be a contractor mining operation. Hence, the selection of the equipment, and mode of operation, will be determined by the mining contractor. As a guide, RPM estimate a typical fleet will comprise the items set out in Table 24-10.

Table 24-10 Equipment Requirements for Key Years

Year	1	2	3	4	5	6	7
Major Equipment							
Excavator 250tonne	3	2	1	1	1	1	-
Excavator 110tonne	1	1	1	1	1	1	1
Haul truck 140tonne	15	13	9	8	9	4	-
Haul Truck 90 tonne	2	2	2	2	2	2	5
Support Equipment							
Track dozers 300 kW	1	1	1	1	1	1	1
Track dozers 425 kW	1	1	1	1	1	1	1
Graders	1	1	1	1	1	1	1
Water truck	1	1	1	1	1	1	1

24.11 Metallurgical Processing and Infrastructure

24.11.1 Process Plant

The ore treatment process through the PP1 plant involves the following activities:

- Crushing and Grinding;
- Leach/Adsorption;
- Carbon Stripping/Elution/Electrowinning;
- Carbon Regeneration;
- Tailings Disposal;
- Reagent Mixing/Handling, and
- Plant Services.

To achieve increased capacity in the PP1 processing circuit to 2 Mtpa, the following is required:

- Crushing circuit : sufficient installed capacity; no upgrade envisioned; minor change in operating conditions (finer crush size : F80 of 5.0mm compared to current F80 5.5mm);
- Milling circuit : increasing of the size of motors on the SAG and two ball mills as well as upgrading the classification circuit;
- Leaching circuit : additional leaching capacity required to maintain 24 hour residence time, namely refurbish 3 PP2 leach tanks (including oxygen injection and cyanide addition), installing new and modifying existing pump and pipework to transfer slurry between PP01 and PP02 leaching circuits
- Tailings pumps: minor upgrade in capacity.

The above modifications from the basis of the capital cost estimate set out in Section 3.14.1.

24.11.2 Gold Recovery

The feed grade-recovery relationship for the processing of underground ore types in the Superior PP01 processing circuit was based on historical metallurgical data for the treatment of these ore types.

Based on feed grade intervals, the subsequent relationship was estimated to be:

≥0.25<2.5 g/t : Gold Recovery (%) = 79 x Gold Feed Grade (g/t)^ 0.08

≥2.5<5.5 g/t : Gold Recovery (%) = 81.4 x Gold Feed Grade (g/t)^ 0.063

≥5.50<10.0 g/t : Gold Recovery (%) = 5.9 x LN(Gold Feed Grade (g/t)) + 80

10g/t : Gold Recovery (%) = 93.

The recent installation of gravity recovery circuit has been estimated to increase gold recovery on average by 0.75%.

Consequently, the gold recovery estimated by the feed grade-recovery relationship justified the increase of 0.75%.

At a feed grade of 2.1g/t Au, a gold recovery of 86% would be expected.

24.11.3 Site Infrastructure

Movement of some site infrastructure is required to enable the expansion of the pits. The key items for relocation are portals to access the underground (located in the main pit area) and infrastructure adjacent to the workshop area (up to the main access road). The portal within the main pit acts as a fresh air intake to the underground.

For the workshop area a trade-off study was completed to ascertain if it was worth relocating the workshop buildings, but the results indicated the capital cost of doing so outweighed the incremental profit from mining the pits to the east of the main access road.

Mining to the west of the main access road of shallow laterite pits will require the following infrastructure to be relocated,

- U/G Fuel supply facilities;
- U/G water supply Tanks, supply and discharge lines;
- Main water supply line to Laterite pit, including standpipe;
- U/G Laydown area;
- Possibly HV power lines pending on pit vicinity, and
- Main pit access roads.

The estimated capital costs for these items were provided by Superior and are detailed in Section 3.14.1.

24.12 Environment and Water Management

The Main Pit cutback would require the same Western Australia Department of Mines, Industry Regulation and Safety (DMIRS) approval applications to be submitted as for the recently approved Area 4 Pit cutback (i.e. Mining Proposal as a minimum, and a Clearing Permit if disturbing fresh ground beyond 10 hectares). The Department of Water and Environmental Regulation (DWER) licensing division may also need to be liaised with if moving infrastructure such as processing and power plants due to such prescribed premises being covered under enviro licensing.

The key environmental, water and other studies to support DMIRS Mining Proposal application include:

- Groundwater/ hydrogeological assessment (particularly in relation to mine dewatering requirements and alteration to the Site Water Balance).

- Surface water/ hydrology assessment (to determine surface water management interventions such as placement of diversion bunds and drains).
- Waste rock characterisation assessment (particularly to determine if any geochemical concerns to be managed for the receiving waste rock dump).
- Flora and Vegetation assessment (assume most of the proposed disturbance would be over existing disturbed ground, so may get away with desktop assessment).
- Pit geotechnical assessment re zone of instability and abandonment bunds placement.

These studies could be undertaken over 3 months in parallel if the scope of the Main Pit cutback is well defined by Superior/ BG (i.e. detailed site layout plan, pit cutback and waste dump expansion designs provided to specialist consultants).

DMIRS typically takes 3 months to assess Mining Proposal application.

On that basis the target duration set by Superior is 6 months providing the scope of proposed works.

24.13 Implementation Schedule

An indicative implementation was prepared to indicate the likely milestones for the Project. The major activities set out in Table 24-11.

Table 24-11 Project Implementation Schedule

Period	Year	Activities / Tasks
Year -1	2021	Exploration Drilling
		Resource model update
		Environmental studies.
		Geotechnical evaluation.
		Groundwater and hydrology study
		Pre-Feasibility study into Main Pit Expansion.
		Board Approval
		Contract tender process and selection of mining contractor.
Year 1	2022	Exploration Drilling to further increase Resource confidence
		Engineering and Upgrade PP1
		Main pit pre-strip
		Process plant upgrade commissioning late Q3
		First gold Q4
Year 2	2023	Main Pit cutback continues.
		PP1 ramp-up to 2.0 Mtpa production rate

The above timeline is ambitious but achievable with good forward planning and diligent management of the process.

24.14 Capital and Operating Costs

24.14.1 Capital Costs

Capital costs were estimated by RPM with support from Superior site engineers. A summary of estimated capital expenditure is given in Table 24-12.

Table 24-12 Project Capital Costs (A$'000)

CAPITAL	Y1	Y2	Y3	Sustaining	Total
Capitalized operating costs	64,167*	0	0	0	64,167
Definition Drilling	5,000	3,000	0	0	8,000
Contractor Mobilisation, setup	2,000	0	0	0	2,000
PP1 Process Plant Upgrade	3,150	0	0	450	3,600
Tailings Dam Expansion	172	946	881	2,599	4,598
Underground Mine Infrastructure	5,000	0	0	0	5,000
Site Infrastructure Relocation (workshop area)	600	0	0	0	600
Contingency @ 15%	2,388	592	132	457	3,569
Total Capital Cost	**82,477**	**4,538**	**1,013**	**3,506**	**91,534**

Notes: capitalised operating costs estimated by difference of A$86.3M less pre-production revenue of A$22.1 M as advised by the Company

The definition drilling cost estimate was developed by Superior and reviewed the QP for Mineral Resources to raise confidence in the resources sufficiently to supporting the proposed mining development.

The development will use contractor mining and hence no capital costs have been estimated for mining equipment. An allowance has been estimated for mobilisation of equipment and basic support mining infrastructure.

The upgrade of PP1, as described in Section 3.11, to support the treatment of open cut material and increase its total throughput capacity to 2 Mtpa, has been estimated by RPM based on our internal industry database and with Support from Superior.

The tailings dam expansion and minor relocation of some site infrastructure, has been estimated by Superior Gold from internal studies.

The Underground Mine Development capital cost was estimated by RPM and accounts for relocation of the portal, reconnection of services, and relocation of vent shafts.

A 15% contingency has been applied to the capital costs commensurate with the level of engineering applied.

24.14.2 Operating Costs

On-site mining operating costs were estimated by RPM. A summary of all operating costs is given in Table 24-13. Operating costs are estimated from the period from Year 2 until completion as Year 1 costs are assumed capitalised.

The contractor mining costs were estimated using a first principles costing approach based on the selected mining fleet and allowance for contractor margin. The average contractor mining unit rate is estimated at A$3.52/t rock mined.

The process plant operating costs were estimated by evaluating current PP1 operating costs and then modifying these based on the upgrade to a throughput of 2 Mtpa.

The mine administration costs are estimated with assistance from Superior and are based on current site costs, adjusted for an assumed 2 Mtpa plant throughput.

Table 24-13 Project Operating Costs

Cost Centre	Y2-EOL (A$M)	Y2-EOL ROM Feed (kt)	Y2-EOL Ounces (koz)	A$/t ROM feed	A$/oz.	US$/oz. (0.70 AUD:USD)
Contractor Mining	271			44	758	531
Processing Plant	119			19	334	234
Mine Admin & Development	25			4	69	48
Transport and Refining	1			0	3	2
Sub Total Excluding Royalty	**415**	6,147	357	**68**	**1,163**	**814**
Royalty	19			3	54	38
Total Operating	435			71	1,217	852
Sustaining Capital	9			1	25	18
AISC	**444**			**72**	**1,242**	**870**

No contingency has been applied to the operating costs.

24.15 Economic Assessment

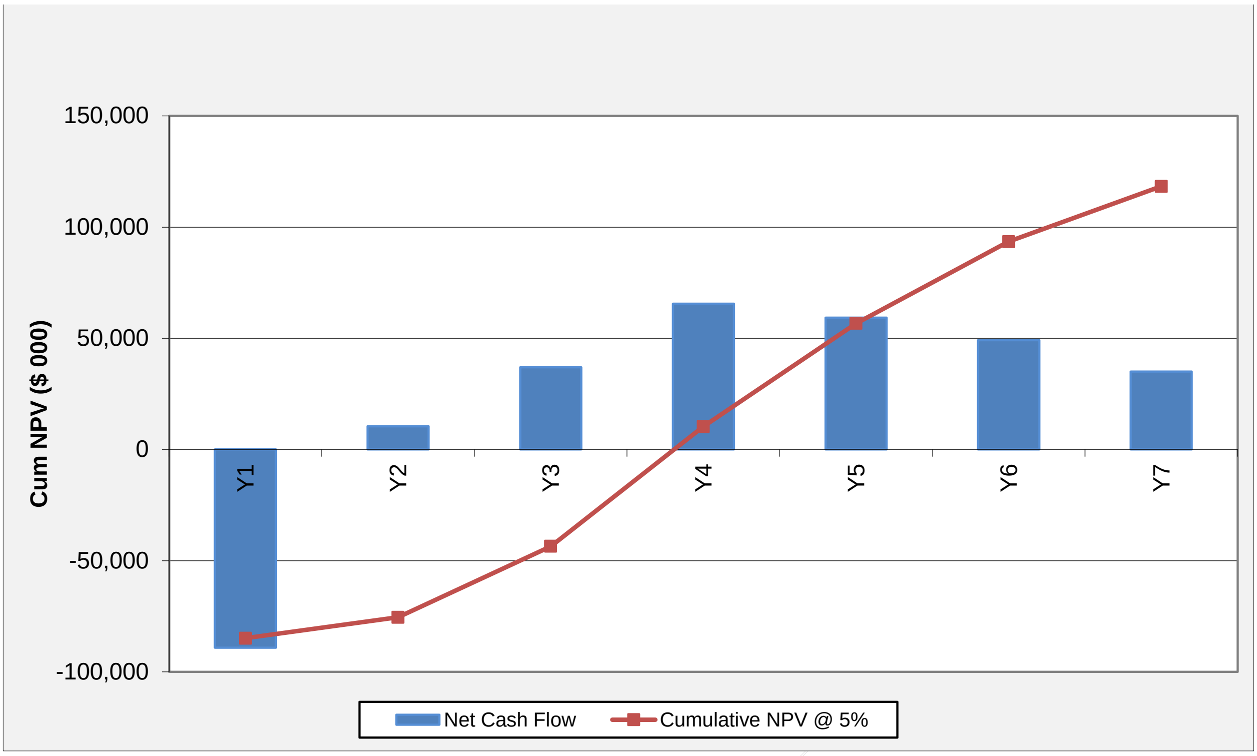
All capital costs, operating costs and revenues were input into the RPM Financial Model. Results of the cash flow analysis are given in Table 24-14. The NPV5% is estimated at A$120M with an IRR of 35% and payback period of 4 years.

Table 24-14 Key Economic Indicators

Economics		**Pre-Tax**	**Post-Tax**
Net present value (NPV5%)	A$ millions	177	120
Net present value (NPV5%)	US$ millions	124	84
Internal rate of return (IRR)	%	45	35
Payback (undiscounted)	years	2.5	2.6
LOM avg. annual cash flow after capital	A$ millions	55	43
Total cash flow (undiscounted)	A$ millions	242	169
Forecasts			
Average gold price assumption	US$/oz.	1,505	1,505
AUD to USD assumption	AUD/USD	0.7	0.7
Production			
Average annual gold production	ounces/yr	60,000	
Total LOM recovered gold (excl. pre-production)	ounces	357,000	
Mine life(2)	years	6	
Average annual mining rate	million tonnes/yr	11.6	
LOM strip ratio	waste:ore	10.3	
Average mill grade	g/t gold	2.1	
Average recoveries	%	86.4	
Capital Expenditures			
Initial capital costs (net of pre-production revenue)	A$ millions	82.5	
LOM sustaining capital costs	A$ millions	9.0	
Costs (Y2-EOL)			
Mining cost	A$/tonne mined	3.89	
Processing cost	A$ /tonne milled	19.38	
G&A cost	A$ /tonne milled	4.15	
Royalty	%	2.50%	
Total cash cost	US$/oz.	852	
AISC	US$/oz.	870	

Discounted cumulative cash flows over time are given in Figure 24-11.

Figure 24-11 Discounted Cash Flow Analysis (A$ 000)



The sensitivity of the economic outcomes (post-tax) to gold price are set out in Table 24-15.

Table 24-15 Gold Price Sensitivity

Gold Price Per ounce	(NPV5%) A$ M	IRR%
$1,300	59	20%
$1,350	74	24%
$1,505	120	35%
$1,800	206	57%
$1,900	236	64%
$2,000	265	72%

24.16 Recommendations

The PEA 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. Several opportunities to potentially improve the economics and accuracy of the proposed PFS have been identified, including but not limited to:

- Investigate the potential removal of one or more surface constraints currently limiting the size of the open pit;
- Complete infill drilling to convert Inferred Resources to Measured and Indicated Resources and update Mineral Resource models;
- Complete on-strike step-out drilling to potentially expand resources;
- Investigate existing exploration targets southeast of the Main Pit;

- Geotechnical drilling to confirm opportunities to steepen current pit walls;
- Further optimize mining strategy resulting in operating cost savings;
- Further optimize mine designs and scheduling resulting in fully-utilized contractor fleet; and
- Investigate interaction with the underground operations to identify optimization opportunities at the overall operation.

25 Interpretation and conclusions

25.1 Plutonic

- The Plutonic Gold Project is currently held 100% by Billabong, a wholly owned subsidiary of Superior Gold Inc.;
- Mineral Production from eight out of the ten main underground operations areas is on-going as at the end of December 2019;
- Current underground mining produces at an average of 5,700 Au oz per month (68,696 Au oz for the period January 2019 to December 2019;
- Resources estimation are now completed for ten underground Resource areas from the Plutonic Operation, not including the two open Pit areas of Perch and Area 4 where Resources have also been estimated. The other two Open Pit Resource areas with reported Resources are Hermes and Wilgeena (Hermes South)
- 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 best practice standards. Three of the remnant earlier Resource block modes are in need of updating, however, they are of sufficient quality to with respect to inputs and methodology to allow for a Global Resource estimates and have had some improvements applied through the incorporation of smaller scale Resource or grade control block model information. This information helps improve detail but may not represent local variability in all areas at this stage. Mine planning and grade control practises 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 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 a number of locations, most importantly in the Baltic, Indian and Caspian areas. These areas are open to the west and provide opportunity to establish mining fonts.

- The PEA 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. Several opportunities to potentially improve the economics and accuracy of the proposed PFS have been identified, including but not limited to:
  - Investigate the potential removal of one or more surface constraints currently limiting the size of the open pit;
  - Complete infill drilling to convert Inferred Resources to Measured and Indicated Resources and update Mineral Resource models;
  - Complete on-strike step-out drilling to potentially expand resources;
  - Investigate existing exploration targets southeast of the Main Pit;
  - Geotechnical drilling to confirm opportunities to steepen current pit walls;
  - Further optimize mining strategy resulting in operating cost savings;
  - Further optimize mine designs and scheduling resulting in fully-utilized contractor fleet; and
  - Investigate interaction with the underground operations to identify optimization opportunities at the overall operation.

25.2 Hermes

- The Hermes Gold Project is currently held 100% by Billabong;

- The Hermes mineralisation is likely hosted primarily by the Archaean Marymia Inlier near its southern contact with the Proterozoic Bryah Basin;
- Mineralisation is currently defined in 88 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 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 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 specific gravity values used to determine the tonnages was validated and updated from analysing data obtained from diamond drilling into the deposit; and
- The ore zones, although appearing to be closed-off to the north & south at Trapper, Klinger & Blake, are open at depth. Additional potential to the north & south of Hawkeye and Winchester is also present and further detailed drilling in those areas is likely to result in additional tonnes.

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 continue with replacing remaining old Block Models (Caspian, Cortex & Pacific Plutonic East & West) with new wireframe constrained Resource block models utilizing the standardized Ordinary Kriging interpolation approach that has now been successfully implemented for the A134, Caribbean, Indian, Timor and Baltic areas.

26.3 Refined Rock Mass (M-Code), Alteration and Structural 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 UG and zones associated with Area 4 pit/Plutonic East UG 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. The use of all possible information is essential to help reduce uncertainties in the short term.

26.4 Evaluation of Hermes South and Hermes UG

Finalise Wilgeena (Hermes South) mining studies and advance permitting and review Hermes existing pits for UG mining potential.

26.5 Open Pit Potential

The PEA 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. Several opportunities to potentially improve the economics and accuracy of the proposed PFS have been identified, including but not limited to:

- Investigate the potential removal of one or more surface constraints currently limiting the size of the open pit;
- Complete infill drilling to convert Inferred Resources to Measured and Indicated Resources and update Mineral Resource models;
- Complete on-strike step-out drilling to potentially expand resources;
- Investigate existing exploration targets southeast of the Main Pit;
- Geotechnical drilling to confirm opportunities to steepen current pit walls;
- Further optimize mining strategy resulting in operating cost savings;
- Further optimize mine designs and scheduling resulting in fully-utilized contractor fleet; and
- Investigate interaction with the underground operations to identify optimization opportunities at the overall operation.

26.6 Bulk UG Potential

Given the large Resource, review the potential of bulk mining the extensive underground Resource.

27 References

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28 Dates and signatures

The effective date of this report is 31 December 2019.

The report is issued on 30 December 2020.

The data on which this contained Mineral Resource and Reserve estimate for Plutonic Operations is based were current as of the Effective Date, 31 December 2019.

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: Stephen Hyland	30 December 2020
Signed: Matthew Keenan	30 December 2020
Signed: Ashutosh Srivastava	30 December 2020

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:

Stephen Hyland.
Principal Consultant Geologist.
Hyland Geological and Mining Consultants (HGMC)
U1 / No 30 Bristol Avenue
Bicton, Perth WA 6157 – Western Australia

(b) Title and Effective Date of Technical Report:

Issued on December 30, 2020, entitled "2020 Mineral Resource and Reserve Estimate for Plutonic Gold Operation Including Main Open Cut Pit Area, Western Australia, Australia", with an effective date of December 31, 2019 (the "**Technical Report**").

(c) Qualifications:

I graduated with a B.Sc. (Geology Double Major) in 1986 from James Cook University, Townsville, North Queensland, Australia. I am a Fellow of the AusIMM and also a member of the CIM (Canadian Institute of Mining, Metallurgy and Petroleum).

I have worked for approximately 35 years in the mining industry in various mineral exploration and production positions and have been an independent consultant geologist for more than 20 years commencing at Ravensgate International in 1997 and then at Hyland Geological and Mining Consultants (HGMC) from 2015.

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:

I visited the Plutonic Gold Mine on a routine short term 'fly-in / fly-out' roster. My most recent visit to the Plutonic Gold Mine was on September 28, 2020 for 5 days.

(e) Responsibilities:

I am responsible for all sections of the Technical Report other than Sections 15, 16 and 18, 19, 21 and 22 which the other two Qualified Persons are responsible for.

(f) Independence:

I am independent of Superior Gold Inc. in accordance with the application of Section 1.5 of NI 43-101.

(g) Prior Involvement:

I have had no 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 Technical Report and certify that the Technical Report has been prepared in compliance with same.

(i) Disclosure:

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 30th day of December, 2020.

Original Signed

Name: Stephen Hyland.

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:

Matthew Keenan
Senior Mining Engineer, Entech Pty Ltd
8 Cook St
West Perth, Western Australia 6005

(b) Title and Effective Date of Technical Report:

Issued on December 30, 2020, entitled "2020 Mineral Resource and Reserve Estimate for Plutonic Gold Operation Including Main Open Cut Pit Area, Western Australia, Australia", with an effective date of December 31, 2019 (the "**Technical Report**").

(c) Qualifications:

I graduated with a B.Eng. (Mining) and B. Comm. (Management) from Curtin University in 2004. I also completed an M. Sc (Mineral Economics) from Curtin University in 2012. I am a member of the Australasian Institute of Mining and Metallurgy (Chartered Professional).

I have worked for a total of 15 years in the mining industry in various technical and management positions. I joined Entech Pty Ltd in 2011 as a Senior Mining Consultant.

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:

I last visited the Plutonic Gold Mine on 19th February 2018 for 2 days.

(e) Responsibilities:

I was responsible for Sections 15, 16, 18, 19, 21 and 22, and the underground contributions to Sections 25 and 26 of the Technical Report.

(f) Independence:

I am independent of Superior Gold Inc. in accordance with the application of Section 1.5 of NI 43-101.

(g) Prior Involvement:

I have had no 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 Technical Report and certify that the Technical Report has been prepared in compliance with same.

(i) Disclosure:

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 30th day of December, 2020.

Original Signed

Name: Matthew KEENAN

CHARTERED PROFESSIONAL
AusIMM
THE MINERALS INSTITUTE
• MINING •
MATTHEW KEENAN

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:

Ashutosh SRIVASTAVA
Alternate Quarry Manager – Billabong Gold
Level 1, 30 Richardson Street
West Perth, Western Australia, 6005

(b) Title and Effective Date of Technical Report:

Issued on December 30, 2020, entitled “2020 Mineral Resource and Reserve Estimate for Plutonic Gold Operation Including Main Open Cut Pit Area, Western Australia, Australia”, with an effective date of December 31, 2019 (the “**Technical Report**”).

(c) Qualifications:

I graduated with a B. Tech. (Mining Engineering) from the Banaras Hindu University in Varanasi, India. I am a Fellow member of the Australasian Institute of Mining and Metallurgy (FAusIMM).

I have worked for a total of 30 years in the mining industry in various positions. I joined Superior Gold Inc. in March 2019 as an employee at the Plutonic Gold Mine and held the position of Alternate Quarry Manager at that site until September 1st, 2020.

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:

I visit the Plutonic Gold Mine on a routine roster and my most recent visit to the Plutonic Gold Mine was on September 1, 2020 for 8 days.

(e) Responsibilities:

I was responsible for Sections **15, 16** and **18** 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. The nature of my prior involvement is that I was the Alternate Quarry Manager from March 2019 to September 2020 and had general oversight of all open pit operations within the Plutonic Gold Mine.

(h) Compliance with NI 43-101:

I have read NI 43-101 and the Technical Report and certify that the Technical Report has been prepared in compliance with same.

(i) Disclosure:

As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 30th day of December, 2020.

Original Signed

Name: Ashutosh SRIVASTAVA