NI 43-101 Technical Report:

Mineral Resource Update
Beatons Creek Gold Project
Nullagine, Western Australia

Effective Date: June 30, 2022

Issue Date: December 16, 2022

Qualified Persons

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Dr Simon Dominy, FAusIMM(CP) FAIG(RPGeo) FGS(CGeol)	*"Simon Dominy"*
Ms Janice Graham, MAIG	*"Janice Graham"*
Mr Jeremy Ison, FAusIMM	*"Jeremy Ison"*
Mr Royce McAuslane, FAusIMM	*"Royce McAuslane"*

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1. SUMMARY

1.1 Overview

This technical report (the ‘Technical Report’ or the ‘report’) has been prepared by Novo Resources Corporation (‘Novo’ or the ‘Company’) and Snowden Optiro (‘Snowden Optiro’) for the Beatons Creek gold project (the ‘project’) held by Beatons Creek Gold Pty Ltd and, in certain circumstances, beneficially held by Nullagine Gold Pty Ltd, both wholly owned Australian subsidiaries of Novo.

The geology and Mineral Resources described in this Technical Report are based on reverse circulation (RC) and diamond core drilling, trench channels, bulk samples and geological mapping collected by Novo at the Beatons Creek gold project. The 2022 Mineral Resource estimate (MRE) for the Beatons Creek gold project has resulted in an Indicated Mineral Resource of 234,000 oz Au and an Inferred Mineral Resource of 42,000 oz Au (Table 1.1). The open pit Mineral Resources contain oxide and fresh mineralization reported within a Whittle optimized shell and constrained within a mineralized wireframe. A cut-off grade of 0.5 g/t Au was applied.

Table 1.1. Open pit Mineral Resources for Beatons Creek; columns may not total due to rounding.

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Indicated	Oxide	0.5	815,000	1.3	33,000
	Fresh	0.5	2,240,000	2.8	201,000
	Total	**0.5**	**3,050,000**	**2.4**	**234,000**

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Inferred	Oxide	0.5	445,000	1.3	18,000
	Fresh	0.5	385,000	1.9	24,000
	Total	**0.5**	**830,000**	**1.6**	**42,000**

Notes:

1. Open pit Mineral Resources contain oxide and fresh mineralization reported within a Whittle optimized shell and constrained within a mineralized wireframe. A cut-off grade of 0.5 g/t Au was applied.
2. The pit shell was estimated with the following indicative parameters:
   (a) Gold price of A$2,600/oz (US$1,690/oz) of gold;
   (b) Nominal processing rate of 1.8 Mt/a with gold recoveries of 93% (oxide) and 91% (fresh);
   (c) Bulk density applied: oxide mineralization 2.50 t/m^3 (waste 2.50 t/m^3) and fresh mineralization 2.80 t/m^3 (waste 2.75 t/m^3);
   (d) A$5.15/t (US$3.35/t) mining cost for oxide and A$5.45/t (US$3.54/t) for fresh;
   (e) A$37.47/t (US$24.36/t) processing cost (incl. G&A) for oxide and A$38.37/t (US$24.94/t) for fresh;
   (f) 25% dilution and 5% loss;
   (g) Royalties 5.25%. In addition to the 5.25% gross royalties, the Company has an obligation to pay deferred consideration in the form of a fee on future gold production equal to 2% of all gold revenue generated by the Company up to the later of cumulative gold production of 600,000 oz Au or cumulative payments of A$20M having been made to IMC Resources Gold Holdings Pte Ltd. Considering this deferred consideration is payable on any production by the Company from any of its projects, the Company has determined that it should not specifically encumber Beatons Creek and while it is factored into any financial analyses prepared by the Company, it is not incorporated in the optimizations used to determine the Beatons Creek reasonable prospects for eventual economic extraction (RPEEE) pit shells;
   (h) Discount factor 6%; and
   (i) A$ to US$ exchange rate of 0.65:1.

No underground Mineral Resources have been reported for 2022. This Technical Report supersedes the technical report titled ‘Preliminary Economic Assessment on the Beatons

Creek Gold Project, Western Australia', dated effective February 5, 2021 and filed under Novo's profile on SEDAR (www.sedar.com) on April 30, 2021.

1.2 Location, Property Description and Ownership

The Beatons Creek gold project is in the East Pilbara Shire, between the major regional centers of Newman and Port Hedland, in the northwestern part of Western Australia (Figure 1.1). The project area is situated west of the town of Nullagine (population approximately 200, 1,364 km north-northeast of Perth). By road, Nullagine is 296 km southeast of Port Hedland and 170 km north of Newman.

The Beatons Creek project consists of auriferous conglomerate horizons hosted by the Hamersley Basin of Late Archean-Paleoproterozoic age within the East Pilbara granite-greenstone terrane of the Early to Late Archean Pilbara Craton, in the northwestern part of Western Australia. The conglomerates are hosted by the Lower Fortescue Group sedimentary sequence. They occur at different stratigraphic levels within the Fortescue Group, occurring in the mid-to-upper parts of the Hardey Formation.

The project area is covered by 46 granted and contiguous tenements and one tenement application totaling 219.23 km²; the tenements include 42 Exploration and Prospecting Licences beneficially held by Nullagine Gold Pty Ltd but currently registered under Tantalumx Pty Ltd (18) and WITX Pty Ltd (8), and held by Beatons Creek Gold Pty Ltd (16), and 4 Mining Leases held by Beatons Creek Gold Pty Ltd. Prospecting Licences, Exploration Licences, and Mining Leases are held for durations of 4, 5 and 21 renewal years respectively. Three of the Prospecting Licences held by Beatons Creek Gold Pty Ltd in the northwestern corner of the project are currently pending approval for transition to a Mining Lease. The property is located near a privately owned railroad used to transport iron ore from Newman to Port Hedland.

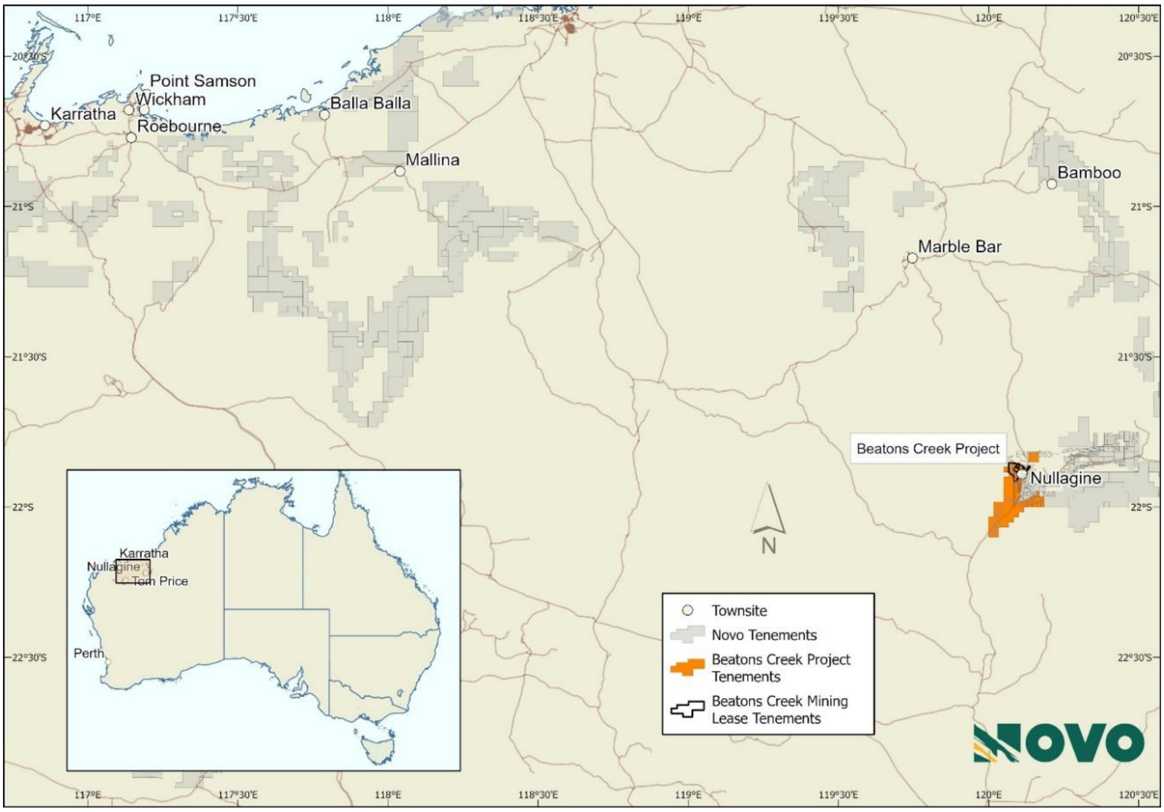

Figure 1.1. Location of Beatons Creek (Source: Novo).

1.3 Geology and Mineralization

Gold mineralization occurs within the Beatons Creek conglomerate member of the Hardey Sandstone formation, which constitutes part of the Fortescue Group (MacLeod et al., 1963). Gold is present as fine (<100 µm) to coarse (>100 µm) particles within the matrix of multiple, narrow, stacked and unclassified ferruginous-conglomeritic mineralized horizons, which are interbedded with unmineralized conglomerates, sandstones and grits with minor intercalations of shale, mudstone, siltstone and tuff. The lateral extent of the mineralization has been identified as being up to 2.5 km.

Gold occurs as free particles up to 5 mm across within the ferruginous matrix of mineralized conglomerates and is strongly associated with detrital pyrite and authigenic nodules (2 mm to 65 mm in diameter), locally referred to as 'buckshot pyrite'.

Gold-bearing conglomerates have been identified at several stratigraphic levels, from surface to approximately 70 m in depth within the Fortescue Group in the Nullagine sub-basin. Auriferous conglomerates at Beatons Creek occur in the mid-to-upper part of the Hardey Formation.

1.4 Exploration, Drilling, Sampling and QA/QC

Exploration by Novo consists of surface geological mapping, trench (or costean) channel sampling of outcrops at shallow depths, diamond core drilling and extensive RC drilling conducted between 2011 and 2022. Historical exploration activities include geochemical and geophysical surveys, geological mapping, and drilling by various operators between 1968 and 2007. They also include a bulk sampling program undertaken in 2018 (Dominy and Hennigh, 2019; Dominy, van Roij and Graham, 2022). Mining commenced in January 2021, supported by extensive resource development and grade control RC drilling.

Table 1.2 summarizes the number of holes, samples and composites used in the 2022 MRE.

Table 1.2. Summary of holes, samples and composites used in the 2022 MRE.

Hole or sample type	Number of holes	Number of samples	Number of composites
Bulk samples	-	54	57
Diamond drillholes	60	580	354
RC drillholes	3,877	25,350	17,186
Trench/costean channel samples	-	57	53
Total	**4,039**	**26,041**	**17,650**

The sample preparation, analyses and sample security procedures implemented by SGS, MinAnalytical and Intertek laboratories in Western Australia meet standard practices and are monitored using control samples. Assay was via LeachWELL (cyanide leaching) or PhotonAssay. In the opinion of the Qualified Persons, the data collected are of acceptable quality to support an MRE.

This MRE is one of the first to be estimated based on samples assayed via the innovative PhotonAssay technique. PhotonAssay is a non-destructive, fast, robust and sustainable method for gold assay.

1.5 Mineral Processing and Metallurgical Testing

Six HQ diamond drillholes were drilled in 2018 to provide fresh mineralization samples for testwork on material from Grant's Hill and South Hill. Comminution testwork shows that fresh material is competent, with an average Bond ball mill work index (Bwi) for Grant's Hill of 18.8 kWh/t. SAG mill comminution (SMC) test data indicate that the fresh mineralization is moderately competent with an average A*b of 47.8 and a range of 38.0 (hard) to 56.6 (soft). Testwork also shows that the fresh mineralization is abrasive with an average Bond abrasion index (Bai) value of 0.26. Overall, three-stage gravity recoverable gold (GRG) test recovery was high at 94.6% and 89.0%, respectively, for the M1 and M2 mineralized conglomerate composites. The test data suggest that the Grant's Hill fresh mineralization is amenable to gravity recovery and that high plant gravity gold recovery (50% to 80% of the GRG) can be expected. The average 24-hour leach extraction for all six tests on Grant's Hill samples (regardless of grind size) was 93.3%. The single stage GRG test recovery was high, at 61.3% and 69.8%, respectively, for the South Hill CH1 and CH2 composites. The average 24-hour leach extraction for all six tests on South Hill samples (regardless of grind size) was 60.1%.

Nine HQ diamond holes were drilled in 2022 to provide fresh mineralization samples for metallurgical testwork on Grant's Hill and Edwards materials. Gravity and kinetic cyanide leach tests were conducted on 23 interval composite samples along with three GRG samples that contained multiple interval samples. A single grind size of P_{80} -150 µm was used with and without carbon addition and the grind size was kept fixed as that is the grind size being achieved at the Golden Eagle processing plant. Three-stage GRG tests were conducted on three composites that were generated from the interval samples to represent the three sample locations. Composites GRG01–03 returned very high overall GRG recoveries of 78.3%, 85.4% and 87.6%. Overall gravity and carbon-in-leach (CIL) extractions ranged from 56% to 98%, with an average of 87% for a 24-hour leach. The recovery results have been weighted by sample representivity (based on MRE tonnages) to generate an overall recovery of 91%.

Between August 2021 and April 2022, three separate fresh bulk processing trials of material from the Grant's Hill mining area were processed through the Golden Eagle processing plant. A single fresh trial in August 2021 (Batch #1: 100% Grant's Hill fresh) was complemented by two additional oxide blended trials in March and April 2022 (Batch #2: 80% and Batch #3: 53% Grant's Hill fresh). Overall, throughputs for the three trials averaged around 207 t/h, which is approximately 10% less than the recorded oxide thoughput. Fresh mineralization dominated Batch #1 – 38,208 t at a reconciled head grade of approximately 1.8 g/t Au yielding approximately 2,034 oz Au, with a recovery of 93.6%. The gravity recovery component during the trial was approximately 56%.

During production, 2.51 Mt of dominantly oxide with some fresh mineralization (~160,000 t), at 1.17 g/t Au was fed to the Golden Eagle processing plant. This contained 94,148 oz Au, with 87,313 oz Au recovered. The global recovery during this period was 92.7%, with 55% recovery from the gravity circuit.

1.6 Mineral Resource Estimation

Oxide and fresh (open pit) Mineral Resources have been estimated by multi-pass ordinary kriging of top-cut 1 m composites. The Indicated and Inferred Mineral Resources are given in Table 1.3 and by oxidation state in Table 1.4.

Table 1.3. Open pit Mineral Resources for Beatons Creek by classification; columns may not total due to rounding.

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Indicated	Oxide	0.5	815,000	1.3	33,000
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Table 1.4. Open pit Mineral Resources for Beatons Creek by oxidation state.

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
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Notes:

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    (a) Gold price: A$2,600/oz Au (US$1,690/oz Au);
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    (d) A$5.15/t (US$3.35/t) mining cost for oxide and A$5.45/t (US$3.54/t) for fresh;
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    (h) Discount factor 6%; and
    (i) A$ to US$ exchange rate of 0.65:1.

Mining costs are based on a conventional open pit truck/excavator mining fleet and actual contract rates scaled to planned future production. The costs reflect the sharp relief in topography and backfill requirement to cover any exposed fresh material to meet expected environmental obligations imposed as part of the approvals process. Mining dilution and loss factors are derived based on the style of mineralization and mining methods.

No underground Mineral Resources have been reported for 2022.

The number of samples used in the estimate is shown in Table 1.2. Top-cuts were defined for each domain using histograms and probability plots to determine where high-grade distribution tails became erratic. Sampled intervals from all data were composited to 1 m. Novo personnel constructed mineralization wireframes in Vulcan; a summary of the mineralization extent is displayed in Figure 1.2.

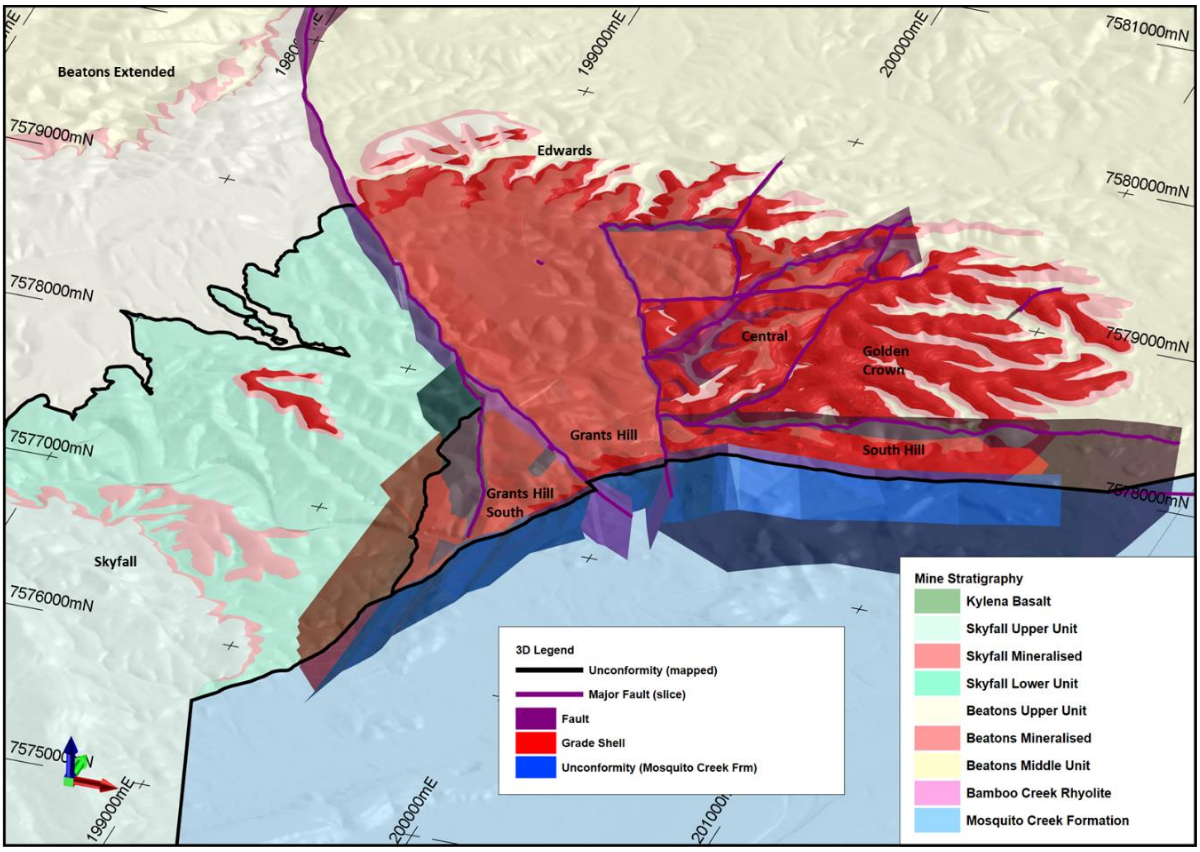


Figure 1.2. 3D model of stratigraphy and mineralization showing fault-bound domains, representing the extents of geological wireframes.

Composites from oxide and fresh domains for each mineralized conglomerate were used for estimation. An example of the resulting block grades is shown in Figure 1.3.

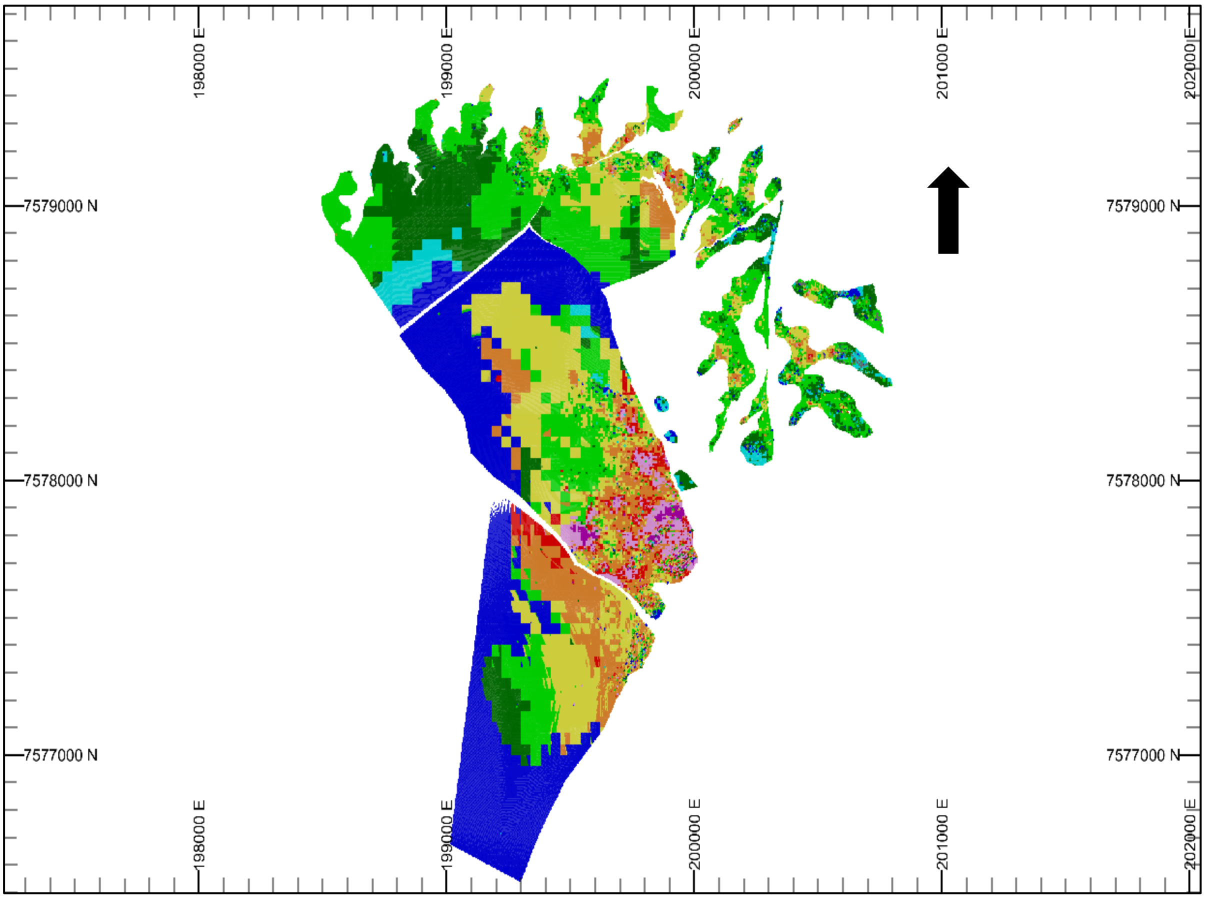


Figure 1.3. Plan view showing estimated block gold grades in the M1 domain.

Mineral Resource classification was generally allocated according to estimation pass, and also considered data type, quality and distribution and bulk density measurement availability. Reasonable prospects for eventual economic extraction (RPEEE) have been determined by evaluation within a potentially exploitable pit shape. Blocks that fall within the pit shell defined by Whittle optimization (Indicated and Inferred Mineral Resources only) were reported above a 0.5 g/t Au cut-off. Estimates have been verified by visual review, examination of swath plots, volume-to-tonnage comparisons, and sensitivity analysis.

The terms ‘Mineral Resource’, ‘Inferred Mineral Resource’, ‘Indicated Mineral Resource’, ‘Mineral Reserves’ and ‘Feasibility Study’ have the meanings as given in the CIM *Definition Standards for Mineral Resources and Mineral Reserves*, adopted by the Canadian Institute of Mining, Metallurgy and Petroleum Council (CIM, 2014). Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability; it is uncertain if applying economic modifying factors will convert Measured and Indicated Mineral Resources to Mineral Reserves. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues; however, no issues are known at this time. The quantity and grade of reported Inferred Mineral Resources in this estimation are uncertain in nature and there has been insufficient exploration to define these Inferred Mineral Resources as an Indicated or Measured Mineral Resource; furthermore, it is uncertain if further exploration will result in upgrading Inferred Mineral Resources to an Indicated or Measured Mineral Resource category.

1.7 Recovery Methods

In 2020 Novo acquired all the outstanding shares of privately held Millennium Minerals Limited (Millennium) and via this transaction Novo became the owner of a processing plant now known as the Golden Eagle mill. All mineralization mined from Beatons Creek during 2021–2022 was fed through the Golden Eagle mill.

The Golden Eagle processing plant includes the following unit processes: a comminution circuit with a single-stage jaw crusher (approximately 400 t/h capacity), a single-stage semi-autogenous grinding (SAG) mill of 6.7 m diameter by 5.65 m effective grinding length with a 4 MW motor and a grinding capacity of 180–190 t/h to 150 µm. Gravity gold recovery is via centrifugal (Knelson) concentration and an intensive cyanidation leach (Acacia) reactor. Leaching occurs in two tanks, followed by seven CIL tanks, with oxygen addition in the first three leach tanks. Tailings is thickened to 55% solids prior to disposal in a tailings storage facility (TSF) with return of decant water. Stripping of loaded carbon is in a split AARL (Anglo American Research Laboratories) column. Gold recovery is via electrowinning cells. Ancillary facilities are present for the bulk delivery, storage and distribution of reagents. Air and water services are reticulated throughout.

1.8 Project Infrastructure

Vehicle access to the mine and processing facility is via the part sealed Newman to Port Hedland Road (State Route 138, Marble Bar Road). The 600 m unsealed access road to the Beatons Creek mine is located 800 m north of the Nullagine township. The Golden Eagle mill is 8.9 km south of the township. The 3.5 km access road crosses a creek floodway which is dry most of the year.

The workforce can be employed on a fly-in, fly-out basis. Newman and Port Hedland have commercial airports with frequent services to and from Perth. The operations workforce was transferred from Newman to the Golden Eagle site by a Novo-operated bus service.

The existing Golden Eagle mill includes the processing plant, administration buildings, workshop, warehouse, laboratory, power station, communications network, water supply and storage, water treatment and wastewater treatment, as well as a nearby 230-room accommodation village.

Power is provided by an on-site power station comprising 10 by 1 MW diesel generators and transmitted via an 11 kV overhead transmission line to the processing plant and the accommodation village. The TSF decant pumps are powered by local generators. An existing fuel farm comprises six diesel storage tanks, with a total storage capacity of 560 kL.

Water supply for the plant site is via borefield networks, pit dewatering and tailings decant, with capture of stormwater. Raw water and process water ponds provide storage at the processing plant. Potable water for the site and accommodation village is supplied by existing reverse osmosis plants. Plant sewage is treated via a fully contained wastewater treatment plant and treated effluent is disposed into the rock ring of the TSF, as per licence conditions. Golden Eagle has a decommissioned tailings storage facility (TSF1) and an active facility (TSF2).

1.9 Environmental Studies, Permitting and Social or Community Impact

Following mining of oxide mineralization during 2021 to 2022, the next stage of the project is the mining of fresh mineralization (the 'Fresh Rock Expansion', FRE). Novo has engaged with the West Australian Department of Mines, Industry Regulation and Safety (DMIRS) and the Department of Water and Environmental Regulation (DWER) over many years and has undertaken an extensive amount of environmental and social assessments. The key consideration in accessing the fresh rock component of the resource is the project's location within a Priority 1 Public Drinking Water Supply Area (PDWSA), and therefore the security of the Nullagine water supply. Extraction of fresh rock requires consideration of the environmental factors Terrestrial Environmental Quality and Inland Waters, as defined below:

- Terrestrial Environmental Quality – the Environmental Protection Authority's environmental objective is '…to maintain the quality of land and soils so that environmental values are protected'
- Inland Waters – the Environmental Protection Authority's environmental objective is '…to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected'.

The interaction between these two factors is a classic source-pathway-receptor model with geochemical properties of the fresh rock being a source, the hydrogeological setting being a potential pathway, and the town's water supply being the receptor. The issue is potential impacts from the mine water and the Nullagine water supply.

The design and site management at Beatons Creek, together with almost a decade of data and studies, have demonstrated there is negligible risk of impact to the public water supply due to an incomplete pathway between the receptor and source. There is no viable pathway for potential contaminants (if generated) at Beatons Creek to reach the town water supply.

To further mitigate any impact of the FRE on the PDSWA, all PAF waste is proposed to be encapsulated and the fresh rock pits backfilled to re-establish pre-existing surface water drainage, resulting in the majority of all waste generated needing to be rehandled, adding significantly to the closure costs of Beatons Creek.

The FRE was referred to the EPA under Section 38 of the EP Act in March 2022. In July 2022, the EPA considered that the likely environmental effects of the MP do not warrant formal assessment and, therefore, published the decision not to assess the MP under Part IV of the EP Act. No public advice was given.

One appeal against the EPA decision not to assess the MP was received. The Appeals Convenor provided an opportunity for the EPA and Novo to respond to the matters raised in the appeal by August 30, 2022, and Novo met this timeframe. The Appeals Convenor is continuing to engage with the appellant and a timeline on resolution cannot yet be estimated. Following receipt of responses from the EPA and Novo, and ongoing consultation with the appellant, the Office of the Appeals Convenor will prepare a report for the consideration of the Minister for Environment, who will decide the appeal. There is no statutory timeframe for preparation of the report for the Minister. The Office of the Appeals Convenor aims to submit 80% of reports within 60 days of receipt of responses from the decision-making authority and the proponent; this timeframe has now been exceeded. There is no further right of appeal on the Minister's decision.

If the Minister dismisses the appeal, further assessment of the FRE MP under Part IV of the EP Act will not be required. If the Minister upholds or partially upholds the appeal, the MP will likely require assessment under the EP Act. The key risk for the FRE MP is the extended timeframe required for assessment under Part IV of the EP Act if the Minister upholds the appeal.

The FRE will also require approval of an MP and MCP under the *Mining Act*. The majority of studies required to support the MP were conducted during preparation of the referral to the EPA. Additional studies are underway to provide more specific mining details that are required for the MP. The MCP for the expanded oxide proposal will be revised to incorporate the FRE MP. The key risk for approval of the FRE MP is demonstrating PAF waste rock material will not result in impacts to the PDWSA underlying Beatons Creek.

1.10 Interpretations and Conclusions

The QPs have generated a new Mineral Resource estimate (MRE) for the Beatons Creek gold project. This includes Indicated Mineral Resources of 234,000 oz Au (3.05 Mt at an average grade of 2.4 g/t Au) and Inferred Mineral Resources of 42,000 oz Au (0.83 Mt at an average grade of 1.6 g/t Au). The Mineral Resources have been reported at a cut-off grade of 0.5 g/t Au and are constrained by Whittle-generated pit shells using a gold price of A$2,600/oz (US$1,690/oz).

This new MRE is based on verified historical drilling data, along with extensive new drilling and geological data collected by Novo during 2021 to 2022. The MRE is based on revised mineralization wireframes developed in 2022 that incorporate new grade control and resource development drilling.

This Mineral Resource is one of the first to be estimated based dominantly on samples assayed via the PhotonAssay technique. PhotonAssay is a non-destructive, fast, robust and sustainable method for gold assay. The QPs consider that the technique is suitable for the estimation and classification of Mineral Resources according to the CIM Definition Standards (CIM, 2014) and associated Best Practice Guidelines (CIM, 2019).

In 2019 and 2022 diamond core drilling was undertaken to support gravity and leach metallurgical testwork on 584 kg of fresh mineralization. A fresh mineralization trial parcel from Grant's Hill (M2 lag) totaling 38,208 t (Batch #1) was run through the Golden Eagle processing plant in August 2021. The trial parcel and metallurgical testwork results indicate that the fresh mineralization is amenable to both gravity and leach gold recovery. For the 2022 MRE, a global fresh mineralization recovery of 91% was applied for RPEEE purposes.

1.11 Recommendations

Based on the status of the Beatons Creek project, the following recommendations are presented:

- Advance the project by conducting further technical and evaluation studies;
- Undertake additional RC drilling to increase the Inferred Mineral Resource base;
- Undertake additional RC drilling to convert Inferred to Indicated Mineral Resources; and
- Undertake additional diamond core drilling to support geological and geotechnical data collection, and metallurgical testwork.

A breakdown of estimated costs for these activities is provided in Section 26.

2. INTRODUCTION

2.1 Novo Resources Corp.

This Technical Report has been prepared for Novo Resources Corp. (TSX: NVO) as an update of the MRE (2022 MRE) for the Beatons Creek gold project.

The Company was incorporated on October 28, 2009, under the laws of British Columbia pursuant to the *Business Corporations Act (British Columbia)* under the name Galliard Resources Corp. The Company changed its name to Novo Resources Corp. on June 27, 2011.

The head office of the Company is located at 1100–1199 West Hastings Street, Vancouver, BC V6E 3T5, Canada. The Company's registered office is located at 2900–733 Seymour Street, Vancouver, BC V6B 0S6, Canada. The Company's operational office is located at Level 1, 46 Ventnor Avenue, West Perth, WA 6005, Australia.

The Company is a mineral exploration company focused primarily on the exploration and development of gold projects in the Pilbara region of Western Australia.

2.2 Introduction

This Technical Report presents an update of Mineral Resources at the Beatons Creek gold project, based on recent production and extensive additional RC drilling.

The Technical Report, titled *NI 43-101 Technical Report: Mineral Resource Update, Beatons Creek Gold Project, Nullagine, Western Australia* was prepared by Qualified Persons (QPs) following the guidelines of NI 43-101, and in conformity with the guidelines of the 2014 Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *Definition Standards for Mineral Resources and Mineral Reserves*.

2.3 Qualified Persons and Site Visits

Dr Simon Dominy, FAusIMM(CPGeo) FAIG(RPGeo) FGS(CGeol), meets the requirements and definition of a Qualified Person as a member of an Accepted Foreign Association, as defined in Appendix A of the Instrument, as a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM CPGeo #205232); Australian Institute of Geoscientists (FAIG RPGeo #1576); and Chartered Geologist and Fellow (CGeol FGS #17580) of the Geological Society of London. The Certificate of Qualified Person for Dr Dominy is in Section 28. Dr Dominy is not independent of Novo. Dr Dominy visited the Beatons Creek mine site from May 8–12, 2022, inclusive, with previous visits having been undertaken in 2018 and 2019. Current site inspection included observations of core drilling, collar locations and drill core; RC drilling, collar locations and samples; Intertek sample preparation laboratory; surface outcrops of oxide and fresh mineralized conglomerates within the pit area; mineralization/waste spotting, tracking and mining/excavation process within the pit; and inspection of the Golden Eagle processing plant. Visits were also made to the MinAnalytical and Intertek PhotonAssay facilities in Perth.

Ms Janice Graham, MAIG, meets the requirements and definition of a Qualified Person as a member of an Accepted Foreign Association, as defined in Appendix A of the Instrument, as a Member of the Australian Institute of Geoscientists (MAIG #7814). The Certificate of Qualified Person for Ms Graham is in Section 28. Ms Graham is independent of Novo, by virtue of being a full-time employee of Snowden Optiro. Ms Graham visited the Beatons Creek mine site during May 8–12, 2022. Site inspections included observations of core drilling, collar locations and drill core; RC drilling, collar locations and samples; Intertek sample preparation laboratory; surface outcrops of oxide and fresh mineralized conglomerates within the pit area; mineralization/waste spotting, tracking and mining/excavation process within the pit; and the Golden Eagle processing plant. Visits were also made to the Intertek PhotonAssay facilities in Perth.

Mr Jeremy Ison, FAusIMM, meets the requirements and definition of a Qualified Person as a member of an Accepted Foreign Association, as defined in Appendix A of the Instrument, as a Fellow of the Australasian Institute of Mining and Metallurgy (#107238). The Certificate of Qualified Person for Mr Ison is in Section 28. Mr Ison is independent of Novo, by virtue of being a full-time employee of Ison Design Pty Ltd. Mr Ison visited the Beatons Creek mine site on December 13–14, 2021.

Mr Royce McAuslane, FAusIMM, meets the requirements and definition of a Qualified Person as a member of an Accepted Foreign Association, as defined in Appendix A of the Instrument, as a Fellow of the Australasian Institute of Mining and Metallurgy (#211257). The Certificate of Qualified Person for Mr McAuslane is in Section 28. Mr McAuslane is independent of Novo, by virtue of being a full-time employee of MineScope Services Pty Ltd. Mr McAuslane visited the Beatons Creek mine site on August 30 to September 1, 2022.

The QPs are responsible for the specific report sections as follows in Table 2.1.

Table 2.1. QP responsibilities and site visits.

Qualified person	Company	Site visit	Section responsibility
Dr Simon Dominy	Novo	May 8–12, 2022	1–16; 19–27
Ms Janice Graham	Snowden Optiro	May 8–12, 2022	1–12; 14–16; 19; 21–27
Mr Jeremy Ison	Ison Design	December 13–14, 2021	13
Mr Royce McAuslane	MineScope Services	August 30 to September 1, 2022	17 and 18

The QPs were assisted by Novo personnel, including Mrs Kas de Luca (General Manager – Exploration), Mr Chris Goti (General Manager – Environment and Heritage), Mr Alwin van Roij (Exploration Manager – East Pilbara), Ms Leonie Burford (Senior Exploration Geologist), Ms Justine Ellis (Tenements Manager), Mr Ryan Guerin (Senior Mine Geologist), Ms Michelle Smith (Senior Resource Geologist) and Mr Thet Aung (Database Administrator). Ms Felicity Jones (Technical Discipline Manager) of 360 Environmental made a substantial contribution to the writing of Section 20.

The effective date of this Technical Report is June 30, 2022.

2.4 Data Sources

This report is based on information collected by the QPs during site visits and on additional information provided by Novo throughout the course of Mineral Resource estimation and report preparation. The QPs have no reason to doubt the reliability of the information provided by Novo. This Technical Report is based on the following sources of information:

- Discussions with Novo on-site and Perth-based personnel and management;
- Site inspection and observation;

- Review of exploration, resource development and grade control drill data; and
- New RC and diamond core drilling completed during 2021–2022.

The content of this Technical Report is based on exploration, resource development and grade control drilling data collected by Novo and the results of estimation performed by Snowden Optiro utilizing data as of May 27, 2022.

Information pertaining to title, environment, permitting and access has also been supplied by Novo personnel.

2.5 Units of Measure

For this Technical Report, common measurements are given in metric units. All tonnages shown are in dry metric tonnes, precious metal grade values are given in grams per tonne gold (g/t Au), and precious metal quantity values are given in troy ounces (oz; 31.10348 g). All references to dollars in this Technical Report are to Australian dollars (A$) unless otherwise noted.

2.6 Abbreviations

The following is a list of abbreviations used in this Technical Report.

Abbreviation	Unit or Term
AARL	Anglo American Research Laboratory
AO	Alunitic oxide
Au	Gold
A$	Australian dollars
BAi	Bond abrasion index (abrasiveness of a lithology)
BLEG	Bulk leach extractable gold
BBWi	Bond ball work index (power consumption to grind a given lithology)
Bulk density	Weight of the rock including the intergranular air space in unit volume
CIL	Carbon-in-leach (cyanide leaching)
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
COV	Coefficient of variation (standard deviation/mean), same as RSV
CRM	Certified reference material
°C	Degrees Celsius
cm	Centimeters (0.01 m)
cm^3	Cubic centimeters
DA	Dynamic anisotropy (a Datamine software routine)
DIA	Department of Indigenous Affairs
DWER	Department of Water and Environmental Regulation
DGPS	Differential global positioning system
DMIRS	Department of Mines, Industry Regulation and Safety
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
FA	Fire assay for gold grade determination
FRE	Fresh Rock Expansion
g	Gramme
Ga	Billions of years

Abbreviation	Unit or Term
G&A	General and administration costs
GHG	Greenhouse gas
GRG	Gravity recoverable gold
g/t Au	Grams per tonne gold
g/cm^3	Grams per cubic centimeter
ha	Hectares
HARD	Half absolute relative difference (precision measure)
HFA	Hardey Formation aquifer
HQ	Diamond drill core size at 63.5 mm diameter
ICPMS	Inductively coupled plasma mass spectrometry
JORC	Joint Ore Reserves Committee
JORC Code	*The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (2012 edition)
kg	Kilograms (1,000 g)
kL	Kiloliters (volume of fluid, x10^3)
km	Kilometers (1,000 m)
km^2	Square kilometers
km/hr	Kilometers per hour
KNA	Kriging neighborhood analysis
kV	Kilovolts (electrical potential x10^3)
kW	Kilowatts (electrical power x10^3)
LDL	Lower detection limit (lowest level of detection for an assay method)
LPG	Liquified petroleum gas
LeachWELL	Cyanide based assay for gold grade determination
m	Meters (100 cm)
M	Million (×10^6)
MCFA	Mosquito Creek Formation aquifer
MCP	Mine Closure Plan
mg/L	Milligrams per liter
mm	Millimeters
mm/yr	Millimeters per year
MOU	Memorandum of Understanding
MP	Mining Proposal
MRE	Mineral Resource estimate
Mt/a	Million tonnes per annum
MW	Megawatts (electrical power ×10^6)
NAF	Non acid-forming
NATA	National Association of Testing Authorities (Australia)
NI 43-101	Canadian Securities Administrators National Instrument 43-101
Novo	Novo Resources Corporation
NSR	Net smelter return
NVCP	Native Vegetation Clearing Permit
OEPA	Office of the Environmental Authority
PAF	Potentially acid forming
PDWSA	Priority Public Drinking Water Supply
PEA	Preliminary Economic Assessment
PEC	Priority ecological community

Abbreviation	Unit or Term
PER	Public environmental report
PMLU	Post-mining land use
ppm	Parts per million (1 ppm = 1 g/t Au)
Project	Beatons Creek
PQ	Diamond drill core size at 85 mm diameter
QA/QC	Quality assurance/quality control
QP	Qualified Person (as defined by NI 43-101)
RAB	Rotary air blast drilling (drilling method not used in MRE)
RC	Reverse circulation drilling (drilling method generally suitable for MRE)
ROM	Run of mine (nominally average grade ‘ore’ from a mine’)
RPEEE	Reasonable prospects for eventual economic extraction
RSD	Rotary sample divider (splitter)
RSV	Relative sampling variability (same as COV)
SAG	Semi-autogenous grinding mill
SD	Standard deviation
SFA	Screen fire assay for gold grade determination
SRE	Short range endemic
SMC	SAG mill comminution test (rock breakage test)
t	Metric tonnes (1,000 kg)
TDS	Total dissolved solids
TOS	Theory of Sampling (see Table 10.1 for individual error definitions)
TSF	Tailings storage facility
oz	Troy ounces (31.10348 g)
t/d	Tonnes per day
US$	United States dollars
µS/m	Siemens per m (electrical conductivity)
µm	Micron (0.001 mm)

3. RELIANCE ON OTHER EXPERTS

The QPs have not assessed the legal status of the Beatons Creek tenements and have relied on information provided by the Company relating to land title, agreements and encumbrances, permitting and ownership.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Beatons Creek gold project is situated in the East Pilbara Shire, which is one of the four local government areas in the Pilbara region of Western Australia. The East Pilbara Shire has an area close to 380,000 km^2 and is the third largest municipality in the world.

Beatons Creek is located between the major regional centers of Newman and Port Hedland, in the northwestern part of Western Australia (Figure 4.1). The project area is west of the town of Nullagine, with a population of about 200 inhabitants, and is located 1,364 km north-northeast of Perth. By road, Nullagine is 296 km southeast of Port Hedland and 170 km north of Newman.

The project area consists of 46 granted and contiguous tenements and one tenement application totaling 219.23 km^2; the tenements include 42 Exploration and Prospecting Licences beneficially held by Nullagine Gold Pty Ltd but currently registered under Tantalumx Pty Ltd (18) and WITX Pty Ltd (8), and held by Beatons Creek Gold Pty Ltd (16), and 4 Mining Leases held by Beatons Creek Gold Pty Ltd. Prospecting Licences, Exploration Licences and Mining Leases are held for durations of 4, 5, and 21 years, respectively, all with the potential for extension. Three of the Prospecting Licences held by Beatons Creek Gold Pty Ltd in the northwestern corner of the project are currently pending approval for transition to a Mining Lease. The property is located near a privately owned railroad used to transport iron ore from Newman to Port Hedland.

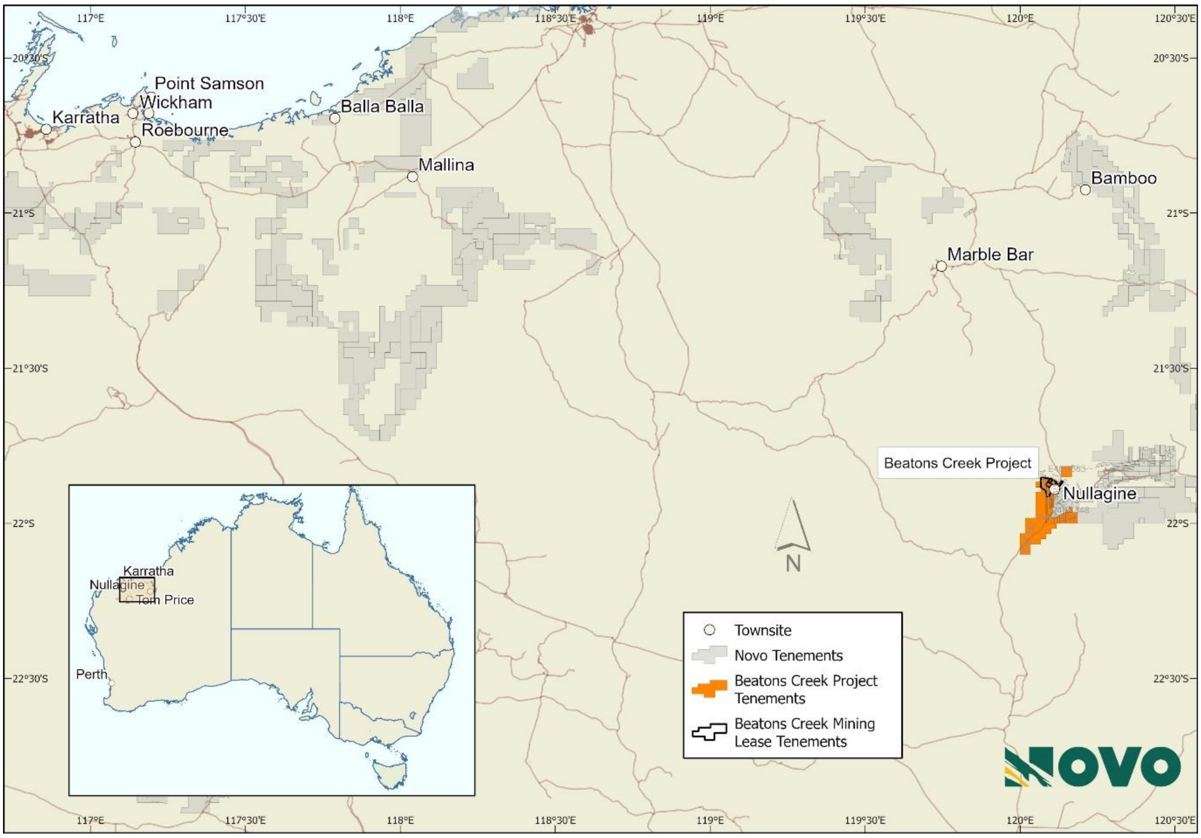


Figure 4.1. Location map (Source: Novo).

4.2 Tenements and Ownership Status

The Beatons Creek project is covered by a group of tenements registered under Beatons Creek Gold Pty Ltd and, in certain circumstances, held beneficially by Nullagine Gold Pty Ltd, both wholly owned Australian subsidiaries. Tenements beneficially held by Nullagine Gold Pty Ltd are registered in the names of Tantalumx Pty Ltd and WITX Pty Ltd (tenements purchased from Creasy Group in 2020) and Beatons Creek Gold Pty Ltd as listed in Table 4.1 and depicted in Figure 4.2. The status of the tenements is listed in Table 4.1.

The Beatons Creek gold project holds a total land coverage of 219.23 km^2, which requires an annual expenditure commitment of A$488,920 in addition to rental payments of A$70,054 for 2022.

Prospecting Licences are held for 4 years, Exploration Licences are held for 5 years, and Mining Leases are held for 21 years, all with the potential for extension.

Table 4.1. List of tenements comprising the Beatons Creek gold project area (Mining Leases shaded in light grey).

Tenement number	Tenement status	Tenement type	Area (km²)	Expenditure commitment (A$)	Rent (A$)	Grant date	Expiry date	Term (years)	Registered holder	DPLH registered sites
E46/797	Granted	Exploration Licence	133.390	126,000	29,862	04/22/2010	04/21/2024	2 (renewal)	WITX Pty Ltd - 100%	Yes
E46/1363	Granted	Exploration Licence	12.720	15,000	612.00	16/04/2021	15/04/2026	5	Beatons Creek Gold Pty Ltd - 100%	No
M46/9	Granted	Mining Lease	2.4841919	24,800	4,365	03/06/1985	03/05/2027	21 (renewal)	Beatons Creek Gold Pty Ltd - 100%	Yes
M46/10	Granted	Mining Lease	1.2126091	12,200	2,147	12/12/1984	12/11/2026	21 (renewal)	Beatons Creek Gold Pty Ltd - 100%	No
M46/11	Granted	Mining Lease	4.6576209	46,500	8,184	01/17/1985	01/16/2027	21 (renewal)	Beatons Creek Gold Pty Ltd - 100%	No
M46/532	Granted	Mining Lease	1.34400	13,500	3,240	08/05/2019	07/05/2040	21	Beatons Creek Gold Pty Ltd - 100%	No
*P46/1743**	Granted	Prospecting Licence	1.4358202	8,000	700	02/06/2013	02/05/2021	8	WITX Pty Ltd - 100%	No
*P46/1744**	Granted	Prospecting Licence	2.0053551	8,000	700	02/06/2013	02/05/2021	8	WITX Pty Ltd - 100%	Yes
*P46/1789**	Granted	Prospecting Licence	1.7116953	6,880	602	03/15/2013	03/14/2021	8	WITX Pty Ltd - 100%	Yes
*P46/1790**	Granted	Prospecting Licence	1.5042636	6040	528.5	02/22/2013	02/21/2021	8	WITX Pty Ltd - 100%	No
P46/1808	Granted	Prospecting Licence	1.9868613	7,960	696.5	12/15/2016	12/14/2024	8	WITX Pty Ltd - 100%	Yes
P46/1809	Granted	Prospecting Licence	1.9779198	7,920	693	12/15/2016	12/14/2024	8	WITX Pty Ltd - 100%	Yes
P46/1810	Granted	Prospecting Licence	0.3943453	2,000	140	05/05/2016	05/04/2024	8	WITX Pty Ltd - 100%	Yes
P46/1821	Granted	Prospecting Licence	1.5896225	6,360	556.5	03/03/2015	03/02/2023	8	Beatons Creek Gold Pty Ltd - 100%	Yes
P46/1822	Granted	Prospecting Licence	1.86300	6,280	549.5	03/04/2015	03/03/2023	8	Beatons Creek Gold Pty Ltd - 100%	Yes
P46/1836	Granted	Prospecting Licence	1.69000	6,760	591.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	Yes

Tenement number	Tenement status	Tenement type	Area (km²)	Expenditure commitment (A$)	Rent (A$)	Grant date	Expiry date	Term (years)	Registered holder	DPLH registered sites
P46/1837	Granted	Prospecting Licence	1.92000	7,680	672	08/07/2017	17/07/2025	8	Tantalumx Pty Ltd	Yes
P46/1838	Granted	Prospecting Licence	2.0000	8,000	700	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1839	Granted	Prospecting Licence	1.99000	7,960	696.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1840	Granted	Prospecting Licence	2.0000	8,000	700	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1841	Granted	Prospecting Licence	1.9700	7,880	689.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1842	Granted	Prospecting Licence	1.9900	7,960	696.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1843	Granted	Prospecting Licence	2.0000	8,000	700	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1844	Granted	Prospecting Licence	1.9900	7,960	696.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1845	Granted	Prospecting Licence	1.8700	7,480	654.5	30/04/2017	29/04/2025	8	Tantalumx Pty Ltd	No
P46/1846	Granted	Prospecting Licence	1.8900	7,560	661.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1847	Granted	Prospecting Licence	1.9800	7,920	693	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1848	Granted	Prospecting Licence	1.9200	7,680	672	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1849	Granted	Prospecting Licence	1.5100	6,040	528.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1850	Granted	Prospecting Licence	1.9800	7,920	693	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1851	Granted	Prospecting Licence	1.8800	7,520	658	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1852	Granted	Prospecting Licence	1.0800	4,320	378	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1853	Granted	Prospecting Licence	1.8900	7,560	661.5	30/03/2017	29/03/2025	8	Tantalumx Pty Ltd	No
P46/1966	Granted	Prospecting Licence	1.0485024	4,200	367.5	03/06/2020	02/06/2024	4	Beatons Creek Gold Pty Ltd - 100%	Yes

Tenement number	Tenement status	Tenement type	Area (km²)	Expenditure commitment (A$)	Rent (A$)	Grant date	Expiry date	Term (years)	Registered holder	DPLH registered sites
P46/1967	Granted	Prospecting Licence	1.9411342	7,800	682.5	03/06/2020	02/06/2024	4	Beatons Creek Gold Pty Ltd - 100%	Yes
P46/1968	Granted	Prospecting Licence	1.9481420	7,800	682.5	03/06/2020	02/06/2024	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/1969	Granted	Prospecting Licence	1.9959456	8,000	700	03/06/2020	02/06/2024	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/1970	Granted	Prospecting Licence	1.9988453	8,000	700	03/06/2020	02/06/2024	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/1973	Granted	Prospecting Licence	1.7651827	7,080	619.5	11/08/2020	10/08/2024	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/2015	Granted	Prospecting Licence	0.1004557	2,000	38.5	02/06/2021	01/06/2025	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/2016	Granted	Prospecting Licence	0.0233627	2,000	35	07/04/2021	06/04/2025	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/2017	Granted	Prospecting Licence	1.6955624	6,800	595	07/04/2021	06/04/2025	4	Beatons Creek Gold Pty Ltd - 100%	No
P46/2024	Granted	Prospecting Licence	0.890136	3,600	315	19/08/2021	18/08/2025	4	Beatons Creek Gold Pty Ltd - 100%	Yes
M46/544	*Pending – Replaces P46/1743, P46/1744, P46/1789*	*Application*	*1.9940520*	*0*	*0*	-	-	-	Beatons Creek Gold Pty Ltd - 100%	No
Total			**219.23**	**488,920**	**70,054**					

DPLH - Department of Planning, Lands and Heritage

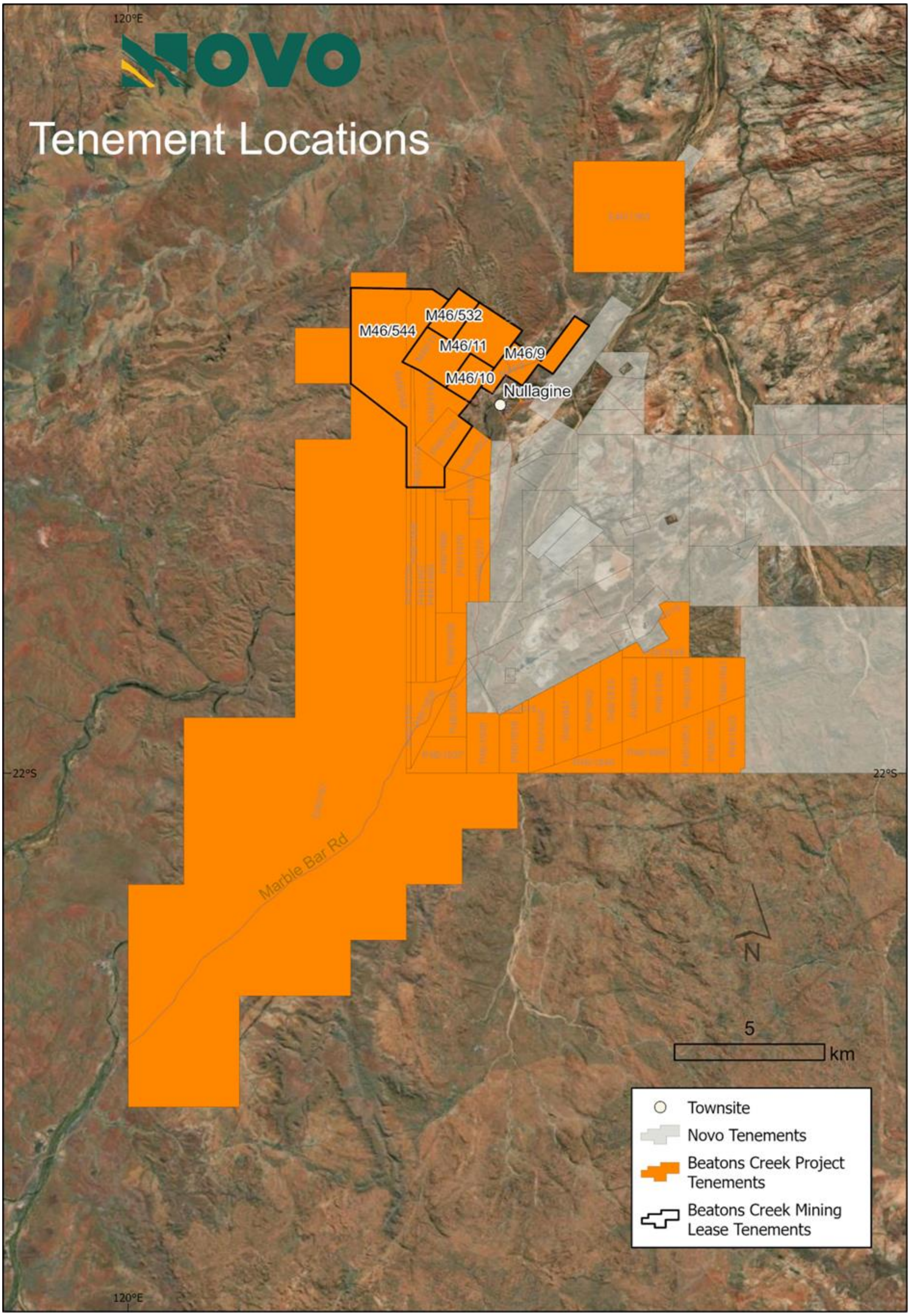


Figure 4.2. Beatons Creek project tenements map (Source: Novo).

4.3 Exploration and Mining Permitting

Guidelines for marking out and applying for minerals tenements in Western Australia are given in the pamphlets *Marking Out and Applying for Mining Tenements* and *Exploration Licences Graticular Boundary System*, available from the Government of Western Australia Department of Mines, Industry Regulation and Safety website.

Exploration Licences do not need to be marked out on the ground. Mining Leases and Prospecting Licences, not on prescribed land, are marked out as follows:

- A post projecting at least 1 m above the ground is fixed firmly in the ground as close as practicable to each corner or angle of the land.
- Two clearly identifiable trenches or rows of stones at least 1 m long must extend from each post in the general direction of the boundary lines.
- The notice of marking out in the Form No. 20 in the First Schedule is fixed firmly to one of the posts, selected as the datum post.

Where the land adjoins other land in respect of which the same person or company is seeking or holds a mining tenement, common posts and trenches or rows of stones may be used for marking out each parcel of land. Applications for mining tenements must be made in the Form No. 21 ‘Application for Mining Tenement’ and lodged at the office of the Mining Registrar of the mineral field in which the land is situated within 10 days of marking out. Application fees, together with the first year’s rent, are payable on lodgement of a mining tenement application. Additionally, a security in the sum of A$5,000, filed in the Form No. 32 must be lodged with the Mining Registrar within 28 days of filing the application.

Additionally, applications for Exploration Licences must be accompanied by a statement specifying:

- The proposed method of exploration;
- Details of the proposed work program;
- Estimate of proposed expenditure on the licence; and
- The applicant’s technical and financial resources.

Applications for Mining Leases must be accompanied by either:

- A mining proposal, or
- A mineralization report containing the details in section 74(7) and be accompanied by a supporting statement to include details in section 74(1a).

4.4 Environmental and Permitting

Novo has obtained all environmental approvals required to commence mining of the Beatons Creek project, including:

- Mining Proposal and Mine Closure Plan to mine and subsequently rehabilitate from the DMIRS;
- Haulage from the Beatons Creek project to the Nullagine processing plant from the DMIRS and the Shire of East Pilbara;
- Processing and disposal of material from the Beatons Creek from the Nullagine processing plant from the Department of Water and Environmental Regulation (DWER);

- *Environmental Protection Act 1986* (EP Act) Part V Native Vegetation Clearing Permit (NVCP); and
- *Rights in Water and Irrigation Act 1914* (RIWI Act) (Regulating Authority – DWER) permitting groundwater abstraction.

The map in Figure 4.3 shows the activities sought for permission under the Mining Proposal and Mine Closure Plan.

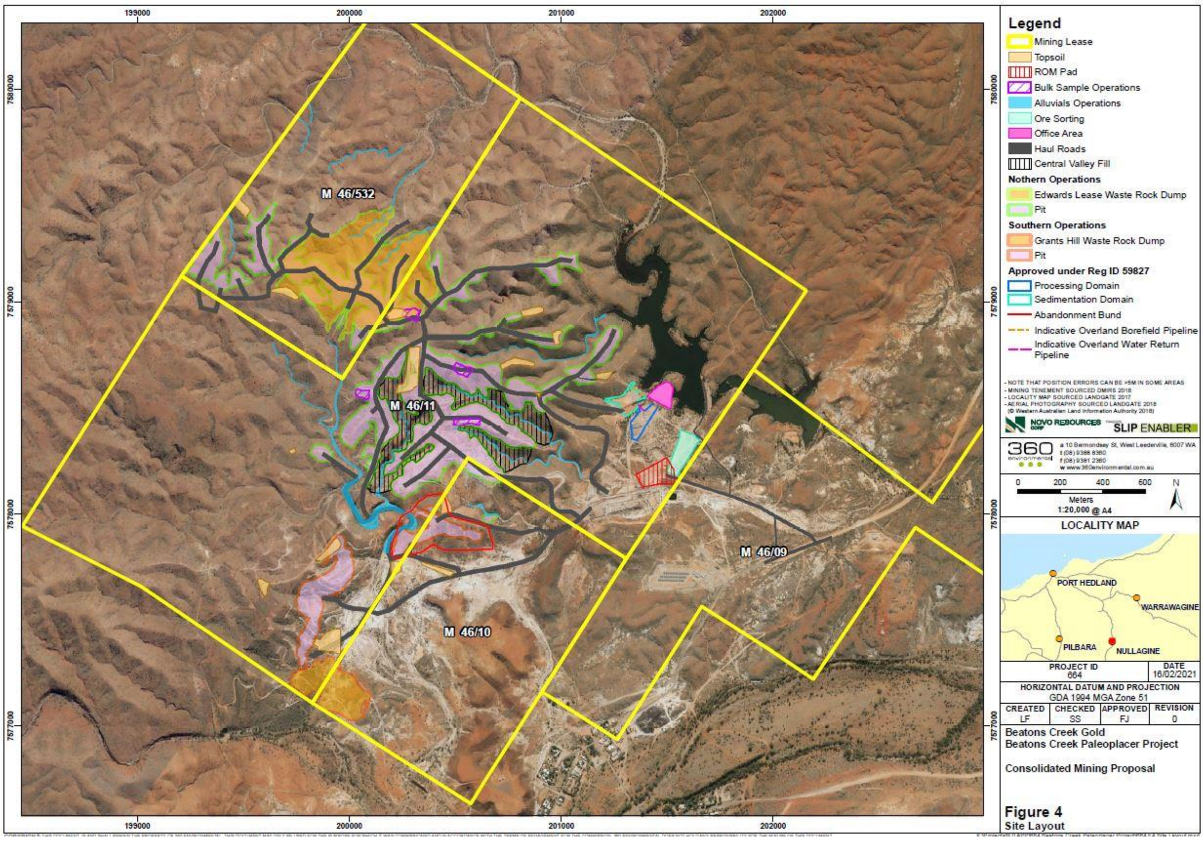


Figure 4.3. Activities for permission under DMIRS mining proposal approvals (Source: Novo).

Extensive baseline environmental assessments for all relevant parameters for this project to receive regulatory approvals (including groundwater and surface water monitoring, geochemical characterization of all rock types and their interaction with groundwater and surface water, noise, dust and social impact modeling) have been completed. Ongoing groundwater quality monitoring will take place on a quarterly basis and be reported annually, or whenever water quality thresholds are exceeded, to demonstrate to the regulators that the operations of the project are not negatively impacting groundwater.

Novo engages its key stakeholders, including native title parties, the Nullagine Township and its residents, and government regulators, on the status of the project and plans for its development. The support of key stakeholders and protection of groundwater quality in the area are the most sensitive matters that will affect any plan to re-commence mining at Beatons Creek.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

Nullagine is the only town in the area of the project, and it lies on the Marble Bar Road, which from Newman to Port Hedland is graded gravel. Frequent air services connect the town with Port Hedland and Marble Bar. Access to the project area is by road, from either Port Hedland (population approximately 16,600) or from the iron ore mining camps of Newman (population approximately 4,200) or the Roy Hill iron ore mine in the northwestern part of Western Australia (Figure 4.1). The Beatons Creek area is adjacent to and west of the town of Nullagine (population approximately 200), located 1,364 km north-northeast of Perth. By road, Nullagine is 296 km southeast of Port Hedland and 170 km north of Newman.

The project area is near to and west of the privately owned Newman to Port Hedland railroad used to transport iron ore. Access within the area is by poor-quality pastoral and mining tracks. The Great Sandy Desert, in the eastern part of the area, is crossed only by one company road. Four-wheel-drive vehicles are essential for most tracks.

5.2 Physiography

A Tertiary surface of peneplanation extends over Western Australia. Earth movements during the Pliocene uplifted the peneplain to form the Great Plateau of Western Australia. In the Pilbara, this surface is referred to as the Hamersley Surface. In the Nullagine area, it is represented by laterite or pisolitic ironstone deposits and is separated from eroded parts of the plateau by breakaways or cliffs (Figure 5.1 and Figure 5.2).

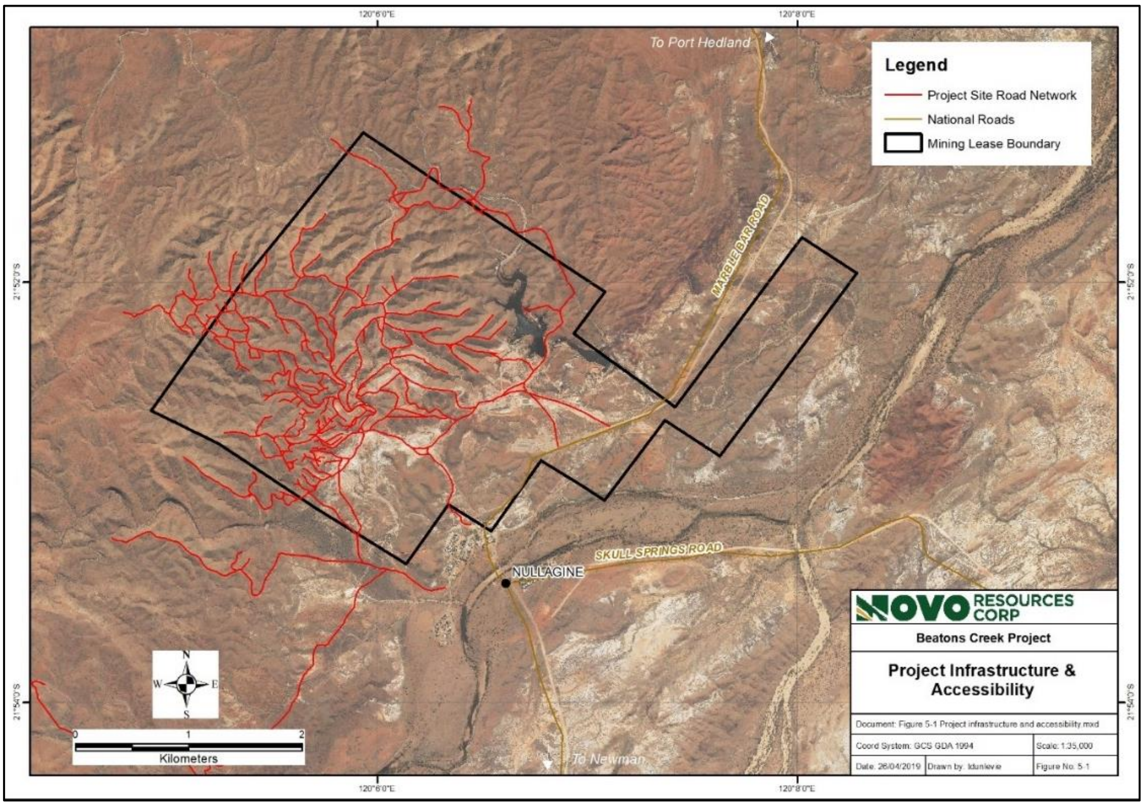


Figure 5.1. Project infrastructure and accessibility (Source: Novo).

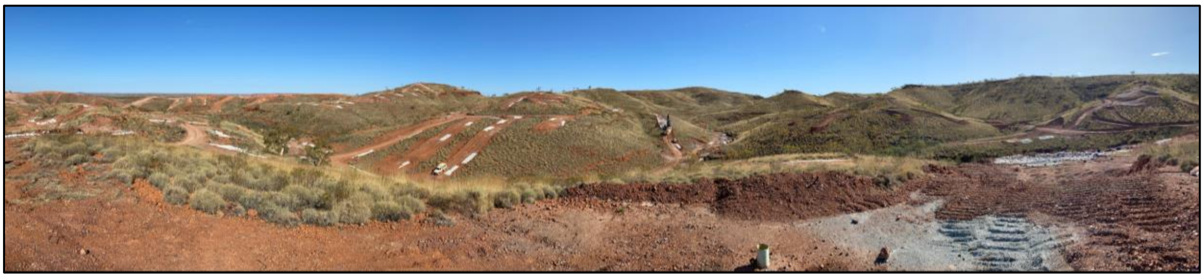


Figure 5.2. Beatons Creek Grant's Hill topography (Source: Novo).

The project area is at an elevation between 200 m and 500 m above sea level. Two large rivers, the Nullagine and the Oakover, flow northwards across the area and eventually join to form the De Grey River. The Oakover River flows along the axis of a major Proterozoic syncline but the Nullagine River's course bears little relation to currently exposed geology, suggesting that it is superimposed. The area can be divided into seven physiographic provinces: plateau, dissected plateau, range, low granite hills, plain, valley, and desert.

Average annual evaporation of the Pilbara region is about 3,600 mm, which is ten times the total annual rainfall. Away from the few major rivers with permanent surface pools or shallow groundwater, vegetation is sparse. The project area is lightly vegetated, with a ubiquitous ground cover of Spinifex grass and scattered shrubs of Hakea, Acacia and Grevillea. Larger trees, including Eucalyptus and Melaleuca species, are confined to the immediate vicinity of drainage lines.

5.3 Climate

The East Pilbara region has an arid continental climate, characterized by very high summer temperatures and large daytime temperature fluctuations (>13.2°C) throughout the year. December and January are the hottest months, with average maximum temperatures above 40°C and record highs over 48°C. From October to February, the average monthly maximum temperature exceeds 36°C. Maximum temperatures greater than normal body temperature occur for 6 months of the year. The lowest temperatures occur in the winter months (between June and August) when average maximum temperatures are below 30°C and average minimum temperatures are 12°C to 13°C.

The East Pilbara region is influenced by both northern (tropical cyclone) and southern (temperate) rainfall systems, which bring rains in the summer and winter months, respectively. However, rainfall in the region is light and infrequent. Nullagine has an average annual rainfall of 357 mm, mostly falling between January and March. Little rain usually falls between July and November, with September and October being the driest months. Except for a few isolated pools, creeks are mostly dry throughout most of the year, but can rise rapidly and flood large areas after heavy rains (during the summer months). As a high proportion of the rainfall can derive from a small number of large storms, flooding near major river and creek systems is not unusual. The Nullagine River is subject to flooding, and the town of Nullagine is in a Floodplain Management Area.

Considering the remote nature of the project area, field work is conducted between late autumn and early spring (April–September), when temperatures and the likelihood of heavy rains are both lowest.

5.4 Local Resources and Infrastructure

Vehicle access to the mine and processing facility is via the partially sealed Newman to Port Hedland Road (State Route 138 Marble Bar Road). Access to the Beatons Creek project is along State Route 138, turning off onto an existing unsealed access road approximately 800 m north of Nullagine. The existing Beatons Creek project facilities are 600 m off State Route 138.

The Golden Eagle processing site is accessed from Nullagine by travelling approximately 9 km south along State Route 138 to the existing site access road. The plant site access road crosses Cajuput Creek via a floodway. The creek is dry for most of the year.

The workforce was employed on a fly-in, fly-out basis. Most flew in via the Newman or Port Hedland commercial airports, which have frequent services to and from Perth. The workforce was transferred from the preferred airport to the plant site by a bus service provided by Novo.

Mine offices, crib rooms and toilets were established in the vicinity of the Beatons Creek site. The plant site includes the existing processing plant facilities and associated infrastructure, TSF and the accommodation village. Infrastructure supporting the processing plant consists of administration buildings, a workshop, warehouse, laboratory, power station, communications network, water supply and storage, water treatment and wastewater treatment areas. The administration building area comprises the main administration office building, toilet block and a first aid, mine rescue and training building.

The plant site includes a diesel generator powerhouse equipped with 10 by 1 MW diesel generators. Power is reticulated at 11 kV to the processing plant and via overhead transmission line to the accommodation village. An existing fuel farm comprises six diesel storage tanks and is used to supply the power station and provide mobile equipment refueling. Water supply for the plant site is via borefield networks, pit dewatering and tailings decant, with capture of stormwater. An accommodation village has been constructed 4 km from the mine site. Potable water for the site and accommodation village is supplied by reverse osmosis plants.

6. HISTORY

Gold was first discovered in the East Pilbara in 1888 and the township of Nullagine was established in the following year. In common with the rest of the Pilbara, gold mining within the area flourished in the early part of the 20th century, but subsequently declined in importance. Over the last 20 years, much of Australia's manganese production has come from mining centers to the east of Nullagine.

6.1 Ownership History

Various operators have conducted work on the Beatons Creek gold project (Table 6-1), but information pertaining to tenement and land acquisition deal structures for this period is limited. Novo's activities pertaining to the development of Beatons Creek from 2011 to February 2021 have been described in previous technical reports (TetraTech, 2015, 2018; Dominy & Hennigh, 2019; Optiro, 2021).

Novo currently controls mineral rights held by 46 tenements and one application, over a total area 219.23 km^2, including four Mining Leases, two Exploration Licences and 40 Prospecting Licences, with one Prospecting Licence currently pending conversion to a Mining Lease (Table 4.1). Novo has commitments for annual expenditures of A$488,920 in addition to rental obligations for A$70,054 (for 2022) on the licences held in good standing. Table 4.1details Novo's tenements.

6.2 Exploration History

Alluvial gold was first discovered in Nullagine in 1888, and by 1893 Nullagine had become the principal alluvial goldfield in the region. A hard-rock source for alluvial deposits at Nullagine was identified in 1888, while the township was formerly declared in 1889.

The mineral potential of the Pilbara Craton has in recent history been downplayed by the minerals industry and, as a result, the region has been much less extensively explored than many other Archean cratons throughout the world, including those in South Africa, Canada and Brazil, and the Yilgarn Craton to the south of the Pilbara Craton.

Since 1983, exploration activities have concentrated on the Nullagine sub-basin, principally in the immediate area of the Beatons Creek goldfield near Nullagine. Several deep diamond holes were drilled in adjacent parts of the Nullagine sub-basin during the mid-1980s.

The major focus of exploration within the Fortescue Group between 1968 and 1982 was uranium exploration, with only sporadic gold and diamond exploration; subsequently, the Nullagine sub-basin remains under-explored. A chronological summary of significant past exploration activities at Beatons Creek is presented in Table 6.1. Figure 6.1 shows historical (pre-2011) drill collars by drill type – RC, diamond (DD) and rotary air blast (RAB) – drilled prior to Novo's evaluation of the project.

Table 6.1. Chronological summary of exploration and mining activities at Beatons Creek.

Year	Activity	Company
1968-1982	Various uranium and gold exploration programs in Fortescue Group, Nullagine sub-basin	Cominco Exploration, Esso Australia, Essex Minerals, Otter Exploration–Marathon Petroleum
1968-1974	Uranium exploration in Hardey Formation, central Nullagine sub-basin Program included airborne and ground radiometrics, and follow-up drilling	Cominco Exploration Pty Ltd (Simpson, 1969)
1974	Uranium exploration in Hardey Formation, central Nullagine sub-basin Program included airborne and ground radiometrics, and follow-up shallow percussion drilling (11 holes)	Esso Australia Ltd (Harrison, 1974)
1978-1981	Uranium exploration in Hardey Formation, central Nullagine sub-basin Program included 23 core and percussion holes	Essex Minerals Co (Wilson, 1979); Otter Exploration NL/Marathon Petroleum Australia
1983-1985	Strip mining and treatment of colluvial and alluvial deposits adjacent to hard-rock conglomerate-hosted gold deposits at Beatons Creek Exploration of Beatons Creek conglomerate involved geological mapping, sampling, diamond and RC drilling	Metana Minerals NL
1983	Beatons Creek drilling - WW series (DD): 2 holes on M46/11	Metana Minerals NL
1984-1985	Beatons Creek drilling: CDH-series (DD): 9 holes on M46/11	Metana Minerals NL
1984	Beatons Creek: B-series (RC): 77 holes on M46/11	Metana Minerals NL
1984	District-scale geological mapping and 2 DD holes in Hardey Formation W and SW of Nullagine	AMB-JV (Australis Mining/Bass Strait Oil & Gas)
1984	Two DD holes to assess subsurface continuity of auriferous package beneath upper Hardey Formation cover, 1 km SW of Beatons Creek historical workings	Ivanhoe Gold
1984	Surface and downhole (DDH IN2) induced polarity	Scintrex (for Ivanhoe Gold)
1984	Single DD hole, 7 km SW of Nullagine	BC-JV (South Eastern Petroleum NL)/Zanex Ltd/Western Resource Projects NL)
1985-1990	Geological mapping and data compilation, trenches, shallow RAB drilling at Beatons Creek	Sons of Gwalia
1986	Two DD holes as follow-up earlier Ivanhoe drillholes	Minsaco (JV with Ivanhoe Gold)
1987-1988	Short-lived continuation of alluvial gold mining operations at Beatons Creek	Black Horse Mining
1992-1993	Single RC/DD hole in lower Kylena Basalt, upper Hardey Formation	Alkane
1993	Diamond and gold exploration on western limb of Nullagine syncline	Ocean Resources
2001-2010	Creasy Group tenements comprising Nullagine Project area staked	Creasy Group
2001	Wedgetail acquires significant package of tenements in Nullagine area previously held under option	Wedgetail Exploration
2001	Beatons Creek workings, COM-series RAB holes: 21 RAB holes on M46/9	Wedgetail
2002	Geological compilation, soil sampling on M46/10-11	Wedgetail Exploration/Mining

Year	Activity	Company
2006	Prospecting/rock sampling at Beatons Creek	Newmont
2006	Beatons Creek (M46/10, 11) soil sampling	Wedgetail Exploration/Mining
2006-2007	Beatons Creek (M46/11) RC drilling: 20 holes	Wedgetail Exploration/Mining
2007	Beatons Creek (M46/11) RAB scout drilling: 173 holes	Wedgetail Exploration/Mining
2010	In-loop electromagnetic surveys on Creasy ground – four lines across eastern margin of sub-basin	Galliard Resources
2010	Millennium Minerals (formerly Wedgetail Mining) announces 25% increase in reserve for Nullagine Gold Project (Late Archean Mosquito Creek Belt, immediately east of Nullagine Project area)	Millennium Minerals
2011	Novo/Millennium announce binding letter agreement providing Galliard with exclusive right to earn 70% interest (as to gold and minerals associated with gold) in Beatons Creek M46/9, M46/10 and M46/11. Commence additional RC drilling	Novo Resources/Millennium
2013-2014	RC and diamond core drilling	Novo Resources
2015	Purchase of 100% interest in the Beatons Creek M46/9, M46/10 and M46/11 from Millennium Minerals	Novo Resources/Millennium
2017	RC drilling	Novo Resources
2018	Bulk sampling program in oxide mineralization	Novo Resources
2018	Six HQ diamond core holes drilled for geological and metallurgical testwork purposes	Novo Resources
2020-2022	Resource development and grade control RC drilling	Novo Resources
2021	January 2021 – commencement of mining at Beatons Creek	Novo Resources
2022	Nine HQ diamond core holes drilled for geological, geotechnical and metallurgical testwork purposes	Novo Resources
2022	September 2022 – pausing of mining at Beatons Creek	Novo Resources
2022	November 2022 – MRE update to support a Feasibility Study on mining fresh mineralization	Novo Resources

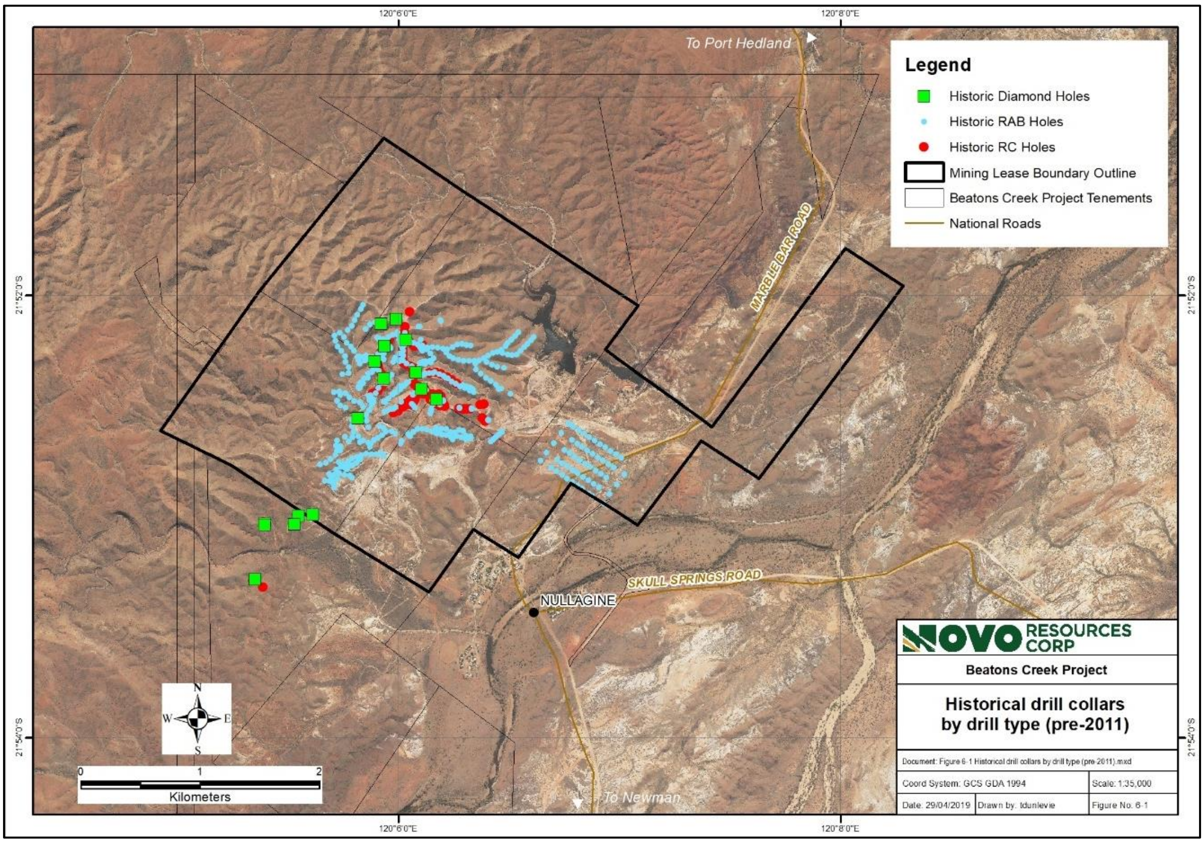


Figure 6.1. Historical drill collars by drill type (Source: Novo).

There are no official records of gold production at Beatons Creek prior to the establishment of the Western Australian Mines Department in 1897. Post-1897 production records indicate abrupt decreases in grade within the first few years of operation at most of the mines. Although local rich pockets of mineralization were mined between 1907 and 1912, organized mining at Beatons Creek had ceased by 1904 (Maitland, 1919). Most estimates suggest total production was <10,000 t of material for <4,000 oz Au, at average grades of 15 g/t Au to 20 g/t Au (Maitland, 1919).

Between January 2021 and September 2022, Novo mined and processed 2.509 Mt at 1.17 g/t Au for 94,148 oz contained gold (87,313 oz recovered gold) from Beatons Creek. Despite optimization activities for the oxide component of the Mineral Resource, mined grade delivered marginal cashflow and extensive grade control drilling defined the extent of oxide mineralization which could be mined. Furthermore, Novo does not yet have approvals from relevant Western Australian regulatory authorities to mine the fresh component of the Mineral Resource. As such, following completion of oxide mining in August 2022, the Company paused production operations at Beatons Creek, with a controlled and phased wind-down of operational activities into care and maintenance (Novo, 2022).

7. GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Beatons Creek project is in the Pilbara region in the northwest of Western Australia. The region is comprised of three major tectonic units: an assemblage of pre-2.80 Ga granite-greenstone terranes, and an unconformably overlying succession of volcanic and sedimentary rocks that were deposited in the 2.77 to 2.40 Ga Hamersley Basin.

From oldest to youngest, these sequences are:

- Pilbara Supergroup (3.53 to 3.19 Ga);
- De Grey Supergroup (3.02 to 2.92 Ga); and
- Mount Bruce Supergroup (2.78 to 2.43 Ga).

The basement lithostratigraphy of the East Pilbara granite-greenstone terrane is formed of moderately to strongly deformed mafic volcanic and intercalated felsic volcanic and sedimentary rocks of the Pilbara Supergroup and the De Grey Supergroup. These rocks occupy a series of arcuate synclinal belts between less-deformed complexes of granitoids. The surrounding granite batholiths range in diameter from 25 km to 110 km and were emplaced prior to 2.92 Ga. Some were subsequently intruded by small, highly reduced, post-tectonic, tin-bearing granites between 2.88 Ga and 2.84 Ga.

Gold mineralizing events have emplaced numerous deposits in various settings in the basement granite-greenstone terrane. These gold sources have long been considered a likely source for auriferous placer deposits hosted in the Fortescue Group near Nullagine (Maitland, 1919; Finucane, 1935; Hickman, 1983; Thorne and Trendall, 2001).

The Mount Bruce Supergroup comprises the Fortescue Group and overlying Hamersley groups (Figure 7.1 and Figure 7.2), a sequence of mafic and felsic volcanics and sedimentary rocks up to 6.5 km thick (Thorne and Trendall, 2001; Blake, 1993, 2001) and exposed over a wide area in the Pilbara Craton.

Thorne and Trendall (2001) divided the Fortescue Group into four major depositional sequences. The entire succession is interpreted to reflect increasing amounts of subsidence in an overall extensional setting.

These four units are summarized as follows:

- Unit 1 (basal) – Consists primarily of the ≤2.5 km thick Mount Roe Basalt which comprises sub-aerial and sub-aqueous (<2%) basaltic lavas and locally intercalated sub-aqueous volcaniclastics (<5%). Sub-aqueous units in the Mount Roe Basalt are interpreted to have been deposited in a lacustrine, rather than marine, setting (Thorne and Trendall, 2001). Widespread north-northeast trending medium- to coarse-grained dolerite and gabbro mafic dykes of the Black Range Suite in the East Pilbara terrane are interpreted feeders to the Mount Roe Basalt (Williams, 1998; Thorne and Trendall, 2001).
- Unit 2 – Primarily the Hardey Formation, which unconformably overlies Unit 1 and is up to 3 km thick, consisting of a diverse association of sedimentary, mafic and felsic volcanic rocks (and high-level intrusions) which were deposited in continental to shallow-marine settings. This unit hosts gold mineralization at Nullagine and Marble Bar.

- Unit 3 – Consists of the basal Kylena (sub-aerial basalt), Tumbiana (marginal to shallow marine sedimentary rocks), and uppermost Maddina (sub-aerial basalt) formations. Although deposited in a sub-aerial environment, Unit 3 marks a widespread coalescence of individual sub-basins across the Pilbara craton (Thorne and Trendall, 2001). Where the Fortescue Group directly overlies granitic basement, the Kylena (Basalt) Formation is typically the lowermost unit (Figure 7.1; Hickman, 1983; Thorne and Trendall, 2001).
- Unit 4 – The Jeerinah Formation marked the onset of a major marine transgression across the Hamersley Basin (which continued into deposition of the overlying Hamersley Group). In the north Pilbara Craton, the Jeerinah Formation consists of argillaceous rocks; however, basaltic lavas and volcaniclastic rocks dominate in the south.

The Fortescue Group is unconformably overlain by marine sedimentary sequences (shale, banded iron formation and carbonate) of the Hamersley Group (Figure 7.1).

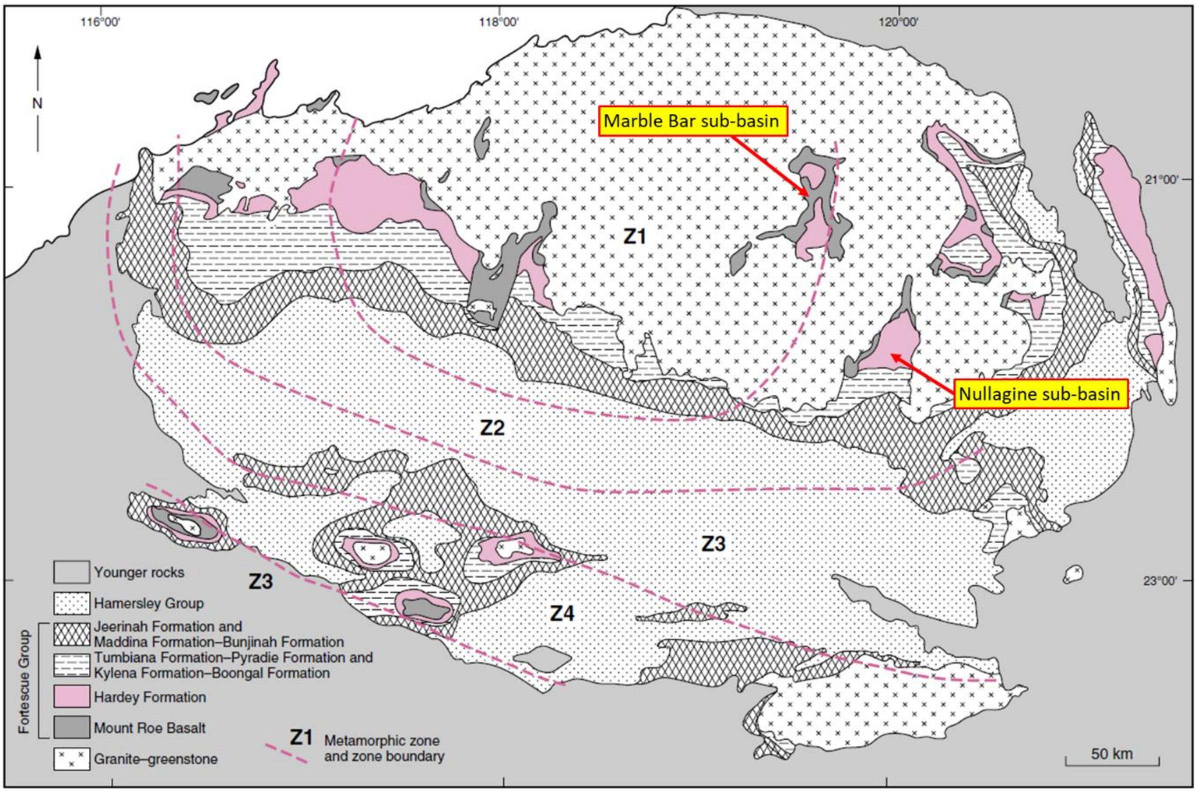


Figure 7.1. Geological map of the Hamersley Basin showing the burial metamorphism zones of Smith, Perdrix and Parks (1982). Zone 1 – prehnite-pumpellyite zone, Zone 2 – prehnite-pumpellyite-epidote zone, Zone 3 – prehnite-pumpellyite-epidote-actinolite zone; Zone 4 – actinolite zone.

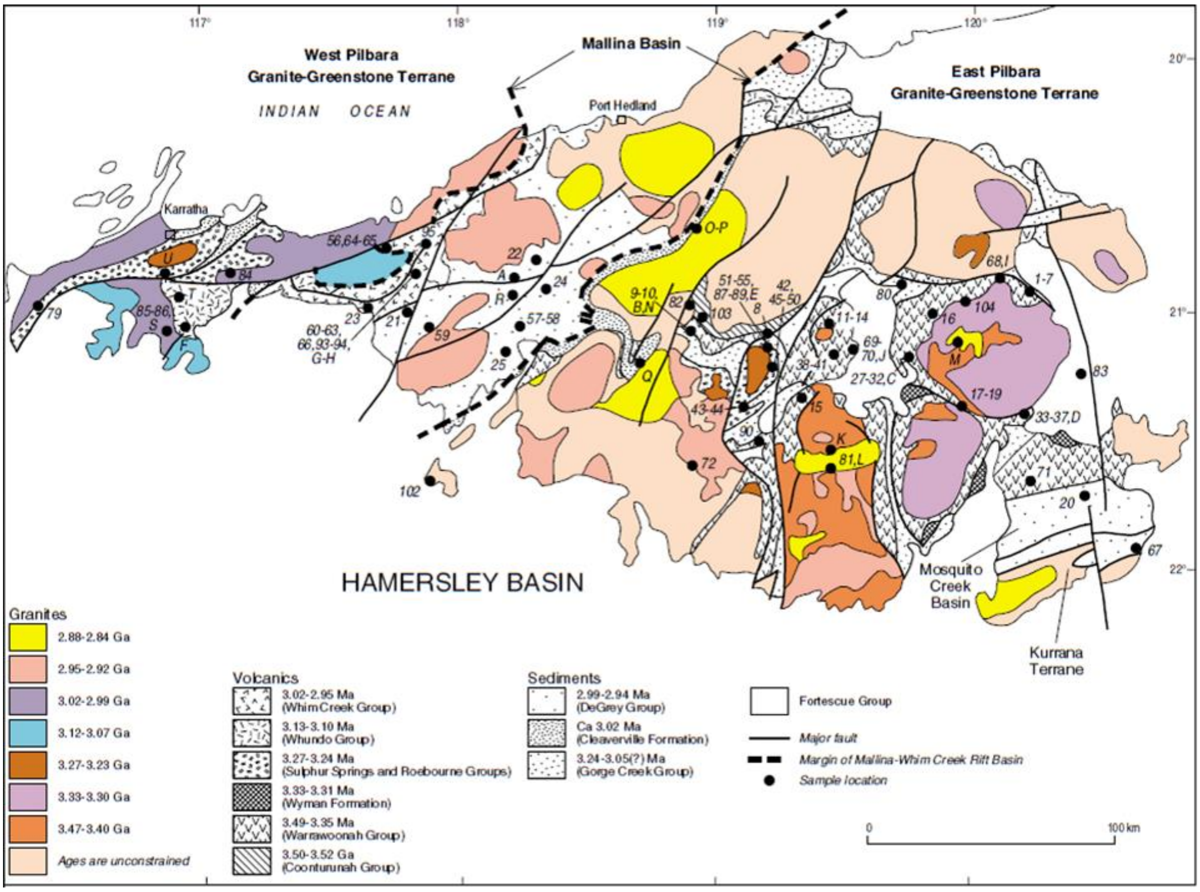


Figure 7.2. Summary map showing the age and distribution of the granites, greenstone successions and sedimentary basins in the north Pilbara Craton (Source: Huston et al., 2002a).

7.1.1 Regional Structure and Metamorphism

The basement rocks of the Pilbara Craton are some of the best preserved and least dismembered Archean terranes in the world. Nonetheless, the Pilbara Craton had a complex structural evolution, involving at least 13 deformation events between 3.46 and 2.75 Ga (Huston et al., 2001, 2002a). In the north Pilbara Craton, the subsequently deposited Fortescue Group basin fill has only undergone minor deformation and low-grade metamorphism (Figure 7.1). In the Beatons Creek project area, the Fortescue Group has been gently folded by two generations of folds and cut by a complex array of mostly small displacement normal faults (Blake, 2001). Fortescue Group strata dip at <20°, although steeper dips (up to 45°) occur locally along the margins of the Nullagine sub-basin (Farrell and Blake, 1984). In the Nullagine sub-basin, assemblages reach prehnite–pumpellyite–epidote metamorphic facies (Figure 7.1). These assemblages indicate maximum temperatures of less than 300°C (Smith, Perdrix and Parks, 1982; Thorne and Trendall, 2001).

7.2 Local Geology

The Nullagine sub-basin, or Nullagine Synclinorium, is a >60 km long, north-northeast trending half-graben formed in response to west-northwest to east-southeast directed extension during the initial stages of continental break-up (Blake, 1984a,b, 1993; Farrell and Blake, 1984; Carter and Gee, 1988; Blake, 2001; Blake et al., 2004). Widespread mafic dykes of the Black Range Suite (interpreted feeders to the Mount Roe Basalt) mostly trend north-northeast, also implying west-northwest to east-southeast directed extension during lower Fortescue Group deposition (Williams, 1998; Thorne and Trendall, 2001; Blake, 2001; Blake et al., 2004). The Nullagine sub-basin opens into the Hamersley Basin to the south and is partially bound by syn-depositional normal faults along its eastern margin (Farrell and Blake, 1984; Blake, 1993). Progressively younger Fortescue Group strata onlap basement rocks towards the south (Farrell and Blake, 1984; Blake 1984a, 1993, 2001).

The Fortescue Group unconformably overlies a wide variety of older Archean rocks around the perimeter to the Nullagine sub-basin (Figure 7.2). Along much of the northeast margin to the sub-basin, the Fortescue Group unconformably overlies the Mosquito Creek Formation, part of Nullagine Group in the De Grey Supergroup, which occupies a 30 km by 65 km east-northeast trending belt east of the town of Nullagine.

The Mosquito Creek Formation is interpreted to extend for at least 20 km beneath the Fortescue Group cover. The Mosquito Creek Formation is host to numerous small- to moderate-sized disseminated, vein- and shear-hosted mesothermal gold deposits, interpreted to have formed at approximately 2.90 Ga (Figure 7.2, Huston et al., 2002).

The basal unit of the Fortescue Group, the Mount Roe Basalt, is discontinuously exposed in the north, and along the northwestern margin of the Nullagine sub-basin, where it is up to 50 m thick (Hickman, 1979; Blake, 2001). Although the Mount Roe Basalt is not exposed at surface in the project area (Figure 7.3), it may occur locally at depth beneath the Hardey Formation cover.

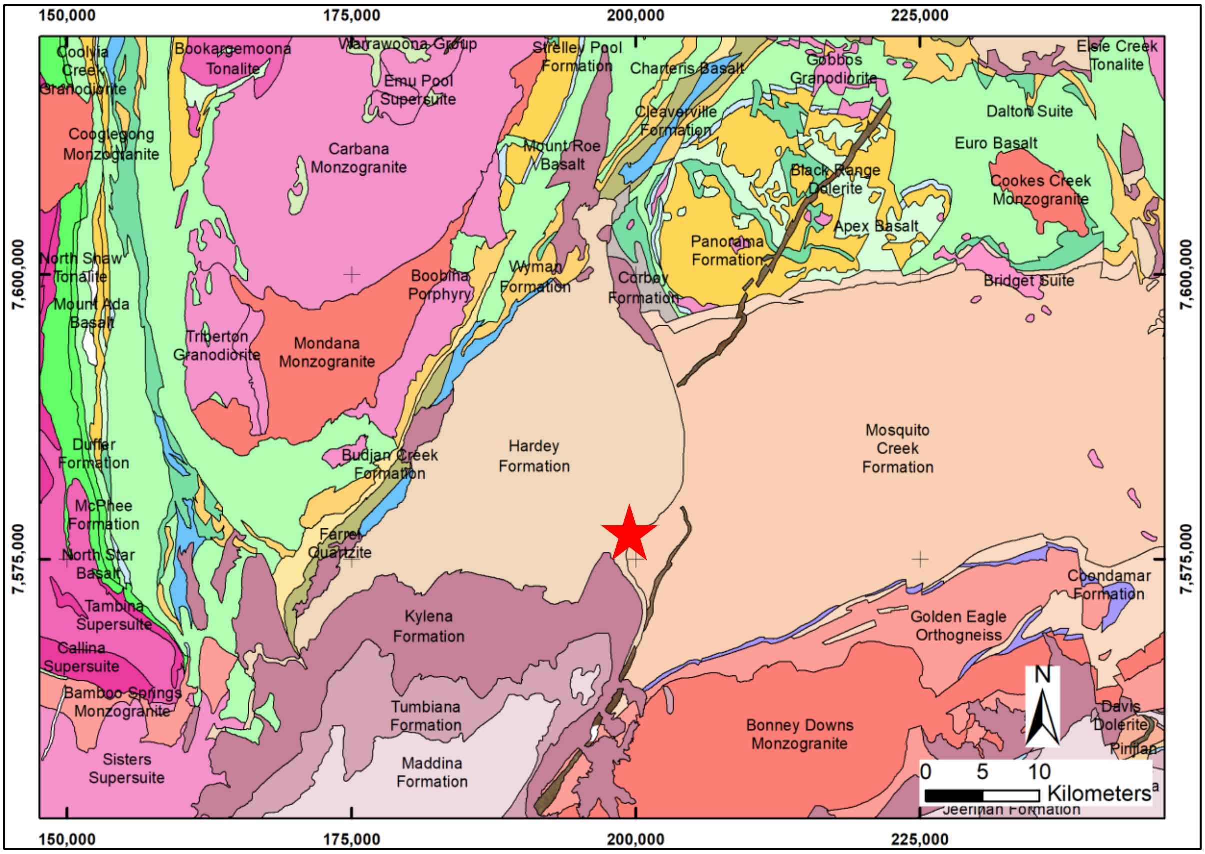


Figure 7.3. Geology map for the Beatons Creek region. Red star marks the project area.

In the Nullagine sub-basin, the Hardey Formation either unconformably overlies the Mount Roe Basalt or older Archean basement and consists of up to 1,700 m of mostly terrigenous clastic sedimentary rocks deposited in braided fluvial, lacustrine and alluvial fan settings

(Blake, 1993; Blake et al., 2004). In the north of the project area, the base of the Hardey Formation is intruded by the up to 1,500 m thick, 2,766 ±2 Ma rhyolite of the Bamboo Creek Member (Thorne and Hickman, 1998). The upper contact of the Bamboo Creek Rhyolite is erosional; however, the Hardey Formation sandstones immediately above this contact have been intruded by rhyolite of identical age to the Bamboo Creek Member, indicating that the time-break across the unconformity was small (Blake et al., 2004).

Blake (2001) subdivides the Hardey Formation above the Bamboo Creek Rhyolite in the Nullagine sub-basin into two unconformable packages: P3 and P4 (Figure 7.4). Auriferous conglomerates exposed in the Beatons Creek area near Nullagine occur in Package P4 of the Fortescue Group (Blake, 2001; Blake et al., 2004, i.e., Taylor Creek Sequence Unit 3b), not at the base of the Hardey Formation, as stated in some earlier Mines Department and Geological Survey reports (Hickman, 1983). A felsic tuff near the base of a well-stratified sequence immediately overlying the auriferous conglomerates (±300 m below the top of P4) is dated 2752 ±5 Ma (U-Pb zircon; Blake et al., 2004) and provides a minimum age constraint on their formation.

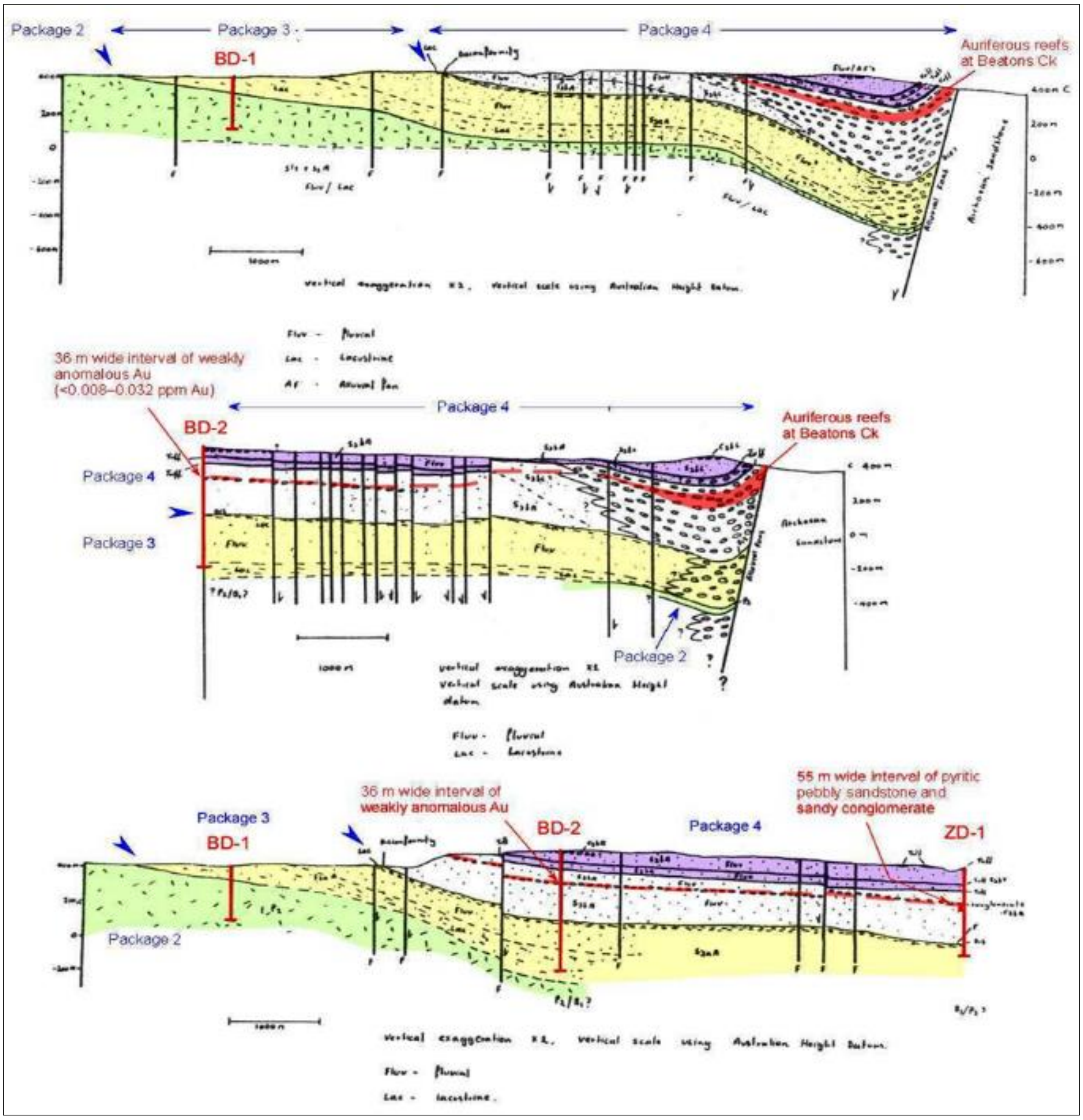


Figure 7.4. Interpretive cross-sections by T.S. Blake (ca. 1984) near the eastern margin of the Nullagine basin. Subdivision P3 in yellow, and P4 in white and red.

7.3 Property Geology

Further diamond drilling and geological mapping has confirmed the Nullagine sub-basin subdivision of the Hardey Formation by Blake (2001), with additional packages defined (Figure 7.5), relating to sequence stratigraphy in an active rift setting, with individual packages coarsening upwards over 50 m to 200 m.

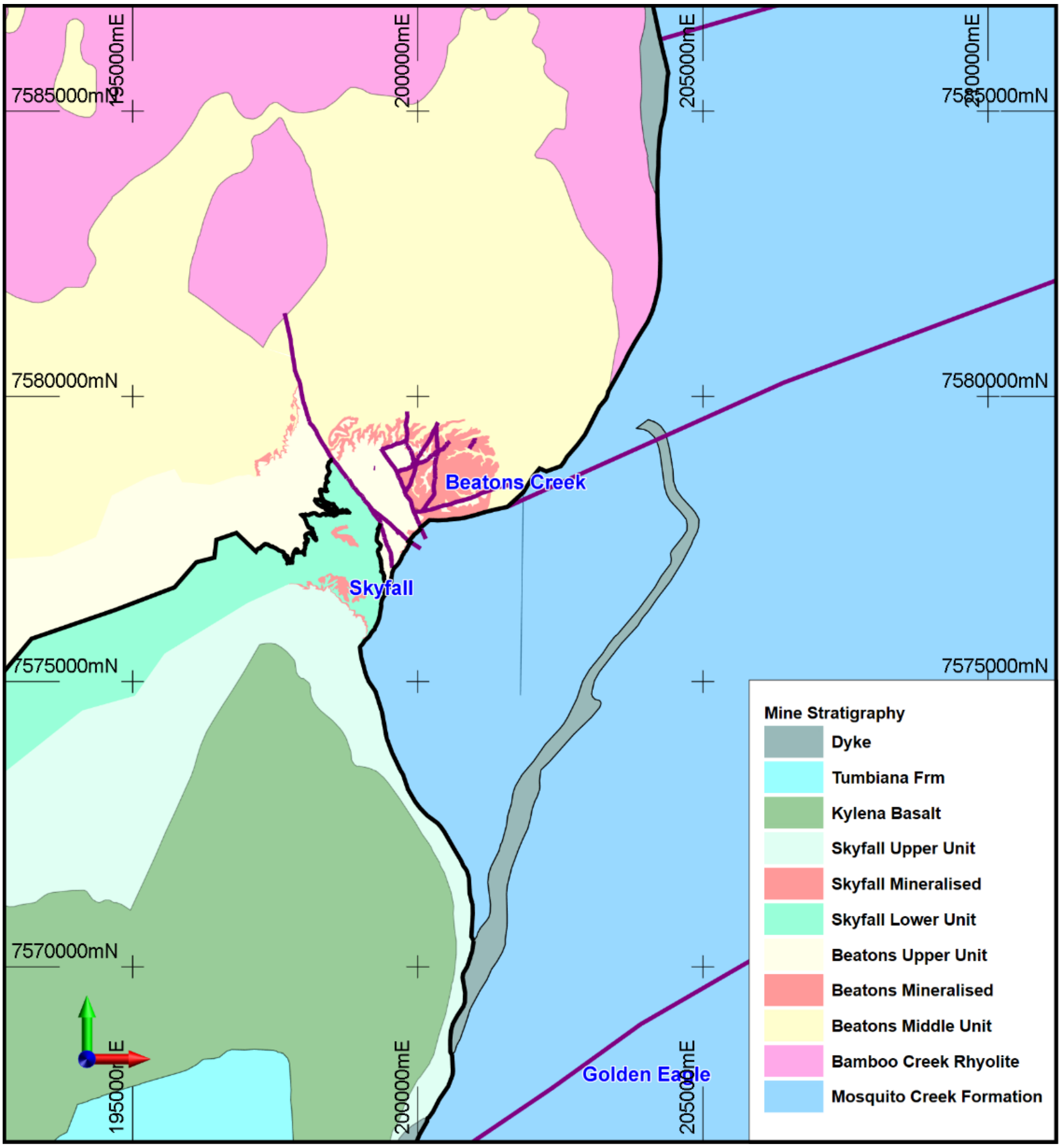


Figure 7.5. Local geology map of Beatons Creek (Source: Novo).

Broadly, the Beatons and Skyfall units are upwards-coarsening cyclical sequences in an active rift basin depositional system, which allow for further subdivision of units.

Mineralization in each sequence is restricted to the top ~50 m sequence of poorly stratified, poorly sorted, polymictic, cobble-to-boulder ferruginous conglomerate sequence, which is confined to an area within a few kilometers of Nullagine (Figure 7.5) where high energy conglomerates directly onlap onto Mosquito Creek Formation stratigraphy. Clast composition indicates the Mosquito Creek Formation as a source and comprises mostly sandstone, siltstone and minor quartz. Clasts relate to underlying Archean basement and comprise gneiss and minor cherts. A very visual and recognizable clast is the ‘dromedary clast’ – a silica and sericite altered conglomerate, sourced from resistive ridges up to 20 m in thickness in the lower parts of the Mosquito Creek Formation. These dromedary clasts are extremely resistive to weathering, can be up to 1 m in diameter, and are spatially related to higher energy depositional environments.

Recognition of the cyclical deposition of the 'Beatons Creek Member' (Blake, 2001) allowed more-detailed stratigraphy to be defined. Based on logging of drill core, downhole wireline data and mapping, several depositional cycles and their sub-units have been identified, with an updated mine sequence stratigraphy now recognizing the packages as described in Table 7.1. There are additional sequences higher up and lower down in the stratigraphy which have not been accurately mapped due to an absence of anomalous surface sample results.

In the Beatons and Skyfall sequences, a comparable 'mineralized unit' of polymictic cobble to boulder conglomerate and elevated pyrite has been recognized, coinciding towards the top of each cycle where the highest depositional energy levels are evident.

Table 7.1. Mine stratigraphy as defined by diamond drilling and mapping.

Code	Unit Name	Description
SU	Skyfall Upper	Sandstones and pebble to cobble conglomerate. Contains tuffs and minor granulestone beds.
SX	Skyfall Mineralized	Cobble conglomerate with occasional boulders. Host to lag horizons (marine reworking). Low-level disseminated pyrite with occurrences of 'buckshot pyrite' concentrations.
SL	Skyfall Lower	Sandstones, including hummocky cross-beds, coarsening upwards to pebble to cobble conglomerate.
BU	Beatons Upper	Sandstones and pebble to cobble conglomerate. Contains tuffs and minor granulestone beds.
BX	Beatons Mineralized	Cobble conglomerate with occasional boulders. Host to mineralized or unmineralized lag horizons (marine reworking). Low-level disseminated pyrite with occurrences of 'buckshot pyrite' concentrations.
BM	Beatons Middle	Pebble to cobble conglomerate with occasional boulders. Low-level disseminated pyrite with minor occurrences of (channelized) concentrations of pyrite.
BL	Beatons Lower *Does not outcrop*	Granulestone and local beds of angular felsic clasts constrained proximal to the Mosquito Creek Formation contact. Minor channelized concentrations of pyrite.

The Skyfall and overlying sequences are under further exploration review, with detailed drilling and further definition of sub-units pending.

The *Beatons Upper* unit represents a lower depositional energy level and contains sandstones, granulestones and pebble conglomerates. Minor cobble conglomerates show an occasional increase in energy and represent more channelized basin fill. Individual beds are extensive. Several tuff horizons (1 m to 5 m in thickness) are easily recognizable in outcrop, drill core, geochemistry, and downhole televiewer data and form marker beds that help define the current 3D model of deposit scale geology.

The *Beatons Mineralized* unit and *Beatons Middle* unit share similar characteristics, and match with Blake's P4 unit. This forms a 200 m thick package comprising a monotonous sequence of pebble-to-boulder conglomerates, with occasional thin interbeds of sandstone. Conglomerate clasts comprise sandstone, siltstone, quartz and dromedary boulder-conglomerates resembling the Dromedary Hills Mosquito Creek unit towards the east. Additional minor clasts of chert, stromatolites and 'mineralized clasts' are also evident.

Regular 0.5 m to 2 m thick horizons feature cobble-to-boulder conglomerates with increased resistive clasts and increased pyrite and represent fluvial channels (proximal to the depositional fan) or zones of marine reworking. Gold-bearing ferruginous conglomerates are restricted to these channels, or marine lags, and are constrained to the 40 m thick *Beatons Mineralized* unit at the top of the sequence. Fluvial type conglomerates and marine lags generally have a clearly defined top and base and represent a higher energy environment conducive to concentrating gold, as well as detrital pyrite and resistive clasts.

The *Beatons Lower* unit is locally extensive in thickness but forms a marked change from the *Beatons Middle* unit. The *Beatons Lower* unit is characterized by angular and poorly sorted felsic clasts and is likely a local feature derived from a local source. The Mosquito Creek Formation has several intrusive felsic units, which are likely to be the local source of this material.

More distal historical diamond holes show a general lower energy package of sandstones and conglomerates below the *Beatons Middle* unit. Due to the depth of this unit and the limited potential for mineralization, further detail of the deeper sequences is not known.

Sufficient data now exist to generate a 3D model of the property geology from diamond drilling and high-density RC drilling. Confirmed by mapping of major fault blocks and marker horizons, Novo developed a 3D structural framework to underpin an improved stratigraphical subdivision. The structural framework further subdivides the property geology into geological domains (Figure 7.6).

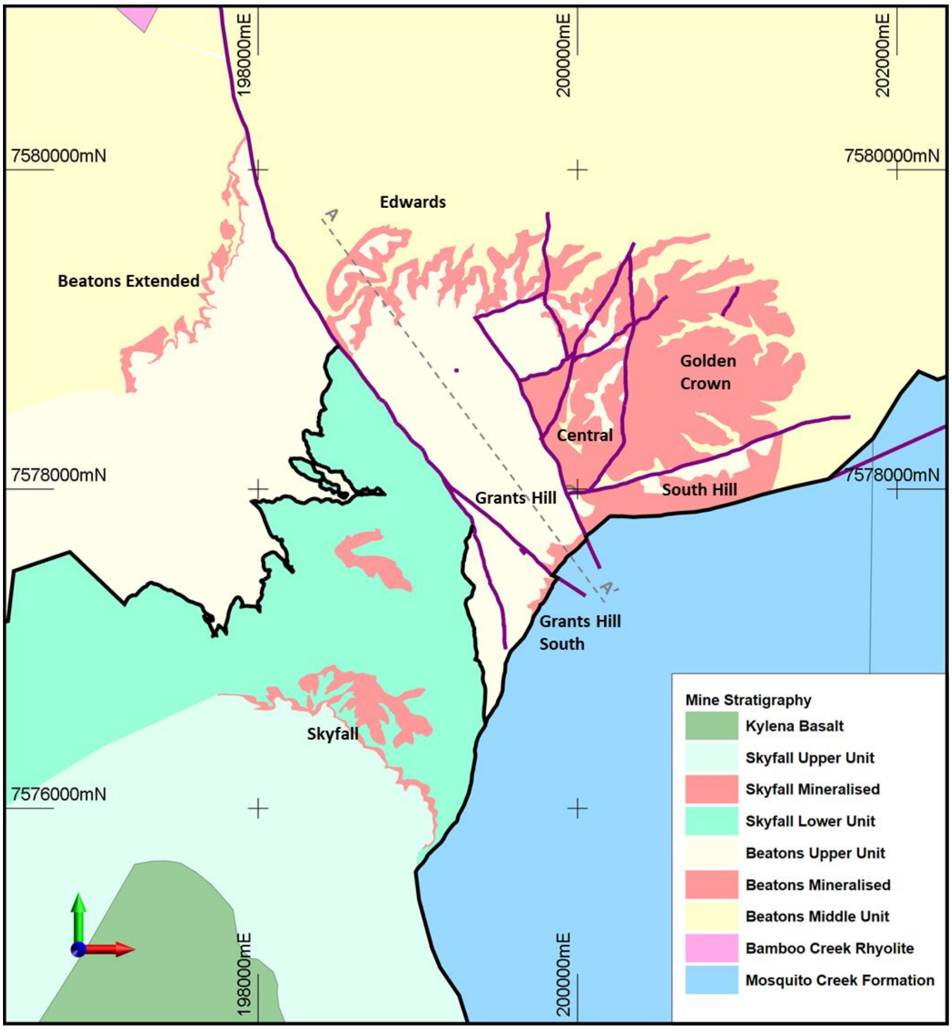


Figure 7.6. Mine-scale geology of Beatons Creek showing section line in Figure 7.7 (Source: Novo).

The geological fault-bound domains differentiate between stacked channel sequences (proximal) and more developed marine reworked material (distal). Reconstructing the geological sequences in 3D has further separated the Golden Crown area from all other domains to the west. Structural data, lode positions, imbrication measurements, and interrogation of the mine stratigraphy show that all other fault blocks represent the same sequence, albeit offset. The Golden Crown block represents a different depositional fan altogether, separated by a fault along its western margin.

The South Hill domain is the only domain not fully understood to date, and there are insufficient data to determine whether it is the proximal component that relates to Grant's Hill marine material, or an offset component relating to Golden Crown.

Marine reworking makes for very consistent stratigraphy, resulting in a very continuous and robust geological model (Figure 7.7). Modeling the more distal domains is also assisted by the outcropping 'marker beds' of tuff horizons.

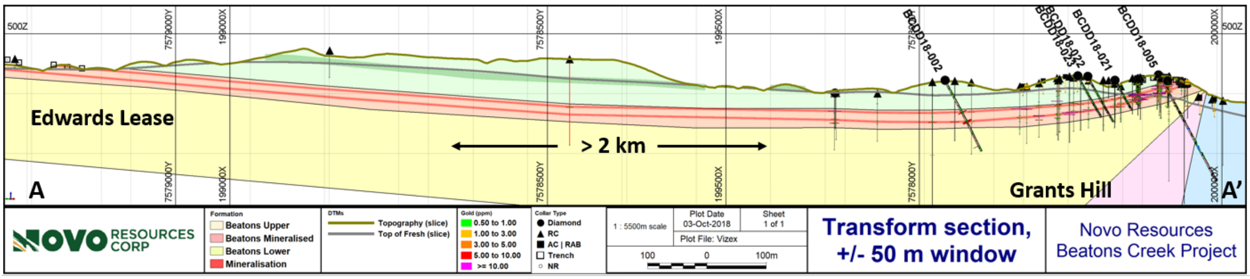


Figure 7.7. **Cross-section showing mine stratigraphy, marker tuff and M1 and M2 lode continuity (Source: Novo).**

7.4 Property Mineralization

7.4.1 Overview

Mineralization relates to the energy level, either during deposition (channel) or reworking (marine lag). High energy levels are represented by clast size, clast composition (e.g., more resistive dromedary clasts), sorting, increased density (e.g., more pyrite/'buckshot pyrite'), and the 'buckshot pyrite' clast size. Mineralization is restricted to fluvial type channel conglomerates or marine lag reworked conglomerates which are readily recognizable from outcrop and drill core. The wider *Beatons Mineralized* unit and *Beatons Middle* unit contain minor disseminated pyrite, but the grade of background mineralization is no more than 0.1 g/t Au.

7.4.2 Channel Mineralization

Fluvial type channel conglomerates are typically clast-supported, heterolithic, pebble-to-cobble conglomerates with occasional boulders (Figure 7.8). Imbrication of clasts is commonly evident, indicating a general north-northwest flow direction in the project area. Trough cross-bedding and channels are commonly evident, suggesting a braided river environment (Figure 7.9).

Figure 7.8. Fluvial type conglomerate with thickness of ~1.8 m, 2018 bulk sampling program (Photograph: Novo).

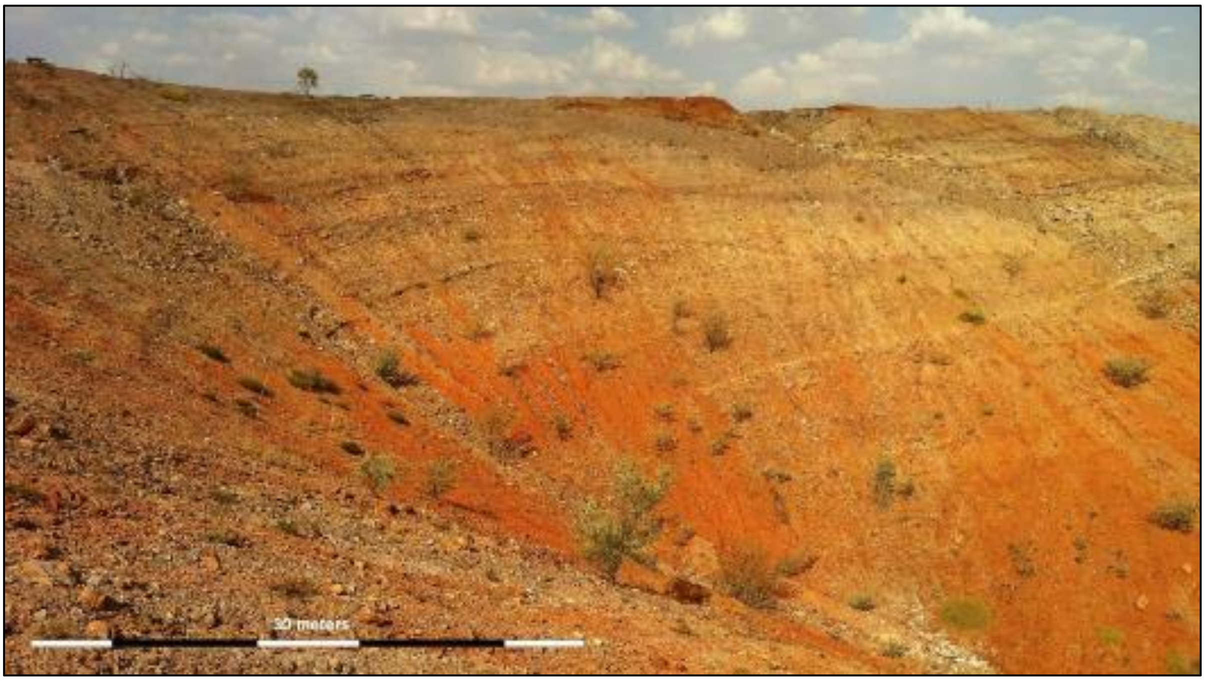


Figure 7.9. Channel trough cross-bedding in a sequence of fluvial type conglomerates on the southern margin of Golden Crown (Photograph: Novo).

Individual channels are often ~50 m across and can be traced over hundreds of meters. The thickness varies between 0.5 m and several meters. Clasts are dominantly sandstone, conglomerate, siltstone and shale locally derived from the nearby Mosquito Creek Formation (+70%), and clasts of several types of metamorphic rock and granite derived from the basement are less common (<10%), but still ubiquitous. White and grey vein clasts are also ubiquitous, making up around 10% to 20% of the clast population; sand and silt dominate the matrix and spotty clusters of detrital pyrite (up to 1 cm diameter), and fine (<1 mm) rounded and boxwork pyrite are common in matrix material, making up to 10% of the rock.

7.4.3 Marine Lag Mineralization

Marine lags (sometimes referred to as 'armored lags') are typically tightly packed, clast-supported cobble-to-boulder conglomerate (Figure 7.10 and Figure 7.11). Individual boulders can exceed 1 m diameter and are dominated by hard, resistant, siliceous dromedary clasts, vein quartz and chert. Sandstone and locally derived shale clasts are less common in marine lags and are commonly tucked between or under larger siliceous boulders. Imbrication is rare and individual beds are 0.3 m to 1.5 m thick and sheet-like, being continuous over hundreds of meters, with the main two marine lags (M1 and M2) continuous over 2.5 km. The matrix is comprised of sand and silt flakes of yellow shale, with ubiquitous and abundant detrital pyrite (up to 3 cm diameter) common in matrix material and making up to 20% of the rock (Figure 7.12). A fresh mineralization exposure in the 2021 Grant's Hill pit is shown in Figure 7.13.

Figure 7.10. Tightly packed armored lag type ferruginous conglomerate with quartz boulders at M1 - Edwards Lease, 2018 bulk sampling program (Photograph: Novo).

Figure 7.11. Armored lag type conglomerate comprising elongated quartz boulders at M1 – Golden Crown, 2018 bulk sampling program (Photograph: Novo).

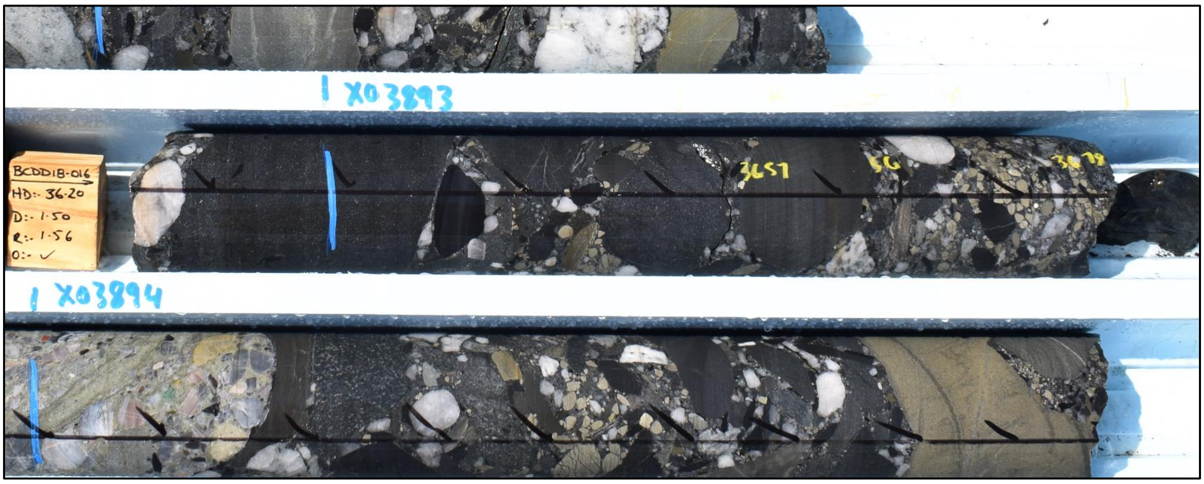


Figure 7.12. 'Buckshot pyrite' in fresh mineralized core from hole BCDD18-016 from 37.05 m to 37.65 m (Sample #X03894: 0.6 m at 8.7 g/t Au), 2018 diamond core program (Source: Novo).

Figure 7.13. Well-developed 'buckshot pyrite' in M2 fresh mineralization in the Grant's Hill pit. Field of view ~1 m (Photograph: Novo, 2022).

7.4.4 Nature of the Gold

Gold within the Beatons Creek conglomerates occurs as fine grains, larger flakes, and rounded particles up to 2 mm across, occasionally exceeding 5 mm. Coarse and fine gold is spatially related to higher concentrations of pyrite, and there appears to be a correlation between gold content and the 'buckshot pyrite' clast size. Coarse gold is defined as that above 100 µm to 150 µm in size (Dominy, 2014, 2016).

Coarse gold particles (>0.5 mm) are regularly visible (circled by blue marker in Figure 7.14 and in core in Figure 7.15), and fine gold can be panned from crushed matrix material with large pyrite concentrations.

Figure 7.14. Gold particles shown in blue circles among 'buckshot pyrite' (black dots) from an oxide channel conglomerate at South Hill (Photograph: Novo).

Figure 7.15. Gold in fresh conglomerate diamond core from the 2018 program (Photograph: Novo).

During trial processing in 2017, a 10,000 t parcel was processed to yield 6,900 g of coarse gold (0.71 g/t Au) from an estimated head grade of 1.9 g/t Au. The size of gold particles from part of this yield reaches 5 mm, as shown in Figure 7.16.

Figure 7.16. Coarse gold fraction from trial mining parcel collected/processed from Golden Crown channels in 2017 yielding a head grade of 1.9 g/t Au (Photograph: S.C. Dominy, 2018).

Other evidence for the presence of coarse gold relates to the following observations:

- The 2018 bulk sampling program yielded coarse gold from the gravity circuit up to 5 mm, with gravity recovery of 62% (2.2 g/t Au head grade) after grinding to P_{80} -750 µm (Dominy, Graham and van Roij, 2022).
- The three-stage GRG testwork program in 2019 indicates 53% (M1 – Domain 211; 5.5 g/t Au head grade) and 37% (M2 – Domain 212; 4.4 g/t Au head grade) of gold reporting to the Stage 1 concentrate (P_{80} -550 µm). Size-by-assay analysis of the two Stage 1 concentrates indicates 31% (M1) and 23% (M2) of the gold being >600 µm in size (Arrowsmith, Parker and Dominy, 2020).
- The three-stage GRG testwork program in 2022 on three master composites indicates 46% (1.7 g/t Au head grade), 50% (2.6 g/t Au head grade) and 56% (2.5 g/t Au head grade) of gold reporting to the Stage 1 concentrate (P_{80} -850 µm). Size-by-assay analysis of the Stage 1 concentrates indicates 65%, 53% and 47% of the gold being >600 µm in size.
- During mine production during 2021 to 2022, the mean gravity recovery was 55% in the range of 36% to 88% for a global head grade of 1.17 g/t Au.
- Trial processing of a 38,000 t batch of fresh mineralization from the M2 domain at the base of the Grant’s Hill pit yielded a mean gravity recovery of 57% (1.8 g/t Au head grade). Visible gold was also noted in hand specimens of this material collected during mining (Figure 7.10).
- Visible coarse gold was noted in samples from oxide mineralization (Figure 7.17).

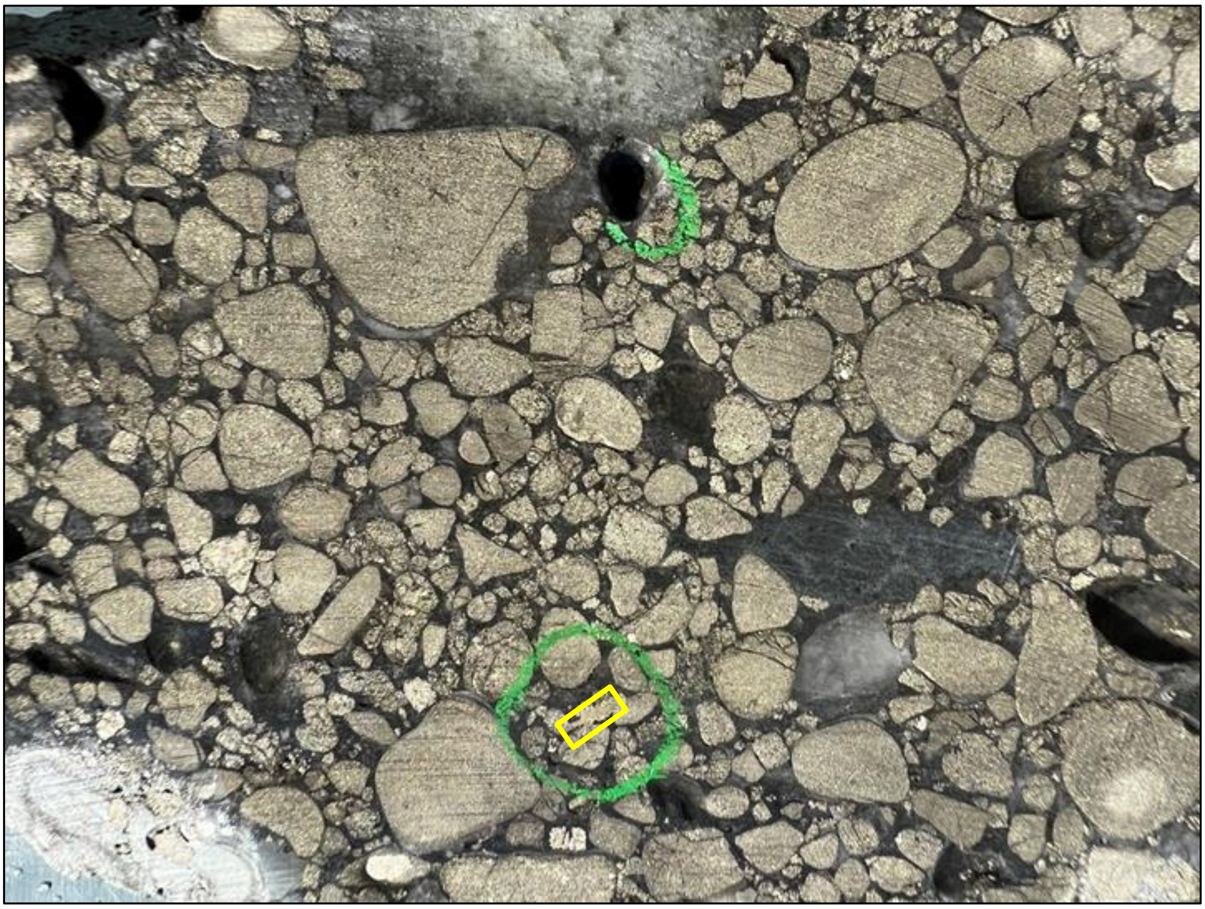


Figure 7.17. Visible gold in a cut hand specimen collected from the M2 domain at the base of the Grant's Hill pit, trial parcel area (Batch #1). Yellow box encloses an elongate gold particle of ~5 mm (Photograph: S.C. Dominy, May 2022).

Mineralization at Beatons Creek is coarse gold dominated, which requires optimized sampling protocols to yield fit-for-purpose assay results (Dominy, 2014; 2016; 2017). In such deposits it is difficult to collect truly representative samples, given that a large mass is required (Dominy, 2017; Dominy, Graham and van Roij, 2022). Optimization, as part of the 2018 bulk sampling program planning, concluded that to provide a representative sample requires a primary mass of approximately 2 t (Dominy, 2018; Dominy, Graham and van Roij, 2022).

8. DEPOSIT TYPES

8.1 Depositional Model

Both fluvial and marine lag type conglomerates are interstratified, indicating that the depositional facies in which they formed were laterally proximal. The depositional environment for these conglomerates is interpreted to have been a river fan delta along a coastline, as shown in Figure 8.1. During periods of low stand, a braided river delta prograded seaward, depositing channelized fluvial type conglomerates.

As sea levels rose, wave action winnowed out fine, light sediment, leaving behind a transgressive armored lag deposit of large siliceous boulders and heavy minerals, including gold. It is in this environment that the economic conglomerates at Beatons Creek formed. This process repeated several times to create the interbedded conglomerates exposed currently (Figure 8.1).

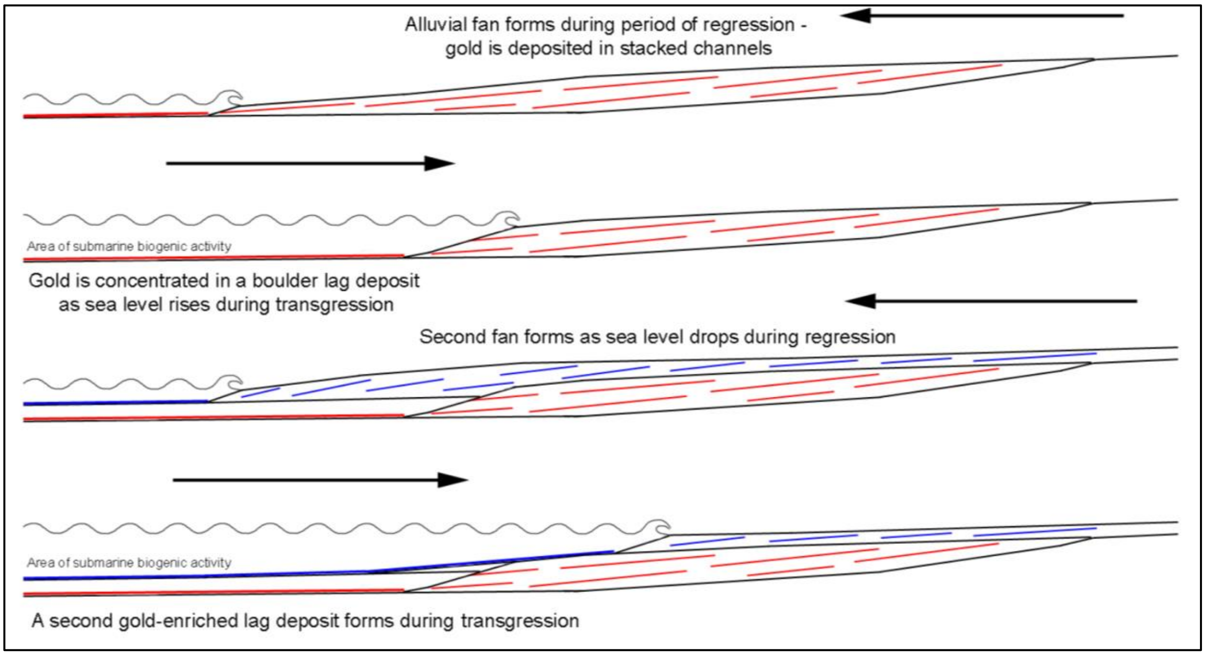


Figure 8.1. Sequence of two regressive and transgressive tracks from top to bottom (Source: Novo).

Channel mineralization is restricted to closer proximity to the Mosquito Creek Formation contact and is the dominant mineralization at South Hill and the southern parts of Golden Crown.

Marine lags are the only form of mineralization distal from the contact, with up to seven lags identified at Grant's Hill and Golden Crown. Towards Edwards Lease (Edwards), only two dominant marine lags continue. These lodes (M1 and M2) have been modelled over 2.5 km along strike, and are only closed off by topography and faults (Figure 8.2).

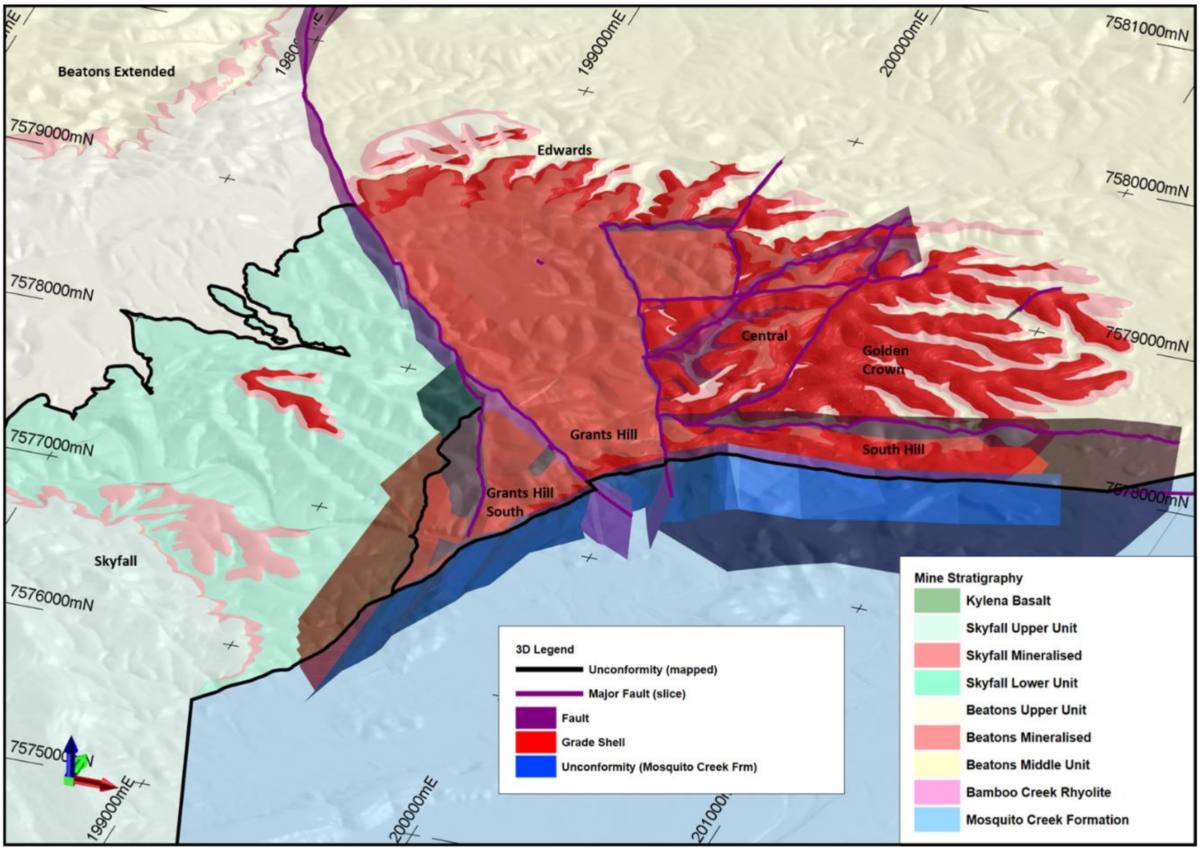


Figure 8.2. 3D model of stratigraphy and mineralization showing fault-bound domains (Source: Novo).

All fault blocks, except for Golden Crown and South Hill, have the M1 and M2 defined as the most dominant and consistent lodes. These lodes are always located in the same stratigraphic sequence (notably the M1 being approximately 12 m below the lowest marker tuff, and the M2 occurring approximately 10 m below the M1).

Additional parallel marine lags have been named M0, M3, M4, M5 and M6 in the Grant's Hill, Grant's Hill South and Central domains.

The Golden Crown block represents a different fan, with imbrication suggesting sedimentation from the east as opposed to the southeast. Three marine lags have been defined in this domain, with an additional sequence of channel mineralization towards the southern margin. The sequence of channel mineralization appears to transition towards marine lag mineralization from south to north, generating a complex geological setting where channels and lags overlap and interplay.

8.2 Model Justification

The palaeoplacer deposition model employed by Novo for the Beatons Creek project is based on detrital gold sourced from the nearby Mosquito Creek Formation and deposited locally. Mineralization has further been concentrated by marine reworking of an already endowed sequence of conglomerates by marine processes, as described above.

Similarities with other conglomerate-hosted deposits of similar age lends credence to the mineralization model used. The presence of significant concentrations of rounded detrital pyrite was also a factor in lode identification, with the best exploration success primarily driven by understanding the sedimentary processes and their effects on concentrating gold. A strong correlation between high depositional energy (in channels) and the amount of reworking (for marine lags) and gold content allows for a straightforward depositional model to be successfully employed.

Some comparable conglomerate-hosted deposits are the subject of debates around potential hydrothermal mineralization, either as the sole mineralizing event or as an overprint (Phillips and Meyers, 1989; Phillips and Law, 1994; Barnicoat et al., 1997). Despite local remobilization of pyrite (and potentially gold) within the matrix, potentially due to dewatering during burial or low-level metamorphism, no evidence of hydrothermal overprinting has been documented at Beatons Creek or elsewhere in the Pilbara.

Other debate around organic or microbially mediated syn-sedimentary gold precipitation or entrapment (Hallbauer, 1975a, b; Mossman et al., 2008) is of less relevance at Beatons Creek. This is due to the limited amount of organic carbon (kerogen or stromatolites) in the system but may play an important part in the exploration and exploitation of other conglomerate-hosted gold targets in the wider Pilbara region. Bacterial mats and stromatolites have been recorded in Hardey Formation conglomerates.

9. EXPLORATION

9.1 Overview

Exploration activities conducted by Novo consist of surface geological mapping, trench channel sampling, trial mining, bulk sampling, diamond core drilling and RC drilling conducted between 2011 and 2022. Historical (pre-Novo) exploration activities include geochemical and geophysical surveys, geological mapping and drilling by various operators between 1968 and 2011 (Table 6.1). Table 9.1 summarizes the number of holes, samples and composites used in the MRE (refer Section 14).

Table 9.1. Summary of holes, samples and composites used in the MRE.

Hole or sample type	Number of holes	Number of samples	Number of composites
Bulk samples	-	54	57
Diamond drillholes	60	580	354
RC drillholes	3,877	25,350	17,186
Trench/costean channel samples	-	57	53
Total	**4,039**	**26,041**	**17,650**

9.2 Trial Mining

In July 2016, trial mining and excavation of a lot (approximately 30,000 t) from a site on a Golden Crown oxide channel took place. Processing of the lot proved to be problematic due to impact crusher breakdowns and inefficiencies that led to the need for unplanned modifications. As a result, only approximately 10.000 t of the material was processed. A reconciled head grade of 1.9 g/t Au was achieved, albeit in the context of unaccounted gold loss in unsampled coarse rejects, plant instability and resulting low recovery, and unrepresentative tails stream sampling.

9.3 Trench (Costean) Channel Sampling

Due to the presence of surface exposures of conglomerates, Novo undertook a trench channel sampling program to complement RC drilling between September and November 2014, through to July 2015, and some associated with the bulk sampling program in 2018.

9.4 Bulk Sampling

Novo undertook a bulk samping program at Beatons Creek during 2018 (Dominy and Hennigh, 2019; Dominy, van Roij and Graham, 2022). The samples were part of the evaluation program which attempted to quantify the magnitude and distribution of gold grades within marine lag and channel mineralization. Novo collected 58 approximately 2 t bulk samples across 1 m increments of conglomerate.

9.5 Drilling

Core drilling to support geological, geotechnical and metallurgical studies was undertaken in 2018 (six holes) and 2022 (nine holes). RC drilling during late 2020 into 2022 included resource development and grade control holes to support mining.

10. DRILLING

10.1 Overview

Since 2011, Novo has drilled 3,877 RC drillholes for a total of 25,350 samples. The purpose of the drilling was to improve resource definition of the mineralized conglomerates, particularly at the Grant's Hill, Grant's Hill South, Golden Crown, Central, Edwards and South Hill areas.

Various drill contractors were employed over the course of this drilling effort. Novo's post-2010 drilling up to 2020 was done by Orbit Drilling in 2011; McKay Drilling in 2012; Castle Drilling in 2013 and 2014, and Three Rivers Drilling in 2017. RC holes were collared using a 5.5-inch (137.5 mm) bit in the regolith zone, followed by a 5.25-inch (131.2 mm) diameter bit for the remainder of the holes. Samples were taken at 1 m intervals down the hole.

Between 2020 and 2022, resource development (20 m by 20 m spacing) and grade control (10 m by 10 m spacing) RC drilling was undertaken (Castle and JSW Drilling). This was completed to expand the resource base and control mining activities, which commenced in 2021. RC holes were collared using 5.5-inch (137.5 mm) or 5.25-inch (131.2 mm) diameter bits. Samples were taken at 0.5 m intervals down the hole.

In 2018 and 2022, Novo completed diamond drillholes (six and nine respectively) for the purposes of grade, geological, metallurgical, geotechnical and bulk density testwork (Figure 10.1).

Figure 10.1. Part of a fresh core intersection (samples MET0028-32) from hole 22BCDD0005, M2 mineralization from Grant's Hill. 2022 drilling program (Photograph: S.C. Dominy, May 2022).

10.2 Theory of Sampling Background

In sections of this report, the QPs refer to various sampling errors defined by the Theory of Sampling ('TOS' – Gy, 1982; Pitard, 2000; Dominy, 2016; Esbensen, 2020; Esbensen et al., 2021). Table 10.1 sets out the definitions of the sampling errors referred to.

Table 10.1. Key sampling errors as defined by the Theory of Sampling.

Sampling error	Acronym	Error type		Effect on sampling		Source of error	Error definition
Fundamental	FSE	FSE + GSE = Quality Fluctuation Error (QFE)	Correct Sampling Error (CSE)	Precision Generator	Random Errors -	Characteristics of the mineralization. Relates to Constitution and Distribution Heterogeneity.	Results from grade heterogeneity of the broken lot. FSE does not cancel out and remains even after a sampling operation is perfect. Experience shows that the total nugget effect can be artificially high because sample weights are not optimal.
Grouping and Segregation	GSE						Relates to the error due to the combination of grouping and segregation of rock fragments in the lot. Once rock is broken, there will be segregation of particles at any scale.
Delimitation	DE		Incorrect Sampling Error (ISE)	Bias Generator	Systematic Errors -	Sampling equipment and materials handling	Results from an incorrect shape of the volume delimiting a sample.
Extraction	EE						Results from the incorrect extraction of a sample. Extraction is only correct when all fragments within the delimited volume are taken into the sample.
Weighting	WE						Relates to collecting samples that are of a comparable support. Samples should represent a consistent mass per unit.
Preparation	PE						Refers to issues during sample transport and storage (e.g. mix-up, damage), preparation (contamination and/or losses), and intentional (sabotage) and unintentional (careless actions and non-adherence of protocols) human error.
Analytical	AE		Analytical			Analytical process	Relates to all errors during the assay and analytical process, including issues related to rock matrix effects, human error, and analytical machine maintenance and calibration.

The FSE and GSE are random errors related to the inherent heterogeneity and characteristics of the material being sampled. They lead to poor precision and can only be minimized through good sampling protocols. The other errors arise because of the physical interaction between the material being sampled and the technology employed to extract the sample. These errors result in bias, which can be reduced by the correct application of sampling methods and procedures. A sample can be described as representative when it results in acceptable levels of bias and precision (Gy, 1982; Pitard, 2000; Dominy, 2014, 2016; Esbensen, 2020; Esbensen et al., 2021).

10.3 Drill Collars

10.3.1 Exploration Holes (Pre-2020)

The protocol employed by Novo for staking and surveying drill collars has been consistent throughout all drilling campaigns. Collar coordinates are in the GDA 1994 MGA Zone 51 Grid Datum. Planned holes are set out by the Novo field personnel using a handheld GPS device. The azimuths are usually set out using a compass and flagging tape/pickets for the rig, to line up with fore-sights and back-sights. The vertical inclination is then set by the driller using a clinometer, which is confirmed by the geologist or field personnel on site prior to commencement of drilling, to ensure that quality is maintained.

Following the completion of drilling, drill collar casings are left in the ground with a plug in each, stating hole identifier, coordinates and orientation. There is often a wooden stake with the above information next to each collar point for ease of identification. Collars are also plugged to prevent local fauna from falling down the holes (Figure 10.2).

Figure 10.2. Plugged and marked drill collar at Beatons Creek (Photograph: Novo).

Drilled and plugged collars are re-surveyed with high-precision equipment to provide final confirmation of individual drill collar locations.

Final collar surveys for drilling conducted between 2011 and 2013 were undertaken by Survey Group using a differential GPS (DGPS) device. Survey Group established a survey control point approximately 100 m north of Grant’s Hill.

In 2014, Novo purchased its own real-time kinematic (RTK) system, consisting of an EPOCH 50 Single Receiver Kit, a Trimble Geo 7 Series handheld GPS, and an XDL Rover 2 radio. This system provides sub-centimeter accuracy, both vertically and horizontally. In 2014, Novo established additional survey control points (referencing the 2012 control point) across the project area to create a reliable standardized survey grouping. All 2014 to 2018 drill collars were surveyed by Novo personnel using the RTK system.

10.3.2 Resource Development and Grade Control Holes (Post-2020)

Planned holes were set out by Novo field personnel using a handheld GPS device. The azimuths were set out using a compass and flagging tape/pickets for the rig to line up with fore-sights and back-sights. The vertical inclination was then set by the driller using a clinometer, which was confirmed by the geologist or field personnel prior to commencement of drilling to ensure that quality was maintained.

All drill collars were surveyed using a DGPS system by suitably qualified Novo survey personnel. During the period between December 2020 and February 2021, 247 drill collars were not picked up, and the database only contains the planned collar data. This was an oversight by the site team and is discussed in Section 14.5.

10.4 Downhole Surveys

Considering the drillholes are vertical and at shallow depth (<25 m), downhole surveys were not collected for the RC holes drilled between 2011 and 2017. The average hole depth was approximately 50 m, with the deepest at 235 m.

All 2018 diamond holes were surveyed using an Eastman single shot camera at 10 m intervals.

All 2022 diamond holes were surveyed using a downhole gyroscopic (gyro) tool at 10 m intervals.

The post-2020 resource development and grade control RC holes were dominantly vertical. The holes drilled in oxide mineralization were not surveyed, based on the assumption that they were both vertical and short (<25 m). All holes in fresh mineralization were surveyed every 10 m to 20 m using either a downhole gyro tool or Eastman single shot camera.

10.5 Geological Logging

Geological logging of both RC chips and drill core was undertaken on site by geologists familiar with the project, who also monitored the drilling and sampling procedures.

Logging of RC chips was undertaken using sieving, with samples of each interval retained in chip trays stored on site. Prior to 2020, drilling chips were logged in the field next to the collar site. After 2020, only resource development (20 m by 20 m spacing) RC chips were logged.

Logging of drill core takes place at a core yard facility on site, with core oriented, meter marked and washed prior to logging.

The geology logs record regolith, lithology, structure, texture, grain-size, alteration, oxidation, mineralization, quartz percentage and sulfide types and percentages by sample interval. Logging is completed directly into the digital Geobank Mobile logging system.

10.6 Sampling Methodology

10.6.1 RC Sampling Methodology (Pre-2020)

RC chips were collected at 1 m intervals via a cyclone and fixed splitter attached to the side of the rig or trailer mounted. This arrangement was air-cleaned on a regular basis by the drill crew to limit cross-sample contamination and was monitored by the supervising geologist.

During earlier drilling programs (a component of 2006, all of 2011, and up to and including BCRC12-028 in 2012), 4 m composites were generated by spear-sampling for preliminary assay testwork. Composite results over a reported threshold value were subsequently resubmitted per individual meter. All speared 4 m composite data have been excluded from the MRE.

For the programs prior to 2014, a standard split generated a nominal 3 kg sample for assay, with the remainder of the sample retained on site in a plastic bag. For the 2014 and 2017 RC programs, a Jones (riffle) splitter was used to collect and split material from the cyclone into a 50/50 split, generating a 15 kg to 20 kg sample. The half split to be analyzed at the laboratory was collected in cloth bags, and the other half split was placed in a green plastic bag and left at the drill site. Split weights were checked at a rate of approximately 1 in 10.

10.6.2 Diamond Core Sampling

Diamond drilling was conducted to generate PQ or HQ core. Core was oriented, marked up and validated against driller core blocks prior to measuring core recoveries. For the pre-2018 core, an Almonte core cutter was used to cut core in half, consistently sampling on the same side of the orientation line. Samples were typically 1 m in length, although they were varied based on geological contacts. A minimum sample length of 0.5 m ensured sufficient sample for further analysis. The maximum sample length was set at 1.1 m.

For the 2018 and 2022 programs, the entire PQ core was crushed, and a rotary sample divider (RSD) was used to collect sub-samples for PhotonAssay. Due to the needs of metallurgical testwork, the assay samples were returned to each composite prior to recovery testwork. This was facilitated by the PhotonAssay method being non-destructive (refer Section 11.5).

Diamond core recovery was >95% (total core recovery), with most being >97%.

10.6.3 RC Sampling Methodology (Post-2020)

RC chips were collected at 0.5 m intervals via a cyclone and fixed cone splitter attached to the side of the rig or trailer mounted (Figure 10.3). This arrangement was air-cleaned on a regular basis by the drill crew to limit cross-sample contamination and was monitored by the supervising geologist.

The splitter produced two equal splits of approximately 8 kg to 10 kg each: A and B splits. Between commencement and mid-August 2021, both splits were submitted to the laboratory. After August 2021, only one of the A or B split was submitted to the laboratory, unless a field duplicate was indicated, in which case A and B splits were both submitted. The split not submitted to the laboratory was disposed of.

Figure 10.3. Castle Drilling rig #12 located at Beatons Creek. Static cone splitter set up to collect both A and B samples (Photograph: S.C. Dominy, May 2022).

RC drilling is a commonly applied sample collection methodology due to its relatively low cost and rapid application (under optimal conditions, approximately 200 m to 250 m per 12-hour shift). However, RC drilling is not a panacea that results in low sampling errors. During the drilling process (bit to cyclone) DE, EE and PE can pervade. DE are generated through variability in the sample length drilled (e.g., 0.5 m at Beatons Creek). Variability may occur due to incorrect or obliterated driller's depth marks, driller inattention to the job, bit diameter change as the shift progresses, and excessive hole blowing between rods. EE are generated through outside return loss due to a lack of pressure, which may relate to worn O-rings, poor compressor capacity, blown inner-tube, or insufficient attention paid to ensuring that the sample interval has time to clear from bit to bag. PE relate to wet samples where substantial fines loss in slurry may occur. The sampling errors are defined in Table 10.1.

RC recovery was monitored through the weights of the A and B rig splits collected routinely to August 2021, and as part of the duplicate program after August 2021. A 140 mm diameter drill bit was used across the three rigs that were active during the 2021–2022 period. Bits were changed after reducing in size to 130 mm. This leads to DE, where the expected mass will change as the hole/shift progresses. For oxide mineralization, the range in expected mass is between 16.6 kg and 19.2 kg, and between 18.6 kg and 21.6 kg for fresh mineralization.

Assuming the expected median bit size of 135 mm, the expected mass recoveries are 17.9 kg and 20 kg for oxide and fresh samples, respectively. Based on the former, the average oxide recovery was 89%, with 55% of all data showing between 85% and 100% recovery. The mean mass was 15.9 kg. The average fresh recovery was 90%, with 55% of all data showing between 85% and 100% recovery. The mean fresh mass was 18 kg. In both cases, the proportion of data indicating >85% recovery was less than the expectation, which is 80% of the samples having better than 85% recovery. Note that mass data were filtered at mean plus/minus 3SD to remove potential outlier values. This process removed <1% of the total dataset relating to under- or over-weight samples. The variable and sub-optimal recoveries can be explained to some extent by the bit diameter change and bulk density variability. Some fines loss from rig cyclones was also noted. The unusual sample length of 0.5 m was likely to cause additional DE, as this requires more attention to drill than 1 m composites. Wet ground was rarely encountered at Beatons Creek.

RC drilling was undertaken by three rigs: Castle Drilling rigs 10 and 12, and the JSW rig. Smith (2022) undertook a review of RC recovery on a rig-by-rig basis. The Castle Drilling rig 12 performed the best overall with regards to consistency and recovery. While adequate RC recoveries were attained by the JSW rig, sample recoveries varied after each rod change, which is a typical feature of RC drilling. There was an overall pattern of lower sample weights at the start and end of a run. Although recoveries were between the upper and lower limits of the theoretical sample weight range, there was a need to improve overall consistency. The Castle Drilling rig 10 displayed both overweight and underweight sample weights at depth in fresh mineralization.

The cyclone feed to bag process is also not devoid of sampling errors. Recovery of the A and B samples at the rig was via a static cyclone/fixed cone splitter attached to the side of the rig or trailer mounted. The splitter was set to recover a 50/50 split. Sample splitting at the rig was monitored through the weights of the A and B splits collected routinely (to August 2021) and as part of the duplicate program after August 2021. For oxide mineralization, the split precision was ±12%, with 80% less than ±20% precision. For the fresh mineralization, the split precision was ±14%, with 79% less than ±20% precision. These figures are acceptable, albeit high. Static cone splitters often produce biased samples because it is difficult to ensure material is presented to the splitter consistently. The process is prone to DE (e.g., uneven feeding to the splitter and/or a non-level splitter unit), EE (sample lost as dust and material adherence to the inside of the unit) and PE (inter-sample contamination, driller intervention, sample loss during bagging and sample bag numbering mix-ups). The QPs (Ms Graham and Dr Dominy) witnessed dust loss from the cyclones during their site visit in May 2022. The matter was flagged with the site team, who committed to enhanced drill crew communication on the matter.

10.6.4 Trench Channel Sampling

Trench channel (or costean) sampling was undertaken during 2014, 2015 and 2018. Where outcropping conglomerate horizons were present, channel samples were collected from trenches at 20 m to 70 m spacings along strike. The sample interval size did not exceed one 1 m (vertical). If a conglomerate horizon was <1 m thick, a sample was collected from the top to the bottom of the layer. If the horizon thickness exceeded 1 m, two or more samples were collected.

Samples were collected from outcrops where it was possible to access a full profile of the conglomerate horizon from top to bottom, or material exposed in small trenches using an excavator or dozer. Samples were collected using a Kanga drill to loosen material and a tarpaulin was used to catch the material from the drill. Samples were collected over a face 0.5 m–1 m wide to provide a better representation of material, including boulders and matrix. From 2018, a line was marked perpendicular to the profile, and a channel was sampled, mimicking a diamond drillhole to reduce sample extraction bias. A sample weighing between 40 kg and 65 kg was collected and split between two polyweave bags.

Field duplicates were collected at a rate of approximately 1 in 15 samples and were processed and analyzed along with the original samples. Blank samples (3 kg of certified barren quartz sand) were inserted at an approximate rate of 1 in 15 trench samples.

Trench samples were individually placed in polyweave sacks (bulka bags), tied, and bundled and stacked on pallets for transport. Sample shipments were made from the Nullagine freight yard to the Intertek laboratory in Perth on a weekly basis.

The trench samples were prone to high DE and EE during sample collection. The softer matrix material contains the dominant part of the gold inventory, and by virtue of its relative softness is easily over-sampled (e.g., high EE). More silicified, less oxidized and dromedary boulder areas are hard and are prone to relative under-sampling without the use of a diamond saw. This issue of high DE and EE leading to grade bias is typical of channel-style sampling, unless it is undertaken under close supervision (Dominy et al., 2018).

After the 2019 MRE, it became apparent that the channel samples were strongly and positively biased. Consequently, most of the channel samples have not been used for the 2022 MRE (only 57 have been used in the 2022 MRE update; Table 9.1).

10.6.5 Bulk Sampling

Novo undertook a bulk samping program at Beatons Creek during 2018 (Dominy and Hennigh, 2019; Dominy, van Roij and Graham, 2022). The samples were part of the evaluation program attempting to quantify the magnitude and distribution of gold grades within marine and channel lag conglomerate mineralization. Novo collected 45 primary and 13 duplicate bulk samples (all bulk samples approximately 2 t each) across 1 m increments of conglomerate (Figure 10.4). The bulk samples were collected to investigate: (a) local grade at a large sample support, and (b) metallurgical recovery.

Figure 10.4. Marked-out bulk sample ready for collection, through to removal and collection (Photographs: Novo, 2018).

Bulk samples were collected following an initial review of historical metallurgical and mineralogical data to determine a grade vs gold particle size relationship. The subsequent bulk sample variability program covered the broad grade distribution spatially across key oxide conglomerates. The program was deemed to be fit for purpose based on an acceptable total sampling error component of ±22%, and overall compliance with all QC requirements (Dominy and Hennigh, 2019; Dominy, van Roij and Graham, 2022).

Sample collection was supervised by a Novo geologist(s) assisted by field technicians. Once the surface had been cleared of vegetation, a trench was dug to expose a cross-section through the mineralization and to ensure that a sequence from the footwall through to the hangingwall was exposed (Figure 10.4).

The bulk samples were collected to minimize sampling errors. The consistent outline of the bulk sample aimed to reduce DE, with all the sample within the delimited area carefully collected to minimize the EE. The entire sample was fed through a pilot plant to remove errors related to sample splitting. The plant was cleaned thoroughly between samples to minimize PE (e.g., gold loss).

Samples were shipped to SGS in Malaga, Perth, for full sample processing. Some initial sample crushing, grinding and gravity concentration was undertaken at ALS Metallurgy, Perth. Assaying of most gravity concentrates, dust and tails was undertaken at SGS (Perth Airport), with additional dust and tails assays undertaken at MinAnalytical (Perth).

Novo applied considerable effort to the minimization of sampling errors during bulk sample collection. Similarly, the SGS pilot plant was operated diligently and with regular supervision from both Novo personnel (including the QP, Dr Dominy) and the contract metallurgist employed to assist. The bulk sampling program resulted in the highest quality grade determinations at Beatons Creek. Field duplicate pairs provided a precison of ±22% (Dominy and Hennigh, 2019; Dominy, Graham and van Roij, 2022).

11. SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Overview

The 2022 Mineral Resource (refer to Section 14) was estimated from 26,041 samples (17,650 composites), comprising 54 bulk samples (57 composites); 580 diamond core samples from 60 holes (354 composites); 25,350 RC samples from 3,877 holes (17,186 composites) and 57 trench channel samples (53 composites).

Most of the pre-2020 assays used for the estimate were determined using the LeachWELL (cyanide leaching) technique (13%). Some samples were assayed by the fire assay (FA) or screen fire assay (SFA) methods (1% each).

Assays from 2020 onwards, and solely informing the Indicated Mineral Resource, were determined by the PhotonAssay technique (85% of total assays used) using either a 2.5 kg (65% of PhotonAssay) or 5 kg (35% of PhotonAssay) assay charge, split as multiple individual 500 g samples (PhotonAssay pots) and averaged.

11.2 Sample Preparation and Assay (Pre-2020)

Sample preparation, analyses and security measures followed by Novo meet reasonable practice for sample collection, for both drilling and trench channel sampling. The results obtained from the sampling collection campaigns since 2011 are appropriate to support an MRE.

Primary laboratory preparation and analysis was completed at Intertek Genalysis Laboratory (Perth). Intertek is independent of Novo and is an accredited facility that conforms to NATA ISO/IEC 17025 standards.

Pre-2014, and at the laboratory, samples were sorted, dried and weighed. Thereafter, the up to 3 kg submitted sample was:

- Crushed to -2 mm;
- Rotary split to 1 kg;
- Pulverized to P_{85} -75 µm; and
- Split for FA (30 g–50 g) or for 6-hour LeachWELL assay followed by inductively coupled plasma mass spectrometry (ICP-MS) analysis.

Post-2014, and at the laboratory, samples were sorted, dried and weighed. Thereafter, the up to 15 kg–20 kg submitted sample was:

- Crushed to -2 mm with a Boyd crusher;
- Rotary split to 9 kg;
- Pulverized (9 kg) to P_{85} -75 µm – this had to be done in three 3 kg units due to the limited size of the pulverizer;
- Re-homogenized (the three pulverized splits were re-homogenized to 9 kg of pulp);
- Re-split (the 9 kg of pulp was re-split into three 3 kg bags); and
- Subjected (one 3 kg pulp) to a 6-hour LeachWELL assay followed by ICP-MS analysis.

Due to the large size of RC sample splits and the estimated long processing time and high preparation costs, the 2014 RC samples underwent a 'triage' approach to ascertain which samples contained gold and thus required full processing and analysis. The laboratory put each sample of raw drill cuttings through a riffle splitter to collect a 1–2 kg sub-sample. Without further processing, 1 kg of this split was subjected to a 6-hour LeachWELL assay and ICP-MS analysis. Samples reporting gold values of >0.15 g/t Au were selected for full analysis by 3 kg LeachWELL assay on a different split.

Some early samples, after crushing, were sub-sampled and then pulverized prior to sub-sampling for FA (30–50 g charge size) or SFA (500 g or 1,000 g charge size).

All protocols pre-2020 are prone to high quality fluctuation error (QFE, being FSE plus GSE), given that pulverized mineralization containing liberated coarse gold is sub-sampled. Such a process is also likely to yield enhanced PE due to the loss of liberated gold and/or cross-contamination from liberated gold (Dominy, 2014; 2016; 2017). Splitting of pulps will have an increased FSE, and segregation of liberated coarse gold will promote the GSE (Minnitt, Dominy and Esbensen, 2022).

11.3 Trench Channel Sample Preparation and Analysis

At the laboratory, trench (costean or channel) samples were prepared and analyzed using the following protocols:

- Dried and weighed;
- Crushed the entire sample to -2 mm with a jaw crusher followed by a Boyd crusher;
- Rotary split to 9 kg;
- Pulverized the 9 kg to P_{85} -75 µm – this had to be done in three 3 kg units due to the limited size of the pulverizer;
- Re-homogenized (the three pulverized splits were re-homogenized to 9 kg of pulp);
- Re-split (the 9 kg pulp was re-split into three 3 kg bags); and
- Subjected one 3 kg pulp to a 6-hour LeachWELL assay and ICP-MS analysis. Approximately one-third of trench samples were subjected to a 24-hour leach time.

For the 2018 trench channel sampling program, the entire 50 kg sample was pulverized and then split to produce one 3 kg lot for LeachWELL assay.

11.4 Diamond Drill Core Sample Preparation and Analysis

Samples were sorted, dried and weighed at the laboratory. Samples were prepared and analyzed using the following protocol:

- Crushed to -2 mm with a Boyd crusher;
- Pulverized all material to P_{85} -75 µm;
- RSD split the pulp to generate two 1 kg bags;
- Subjected the 1 kg pulp to a 24-hour LeachWELL assay followed by ICP-MS analysis. For any sample within the mineralized sequence, two 1 kg pulps were assayed; and
- Any LeachWELL result over 0.2 g/t Au triggered an FA on the residue to quantify any gold potentially not dissolved during leaching.

11.5 Sample Preparation and Assay (2020 Onwards)

11.5.1 Sample Preparation

Resource development and grade control RC drilling undertaken from October 2020 onwards produced 0.5 m samples. The rig cone splitter produced two equal splits (A and B) of approximately 8 kg–10 kg each.

Initial sample preparation was undertaken at MinAnalytical, Perth and Kalgoorlie. PhotonAssay was initially undertaken at MinAnalytical in Perth, and then at both Perth and Kalgoorlie. This work commenced in October 2020, terminating in late August 2021.

In June 2021 activities were transferred to Intertek, where samples were prepared and assayed at the Intertek laboratory in Perth. From late August 2021, samples were prepared at the Intertek-operated Golden Eagle site laboratory (Figure 11.1). All PhotonAssay analysis was undertaken at Intertek, Perth.

[A] [B]

[C] [D]

Figure 11.1. Golden Eagle site preparation laboratory operated by Intertek: [A] Orbis smart crusher; [B] Five filled PhotonAssay pots; [C] Received samples ready to be placed in the dryers; and [D] General view of the sample preparation area (Photographs: S.C. Dominy, May 2022).

Between commencement and mid-August 2021, both splits were submitted to the laboratory. After August 2021, only one of the A or B split was submitted to the laboratory, unless a field duplicate was indicated, in which case A and B splits were submitted.

On commencement of the grade control program, the A and B splits were both submitted to the laboratory for analysis. Based on the evaluation of 2,525 oxide and 1,139 fresh A-B assay pairs (of 2.5 kg or five PhotonAssay pots each), the decision was made in mid-August 2021 to submit only one, A or B split sample, to the laboratory (Dominy and Graham, 2021). This decision was based on the analysis of pair variances and scenario testing of various combinations of assays (PhotonAssay pots) during estimation of a trial area at Grant's Hill. The analysis showed that above 3 kg of sample (six PhotonAssay pots), precision did not notably improve, and that estimates using 6 to 10 PhotonAssay pots were within ±5% on a global domain basis. Critically, the change improved sample turnaround time and reduced costs.

For the current PhotonAssay protocol, the A or B split sample is sorted, dried and weighed at the laboratory. Thereafter:

- Crushed to -3 mm in a Boyd (commercial laboratory) or Orbis (on-site laboratory) smart crusher (Figure 11.1.A);
- A sub-sample of approximately 2.5 kg is split off automatically; and
- The 2.5 kg is manually poured into five PhotonAssay pots (Figure 11.1.B).

Laboratory personnel clean the crushers between each sample, although this is restricted to brushing and air blasting the easily accessible parts of the unit. At the beginning, middle and end of each shift, the crusher units are run through with blank material and vacuum cleaned. At the beginning of each shift, the barren material run is used to check that the splitter is taking splits that are within ±5%, in weight terms, of each other.

The protocol applied from 2020 onwards was aimed to minimize sampling errors in a practical and cost-effective way. As part of the grade control design program, FSE calculations were undertaken across four grade and liberation diameter scenarios (Dominy and Graham, 2020; 2021). On an individual basis (e.g., 20 kg to 5 kg, then changed to 20 kg to 2.5 kg), the FSE values were below ±20% across grades of 0.5 g/t Au to 5 g/t Au using liberation diameters below 500 µm. Between 500 µm and 1,000 µm, the FSE values increase to ±75% and higher with a liberation diameter between 1,000 µm and 2,000 µm. Any FSE value above ±30% is sub-optimal and will enhance the sampling component of the nugget effect (Dominy, 2014; Pitard, 2000).

However, during grade estimation by block kriging, more than one sample is used to inform the estimate, thus reducing the overall FSE value. Review of the effect, given minimum and maximum informing samples being between 5 and 22, shows the FSE values are reduced below ±30% (Dominy and Graham, 2021). Other sampling errors, such as DE, EE and PE, were minimized through good laboratory practice and application of a linear splitter in the smart crusher unit.

The downside of reducing to a 2.5 kg assay charge relates to geological modeling where a 0.5 g/t Au cut-off is applied during the construction of the mineralized wireframes (refer Section 14.6). Review of the duplicate field data (where either A or B shows a grade ≥0.5 g/t Au) shows that 66% of the pairs have A and B values ≥0.5 g/t Au. Thus, there is a 34% risk that if the A or B assay is taken, it might not be ≥0.5 g/t Au. If the combined A and B grades are taken, then 91% of pairs are ≥0.5 g/t Au. Taking only the A or B assay results in a higher probability of a given sample not being included in the wireframes. For the more continuous marine lags this is not so problematic, given that realistic assumptions about their gross continuity can be made. This risk is higher for the more complex channel areas, where discontinuity is likely.

The change was recommended in August 2021 on the assumption that ongoing RC drilling would be well-controlled, chip logging undertaken and that other geological inputs would be enhanced (e.g., geological mapping).

11.5.2 PhotonAssay Assay Technique

The PhotonAssay method is a non-destructive and rapid gold assay technique capable of analysing coarse (crushed <3 mm) 500 g samples at a rate of 72 samples per hour (Figure 11.2; Tickner et al., 2017; Tremblay et al., 2019). The method was commercialized and is operated globally by Chrysos Corporation (ASX: C79) of Australia, in partnership with commercial laboratory groups. PhotonAssay is trademarked to Chrysos Corporation.

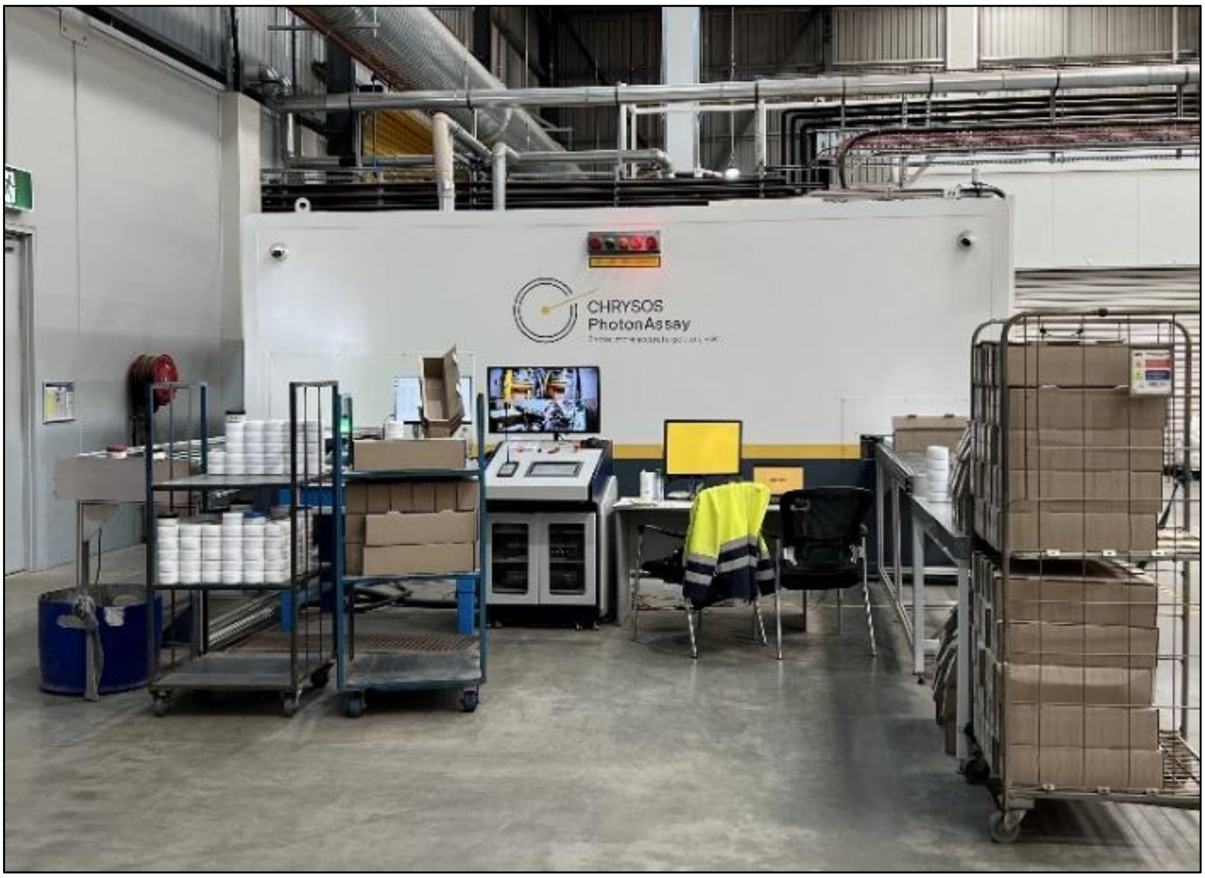


Figure 11.2. One of three Chrysos PhotonAssay units at Intertek Perth (Photograph: S.C. Dominy, June 2022).

Based on the principles of photon activation analysis, the method uses a high-power, high-energy X-ray source to excite nuclear changes in any gold atoms present in a sample, and then measures a characteristic signature emitted by these atoms (Figure 11.3). Sample material is loaded into a sealed plastic jar (pot) in which it remains throughout the analysis (Figure 11.1.B). A removable reference disc is fixed to the outside of the jar.

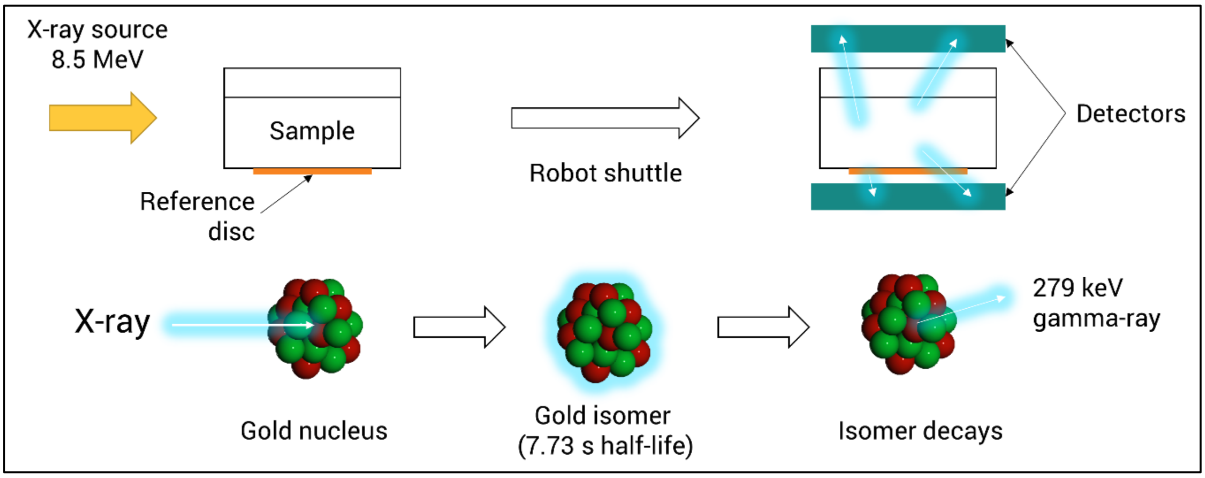


Figure 11.3. Illustration of the PhotonAssay process (Source: Chrysos Corporation).

The samples and reference discs are exposed to a high-energy, high-intensity X-ray beam, typically for 15 seconds. The high-energy X-rays induce nuclear changes in any gold atoms present in the sample, exciting their atomic nuclei into a short-lived state. The gold nuclei in the sample absorb the high energy X-ray photons created using a linear accelerator and are transformed into the ^{197m}Au nuclear isomer. This species decays with a half-life of 7.73 seconds and emits a gamma ray of 279 keV.

The sample is transferred to a germanium detector station using a robotic shuttle. As the excited gold nuclei relax back to the ground state, they emit gamma rays with a characteristic gold energy, which are converted via calibration with standards of known concentration into gold assays. The detector records and counts the gamma rays. Software then relates the strength of the gamma ray signal back to the concentration of gold in the sample. The standard assay process is based on a two cycles (‘PAAU02’; Chrysos, 2022a), where the sample pot is irradiated twice, with the two values averaged to provide the reported grade.

The reference disc contains a compound of the element bromine, which activates in a similar fashion to gold, but emits a lower energy 207 keV gamma ray. Measurement of the bromine activation signal serves as a reference that can be used to correct for any variations in the power of the X-ray source or efficiency of the detection system. This reference significantly improves measurement accuracy and allows each analysis to be directly tied back to calibration measurements performed on a suite of certified reference materials (CRMs).

The basic flow of sample pots into the PhotonAssay unit is illustrated in Figure 11.4.

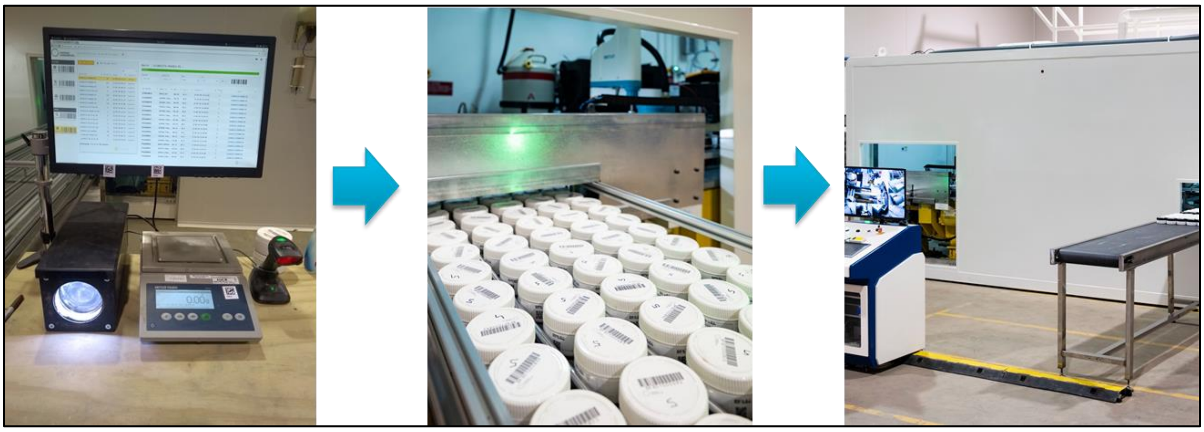


Figure 11.4. Illustration of PhotonAssay process from (left to right) sample pot logging into the system; automatic feed of sample pots to the unit; and automatic outflow of pots from the unit ready for storage (Source: MinAnalytical).

The PhotonAssay measurement precision varies from about 12% relative at a grade of 0.1 g/t Au to about 4% relative at a grade of 1 g/t Au. At grades of >10 g/t Au, the precision is <2% (Chrysos, 2022a). The lower detection limit (LDL) is approximately 0.01 g/t Au to 0.03 g/t Au for typical samples. The upper detection limit is 350 g/t Au, though can be increased to 10,000 g/t Au as required ('PAAU02HH': Chrysos, 2022a).

The methodology is relatively matrix insensitive, though is prone to interference where uranium-thorium are >15 ppm and/or barium >3,000 ppm. Where higher levels are present, the detection limit increases and the precision is reduced.

Prior to committing to using PhotonAssay, Novo undertook a review of the methodology, which included analysis of assay comparison and CRM data from Chrysos, visits to MinAnalytical to observe the first commercial unit in operation, discussions with other parties applying the technology, and a Stage 0 testwork program.

The Stage 0 testwork program used crushed mineralized core from Beatons Creek to undertake granulometric/screened material PhotonAssay study, LeachWELL to PhotonAssay assay comparisons, pot-by-pot replicate PhotonAssay (analytical repeats); whole sample multiple-pot PhotonAssay (samples effectively assayed to extinction by PhotonAssay); and pot-by-pot 'local heterogeneity' tests where each pot was shaken between assays (Dominy and Graham, 2020). Novo concluded that the methodology was applicable to its aims, and concluded that (Dominy and Graham, 2020):

- As coarse gold mineralization, the opportunity to assay ten (or other number deemed appropriate) 500 g (5 kg assay charge) pots of material was highly advantageous in reducing the FSE value relating to the primary to assay reduction in mass;
- The use of crushed material only was important, given the need to avoid handling pulps bearing coarse gold and reduction of QFE, EE and PE);
- The method was fast and cost-effective; and
- The removal of cyanide from the assay protocol was advantageous from a safety and environmental perspective.

After the Stage 0 study, Novo committed to an initial RC drilling program at Grant's Hill and Edwards (the Stage 1 program) utilizing approximately 1,000 holes. Stage 1 included a full QC program, including CRMs, blanks, umpire assays and duplicates. QC results were acceptable and supported the ongoing use of PhotonAssay for grade control and resource development RC drilling grades.

PhotonAssay technology had previously been used by Novo during the 2018 bulk sampling program (Dominy and Hennigh, 2019; Dominy, Van Roij and Graham, 2022) and the 2019 metallurgical testwork program. All assays were undertaken at MinAnalytical Perth.

The PhotonAssay method is NATA accredited at MinAnalytical (registered as MinAnalytical Laboratory Services; accreditation number #18876) - ISO/IEC 2005 21075 in-house method AU-PA01. The method is also NATA accredited at Intertek (registered as Intertek Genalysis WA; accreditation number #3244) - ISO/IEC 2017 17025 in-house method PA W0002 (PAAU02).

There are currently 13 PhotonAssay units globally, with a further 49 contracted for deployment as of end October 2022 (Chrysos, 2022b). Early movers in the global mining industry to use PhotonAssay include Agnico Eagle Mines Limited (Fosterville mine, Australia), Barrick Gold Corporation (Kibali mine, Democratic Republic of Congo and Bulyanhulu mine, Tanzania), Firefinch Limited (Morila mine, Mali), Newfound Gold Corporation (Queensway project, Canada), Northern Star Limited (various projects in Australia), Novo Resources Corporation (Beatons Creek project, Australia) and Ravenswood Gold Limited (Ravenswood mine, Australia). Commercial laboratory operations include ALS, Perth and Kalgoorlie, Australia; Intertek, Perth, Australia; On-Site Laboratory Services, Bendigo, Australia; MSALABS, Prince George, Val d'Or and Timmins Canada; and SGS, Perth, Australia. Britannia Mining Solutions will deploy an initial two units in Canada and the USA by mid-2023, with a further 10 units globally thereafter. Other units will be deployed globally over the coming few years.

11.6 Quality Assurance/Quality Control (2006 to 2020)

Quality assurance and quality control (QA/QC) are the key components of a quality management system (Dominy, Purevgerel and Esbensen, 2020). Quality assurance is the collation of all actions necessary to provide adequate confidence that a process (e.g., sampling, preparation, and assaying) will satisfy the pertinent quality requirements. While QA deals with prevention of problems, QC aims to detect these. QC procedures monitor both precision and accuracy, as well as sample contamination during preparation and assaying.

Novo used written procedures as the key to its QA process, whereby all personnel are trained in their use. These cover drilling through to sample collection and assaying, QC key performance indicators (KPIs), and data handling. Intertek used its own in-house procedures.

Novo inserted CRMs and blanks into its sample stream. Field and laboratory duplicates were also taken. Intertek undertook its own in-house QC, through insertion of CRMs, blanks and duplicates.

11.6.1 Quality Assurance/Quality Control (Pre-2011)

QA/QC pre-2011 is not well documented and relates to the 2006 and 2007 RC programs. These programs account for 0.9% of all samples used in the 2022 MRE, which only inform the Inferred Mineral Resource category.

11.6.2 Quality Assurance/Quality Control (2011–2020 period)

Samples collected by Novo during the period 2011–2020 were primarily prepared and assayed by Intertek using the LeachWELL technique. QC was undertaken for all programs. CRMs were not inserted in the 2017 and 2018 trench channel samples. QC sample performance was monitored throughout, with no fatal issues being observed.

In-stream CRMs, blanks, and duplicates demonstrated acceptable results. Overall QC failures were infrequent, and some relate to labeling mismatches between QC sample types. QC measures implemented by Novo include CRMs, blanks, and duplicates, as summarized in Table 11.1.

Table 11.1. Quality control insertion during 2011 to 2020.

Stream	Global total samples	CRMs	Blanks	Field duplicates	Pulp duplicates
2011, 2012 and 2013 RC drilling	19,859	871	308	837	0
2014 trench	512	62	88	65	152
2014 RC drilling	8,679	646	479	114	166
2015 trench	222	15	17	9	152
2017 trench	939	0	27	27	*939
2018 trench	533	0	31	30	*533
2018 drilling (diamond)	4,226	233	243	0	*679
Total	**34,970**	**1,827**	**1,193**	**1,082**	***2,621**
	Rate	5.2%	3.4%	3.1%	*7.5%
		1 in 20	1 in 29	1 in 32	*1 in 13

**For the 2015 and 2017 trench, and 2018 diamond drilling programs 2× or 3× 1 kg LeachWELL assays were undertaken on pulps, giving effective pulp duplicate samples.*

An example CRM plot is shown in Figure 11.5. It displays a global bias of -3.5%, where a total of 79 CRMs were submitted, with six in the 2SD to 3SD (SD: standard deviation) range and 73 <2SD. There were no 3SD breaches noted.

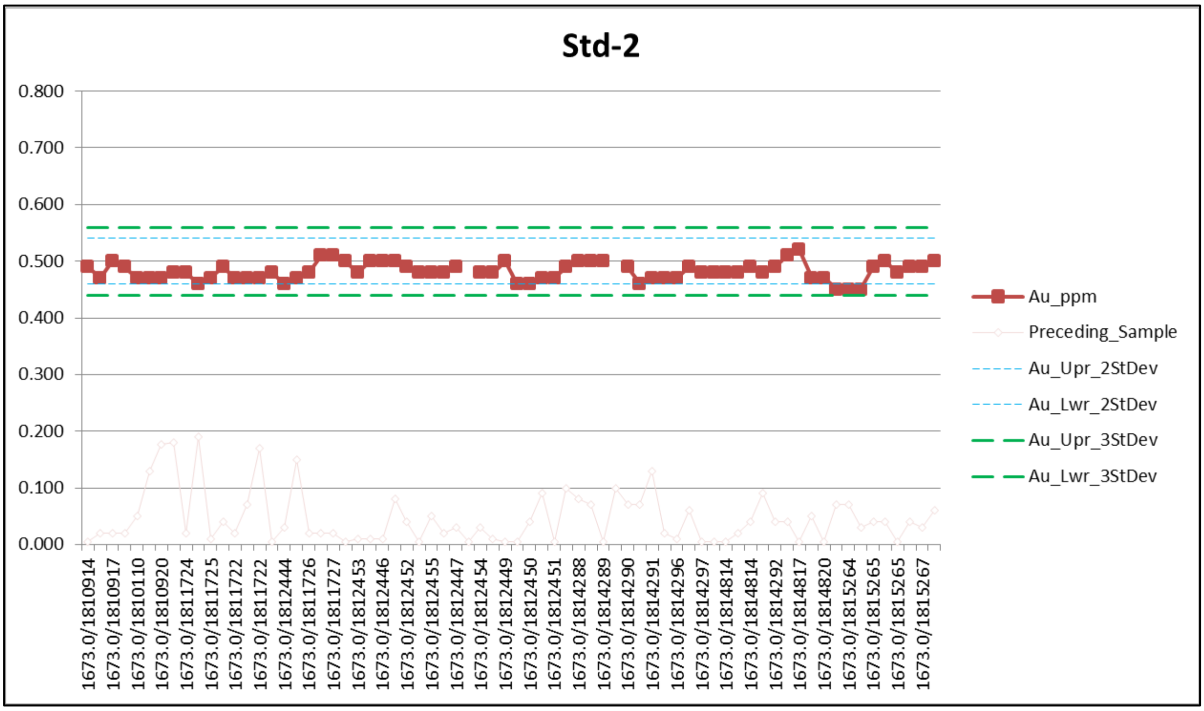


Figure 11.5. Example CRM G316-5 (0.5 g/t Au) used during the 2018 diamond drilling program. StDev = SD.

Blank samples were submitted at a rate of approximately 1 in 30. Washed sand was used as blank material during 2011, though this indicated background concentrations of gold (Figure 11.6). The sand was replaced with certified barren sand for the 2012 and 2013 programs. The use of sand as blank material is not optimal. From 2014 onwards, lump dyke material from near the town of Nullagine was used. The performance of blanks is acceptable and routinely returns values at below five times the assay detection limit (<0.1 g/t Au).

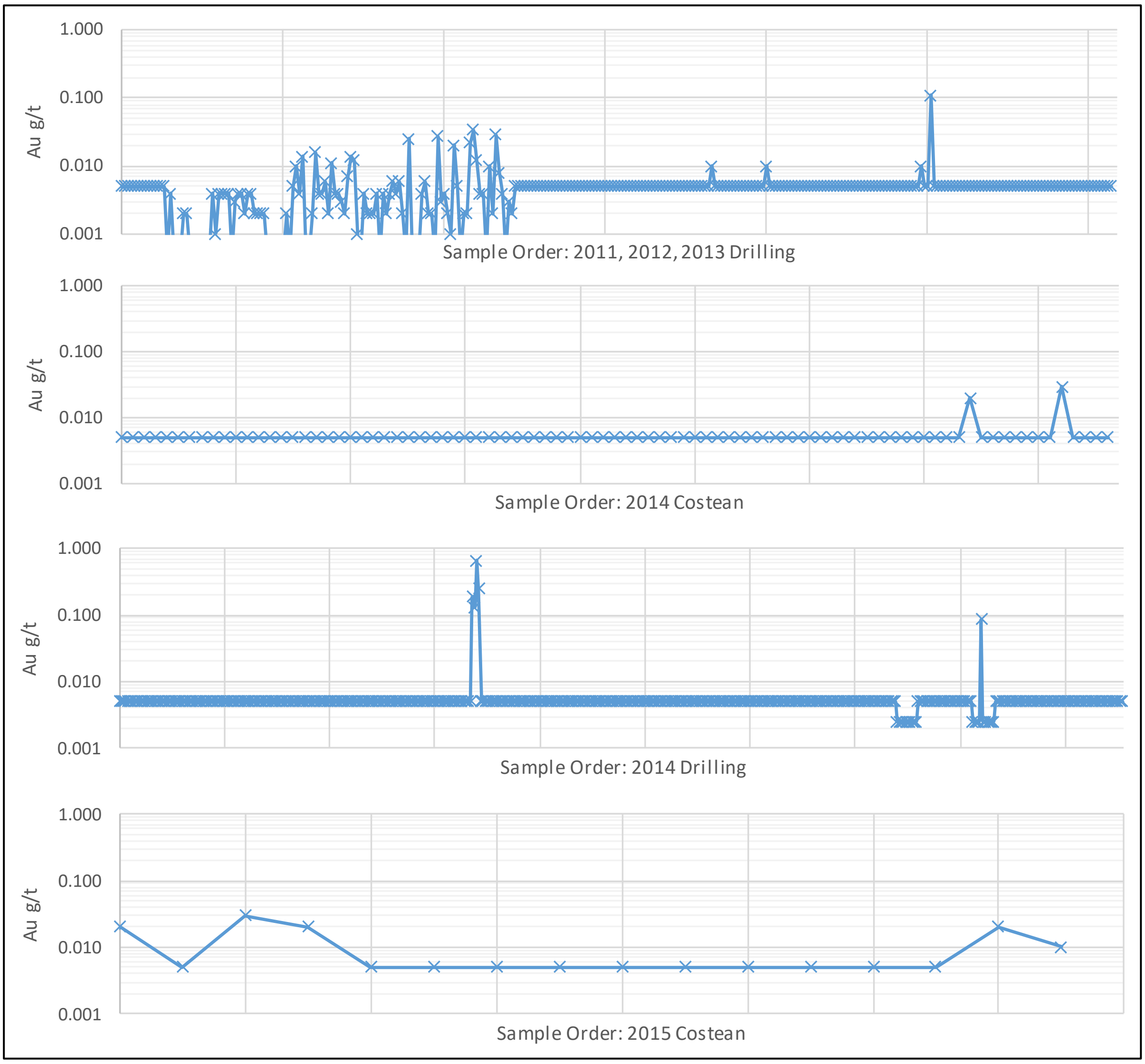
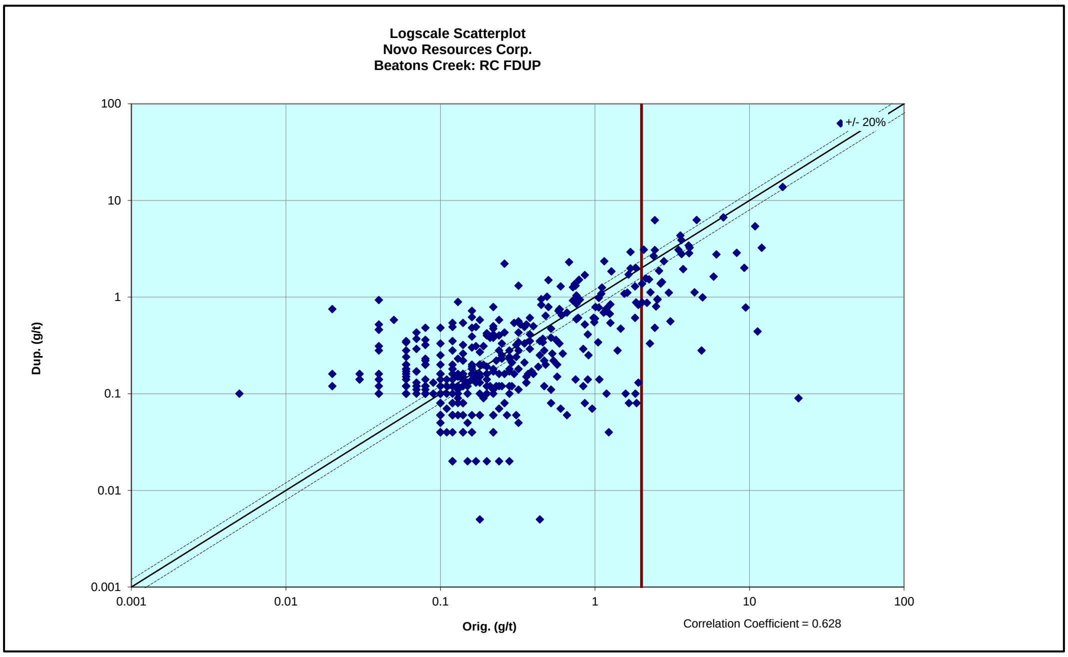


Figure 11.6. Blank control analysis.

Field duplicates were submitted into the sample stream at a rate of approximately 1 in 30 at the rig. Analysis of trench channel sample and RC rig field splits yields pairwise coefficients of variation (COVs) of 52% and 60%, respectively (Figure 11.7). The pairwise COV for field duplicates comprises sample collection, preparation and analytical errors. A field duplicate performance of ±50% to 60% is reasonable in deposits dominated by coarse gold (Dominy, Purevgerel and Esbensen, 2020).



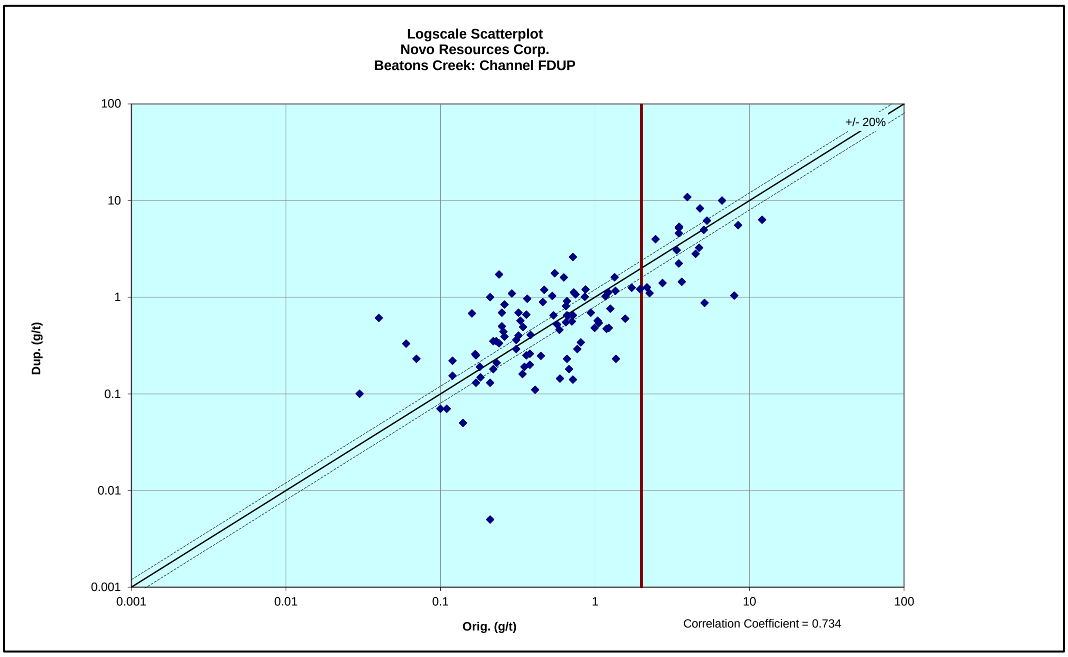


Figure 11.7. Field duplicate variability; upper RC duplicates (N = 427) and lower channel duplicates (N = 108). Data filtered at 0.1 g/t Au. All assays by LeachWELL.

Pulp duplicates were submitted into the sample stream at a rate of approximately 1 in 13, though this high insertion rate also reflects the fact that, for the 2015 and 2017 channel and 2018 diamond drilling programs, two to three 1 kg LeachWELL assays were undertaken on pulps, giving effective pulp duplicate samples. Figure 11.8 shows reasonable reproducibility of pulp duplicate pairs. Analysis of pulp duplicates yields a pairwise COV of 23%. The pairwise COV for pulp duplicates is made up of analytical errors (including splitting error). A pulp duplicate performance of 23% is not atypical in a coarse gold deposit, and where coarse gold may remain in the pulp (Dominy, Purevgerel and Esbensen, 2020).

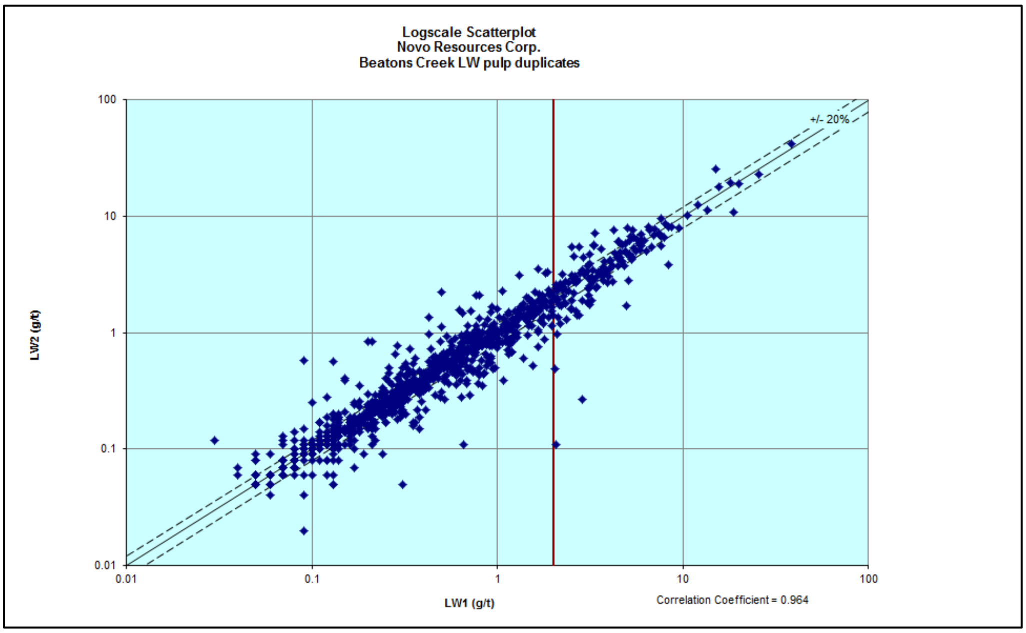


Figure 11.8. LeachWELL pulp duplicates (N = 1,050).

11.7 Quality Assurance/Quality Control (2020–2021 Period)

11.7.1 Overview of QC Actions

Grade control and resource development RC samples, collected by Novo during the period October 2020 to May 2022, were prepared and assayed at either MinAnalytical (Perth and Kalgoorlie) or Intertek (Perth). All assays were via the PhotonAssay method. QC was undertaken across all programs. QC sample performance was monitored throughout the campaigns, with no fatal matters being observed. QC actions include:

- Use of OREAS CRMs which are ISO 17034 accredited through NATA. CRMs were submitted at a rate of 1 in 10. These were inserted at MinAnalytical (Perth and Kalgoorlie) and Intertek (Perth) as the random selection of pre-filled lettered PhotonAssay pots (e.g., H = OREAS251). All CRMs were in pulp form.
- Submission of blank material at a rate of 1 in 50. These were inserted at Beatons Creek as ~2.5 kg bags of crushed basalt.
- Submission of field duplicates. Between October 2020 and August 2021, the A and B rig splits were both submitted for assay. During this period, no other field duplicate was submitted. After August 2021, where the A or B split was used for the assay, the A and B splits were submitted as field duplicates at a rate of approximately 1 in 90.
- Submission of laboratory coarse duplicates. Between October 2020 and August 2021, when the A and B rig splits were both submitted for assay, few coarse splits were taken. After August 2021, where the A or B split was used for the assay, the A or B split was taken twice to provide coarse duplicates at a rate of 1 in 30.
- Assay replicates at a rate of 1 in 30. These were randomly selected samples (five PhotonAssay pots) re-assayed by PhotonAssay.
- Umpire assays were undertaken by campaign and not routinely selected; batches of samples (five PhotonAssay pots) were submitted for SFA.

Intertek undertook its own in-house QC, through insertion of CRMs, blanks and duplicates.

11.7.2 CRMs used by Novo

From October 2020 to March 2022, Novo used five CRMs at Beatons Creek (Table 11.2).

Table 11.2. CRMs used at Beatons Creek by Novo.

CRM ID	Novo ID	Chrysos PhotonAssay 1SD	CRM grade (g/t Au)	Nom. grade class
OREAS251	H	0.032	0.495	LCOG
OREAS223	I	0.055	1.78	ROM
OREAS254B	J	0.070	2.53	ROM
OREAS255B	K	0.100	4.16	HG
OREAS229B	C	0.240	11.95	VHG

LCOG – low cut-off grade; ROM – run of mine grade; HG – high grade; VHG – very high grade.

CRMs were chosen to cover a range of nominal grades from cut-off (0.5 g/t Au) to high (>4 g/t Au) grade.

OREAS223 and OREAS 229B are primary mineralization from the Wilber Lode, Andy Well mine, in Western Australia, mixed with greenstone from Victoria. OREAS251, OREAS254B and OREAS255B are oxide mineralization from the Wilber Lode, Andy Well mine in Western Australia, mixed with greenstone from Victoria.

From March 2022, Novo introduced five PhotonAssay certified OREAS CRMs (Table 11.3) to replace the previous non-specific CRMs.

Table 11.3. PhotonAssay specific CRMs used by Novo.

CRM ID	Novo ID	Certified PhotonAssay 1SD	CRM grade (g/t Au)	Nom. grade class
OREAS251B	M	0.028	0.495	LCOG
OREAS253B	N	0.048	1.25	ROM
OREAS236	O	0.062	1.78	ROM
OREAS241	P	0.191	6.78	HG
OREAS243	Q	0.251	12.17	VHG

LCOG – low cut-off grade; ROM – run of mine grade; HG – high grade; VHG – very high grade.

CRMs were chosen to cover a range of nominal grades from cut-off (0.5 g/t Au) to high (>4 g/t Au) grade.

OREAS236, OREAS241 and OREAS243 were prepared from a blend of gold mineralization and barren Cambrian greenstone. The mineralization was sourced from the Frog's Leg gold mine, Western Australia. The Cambrian greenstone was sourced from an area north of Melbourne, Australia. OREAS251B and OREAS253B were prepared from a blend of gold-bearing oxide mineralization and barren materials (basaltic scoria, quartz and mudstone). The mineralization (Wilber Lode) was sourced from the Andy Well mine in Western Australia.

11.7.3 CRM Performance Metrics

Five metrics were used to measure CRM performance:

1) Precision
2) Bias
3) Z-score
4) >3 standard deviations (>3SD)
5) >2 standard deviations (>2SD).

The definitions of each follow:

1) Precision – is the coefficient of variation of the assayed CRM batch, effectively measuring the repeatability of the CRM assays. This precision is given on a CRM PhotonAssay pot-by-pot group basis.
2) Bias – is a measure of deviation of the entire assayed CRM batch from the expected CRM grade. Calculated as: { ([laboratory mean grade – CRM grade] / CRM grade) * 100 } where values may be positive or negative.
3) Z-score – is a measure of how many standard deviations the results (by batch) are from the mean. The higher the Z-score, the greater the deviation from the mean. Calculated as: { [laboratory mean grade – CRM grade] / CRM standard deviation } where values may be positive or negative.
4) 3SD breaches –the number of laboratory results that are greater than three times the CRM standard deviation. In a normal distribution, 99.7% of the data lies within 3SD; therefore, it is expected that 0.3% of the data will be greater than 3SD. It is accepted that 1% (1 in 100) of the data will be greater than 3SD.
5) 2SD breaches –the number of laboratory results that are greater than twice the CRM standard deviation. In a normal distribution, 95.4% of the data lies within 2SD; therefore, it is expected that 5% of the data will be greater than 2SD. Up to 10% >2SD is deemed to be acceptable.

To achieve reportable Mineral Resources, the QPs applied the CRM metrics presented in Table 11.4 (Dominy, 2022). Note that a *Marginal fail* category was used at the discretion of the QPs.

Table 11.4. Target CRM performance metrics (Dominy, 2022).

Target values for Mineral Resources								
PRECISION	<5%	Good	5-10%	Accept	[10-12%]	Marg. fail	>10%	Fail
BIAS	<2.5%	Good	2.5-5%	Accept	[5-6%]	Marg. fail	>5%	Fail
Z SCORE	<0.8	Good	0.8-1.2	Accept	[1.2-1.4]	Marg. fail	>1.2	Fail
>3SD	<0.3%	Good	0.3-1%	Accept	[1-1.2%]	Marg. fail	>1%	Fail
>2SD	5%	Good	5-10%	Accept	[10-12%]	Marg. fail	>10%	Fail

For CRMs used between October 2020 and March 2021, the 1SD values used were recommended by Chrysos based on its testwork. As the data population developed (>500 CRM assays), the achieved value was applied. From March 2021 onwards, the certified 1SD values were applied. These compare well with the Chrysos values. As the data population developed (>500 CRM assays), the achieved value was applied.

11.7.4 CRM Performance Examples

Figure 11.9 and Table 11.5 show a summary of CRM OREAS229B from Intertek for the period June to October 2021. The control plot indicates an underlying cyclicity of the data, though dominantly within the 2SD control lines.

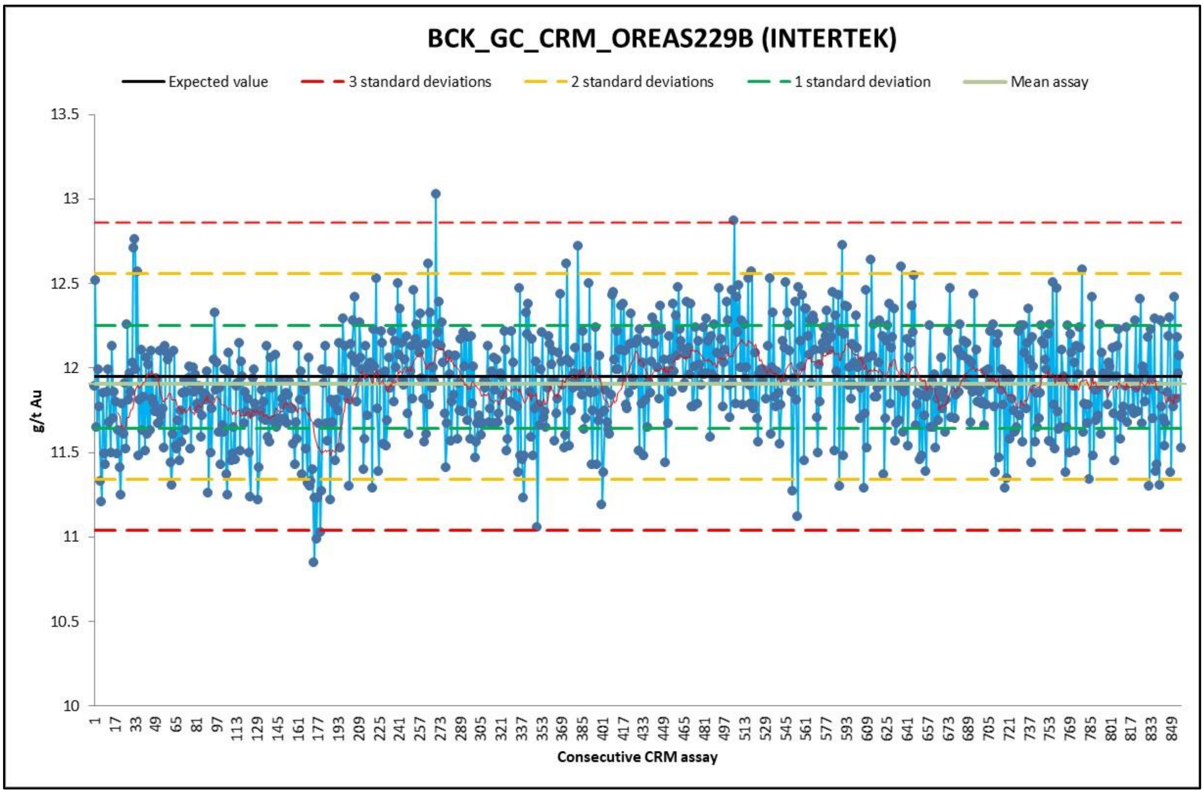


Figure 11.9. Control plot for OREAS229B.

Table 11.5. Summary of performance metrics for OREAS229B.

Metric	Result
No. of CRMs	857
Mean grade [CRM]	11.91 [11.95]
Mode/Median grade	11.86/11.90
Min/Max grade	10.85/13.03
SD	0.304
Skewness	0.002
Precision	2.6%
Bias	-0.4%
Z-score	-0.15
>3SD [No.] %	[5] 0.6%
>2SD [No.] %	[44] 5.1%

OREAS229B shows good precision, bias, and Z-score. There were five 3SD breaches (0.6%), within expectation. The number of >2SD assays was within expectation. OREAS229B was considered *Acceptable*.

During the period June to October 2021, CRMs were not certified for PhotonAssay. Novo applied its own 1SD values given the large numbers of determinations (Table 11.6).

Table 11.6. CRM applied 1SD values.

CRM ID	CRM grade (g/t Au)	Novo PhotonAssay 1SD
OREAS251	0.495	0.034
OREAS223	1.780	0.069
OREAS254B	2.530	0.088
OREAS255B	4.160	0.137
OREAS229B	11.950	0.304

During the period June to October 2021, five different CRMs totaling 5,292 individual CRMs were used to validate the PhotonAssay assays. Table 11.7 summarizes the CRM metrics. The period CRM insertion rate was 1 in 8.

All CRMs were acceptable, with OREAS223 flagged as a marginal failure. This related to the higher bias (-3.1%) pushing more values into the -3SD and -2SD categories, and a local effect of the observed cyclicity. The overall -3.1% bias is acceptable, being within ±5% and the marginal flag indicating that the CRM should be kept under observation. The matter was discussed with the laboratory personnel who indicated that they would keep unit calibration under review.

Table 11.7. Summary of all CRM all performance metrics (June to October 2021).

Beatons Creek Stage 1 Grade Control Programme - QC CRM Results												
CRM ID	CRM Grade	No.	Precision		Bias		Z-score		>3SD		>2SD	
	g/t Au		Value	Class	VALUE	Class	Value	Class	No.	%	No	%
OREAS251	0.49	1125	7.0%	Accept	-1.5%	Accept	-0.2	Good	4	0.4%	45	4.0%
OREAS223	1.78	1114	4.0%	Good	-3.1%	Accept	-0.8	Good	17	1.5%	142	12.7%
OREAS254B	2.53	1105	3.5%	Good	-1.0%	Good	-0.3	Good	6	0.5%	64	5.8%
OREAS255B	4.16	1091	3.2%	Good	1.5%	Good	0.5	Good	9	0.8%	78	7.1%
OREAS229B	11.95	857	2.6%	Good	-0.4%	Good	-0.2	Good	5	0.6%	44	5.1%
Colour coding:	Good	Accept	Margin Fail	Fail								

Figure 11.10 and Table 11.8 show a summary of CRM OREAS253B from Intertek for the period March to May 2021.

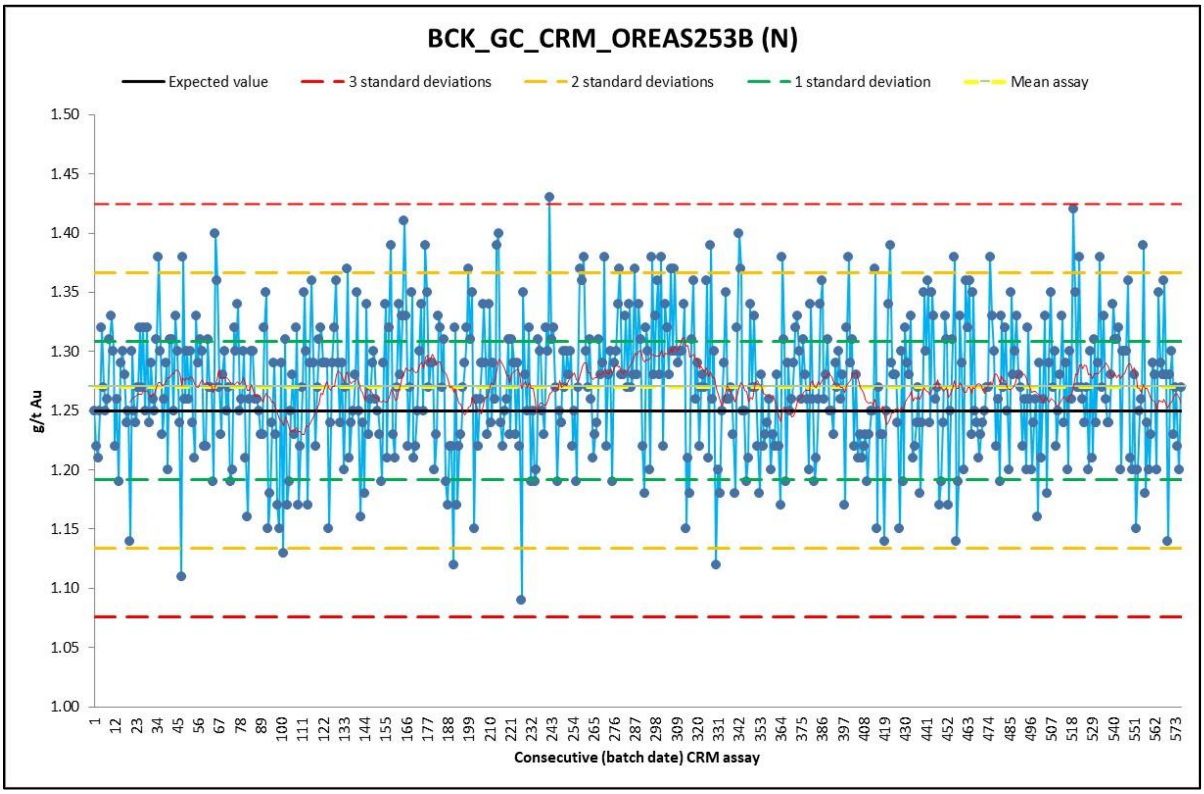


Figure 11.10. Control plot for OREAS253B.

Table 11.8. Summary of performance metrics for OREAS253B.

Metric	Result
No. of CRMs	576
Mean grade [CRM]	1.27 [1.25]
Mode/Median grade	1.30/1.27
Min/Max grade	1.09/1.43
SD	0.0581
Skewness	-0.054
Precision	4.6%
Bias	1.6%
Z-score	0.35
>3SD	[1] 0.2%
>2SD	[38] 6.6%

OREAS253B shows good precision, bias, and Z-score. The number of 2SD and 3SD breaches is acceptable. The OREAS253B performance was considered acceptable.

During the period March to May 2021, five CRMs totaling 2,876 individual CRM assays were used to validate the assays at Beatons Creek. Table 11.9 summarizes the CRM metrics, where all were deemed to have passed. The CRM insertion rate for this period was 1 in 6.

Table 11.9. Summary of all CRM performance metrics (March to May 2021).

Beatons Creek GC & RESDEV Programme - QC CRM Results													
CRM ID	CRM Grade g/t Au	No.	Precision		Bias		Z-score		>3SD		>2SD		Overall
			Value	Class	VALUE	Class	Value	Class	No.	%	No	%	
OREAS251B	0.49	601	6.8%	Accept	0.9%	Good	0.12	Good	4	0.7%	25	4.2%	PASS
OREAS253B	1.25	576	4.6%	Good	1.6%	Good	0.35	Good	1	0.2%	38	6.6%	PASS
OREAS236	1.78	566	3.7%	Good	-1.3%	Good	-0.36	Good	2	0.4%	36	6.4%	PASS
OREAS241	6.78	568	2.9%	Good	0.1%	Good	0.04	Good	2	0.4%	27	4.8%	PASS
OREAS243	12.17	565	2.9%	Good	-0.1%	Good	-0.04	Good	1	0.2%	29	5.1%	PASS
Colour coding:	Good	Accept	Margin Fail	Fail									

During the MRE data reporting period from October 2020 to May 2022, Novo assayed 18,719 individual CRMs, with a mean insertion rate of 1 in 7. The overall results are summarized in Table 11.10.

Table 11.10. High-level summary of CRM and blank results from the Novo grade control and resource development programs at Beatons Creek between October 2020 and May 2022.

Period	Summary	Approx. insertion rate	Pass	Fail
Nov 19 to May 21 [MinAnalytical]	CRMs	4	7	0
	Blank	61	Yes	0
Jun 21 to Oct 21 [Intertek]	CRMs	8	5 [4 pass; 1 marginal]	0
	Blank	53	Yes	0
Nov 21 to 21 Dec 21 [Intertek]	CRMs	11	5 [4 pass; 1 marginal]	0
	Blank	52	Yes	0
22 Dec 21 to Jan 22 [Intertek]	CRMs	6	5 [4 pass; 1 marginal]	0
	Blank	32	Yes	0
Feb 22 to 15 Mar 22 [Intertek]	CRMs	6	5 [3 pass; 1 marginal]	1
	Blank	29	Yes	0
16 Mar 22 to May 22 [Intertek]	CRMs	7	5	0
	Blank	29	Yes	0

During the entire period there was only one CRM batch fail, during the February to March 2022 period. This CRM, OREAS223, displayed a global negative bias of 4% that increased the number of 2SD (21%) and 3SD (4%) breaches.

11.7.5 Blanks

During the period October 2020 to May 2022, 3,017 blanks were processed through sample preparation to final PhotonAssay. The global insertion rate was 1 in 40. Based on a blank assay trigger grade of 0.1 g/t Au (five times nominal LDL of 0.02 g/t Au), only 16 out of 3,017 (0.5%) breached the trigger. The highest failure grade was 2.5 g/t Au, with two >0.5 g/t Au, and the rest (10) between 0.1 g/t Au and 0.5 g/t Au.

Figure 11.1 shows the blank results for the period February to March 2022, totaling 612 assays based on an insertion rate of 1 in 29. Overall, the blanks are acceptable, with no breaches.

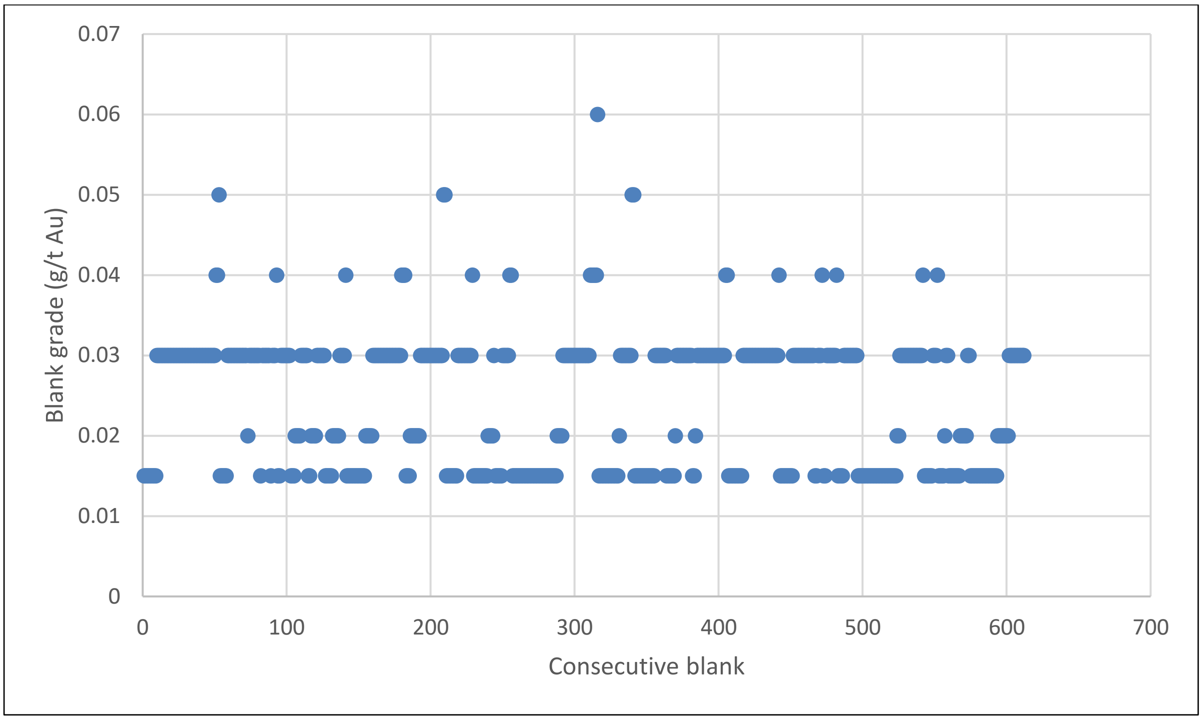


Figure 11.11. Blank results for the period February to March 2022.

11.7.6 Field and laboratory (coarse) duplicates

During the period October 2020 to August 2021, the A and B rig splits were submitted separately to the laboratory, being effectively field (rig) duplicates. A small number of laboratory coarse crush splits were taken during this period (N = 152). From August 2021, the A or B rig split was submitted to the laboratory. Field and laboratory duplicates were collected at predetermined intervals after August 2021.

All duplicates were filtered at 0.2 g/t Au, representing ten times the nominal PhotonAssay LDL of 0.02 g/t Au.

The duplicate strategy from August 2021 is presented in Figure 11.12 and outputs are shown in Table 11.1.

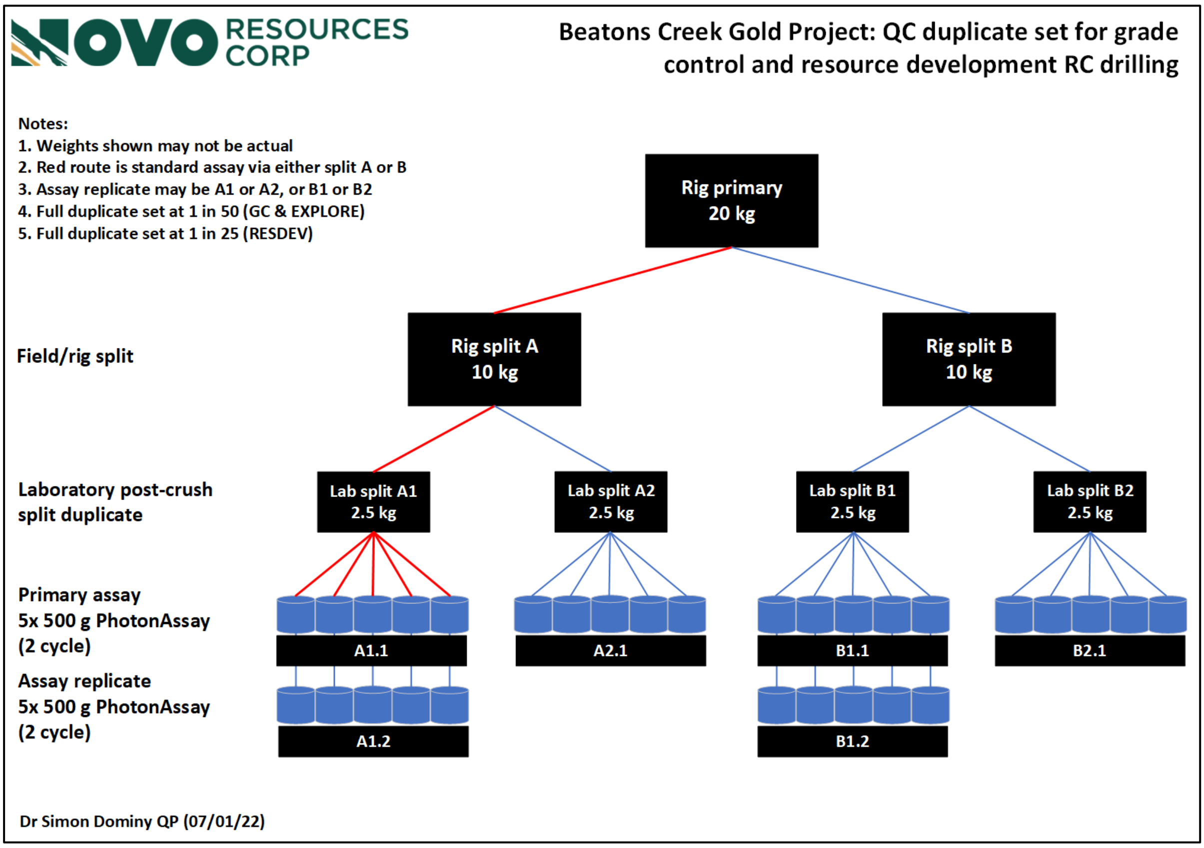


Figure 11.12. Summary of duplicate splits strategy after August 2021 (Dominy, 2022).

Table 11.11. Outputs from the duplicate program after August 2021.

Duplicate type	Assay pairs	Output
Field	A1.1–B1.1 A2.1–B2.1	Rig split precision (at 2.5 kg assay mass)
Laboratory coarse	A1.1–A2.1 B1.1–B2.1	Laboratory split intra-sample precision

Drill intervals were flagged for field (rig) duplicate or laboratory (coarse) duplicate at the drill site sample selection stage. The process aimed to select the duplicate close to the expected mineralized interval. However, duplicates include sub-grade material that was not included in the wireframes.

For all duplicate sets, the data exported from the Novo Geobank database were filtered to remove all pairs where one or both sample assays had less than four PhotonAssay pots (each sample should have five pots). Table 11.12 reports numbers of sample pairs and submission rates.

Table 11.12. Sample pairs from duplicate program after August 2021.

Duplicate type	Assay set (refer Figure 11.11)	Original no.	Insertion rate	No. ≥4 assay pots each sample	Effective rate
Field	A1.1–B1.1 A1.2–B1.2	1,184	1 in 90	1,110	1 in 96
Laboratory coarse	A1.1–A1.2 B1.1–B1.2	3,061	1 in 35	2,386	1 in 44

The target submission/insertion rate is 1 in 50 for all duplicates. The laboratory coarse duplicates are complying, whereas the field duplicates are not. Given a total number of field duplicates (more than 1,000), the lower submission/insertion rate is not deemed to be problematic.

11.7.7 Field duplicates

11.7.7.1 October 2020 to August 2021 Period

During the period October 2020 to August 2021 when the A (8 kg–10 kg) and B (8 kg–10 kg) splits were taken at the rig, 2,525 oxide duplicates and 1,154 fresh duplicates were processed (Dominy and Graham, 2020). It should be noted that these duplicates represent a comparison between the A1 and B1 splits (2.5 kg each), which were averaged to provide the final grade and are thus not true field duplicates. These datasets are presented after the removal of <4 pot samples and filtering at 0.2 g/t Au. A summary of the results is shown in Table 11.13.

Table 11.13. Summary of all A1 vs B1 duplicate grade metrics (October 2020 to August 2021). Precision values are rounded to the nearest whole percent.

Metric	Oxide mineralization	Fresh mineralization
No. of pairs	2,525	1,154
Mean grade (g/t Au)	1.82	2.25
Median grade (g/t Au)	0.55	0.74
Minimum grade (g/t Au)	0.02	0.02
Maximum grade (g/t Au)	101.27	118.41
Lower Q (g/t Au)	0.28	0.33
Upper Q (g/t Au)	1.74	1.86
RSV (%)	300%	260%
Pairwise RSV	±50%	±52%
90^{th} percentile	±59% HARD/±83% RSV	±62% HARD/±88% RSV

RSV – relative sampling variability; HARD - half absolute relative difference

The pairwise RSV values for oxide and fresh are high, but consistent with mineralization having a high level of coarse gold, such as at Beatons Creek.

A limited number of A2 and B2 splits were taken (N = 72 after filtering), allowing the pairwise comparison of A1–B1 versus A2–B2 splits (5 kg each). The pairwise RSV for these true field duplicates was ±40%, which is moderately high, but consistent with strong coarse gold mineralization, such as at Beatons Creek. It is noted that the data population assessed is small.

11.7.7.2 August 2021 to May 2022 Period

After August 2021, when only the A or B rig split was submitted to the laboratory, a specific strategy was implemented for duplicates (Figure 11.13 and Table 11.11). During August 2021 to the end of May 2022, 1,110 field duplicates were analyzed. These represented the A1.1–B1.1 and A1.2–B1.2 field duplicate pairs (Table 11.14). Figure 11.13 and Figure 11.14 show HARD and cumulative frequency plots of the A1.1–B1.1 and A1.2–B1.2 field duplicate pairs. The post-August 2021 field duplicates are not reported as oxide and fresh mineralization separately, as the results are virtually identical.

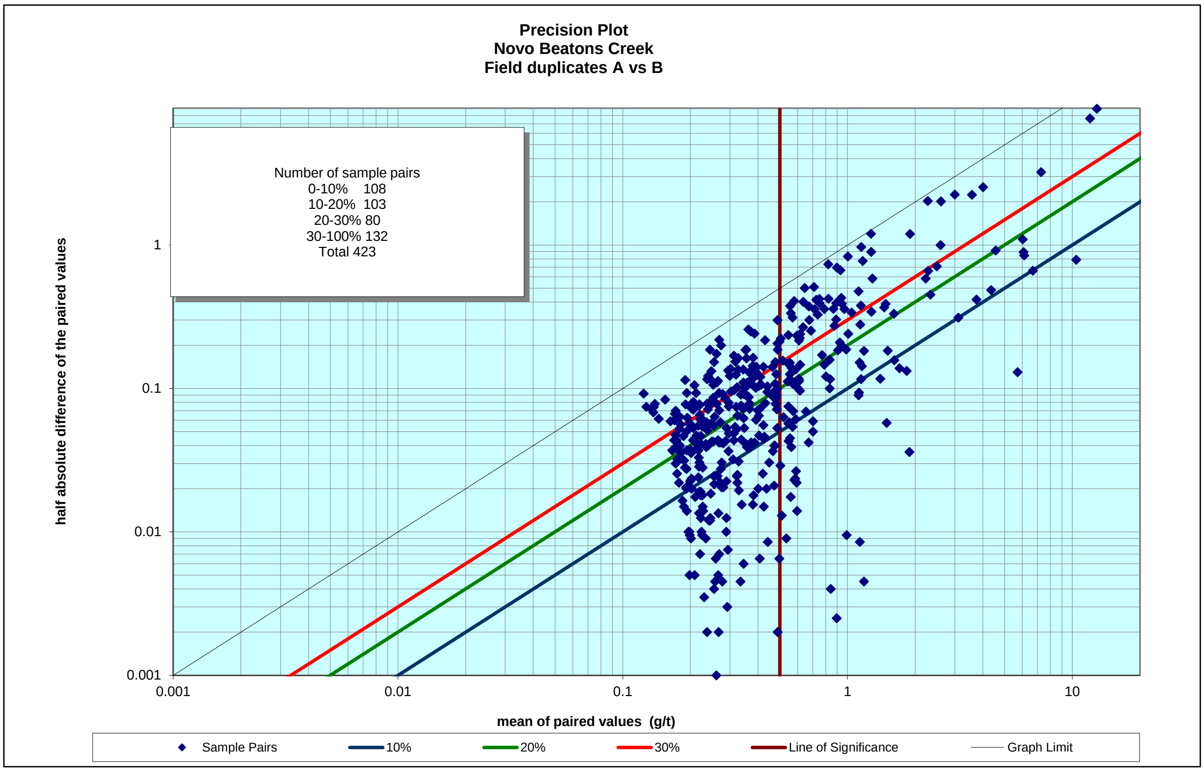


Figure 11.13. HARD plot of A1.1–B1.1 and A1.2–B1.2 field duplicates.

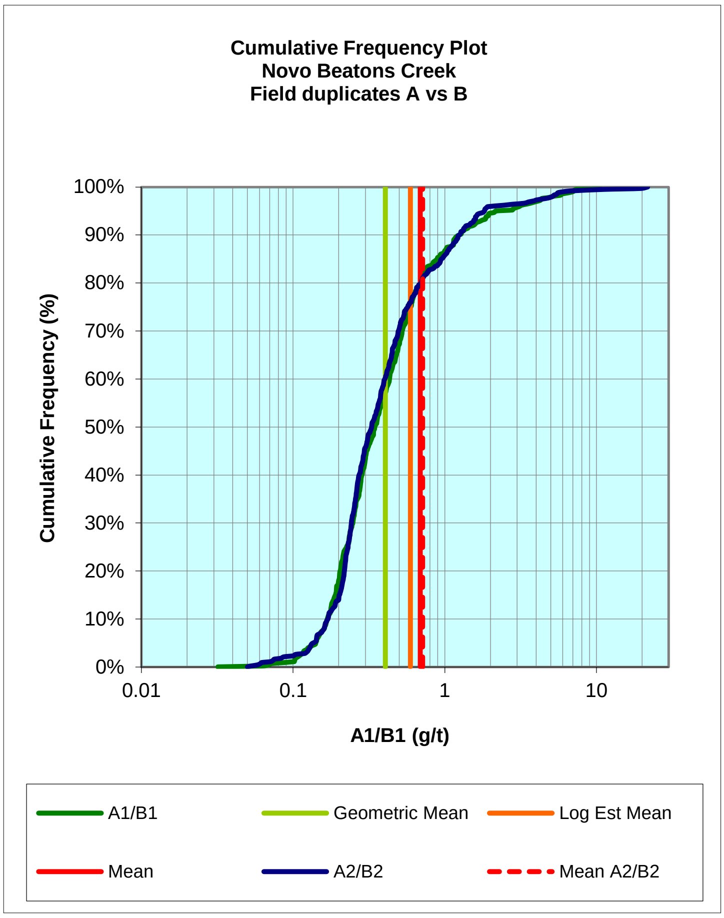


Figure 11.14. Cumulative frequency plot of A1.1–B1.1 and A2.1–B2.1 field duplicates.

Table 11.14 summarizes the field duplicate grade metrics for the August 2021 to May 2022 period.

Table 11.14. Summary of all field duplicate grade metrics (August 2021 to May 2022).

Metric	A1.1 & A2.1	B1.1 & B2.1
No. of pairs No. of filtered pairs	1,110 423 (after filtering to 10 × LDL [0.2 g/t Au] on the pair means)	
Mean grade (g/t Au)	0.69	0.71
Median grade (g/t Au)	0.35	0.33
Minimum grade (g/t Au)	0.03	0.05
Maximum grade (g/t Au)	10.49	21.77
Lower Q (g/t Au)	0.23	0.23
Upper Q (g/t Au)	0.60	0.57
RSV (%)	172	239
Pairwise RSV	±45%	
90th percentile	±54% HARD/±76% RSV	

The pairwise RSV values for both oxide and fresh are high, but are consistent with strong coarse gold mineralization, such as at Beatons Creek.

In addition to the field duplicates (Figure 11-12; A1 vs B1 and A2 vs B2), full field duplicates were analyzed, comprising both 2.5 kg splits (A and B) to give an effective assay size of 5 kg. The full field duplicate pairs comprise the [A1.1–A2.1] and [B1.1–B2.1] splits (Figure 11-12 and Table 11.15). Graphical analysis is shown in Figure 11.15 and Figure 11.16.

Table 11.15. Summary of A1.1–A2.1 versus B1.1–B2.1 full field duplicates.

Metric	A1.1–A2.1	B1.1–B2.1
No. of pairs No. of filtered pairs	555 215 (after filtering to 10 × DL [0.02 g/t Au DL] on the pair means)	
Mean grade (g/t Au)	0.68	0.70
Median grade (g/t Au)	0.35	0.34
Log mean grade (g/t Au)	0.59	0.58
Minimum grade (g/t Au)	0.09	0.05
Maximum grade (g/t Au)	10.06	20.70
Lower Q (g/t Au)	0.22	0.23
Upper Q (g/t Au)	0.61	0.51
RSV (%)	167	235
Pairwise RSV	±38%	
90th percentile	±35% HARD/±49% RSV	

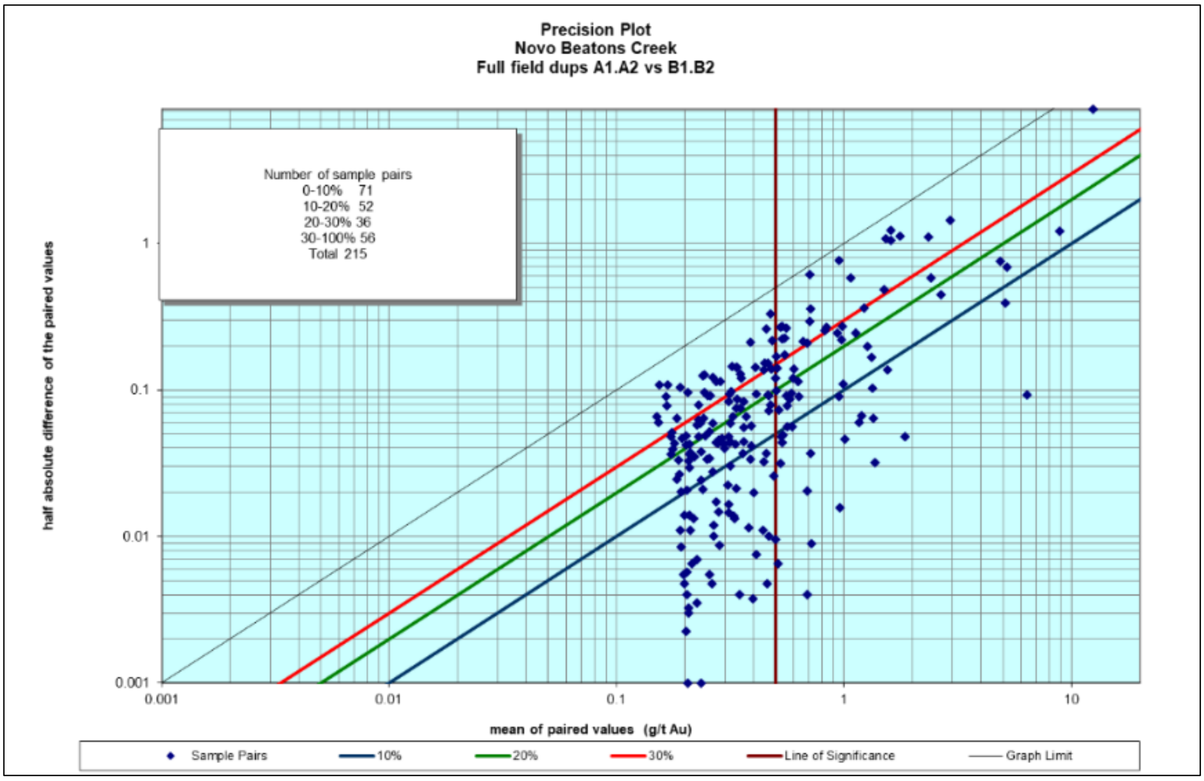


Figure 11.15. HARD plot of A1.1–A2.1 versus B1.1–B2.1 full field duplicates.

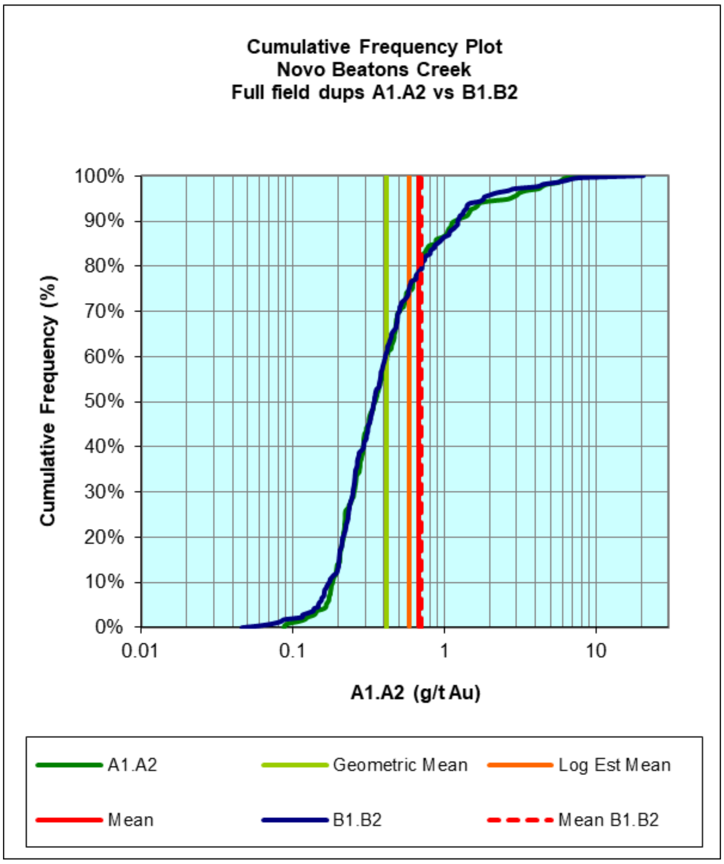


Figure 11.16. Cumulative frequency plot of A1.1–A2.1 versus B1.1–B2.1 full field duplicates.

The pairwise RSV, and 90th percentile HARD and RSV values are within expectation. The data show minimal bias between the data pairs (Figure 11.16). The overall pairwise RSV for the full field duplicates is 38%, compared to 45% for the A1–B1 and A2–B2 field duplicate pairs. The reduction in precision is not large, given the doubling of the pair sample mass to give 5 kg, and supports the original reduction to a single rig split assayed rather than two (Dominy and Graham, 2021).

11.7.8 Laboratory duplicates

11.7.8.1 October 2020 and August 2021 Period

A limited number of A2 and B2 splits were taken (N = 72 after filtering), allowing the pairwise comparison of A1–A2 versus B1–B2 splits (5 kg each). The pairwise RSV for these duplicates was ±29% which is moderate, but consistent with strong coarse gold mineralization, such as at Beatons Creek. It is noted that the data population is small.

11.7.8.2 August 2021 to May 2022 Period

After August 2021, when only the A or B rig split was submitted to the laboratory, a specific strategy was implemented for laboratory duplicates (Figure 11-12 and Table 11.11). From August 2021 to end of May 2022, 2,386 laboratory duplicates were analyzed. These represented the A1–A2 and B1–B2 duplicate pairs (Table 11.11). Figure 11.17 and Figure 11.18 show half absolute relative difference (HARD) and cumulative frequency plots of the A1–A2 and B1–B2 laboratory duplicate pairs. The post-August 2021 laboratory duplicates have not been reported as oxide and fresh mineralization separately, as the results are virtually identical.

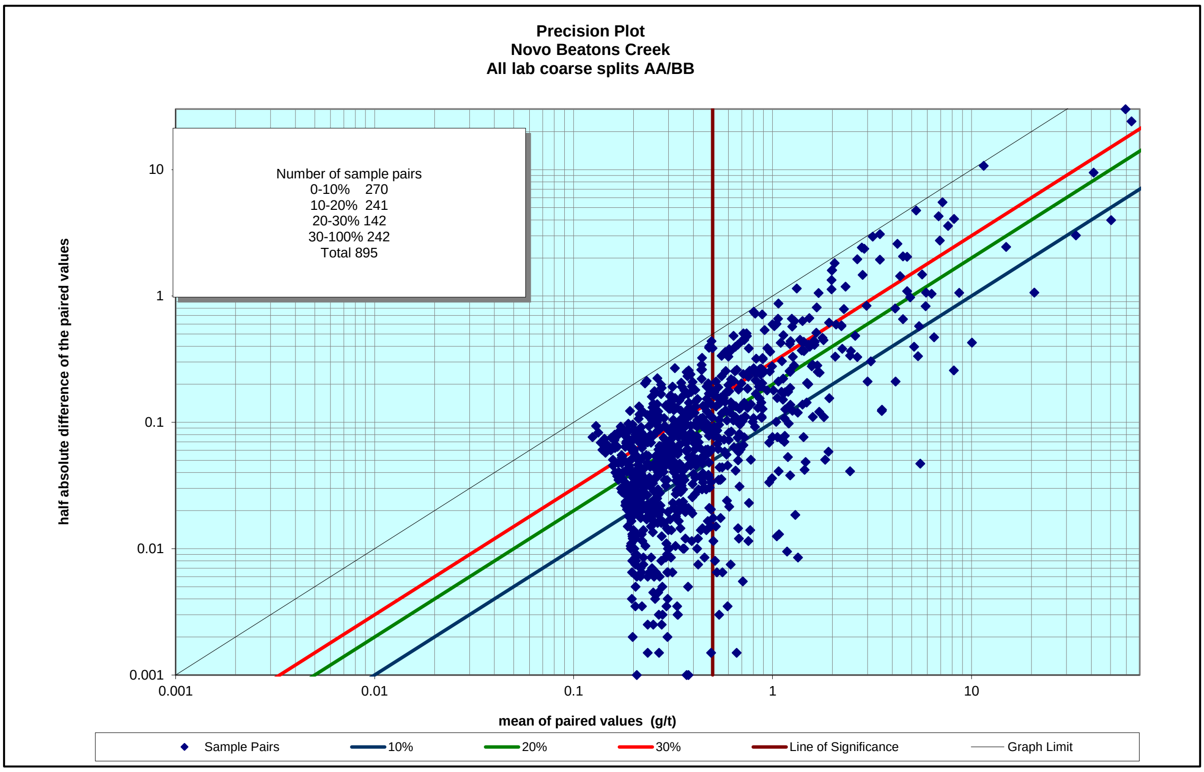


Figure 11.17. HARD plot for A1–A2 and B1–B2 laboratory coarse duplicates.

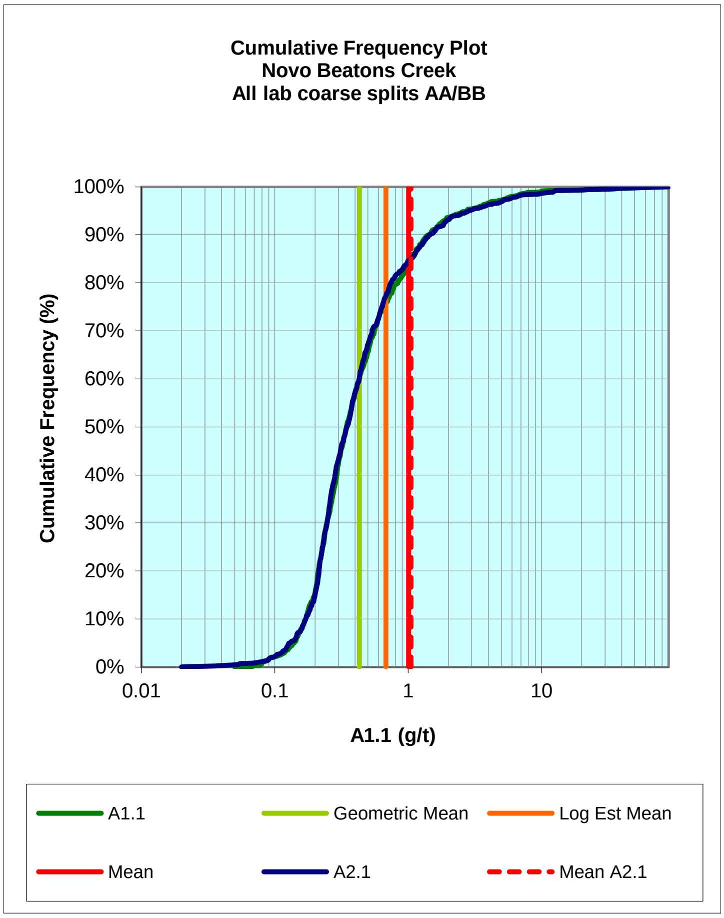


Figure 11.18. Cumulative frequency plots for A1–A2 and B1–B2 laboratory coarse duplicates.

Table 11.16 summarizes all laboratory coarse duplicates.

Table 11.16. Summary of all laboratory coarse duplicates. Precision values have been rounded to the nearest whole percent.

Metric	A or B1.1	A or B1.2
No. of pairs No. of filtered pairs	2,386 895 (after filtering to 10 × LDL [0.02 g/t Au LDL] on the pair means)	
Mean grade (g/t Au)	1.01	1.05
Median grade (g/t Au)	0.35	0.35
Log mean grade (g/t Au)	0.68	0.69
Minimum grade (g/t Au)	0.05	0.02
Maximum grade (g/t Au)	87.82	89.54
Lower Q (g/t Au)	0.23	0.23
Upper Q (g/t Au)	0.66	0.63
RSV (%)	416	414
Pairwise RSV	±42%	
90th percentile	±50% HARD/±71% RSV	

The laboratory duplicates pairwise RSV, and 90th percentile HARD and RSV values are within expectation, with pairwise RSV being ±42%. Differences between individual split grades are due to the presence of coarse gold within the primary sample.

11.7.9 Replicate Assays

During the 2020 to 2022 period, 2,969 analytical replicates were undertaken. The replicates are sets of four to five sample pots re-assayed via PhotonAssay. A total of 2,919 pairs were used for analysis given the removal of 50 pairs due to missing individual assay pots. Note in some cases the replicate was taken directly after the primary assay; in other cases the pots were re-assayed later. It is currently not possible to differentiate between the two replicate types.

Figure 11.19, Figure 11.20 and Figure 11.21 show a graphical comparison between the PhotonAssay replicate assay results. Table 11.17 summarizes the population statistics.

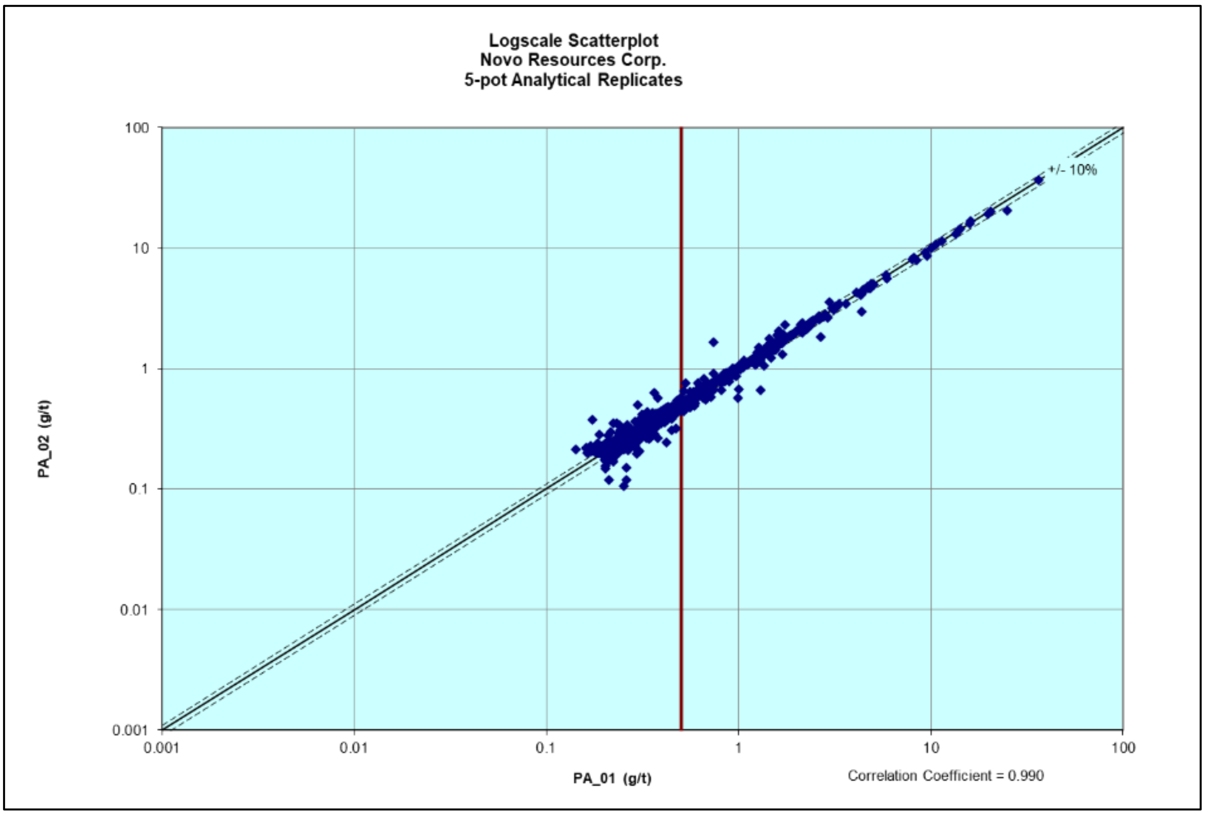


Figure 11.19. Log scatter plot of PhotonAssay replicate assays.

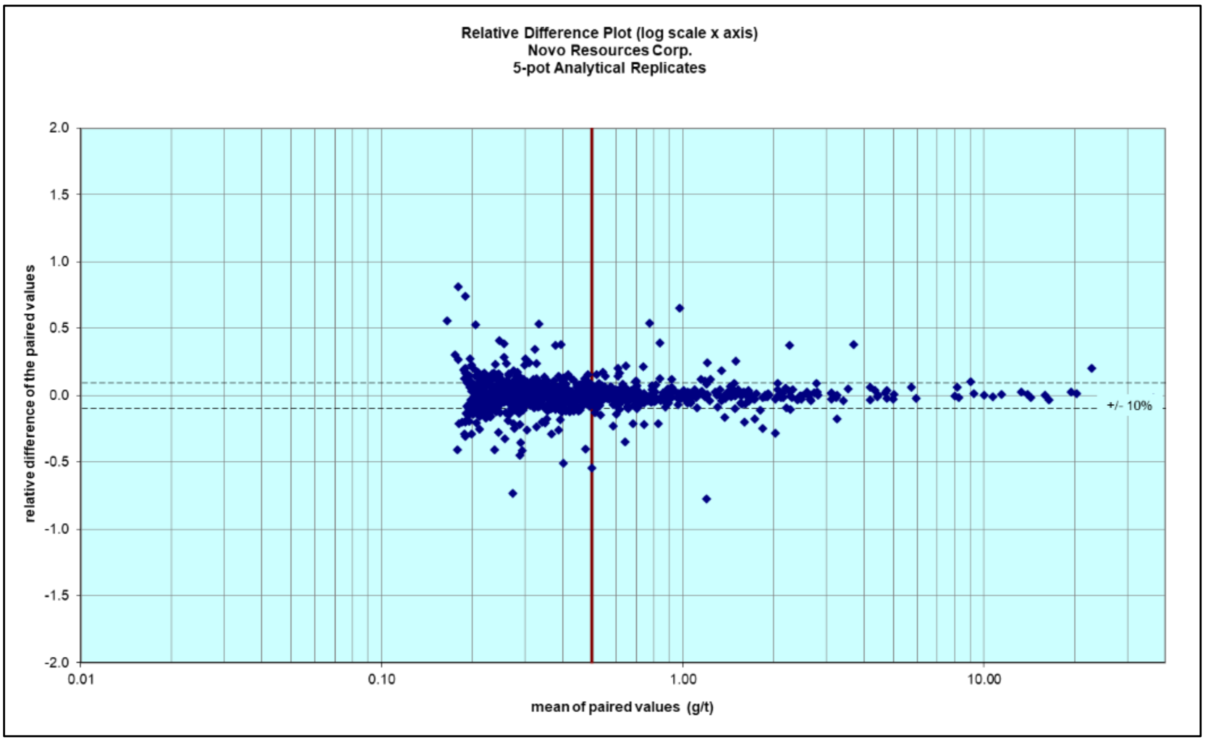


Figure 11.20. Log relative difference plot of PhotonAssay replicate assays.

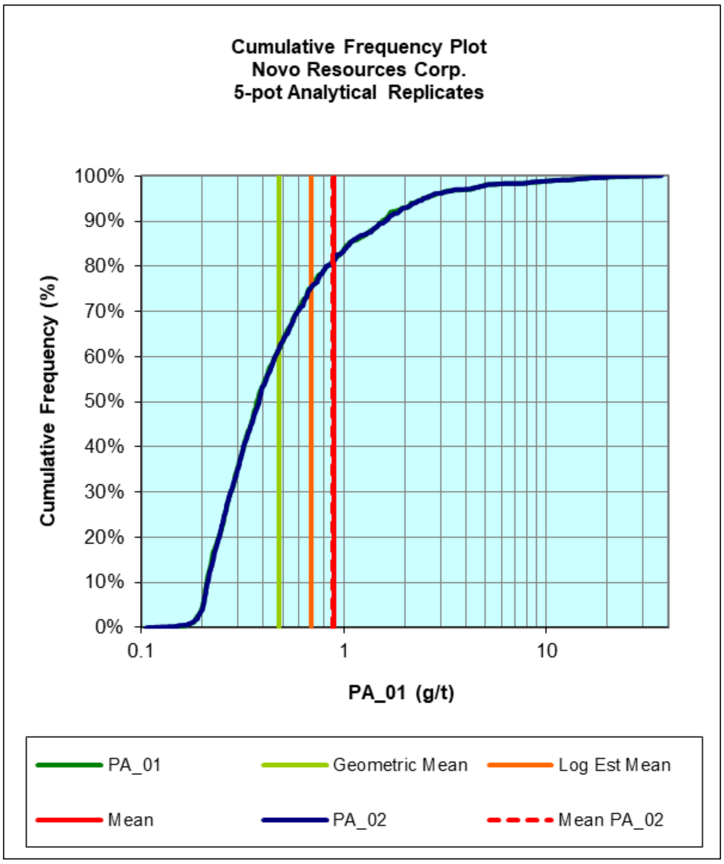


Figure 11.21. Cumulative frequency plot of PhotonAssay replicate assays.

Table 11.17. Summary of PhotonAssay replicate metrics.

Metric	PhotonAssay 1 (original)	PhotonAssay 2 (replicate)
Number of pairs	952 (after filtering to 10 × DL [0.02 g/t Au DL] on the pair means)	
Mean grade (g/t Au)	0.90	0.89
Median grade (g/t Au)	0.38	0.38
Minimum grade (g/t Au)	0.14	0.15
Maximum grade (g/t Au)	36.16	36.95
Lower Q (g/t Au)	0.26	0.26
Upper Q (g/t Au)	0.68	0.68
COV	250%	246%
Pairwise RSV	±7%	
90^{th} percentile	±16% HARD/±23% RSV	

The analytical replicates display an acceptable precision of ±7%. The two populations are similar and display no bias (Figure 11.21). The minor differences noted in the population are likely to relate to (1) natural PhotonAssay machine variability and (2) the known heterogeneity effect in PhotonAssay analysis, where movement of a pot may cause coarse gold to move and thus have a different geometry within the source-to-detector alignment. This latter effect is likely to be most relevant where the replicates were done later. In this case, handling of the pots may have led to coarse gold particles repositioning themselves and hence changes in grade. PhotonAssay testwork by Novo indicated a precision of approximately ±15% for a small test group (N = 40) of individual PhotonAssay pots that were shaken between assays, with precision reducing to approximately ±6% for groups of five pots (Dominy and Graham, 2020).

Intertek undertook its own replicate assays and reported these on a pot-by-pot basis. The 90^{th} percentile was ±20% to 22% HARD.

11.7.10 Umpire Assays

During the period June 2021 to May 2022, 410 umpire assays were undertaken. Umpire assays were based on a single 2.5 kg assay charge (e.g., five PhotonAssay pots) recombined and pulverized to P_{80} -75 µm. A 1 kg sub-sample was riffle split from the 2.5 kg pulp and assayed via SFA. All umpire SFAs were undertaken at Intertek.

Figure 11.22 and Figure 11.23 show a graphical comparison between the PhotonAssay and SFA results, and Table 11.18 summarizes population statistics.

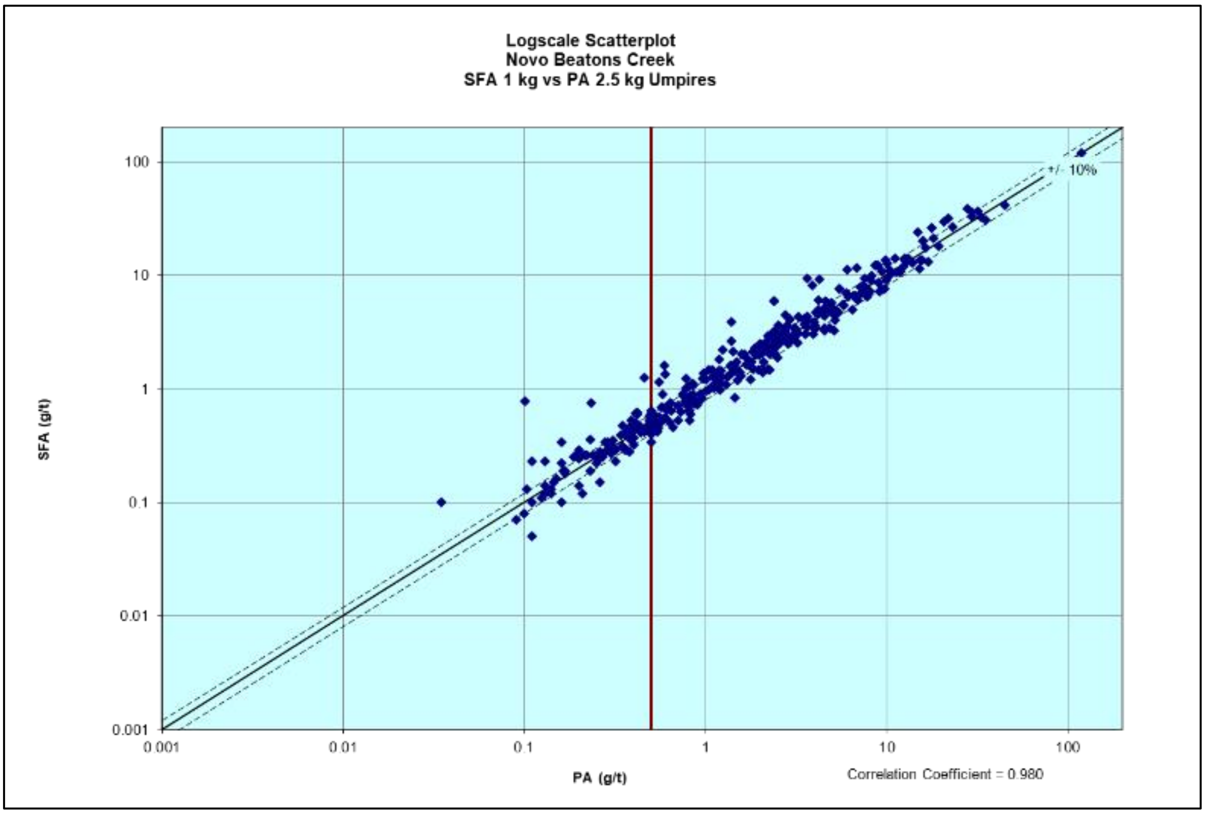


Figure 11.22. Log scatter plot of umpire SFA versus PhotonAssay assays.

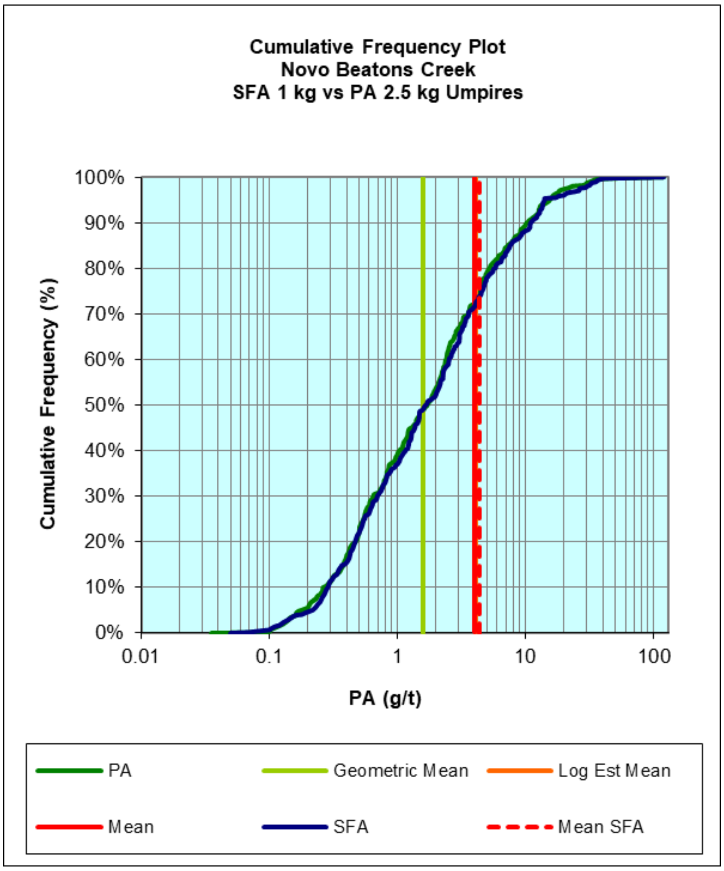


Figure 11.23. Cumulative frequency plot of umpire SFA versus PhotonAssay assays.

Table 11.18. Summary of umpire PhotonAssay and SFA grade metrics. Precision values rounded to the nearest whole percent.

Metric	PhotonAssay	Screen fire assay
Number of pairs	410	
Mean grade (g/t Au)	4.01	4.37
Median grade (g/t Au)	1.69	1.67
Minimum grade (g/t Au)	0.03	0.05
Maximum grade (g/t Au)	118.5	120.3
Lower Q (g/t Au)	0.53	0.55
Upper Q (g/t Au)	4.21	4.49
RSV (%)	201	197
Pairwise RSV (%)	±19%	
90th percentile	±19% HARD/±27% RSV	

Overall, the SFA grades are higher than the PhotonAssay grades, globally by 9%. It should be noted that the umpire assays are not exact duplicates of the original PhotonAssay as the samples were reduced to 1 kg post pulverization. Sampling errors related to the pulverization/splitting of the original approximately 2.5 kg sub-sample to 1 kg include the FSE, GSE, EE, DE and PE.

The positive SFA bias likely relates to the presence of coarse gold. Given the coarse nature of the gold at Beatons Creek, the results are reasonable and validate the PhotonAssay assays.

11.7.11 Current Sampling Protocol Error Analysis

The pair duplicate precisions presented in sections 11.7.7 to 11.7.9 were used to analyze the current sampling protocol in order to determine where the error distribution lies for both oxide and fresh mineralization (Table 11.19). RSV values rounded to the nearest whole percent. The field RSV applied here is an average value for all field duplicates taken across October 2020 to May 2022 for oxide and fresh mineralization combined.

Table 11.19. Stagewise error estimate for the grade control and resource development sampling protocol at Beatons Creek.

RSV	Split action	Split ratio	Field (rig) split RSV	Laboratory split RSV	Analytical RSV
Total RSV	20 kg to 10 kg	50%	±50%	±42%	±7%
Stage RSV	10 kg to 2.5 kg	25%	±27%	±41%	±7%
Relative proportion	2.5 kg assay charge repeat: 5x PA pots	0%	30%	68%	3%

The highest RSV is seen in the laboratory split, where the stage precision is ±41%, representing 68% of the total error. Given this step of reducing the field split from 10 kg to 2.5 kg shows the highest proportion of error, this is the step that could be optimized. Optimization could include taking two 2.5 kg splits (e.g., 5 kg in total), as previously undertaken between commencement and August 2021 (Dominy and Graham, 2021).

11.7.12 Laboratory Internal QC

MinAnalytical undertook its own QC program, including CRMs (e.g., OREAS237, OREAS229B, OXE150 and CDNME1411) and analytical blanks (blank material by PhotonAssay only). Submission rates vary but averaged between 1 in 25 and 1 in 50.

MinAnalytical QC results have been reviewed by the QPs and provide no cause for concern. CRMs are within ±5% bias and display 3SD breaches within expectation. All blank assays are below five times the LDL (0.1 g/t Au).

Intertek undertook its own QC program, including CRMs (e.g., OREAS13B, OREAS254B, OREAS255B, OREAS277, OREAS622, OREAS624, OXD167 and OXE166), analytical blanks (blank material by PhotonAssay only) and analytical repeats (replicate assay on the same PhotonAssay pot). Submission rates vary, but across the period June 2021 to May 2022 averaged: CRMs 1 in 5–10, blanks 1 in 20, and analytical replicates 1 in 5–10. Intertek QC results have been reviewed by the QPs and provide no cause for concern. CRMs are within ±4% bias and display 3SD breaches within expectation. All blank assays are below five times the LDL (0.1 g/t Au). Analytical replicates are 90% less than ±17% to 22% HARD.

11.7.13 Flagged Issues

During the period from August to November 2021, the on-site laboratory had sample preparation issues. Once identified, the laboratory was put on stop until the issues were resolved.

The first issue occurred with one of the three Orbis smart crushers, which was taking highly variable splits from the feed sample. It was supposed to take two approximately 2.5 kg splits into each of two trays, with the remainder passing to a reject tray. The erroneous unit was achieving a precision of ±16% and a mass difference of up to ±20%. Normal performance was a precision of ±2–3% and mass difference of less than ±5%. As a result, the crusher units were serviced, and laboratory personnel were retrained to ensure the equipment was used properly. Intertek provided a revised Standard Work Instruction (Intertek SWI-1012). Novo also instigated more regular laboratory check visits.

The second issue related to the filling of the PhotonAssay pots. In one case, the operator(s) poured both 2.5 kg splits into a larger tray and scooped out material to fill the five PhotonAssay pots. In another case, the operator(s) took the reject tray (approximately 5 kg) and scooped out material to fill the five PhotonAssay pots. As a result, laboratory personnel were retrained to ensure only one split was used to fill the five pots. Intertek provided a revised Standard Work Instruction (Intertek SWI-1012). Novo also instigated more regular laboratory check visits.

The QPs reviewed the drillholes with samples that may have been affected during this period and reviewed their spatial location. It is not possible to identify exactly which samples may have been affected. The drillholes in Edwards and Grant's Hill that may have been affected are in areas that have been mined out. There is a portion of Golden Crown that is in-situ that may have been affected.

The QPs reviewed the laboratory coarse duplicates for the period August to November 2021 and found that the precision achieved during this period was consistent with the rest of the data. Given the large sample volumes, the potential low bias (if any) and the fact that multiple samples influence an individual block estimate, the QPs consider the risk to the MRE to be low and have accepted the data.

11.8 Sample Security

11.8.1 Historical Sampling (Pre-2011)

Sample security procedures during this period are unknown.

11.8.2 Novo Sampling (2011–2017)

All RC, channel and diamond core samples collected during the period were individually bagged, bundled, and secured on a pallet at Beatons Creek by Novo personnel. An independent trucking company was used to transport the samples to Genalysis Intertek in Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. Any discrepancies were reported to the Novo supervising geologist.

11.8.3 Novo Sampling (2018–2022)

All channel samples (2018) collected during the period were individually bagged, bundled, and secured on a pallet at Beatons Creek by Novo personnel. An independent trucking company was used to transport the samples to Genalysis Intertek in Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. Any discrepancies were reported to the Novo supervising geologist.

All diamond core trays collected during the period (2018 and 2022) were secured on a pallet at Beatons Creek by Novo personnel. An independent trucking company was used to transport the samples to the Metallurgy (2018) and Intertek (2022) laboratories in Perth. On arrival, the sample deliveries were checked against the submission paperwork from Novo. No discrepancies were reported.

All bulk samples (2018) collected during the period were individually bulka-bagged and secured into wooden boxes at Beatons Creek by Novo personnel. An independent trucking company was used to transport the boxed samples to SGS in Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. Any discrepancies were reported to the Novo supervising geologist.

For RC drilling between November 2020 and May 2022, samples were individually bagged, bundled, and secured on a pallet at Beatons Creek by Novo personnel. An independent trucking company was used to transport the samples to MinAnalytical in Perth or Kalgoorlie, and/or Intertek in Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. Any discrepancies were reported to the Novo supervising geologist.

For RC drilling between August 2021 and May 2022, RC samples were taken from the rig to the Intertek-operated laboratory at Golden Eagle by Novo personnel. After preparation, PhotonAssay pots were independently shipped to Intertek in Perth. On arrival at the laboratory, the delivery was checked against the submission paperwork from Novo. Any discrepancies were reported to the Novo supervising geologist.

Given that the PhotonAssay pots were loaded at the Golden Eagle laboratory and transported to Intertek in Perth, there is some risk of segregation within the pots. This may particularly affect samples with liberated coarse gold present. The degree of liberation may be reduced due to the fact that samples were only crushed, though the grinding effect of the RC bit would still liberate some gold. At no time after filling were the pots opened or any sample mass reduction undertaken. The entire volume of sample within each pot is scanned in the PhotonAssay unit.

During the Stage 0 testwork (refer Section 11.5.2), a series of PhotonAssay pot repeats were undertaken, where the pots were shaken for approximately 30 seconds between assays. This was undertaken to check for the heterogeneity effect, where movement of in-pot material between scans can sometimes yield different assay values. Testwork was undertaken on 50 pots with grades ranging between 0.3 g/t Au and 20 g/t Au. The overall pairwise precision between the shaken replicates was ±15% on a pot-by-pot basis. The precision based on groups of 10 pots was calculated to be ±5%, and for groups of 5 pots ±7%. The highest variation was seen on pots with >2 g/t Au grade. Overall, any likely effect is deemed to be small and not likely to affect every pot or sample.

11.9 Qualified Persons Statement

The QPs (Ms Graham and Dr Dominy) have conducted a review of the Novo sampling, sample preparation, assay and QA/QC procedures. This review indicates the procedures are adequate for the reporting of Mineral Resources.

12. DATA VERIFICATION

12.1 Data Verification by the Qualified Persons

The 2022 Mineral Resource was estimated from 26,041 samples (17,650 composites), comprising 54 bulk samples (57 composites); 580 diamond core samples from 60 holes (354 composites); 25,350 RC samples from 3,877 holes (17,186 composites) and 57 trench channel samples (53 composites).

The QPs (Ms Graham and Dr Dominy) have taken steps to review the sample data to verify their veracity. Steps taken included:

- Audit visits to the Metallurgy and SGS metallurgical testing/pilot facilities in reference to the 2018 metallurgical testwork and 2018 bulk sampling programs (Dr Dominy);
- Audit visits to MinAnalytical and Intertek laboratories;
- Discussions with Novo exploration and mine geology personnel and contractors;
- Review of sample collection and preparation/assaying procedures;
- Review of photographic records of sample collection;
- Review of drill logs;
- Inspection of 2018 (Dr Dominy) and 2022 (Ms Graham and Dr Dominy) diamond drill core;
- Review of selected results files and certificates supplied by laboratories;
- Analysis of historical, Novo and laboratory QC;
- Database audit (Snowden Optiro, 2022); and
- Site visit in May 2022, including observations of core drilling, collar locations and drill core; RC drilling, collar locations and samples; onsite Intertek sample preparation laboratory; surface outcrops of oxide and fresh mineralized conglomerates within the pit area; mineralization/waste spotting, tracking and mining/excavation process within the pit; and the Golden Eagle processing plant.

The QPs (Ms Graham and Dr Dominy) did not deem it necessary to collect and analyze check samples, given the 2018 bulk sampling program and active mining during 2021 and 2022. Ms Graham and Dr Dominy visited the Beatons Creek site in May 2022. No issues were encountered during the verification process.

QPs Mr Ison and Mr McAuslane undertook site visits as part of their verification relating to sections 13, 17 and 18 of this report.

12.2 Opinion of the Qualified Persons

The QPs (Ms Graham and Dr Dominy) have, through examination of Novo documents; including QA/QC reporting and personal inspections on site and discussions with Novo personnel, verified the data in this report and satisfied themselves that the data are adequate for the purpose of this report. The final database is of a suitable quality for use in an MRE.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Historical Metallurgical Testwork (Oxide and Fresh Mineralization)

There has been limited comminution testwork conducted on oxide mineralization samples from Beatons Creek, with results for six samples with variability in material competency not well understood (Arrowsmith, Parker and Dominy, 2019). The average crushing work index value is 7.4 kWh/t, the average Bond rod mill work index is 12.4 kWh/t and the average Bond ball mill work index (BBWi) is 14.2 kWh/t. Oxide A*b values range from 75.9 to 104.8, with an average of 86.7, and the average Bond abrasion index (BAi) is 0.26.

A significant quantity of gold recovery testwork has been undertaken on Beatons Creek oxide material, but it is difficult to collate the data into a single congruent dataset with comparable recovery results due to the various test methods used (Arrowsmith, Parker and Dominy, 2019). A typical overall recovery would be 94.6%, with a gravity recovery of about 67.3% for the pre-2018 bulk sample results.

The 2018 Beatons Creek oxide bulk sampling program was encouraging and supported the historical test data. The weighted average overall gold recovered to the gravity concentrate and leached from the gravity tail was 97.3%, with 58.3% recovered to the gravity concentrate.

While there are no specific historical metallurgical tests to determine recovery from fresh mineralization, there is some characterization work that indicates the potential gold recovery of the fresh mineralization.

There is a small dataset of LeachWELL extractions that, with the addition of a gold assay of LeachWELL residue, provides an indication of the potential gold recovery from fresh mineralization and indicates a recovery in the range 85% to 88%. While the results do not represent plant recoveries, they suggest that the Beatons Creek fresh mineralization is amenable to gold extraction by cyanidation and provides some confidence that the gold is free milling.

Petrographic and mineralogical analyses completed on samples of fresh drill core provide insight into the gold size, mineral association and deportment (Arrowsmith, Parker and Dominy, 2019). Key findings of the mineralogical analyses that provide some confidence that high gold extractions can be achieved from the Beatons Creek fresh mineralization are:

- Gold is present as native gold, from 1 µm to 1,000 µm in size.
- A sizeable proportion of the gold reports to the +150 µm fraction (within which high gravity recovery can be expected).
- Much of the gold is liberated (free milling) and a high leach recovery can be expected.

13.2 2018 Bulk Sampling Program (Oxide Mineralization)

Novo undertook a bulk samping program at Beatons Creek during 2018 (Dominy and Hennigh, 2019; Dominy, van Roij and Graham, 2022). The samples were part of the evaluation program attempting to quantify the magnitude and distribution of gold grades within marine and channel lag conglomerate mineralization. Novo collected 45 primary and 13 duplicate bulk samples (approximately 2 t each) across 1 m increments of conglomerate. The bulk samples were collected to investigate: (a) local grade at a large sample support; and (b) metallurgical recovery.

Samples were shipped to SGS, Perth, for full sample processing. Some initial sample crushing, grinding and gravity concentration was undertaken at ALS Laboratories and Metallurgy Pty Ltd, Perth. Assaying of most gravity concentrates, dust and tails was undertaken at SGS, with additional dust and tails assays undertaken at MinAnalytical.

The bulk sampling program indicated that oxide mineralization could locally yield grades of between 0.2 g/t Au and 6.2 g/t Au at a mean grade of approximately 2.2 g/t Au (undiluted). The program also indicated that at a coarse grind size of 750 µm, good recoveries were possible via gravity and leaching. Globally, the bulk sample lot (135 t) yielded a grade of 2.2 g/t Au, with 62% gravity recovery. The recovery for the >0.5 g/t Au bulk samples (119 t) was 2.42 g/t Au also with 62% gravity recovery.

13.3 Fresh Mineralization Testwork

13.3.1 2019 Testwork Program (Phase 1)

The locations of the six 2018 PQ diamond drillholes used for metallurgical testwork at Grant's Hill (M1 and M2 mineralization) and South Hill (CH1 and CH2 mineralization) are shown in Figure 13.1 (Arrowsmith, Parker and Dominy, 2019). Total core recovery for the program was >97%.

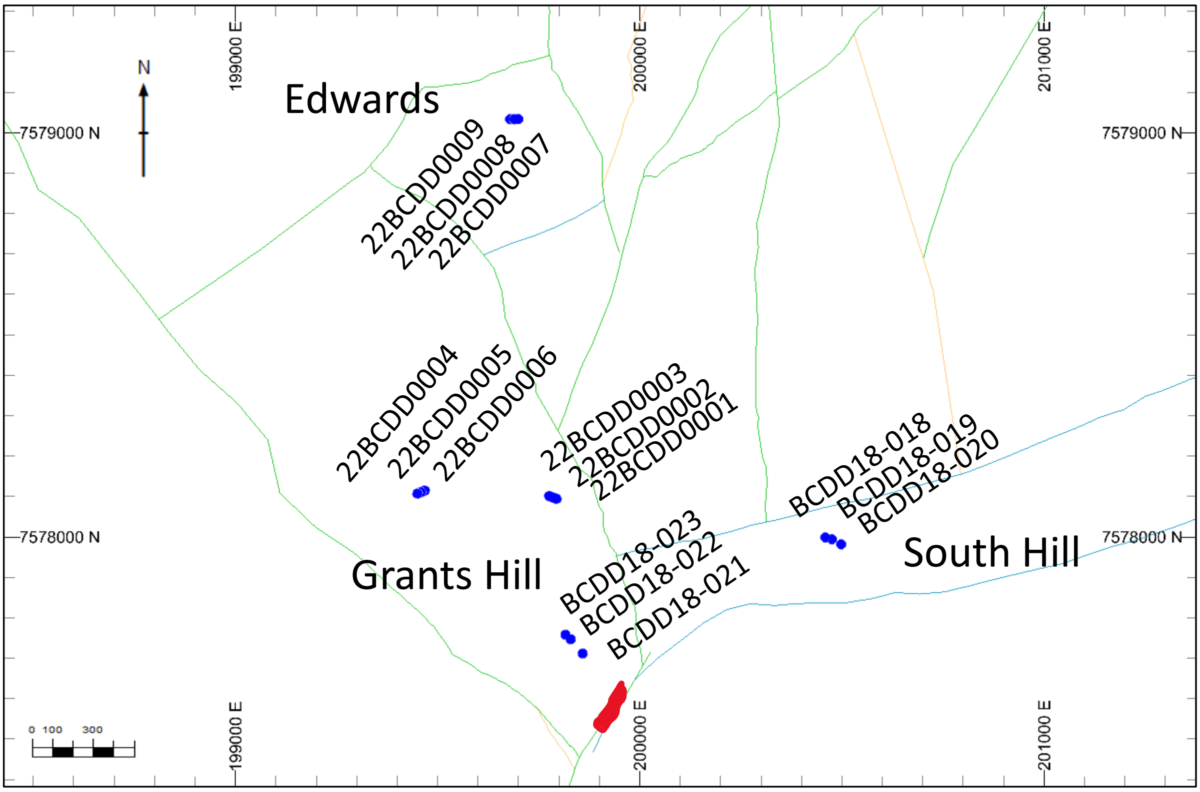


Figure 13.1. **Plan of the 2018 (series BCDD18-) and 2022 (series 22BCDD-) metallurgical diamond core hole locations at Grant's Hill, South Hill and Edwards areas of Beatons Creek. Red highlight indicates approximate location of the 2021 Batch #1 fresh trial mineralization parcel.**

All intersections are in fresh mineralization within the open pit shell. Samples were selected from drill core stored in trays by identifying the true mineralization width based on 'buckshot pyrite' geological markers. The gold is associated with detrital pyrite (2 mm to 65 mm in diameter) resulting in true mineralization widths between 0.57 m and 1.68 m. A total of 11.8 m equivalent of mineralized material was produced for a total mass of 184 kg across the six holes.

A minimum mining width of 1 m was applied, and a minimum sample interval length of 1 m was selected for those samples with a true mineralization width <1 m. In addition, edge dilution from below the footwall and above the hangingwall was included in the selected interval length.

Each conglomerate (Grant's Hill - M1 and M2; South Hill - CH1 and CH2) was represented by three intersections (12 intersections across the four conglomerates) ranging from 18.4 kg to 28.4 kg in mass.

A specific testwork protocol was designed to acquire maximum information for each primary intersection and ultimate composite. Each individual intersection provided a variability sample for:

- Gold grade;
- Multi-element geochemistry (Zn, Cu, As, Sb, etc.); and
- Comminution data (Bond ball work index, SMC test and Abrasion index).

Each set of three mineralized intersections was then blended to form four master composites (for each of M1, M2, CH1 and CH2) for recovery testwork, ranging from 50.6 kg to 66.5 kg in mass. The following testwork was undertaken:

- Head grade of master composite;
- Three-stage GRG testwork (on master composite);
- Kinetic leach testing (on tails); and
- Diagnostic testing (on tails).

After logging on site, all core was stacked and secured onto pallets for shipping to the laboratory by Novo personnel. An independent trucking company was used to ship the core to Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. No discrepancies were reported. Testwork was undertaken by Metallurgy Pty Ltd (Welshpool, Perth). Metallurgy Pty Ltd is independent of Novo.

13.3.1.1 Grant's Hill results

The weighted average head grades for the M1 and M2 composites were 5.46 g/t Au and 4.35 g/t Au, respectively, which compare well to the assayed head grade of 5.39 g/t Au for M1 and 4.85 g/t Au for M2.

Geochemical analysis on the Grant's Hill composites indicates elevated levels (levels greater than three times the geochemical abundance index) of arsenic, mercury and antimony.

Assay-by-size results indicate that most of the gold is in the +150 µm fraction, with 87.3% and 87.9% of the gold in the M1 and M2 composites residing in the coarsest fraction.

Overall, three-stage GRG test recovery was high at 94.6% and 89.0% for the M1 and M2 composites, respectively. The recovery by size and stage data indicates that both the Grant's Hill composites have a high percentage of coarse gold, with 79.4% of the gold recovered in the +150 µm fractions for M1 and 67.9% of the gold recovered in the +150 µm fractions for M2. The test data suggests that the Grant's Hill fresh mineralization is amenable to gravity recovery and that high-plant gravity gold recovery (50–80% of the GRG) can be expected from a well-designed and operated processing plant.

The kinetic leach results for the Grant's Hill composites indicate fast leach kinetics, with a minor impact of grind size on leach extraction. The average 24-hour leach extraction for all six tests (regardless of grind size) was 93.3%. The results indicate a slight reduction in the gold concentration in solution over the leach profile, and therefore the potential for preg-robbing cannot be ruled out.

The diagnostic leach data on the gravity tails for the two Grant's Hill composites indicates that most of the gold is cyanide-soluble, with 80% and 87.2% extracted at a low cyanide concentration for M1 and M2 composites, respectively. Additional gold was extracted under more intense cyanidation, suggesting that overall recovery from cyanidation for these two composites could be as high as to 92% to 93%. The remainder of the gold sample was not readily cyanide recoverable due to it being occluded, locked in silicates, refractory or sulfide solid solution gold.

13.3.1.2 South Hill results

The weighted average head grades for the South Hill CH1 and CH2 composites were 0.69 g/t Au and 1.24 g/t Au respectively, which compare well to the assayed head grade of 0.84 g/t Au for CH1 and 1.44 g/t Au for CH2.

Geochemical analysis on the South Hill composites indicates elevated levels of arsenic, mercury and antimony.

Assay by size results indicate that most of the gold is in the +150 µm fraction, with over 92% of the gold in the CH1 and CH2 composites residing in the coarsest fraction.

The single stage GRG test recovery was high at 61.3% and 69.8% for the CH1 and CH2 composites, respectively. The recovery by size and stage data indicates that both the South Hill composites have a high percentage of coarse gold, with 38% of the gold recovered in the +150 µm fractions for CH1 and 54% of the gold recovered in the +150 µm fractions for CH2.

The kinetic leach results for the South Hill composites indicate fast leach kinetics, with no correlation between grind size and leach extraction. The average 24-hour leach extraction for all six tests (regardless of grind size) was 60.1%.

The diagnostic leach data on the gravity tails for the two South Hill composites indicate that most of the gold is cyanide soluble, with 65% and 67% extracted at a low cyanide concentration for CH1 and CH2 composites, respectively. The remainder of the gold sample was not readily cyanide-recoverable due to it being occluded, locked in silicates, refractory or sulfide solid solution gold.

The results from the South Hill testwork are broadly consistent with the earlier work reported for Grant's Hill.

13.3.1.3 Comminution Results

Comminution testwork shows that the Beatons Creek fresh material is competent, with an average BBWi for Grant's Hill of 18.8 kWh/t. SAG mill comminution test (SMC) data indicate that the Beatons Creek fresh mineralization is moderately competent, with an average A*b of 47.8 and a range of 38.0 (hard) to 56.6 (soft). Testwork also shows that the Beatons Creek fresh mineralization is abrasive, with an average BAi of 0.26 (similar to the oxide material).

13.3.2 2022 Testwork Program (Phase 2)

Nine PQ diamond drillholes have been used to generate samples for metallurgical testwork (Ison, 2022). These drillholes were located in three areas, with three drillholes at each location. Each hole intersects mineralized conglomerates, with some samples including minor amounts of hangingwall and footwall dilution to improve the mining width representation of those samples. Including minor amounts of hangingwall and footwall also increases the sample weight for metallurgical testwork requirements and provides an understanding of the impact of this dilution on metallurgical performance. All intersections are in fresh (sulfide) mineralization within the open pit shell. The sampling program targeted the M0, M1, M2 and M3 mineralized conglomerates. A total of 25.7 m equivalent of mineralized material was produced, for a total mass of 400 kg across the nine holes. Total core recovery for the program was >97%.

After logging on site, all core was stacked and secured onto pallets for shipping to the laboratory by Novo personnel. An independent trucking company was used to ship the core to Perth. On arrival at the laboratory, the sample delivery was checked against the submission paperwork from Novo. No discrepancies were reported. Testwork was undertaken by ALS Perth. ALS Perth is independent of Novo.

As there is a practical constraint on the minimum mining width of 1 m, a minimum sample interval length of 1 m was selected for those samples with a 'true mineralization width' less than this. In addition, edge dilution from below the footwall and above the hangingwall was included in the selected interval length.

Figure 13.1 illustrates the selected sample locations for the Beatons Creek fresh mineralization samples for both the Phase 1 and Phase 2 programs. The Phase 1 samples were located at Grant's Hill and South Hill locations, and the Phase 2 samples were located at Edwards, Grant's Hill Distal and Grant's Hill Creek.

The 2022 testwork program was aimed at determing the metallurgical performance when processing fresh mineralization through the Golden Eagle plant by simulating the plant conditions.

Comminution testwork was conducted on three interval samples to provide information to assess the comminution characteristics of the fresh mineralization to allow prediction of the expected throughput and operating costs when processing fresh mineralization through the Golden Eagle mill. The testwork covered SMC, BAi and BBWi tests. The BBWi test results show that the fresh material is competent, with an 85th percentile for BBWi of 19.5 kWh/t. The fresh mineralization is abrasive, with an 85th percentile for BAi of 0.245. The SMC test results show that the fresh material is moderately competent, with an 85th percentile A*b of 47.4 and a range of 38.0 (hard) to 56.6 (soft).

Orway Mineral Consultants (Orway) used the results in conjunction with analysis of two fresh plant trials to predict the processing rate of fresh material through the Millennium comminution circuit. Orway concluded that there was good agreement between the two fresh mineralization plant trials and the comminution testwork results. Orway predicted a throughput rate of 196 t/h (1.6 Mt/a) at a target product size of P_{80} -150 µm, when processing fresh mineralization.

Bulk leach extracable gold (BLEG) cyanide leach tests were conducted in duplicate on 23 interval composite samples to assess the cyanide recoverable component of the samples. Note that the BLEG leach conditions are significantly more intensive than the leaching conditions that the material would undergo in the full-scale processing plant. BLEG gold extractions varied from 78% to 98%, with an average extraction of 91.4%. The results indicate that the majority of fresh samples provide high gold extraction; however, BLEG extraction cannot be used as a predictor of expected plant extraction due to the finer grind in the BLEG test (P_{80} -45 µm) and use of high cyanide additions.

Select multi-element head assay ranges from the metallurgical samples are shown below.

- Au: 0.07 g/t to 32.9 g/t
- Ag: <0.3 g/t to 3 g/t
- As: 110 ppm to 340 ppm
- S total: 1.3% to 5.3%
- S sulfide: 1.2% to 5.2%
- C_{org}: up to 0.06% [organic carbon]
- C_{total}: <0.03% to 0.15% [total carbon].

Gravity and kinetic cyanide leach tests were conducted on 23 interval composite samples and three GRG samples that contained multiple interval samples. A single grind size of P_{80} -150 µm was used with and without carbon addition to assess the likely leach time required as well as the impact of carbon addition on leach recovery as both these factors can significantly impact on leach recovery. The grind size was kept fixed, as that is the grind size being achieved in the Golden Eagle plant. The sample was processed through a single stage of gravity recovery using Knelson laboratory-scale gravity concentrator and the gravity concentrate had gold recovered using mercury amalgamation. Overall gravity and CIL extractions ranged from 56% to 98%, with an average of 87% for 24-hour leach duration. These extraction results have been weighted by sample representivity to generate an overall recovery of 91%.

GRG tests were conducted on three composites that were generated from the interval samples to represent the three sample locations. Composites GRG01-03 observed very high overall GRG recoveries of 78.3%, 85.4% and 87.6%. All three composites showed similar GRG recovery distribution by stage, with roughly 80% of gold recovered in the first two stages at P_{80} -850 µm and P_{65}-75 µm, respectively, with GRG falling rapidly in the third stage at P_{80} -75 µm as the available GRG diminished. These results suggest a significant portion of coarse-grained available gold together with a wider spectrum of finer-grained associations.

Additional testwork has been conducted on select samples that generated lower recovery to determine gold location in the leach tailings and to determine whether higher oxygen with or without lead nitrate addition could improve leaching kinetics.

Diagnostic leach results on CIL tailings for samples GL02 and GL10 that gave poor recoveries from gravity followed by CIL of 55% and 86%, respectively, indicated that the remaining cyanidable gold (released with intensive leach conditions) was moderate for GL02 at 36.3% and low at 4.51% for GL10. Elevated levels of locked gold (25.4% and 86.0% for GL02 and GL10, respectively) were in arsenical sulfide mineral, indicated by fine (refractory or solution) gold in arsenopyrite. The remainder non-cyanide recoverable gold was observed in carbonates, reactive sulfide minerals, encapsulated in silicates or in pyritic minerals. The GL02 tailings grade was already low at only 0.11 g/t Au while the tailings grade for GL10 was significantly higher at 0.44 g/t Au. Enhanced leach on GL10 with higher oxygen and high oxygen with lead nitrate did not signficantly impact the tailings grade, which is expected based on the diagnostic leach results.

13.3.3 2022 Fresh Mineralization Plant Trial Program

Between August 2021 and April 2022, three separate fresh bulk processing trials of material from the Grant's Hill (GH) mining area were processed through the Golden Eagle plant (Aleknavicius, 2022; Figure 13.1). A single fresh trial in August 2021 (Batch #1 100% GH fresh; M2 mineralized lag) was complemented by two additional oxide blended trials in March to April in 2022 (Batch #2: 80% GH fresh; Batch #3: 53% GH fresh). Overall, throughputs for the three trials averaged around 207 t/h, which is approximately 10% less than the oxide thoughput. The fresh mineralization dominated Batch #1, comprised 38,208 t at a reconciled head grade of approximately 1.8 g/t Au yielding approximately 2,034 oz Au with a recovery of 93.6%. The gravity recovery component during the trial was 57%.

Table 13.1. Summary of trial parcels through the Golden Eagle plant comprising fresh mineralization.

Batch	Total tonnage (oxide and fresh)	Proportion of fresh mineralization	Tonnage of fresh mineralization	Mill feed grade (g/t Au)	Gravity recovery	Overall gold recovery
#1	38,208	100%	38,208	1.8	57%	93.6%
#2	80,992	80%	64,794	1.7	78%	92.1%
#3	107,542	53%	56,997	1.1	60%	92.7%
Total	226,742	70%	159,999	1.4	67%	92.6%

13.3.3 2019 and 2022 Program Conclusions

The 2018 and 2022 metallurgical diamond core drilling programs provided 15 holes and approximately 37.5 m of equivalent continuous mineralization yielding a total mass of 584 kg. The drillholes provide a reasonable representation of the fresh mineralization. The holes are located across Grant's Hill (nine holes), South Hill (three holes) and Edwards (three holes). The Grant's Hill area is key to the project future, with the holes covering the M0, M1, M2 and M3 mineralized lags. The results of the Grant's Hill testwork are verified by the Batch #1 trial parcel from Grant's Hill (M2) processed in August 2021 (refer Section 13.3.3). The three Edwards holes cover the M1 mineralized lags, and South Hill the CH1 and CH2 channels.

No deleterious elements were identified that could have a significant effect on potential economic gold extraction. There are elevated levels of arsenic and mercury, but not to any concerning degree.

The 2019 and 2022 recovery and comminution testwork indicates that the fresh mineralization is amenable to gravity and leach recovery. This is corroborated by the 2022 fresh trial program (Batch #1; Table 13.1) yielding a recovery of 93.6% through the Golden Eagle plant.

The 2019 and 2022 testwork results, together with the 2021 trial parcel, have been tonnes-weighted based on the 2022 MRE to generate an overall fresh mineralization recovery of 91% for RPEEE purposes. A 93% recovery for oxide mineralization has been applied for RPEEE purposes based on the actual Golden Eagle plant recovery during 2021 to 2022.

13.4 Qualified Person Statement

QA/QC was implemented for the 2019 testwork program (Arrowsmith, Parker and Dominy, 2019). Novo established protocols to cover field collection and handling, core logging, transport/security, sample preparation, and analysis. Novo implemented QC that included barren flushing of equipment, blank sample processing, CRM submission, pulp duplicates and grind tests. The results of the QC program were reviewed and deemed acceptable. Dr Dominy (QP) reviewed the original drill core at Metallurgy Pty Ltd, Perth, and visited the Metallurgy Pty Ltd facility in Perth regularly to review testwork progress and quality.

QA/QC was implemented for the 2022 testwork program. Novo had established protocols to cover field collection and handling, logging and transport/security of drill core. All concentrate and tails assays were undertaken at ALS Perth and included the laboratory internal control procedures. Dr Dominy (QP) viewed the drill collars and drill core at Beatons Creek and at the Intertek laboratory in Perth. Mr Ison (QP) managed the testwork program at ALS Perth.

The QPs (Dr Dominy and Mr Ison) have conducted a review of the Novo metallurgical drilling, sampling and testwork program. This review indicates the procedures and methods applied are adequate for inclusion in the 2022 MRE.

14. MINERAL RESOURCE ESTIMATES

14.1 Disclosure

The Mineral Resource statement presented herein represents an updated MRE prepared for Novo, in accordance with NI 43-101. The project comprises the Beatons Creek deposit, located at Nullagine, in the Pilbara region of Western Australia. The previous MRE was prepared by QPs, Dr Simon Dominy and Dr Quinton Hennigh, and originally reported in an amended and restated technical report titled ‘Mineral Resource Update, Beatons Creek Conglomerate Gold Project, Pilbara Region, Western Australia’ with an effective date of February 28, 2019 (Dominy and Hennigh, 2019). The previous MRE was also included in the Technical Report titled ‘Preliminary Economic Assessment on the Beatons Creek Gold Project, Western Australia’ with an effective date of February 5, 2021 (Optiro, 2021).

The updated MRE has been prepared by Ms Janice Graham of Snowden Optiro, in collaboration with Dr Simon Dominy of Novo. The authors, by virtue of experience and qualifications, are Qualified Persons, as defined in NI 43-101. Ms Graham is independent of Novo. Dr Dominy is not independent of Novo.

The MRE was undertaken with reference to the CIM Best Practice Guidelines (CIM, 2019) and reported according to the CIM Definition Standards (CIM, 2014).

14.2 Assumptions, Methods and Parameters

The estimates have been prepared using the following workflow:

- Data validation;
- Data preparation;
- Exploratory data analysis;
- Geological interpretation and modeling;
- Compositing of assay intervals;
- Consideration and treatment of extreme grades;
- Variogram analysis;
- Creation of block models;
- Grade estimation;
- Model validation;
- Depletion;
- Classification of estimates according to the CIM Definition Standards; and
- Resource tabulation and resource reporting.

The estimate has been completed using Datamine Studio RM v 1.11.300. All statistical analysis has been undertaken using Snowden Supervisor v 8.14.

14.3 Data Provided

The drillhole data used for the Beatons Creek MRE have been exported from Novo’s secure Geobank database and provided in .csv format. The data were provided in two exports: the grade control database and the resource database, both dated June 17, 2022. The data cut-off date was May 27, 2022. A digital terrain model for topographic elevation was provided by Novo, together with wireframe solids for each of the 79 mineralized domains. The pre-mining topographic surface was constructed from LiDAR survey data, surveyed in 2015. The mineralization wireframes were created in Vulcan by Novo and were imported into Datamine Studio RM. Novo provided a weathering surface representing the top of the fresh material, determined from downhole logging.

14.4 Data used in the 2022 Mineral Resource Estimate

The project database comprises several generations of drilling campaigns by various operators prior to acquisition by Novo. The database has been reviewed and selected data have been excluded (Table 14.1). The site geology team provided lists of holes to be excluded from the interpretation.

Table 14.1. Summary of data excluded from the current MRE.

Excluded holes	Number of holes	Reason for exclusion
RAB holes	445	RAB data not suitable for estimation
1984 RC holes	77	Split manually with aqua regia analysis and no QA/QC Erratic results and potential GPS mislocation mean these are not used to constrain grade shells
2016 costeans hole IDs 16TP	36	Grab samples from trial mine benches
2017 costeans hole IDs WRM	4	Grab samples from windrows
06BCRC series	6	Spear-sampled holes
BC15 series	8	Outside Beatons Creek area
Bulk sample/costean no assays	21	Bulk samples with no assays
BCRC - site exclusions	18	Superseded by grade control twins
BCC - site exclusions	25	Superseded by grade control twins or no assays or not associated with lodes
2018 RC holes no assay	24	Waste characterization holes
BSX erroneous collar	3	Bulk sample ID in database as collar
DS series	7	Outside Beatons Creek area
1984 DD hole (IN1)	1	No assays or lithology
ND14DD-001	1	Outside Beatons Creek area
BCDD18-017 - redrilled BCDD18-017a	1	Superseded by re-drill
NRB series	13	2015 holes outside Beatons Creek area or no assays
RRRC12 series	8	Outside area
WRDMB series	11	Environmental holes, no gold assays
WW2	1	RAB hole and spear-sample first 50 m
South Hill grade control - assays not returned	202	Assays not returned at database cut-off
Golden Crown grade control - assays not returned	64	Assays not returned at database cut-off
Grant’s Hill Fresh grade control - assays not returned	33	Assays not returned at database cut-off
2020 grade control holes not assayed	20	Holes not assayed
2021 grade control holes not assayed	16	Holes not assayed
3 Edwards, 2 Golden Crown and Grants Hill 3 - holes no assay	8	Holes not assayed
Costeans	985	Costeans outside of Edwards with grade bias

Two datasets have been used for the MRE. The first dataset (DH10) comprises the high-quality grade control data and recent diamond drilled metallurgical holes, and was used to estimate the 10 m by 10 m (BM10) model area. The second dataset (DH20) comprises the grade control data and the exploration data which was used to estimate the 20 m by 20 m (BM20) and 40 m by 40 m (BM40) model areas. A summary of the drill data and associated models is provided in Table 14.2.

Table 14.2. Summary of data used for the MRE.

Dataset	Composites	Drill data description	Block model area	Block size
DH10	bc_comp_2207_10	GC data only (high quality Novo drilled, large sample data) composited to 1 m	BM10	10 × 10 × 1
DH20	bc_comp_2207_20	Exploration and GC data composited to 1 m, includes DD, RC, BS and 52 TR samples in Edwards	BM20	20 × 20 × 1
			BM40	40 × 40 × 1

GC – grade control, DD – diamond drill, RC – reverse circulation, BS – bulk sample, TR – trench sample

The BM10 resource was estimated using the DH10 dataset from 13,977 composites sourced from 13,950 RC samples (99.8%) and 27 diamond core samples (0.2%). The BM20 and BM40 resource was estimated from the DH20 dataset from 17,650 composites sourced from 17,186 RC samples (97.4%), 354 diamond core samples (2%), 57 bulk samples (0.3%) and 53 trench channel samples (0.3%). The dataset is summarized in Table 14.3.

Table 14.3. Summary of data by dataset and hole type.

Dataset	Composites	Number of composites	Percentage of hole type
DH10	RC	13,950	99.8%
	DD	27	0.2%
	Total	**13,977**	**100%**
DH20	RC	17,186	97.4%
	DD	354	2.0%
	BS	57	0.3%
	TR	53	0.3%
	Total	**17,650**	**100%**

RC – reverse circulation, DD – diamond drill, BS – bulk sample, TR – trench sample

Figure 14.1 shows the location of the input data intervals for all DH10 samples.

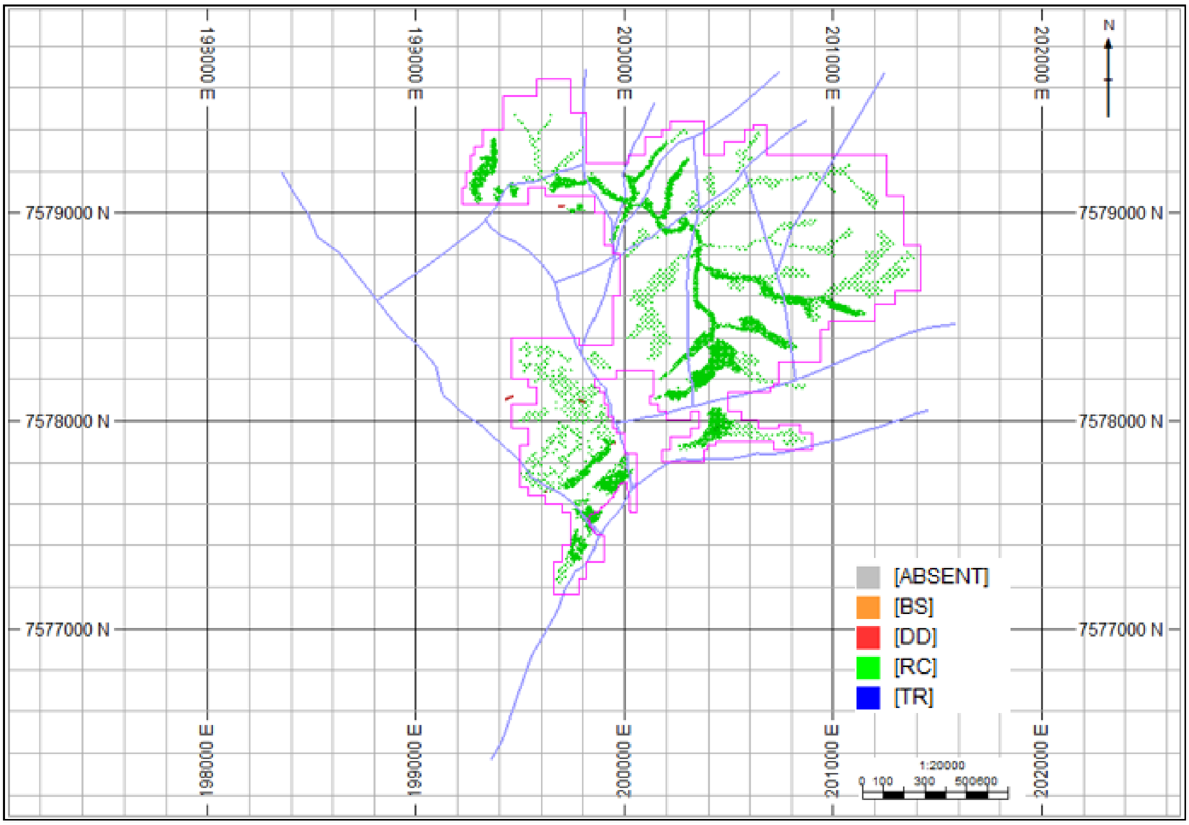


Figure 14.1. Distribution of samples/drillholes (DH10) that inform the BM10 estimate.

Figure 14.2 shows the location of the input data intervals for all DH20 samples.

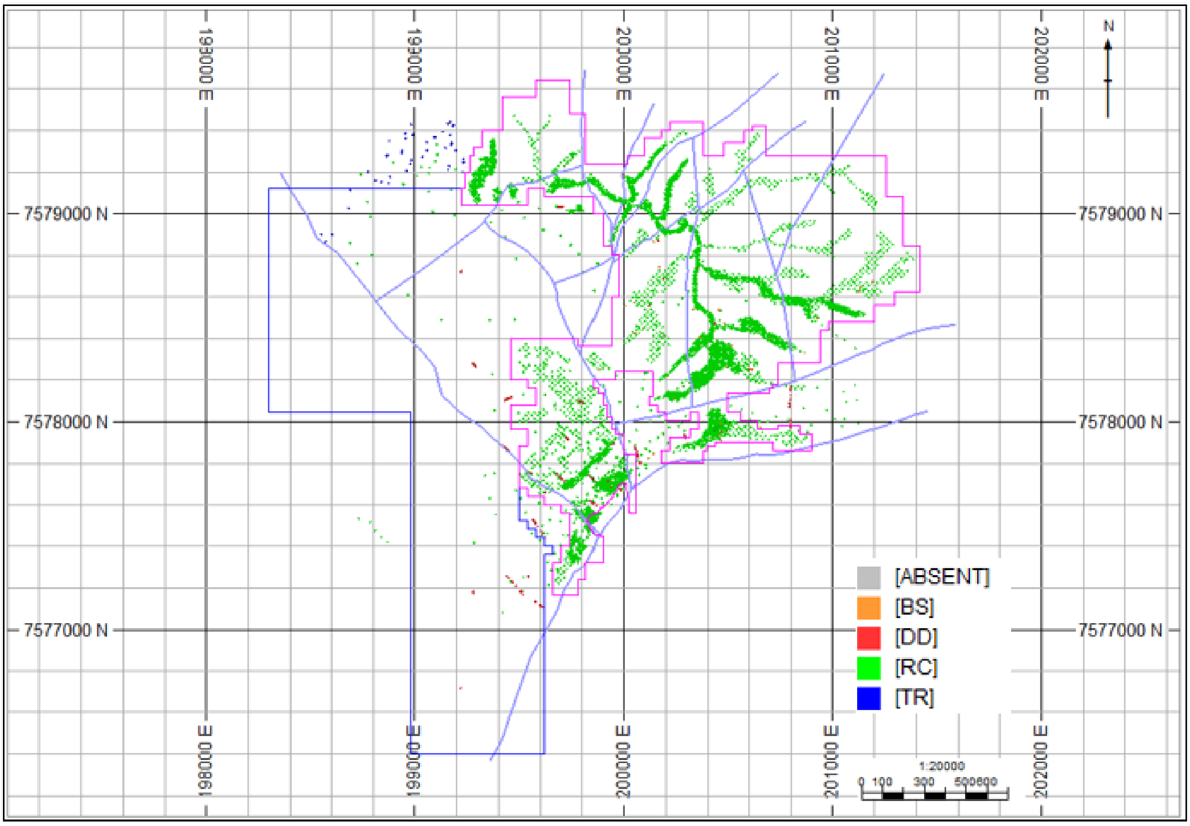


Figure 14.2. Distribution of samples/drillholes (DH20) that inform the BM20 and BM40 estimates.

14.5 Data Validation

Collars, surveys, assays, lithology and specific gravity data have been imported into Datamine format from .csv.

14.5.1 Collars

A collar to topography analysis was undertaken to ensure that the drillhole collars had been picked up correctly. It was identified that 247 collars for grade control holes had not been picked up (Figure 14.3). This oversight occurred during the period from December 2020 to February 2021. The coordinates in the database remain as the planned coordinates. These drillholes are in Grant's Hill and a portion of Central North. While this is not ideal, the areas these holes exist in have been mined out and therefore inclusion of these holes with the planned collar coordinates presents minimal risk to the resource. No additional survey issues have been identified.

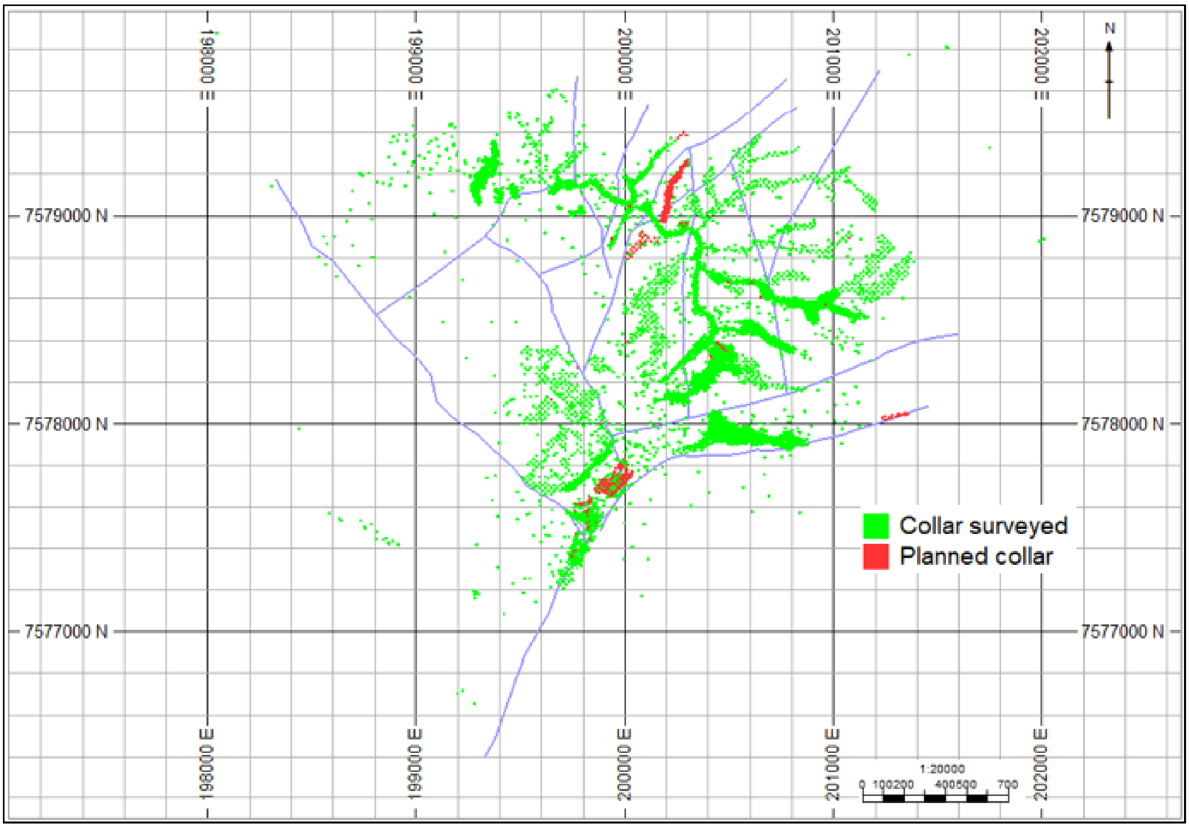


Figure 14.3. Plan view showing areas where collars were not picked up.

14.5.2 Surveys

Downhole surveys were reviewed to ensure that the database did not contain any erratic survey measurements. Many of the drillholes are vertical. Each record was reviewed to determine if there were issues, and no problems were identified.

14.5.3 Assays

Analysis of 1,203 LeachWELL samples with FA on the tails/residues was undertaken during the 2011 to 2018 period. The database contained samples that were assayed by the LeachWELL method which did not have the tails assayed. Based on the analysis of all the FA tails, a correction factor was determined and applied to the remaining LeachWELL samples. Samples with any other assay method have not been corrected.

The following LeachWELL correction factors have been applied:

- For samples where AU_PPM was greater than or equal to 0.10 g/t Au and less than 0.50 g/t Au, a correction factor of 1.12 was applied.
- For samples where AU_PPM was greater than or equal to 0.50 g/t Au and less than 2.00 g/t Au, a correction factor of 1.09 was applied.
- Where AU_PPM was greater than or equal to 2.00 g/t, Au a factor of 1.05 has been applied.

All assay samples have been reviewed for overlaps and duplicate records; no issues have been identified.

Some assay data have changed since the 2019 MRE. A change in the ranking priorities has been implemented, setting LeachWELL assays to have a higher priority than FA for the 2011 RC holes. The QPs consider this is reasonable – LeachWELL represents a large assay charge size and is therefore likely to be more representative.

14.5.4 Lithology

All lithology intervals have been reviewed for overlaps and duplicate records; no issues have been identified.

The data used in the 2022 Beatons Creek MRE have been reviewed, with validation checks showing no material issues with the database supplied.

14.6 Geological Interpretation and Modelling

Mineralization is present as either fluvial channel or marine lag conglomerates. Fluvial type channel conglomerates are typically clast-supported, heterolithic, pebble-to-cobble conglomerates with occasional boulders. Individual channels are often up to 50 m across and can be traced over hundreds of meters. Thicknesses vary between 0.5 m and several meters. Clasts are dominantly sandstone, conglomerate, siltstone, and shale, most likely locally derived from the nearby Mosquito Creek Formation. Marine lags are typically tightly packed, clast-supported cobble-to-boulder conglomerates. Individual boulders can exceed 1 m diameter and are of a heterolithic composition, but are dominated by siliceous dromedary clasts, vein quartz and chert. Individual lags are 0.3 m to 1.5 m thick and sheet-like, being continuous over hundreds of meters, with the main two marine lags continuous over 2.5 km.

From a geological modeling perspective, the lags and channels provide relative end-members of ease/difficulty (Figure 14.4). The lags are easy to model, given their continuous nature, whereas the channels are geometrically more complex and difficult to resolve, particularly when informed predominantly by RC drilling. In some areas, such as Golden Crown, there is a complex overlap of both lags and channels which is challenging to model.

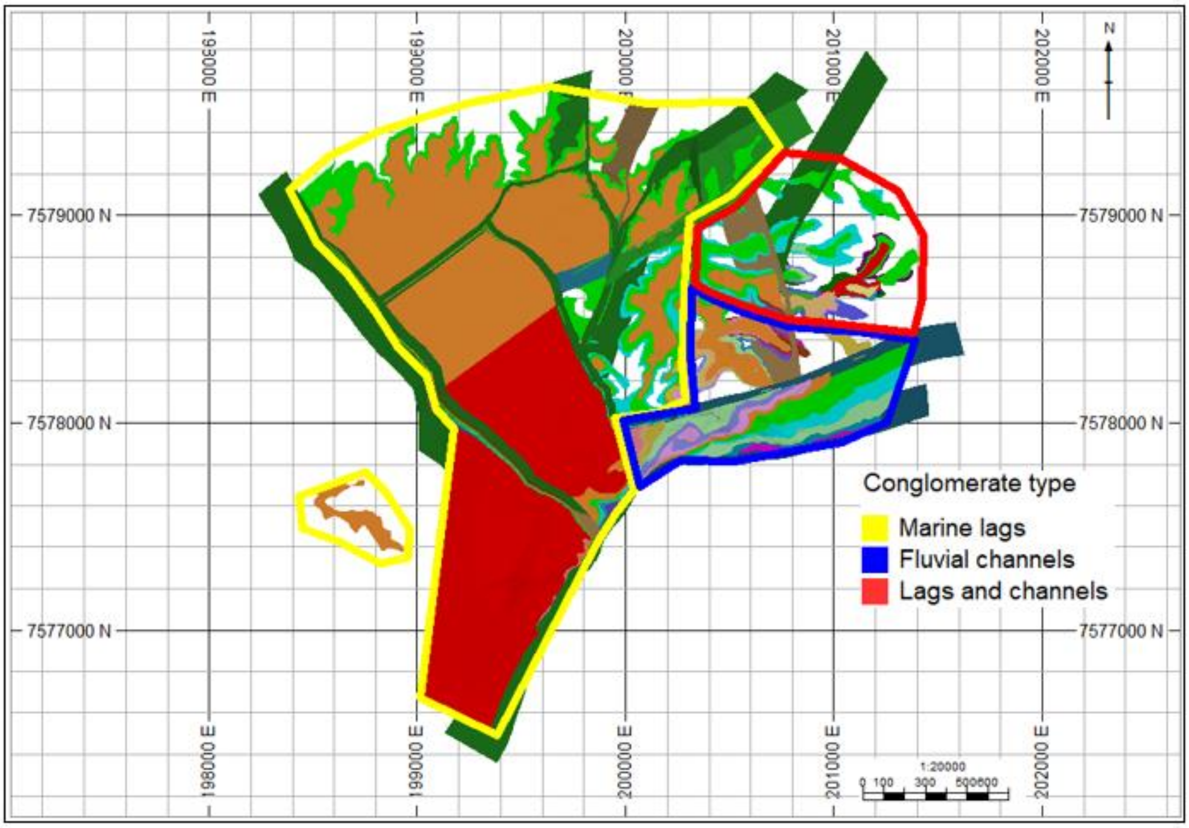
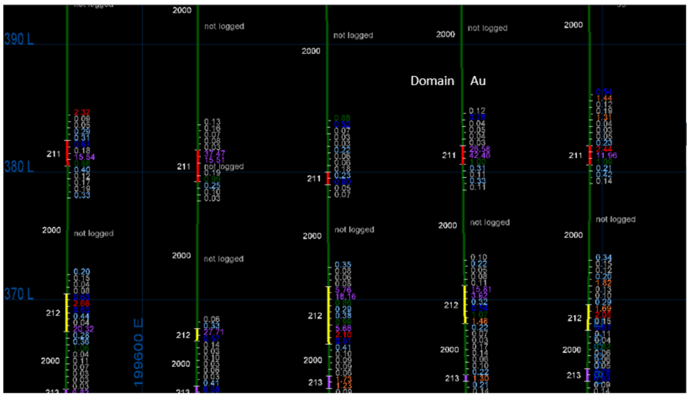


Figure 14.4. Plan showing the extent of the conglomerate mineralization and area by conglomerate type. Area encircled in yellow: marine lags (Grant's Hill, Grant's Hill South, Edwards, Central, North and Central North); in blue: fluvial channels (South Hill and part of Golden Crown); and in red: complex interplay of lags and channels (part of Golden Crown).

The domain (conglomerate mineralization) wireframes were constructed from grade and geological inputs (e.g., RC chip or diamond core logging and/or surface mapping data) where available. Domains have a minimum thickness of 0.5 m, controlled by the RC hole sample length, and have been modelled to a 0.5 g/t Au cut-off grade. The use of 0.5 m (post-2020 resource development and grade control drilling) and 1 m (pre-2020 exploration drilling) RC sampling leads to overestimation of the true mineralization thickness, as the 0.5 g/t Au cut-off results in adjacent samples spanning the true thickness boundaries. Since the mineralization mean grades are higher than the boundary cut-off, spanning samples will generally be included in the domain. The boundary sample may be outside the domain, but its diluted average grade can still be >0.5 g/t Au. This over-modeling is unavoidable given the nature of the RC drilling and sampling process. This results in a partially diluted geological model whose effects will not be uniform across the deposit, and will vary with thickness and grade. This feature reinforces the need for visual control during mining to ensure extraction to the hangingwall and footwall contact. It can be argued that the grade 'dilution' matches the mining approach.

Another effect seen within the mineralization, particularly marine lags, is the 'boulder effect', whereby dromedary boulders may locally yield a grade below 0.5 g/t Au, despite being within a high-grade zone. The wireframe construction process allows for inclusion of grades below 0.5 g/t Au where continuity can be reasonably assumed.

Vulcan software was used to generate all 3D surfaces and solids to define the faults and mineralized conglomerates at Beatons Creek. The Vulcan drillhole database uses a geological interpretation table to flag the 'from' and 'to' intervals of interpreted mineralized and waste geological groups. Each of these geological groups is represented by an individual numeric code, referred to as a domain code. The domain code identifies and separates these geological domains spatially and by grade. Figure 14.5 illustrates the drillhole trace colored by domain and labelled with domain code and gold grade in parts per million (ppm). The corresponding geological table 'interp' with domain intervals, domain, lode, and weathering code is on the right in Figure 14.5. This table facilitates the rapid modeling process that honors the contact point data.



GHF0522

COLLAR | SURVEY | ASSAYS | INTERP | SAMPLES | MINERALS | XRF | STRUCTURE | LITHOLOGY

	FROM	TO	DOMAIN	LODE	WEATHERING
1	0.000	18.500	1000	CGL	OXI
2	18.500	28.000	2000	CGL	FRS
3	28.000	28.500	210	M0	FRS
4	28.500	46.000	2000	CGL	FRS
5	46.000	47.500	211	M1	FRS
6	47.500	57.000	2000	CGL	FRS
7	57.000	60.000	212	M2	FRS
8	60.000	64.000	2000	CGL	FRS
9	64.000	64.500	213	M3	FRS
10	64.500	75.000	2000	CGL	FRS

Figure 14.5. Geological interpretation of drillholes.

The interpretation of the mineralized domains (Figure 14.6) is predominantly driven by grade, with surface mapping and grab samples (note: grab samples are not used in the MRE) providing additional guidance. The interpreted mineralized marine lag domains are generally narrow, continuous horizons, while the channelized mineralization domains are discontinuous horizons that exhibit pinching and swelling. Both the discrete lag and channel domains have a minimum thickness of 0.5 m, are modelled to a 0.5 g/t Au cut-off grade, and are fault bound.

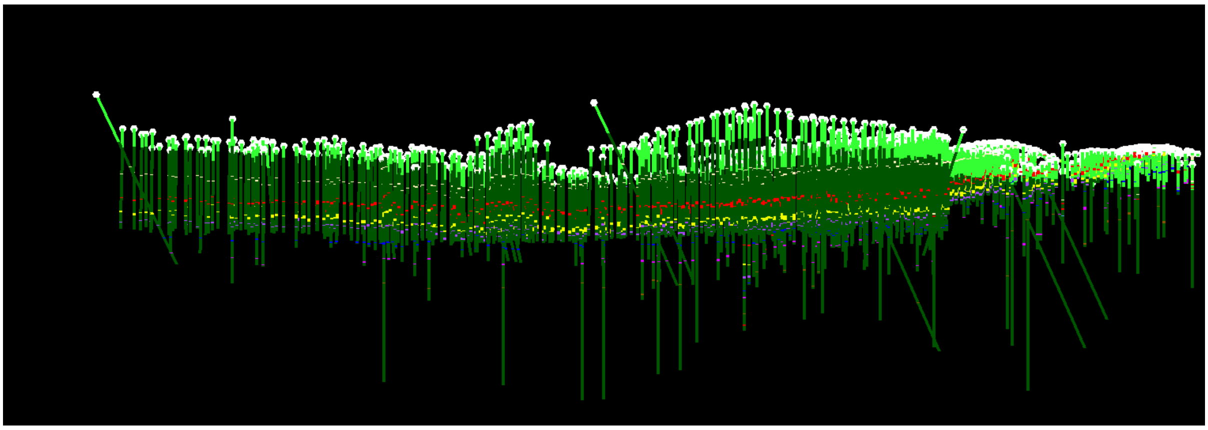


Figure 14.6. Grant's Hill fault block – drillhole interpretations looking southeast.

Wireframing of the domains uses the 'gridding' technique. Gridding is a two-dimensional semi-automated modeling technique used to generate wireframe surfaces in Vulcan. This is a faster approach than the manual generation of wireframes based on sectional polygons and/or string work. The technique generates smoother surfaces and removes the crenulated, serrated edge effects from sectional polygons and/or strings. This technique does not generate enclosed wireframes, so upper and lower surfaces require additional steps, such as a booleaning process, to convert the wireframe surfaces to 3D closed solids.

The gridding process uses contact points extracted from the geological interpretation table (Figure 14.7). For each domain code, an upper and lower surface intercept contact are extracted for modeling. In addition, guide points can be incorporated to improve the surface where there are no data or data coverage is sparse. These point data are stored as Vulcan layers, with the nomenclature denoting the data source by surface location, domain code and point data confidence, i.e., base_210_I and base_210_G.

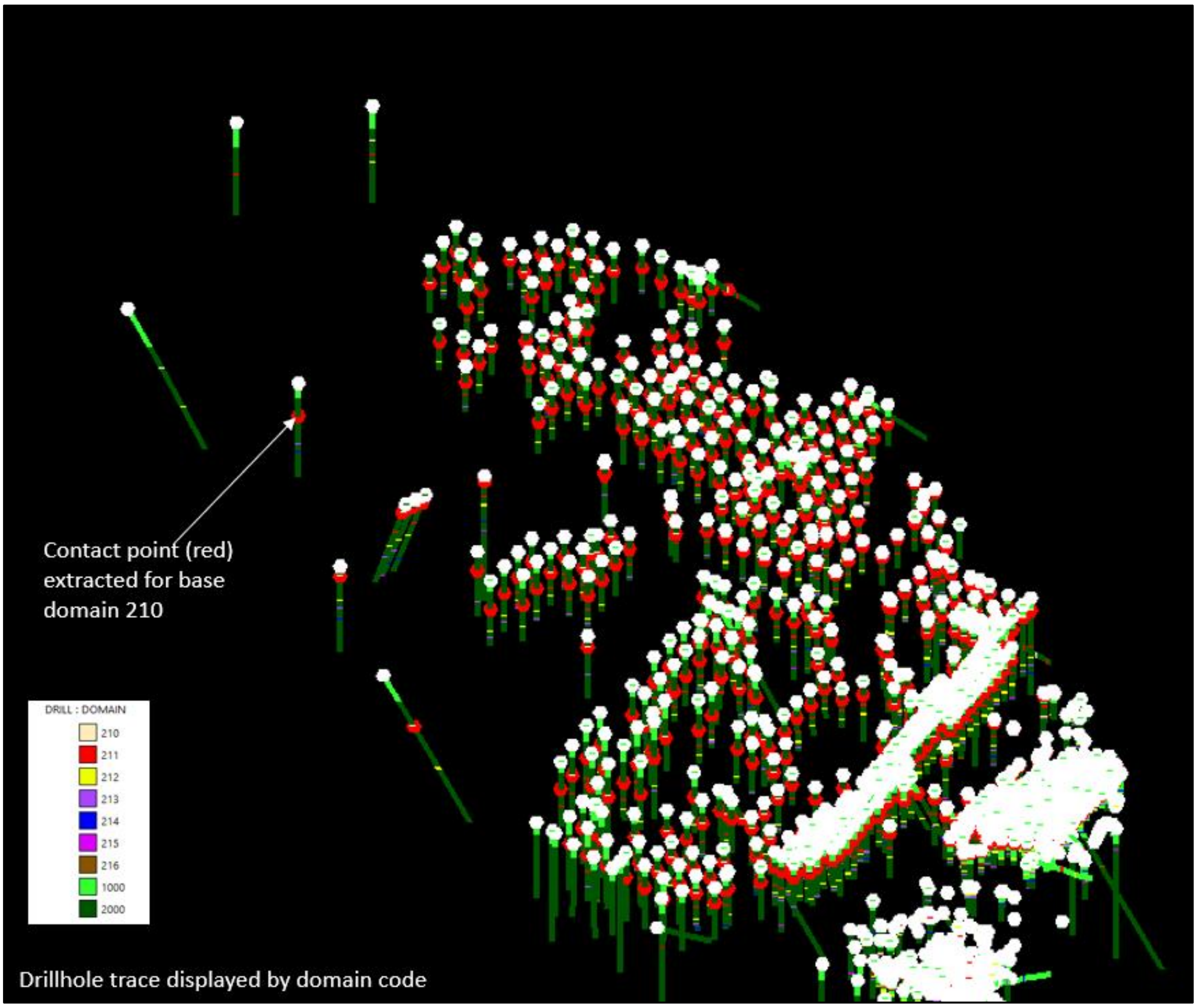


Figure 14.7. Extracted contact point for Domain 210 base.

The extracted data points are reviewed for any discrepancies in densely covered areas and/or twinned holes that may result in spikes or depressions in the surface. This can occur when RC holes and channel samples are twinned, resulting in the base of the channel being deleted.

The gridding method and parameters use an inverse distance modeling algorithm. The method searches around each grid node for a minimum number of points to use to interpolate the grid node value. The grid node values are determined by taking a weighted average of the collected data points. The closer a drillhole is to the grid node, the greater the effect it will have on the calculated node value. All data points, and thus the interpreted domain intercepts, are honored. The modeling parameters require a manual input for specifications defining the minimum and maximum extents of the surface and the grid size; in general, half the drill spacing is deemed appropriate. A command file is executed in Vulcan T shell to generate the surface. Figure 14.8 illustrates an example of the base surface generated and the corresponding contact points.

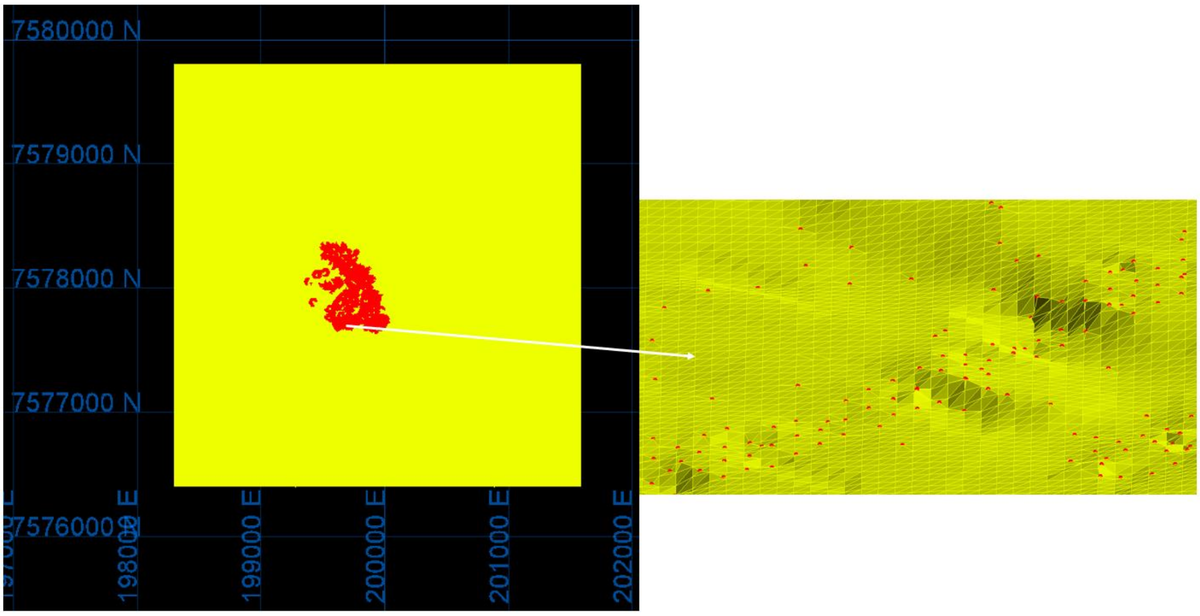


Figure 14.8. Wireframe of Domain 210 base.

The modeling process is repeated for the relevant upper contact. The upper and lower 2D wireframes are booleaned together with a solid of the bounding fault block (Figure 14.9) to form the final 3D solid, as displayed in Figure 14.10.

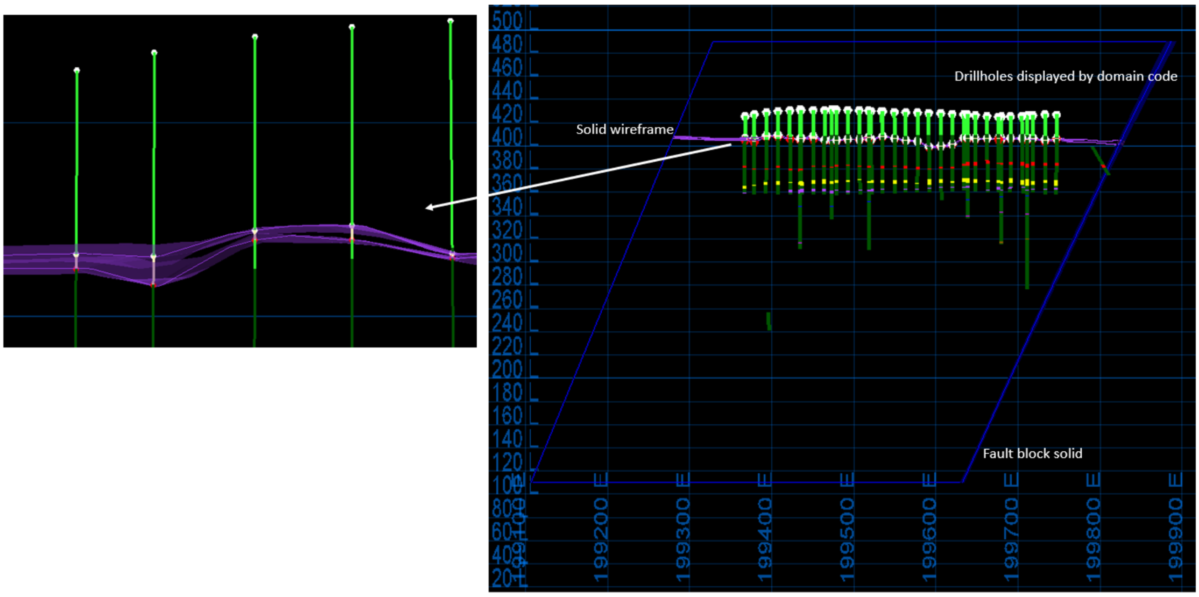


Figure 14.9. Boolean join of domain surfaces and fault block.

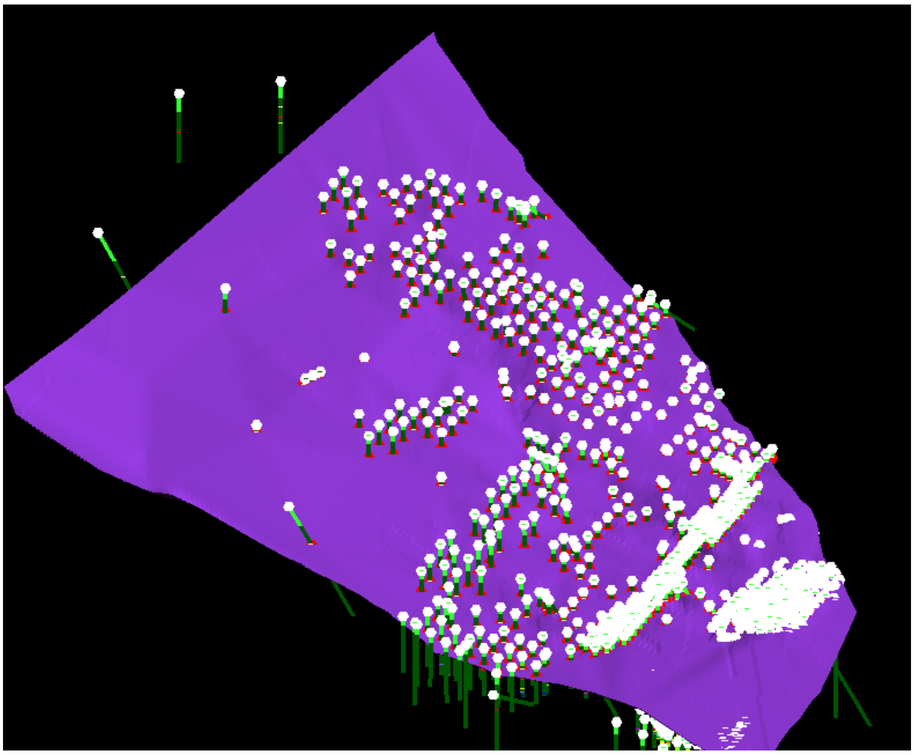


Figure 14.10. Solid wireframe of Domain 210.

Figure 14.11 summarizes the spatial extent of the mineralization wireframes used in the estimate as displayed in Datamine.

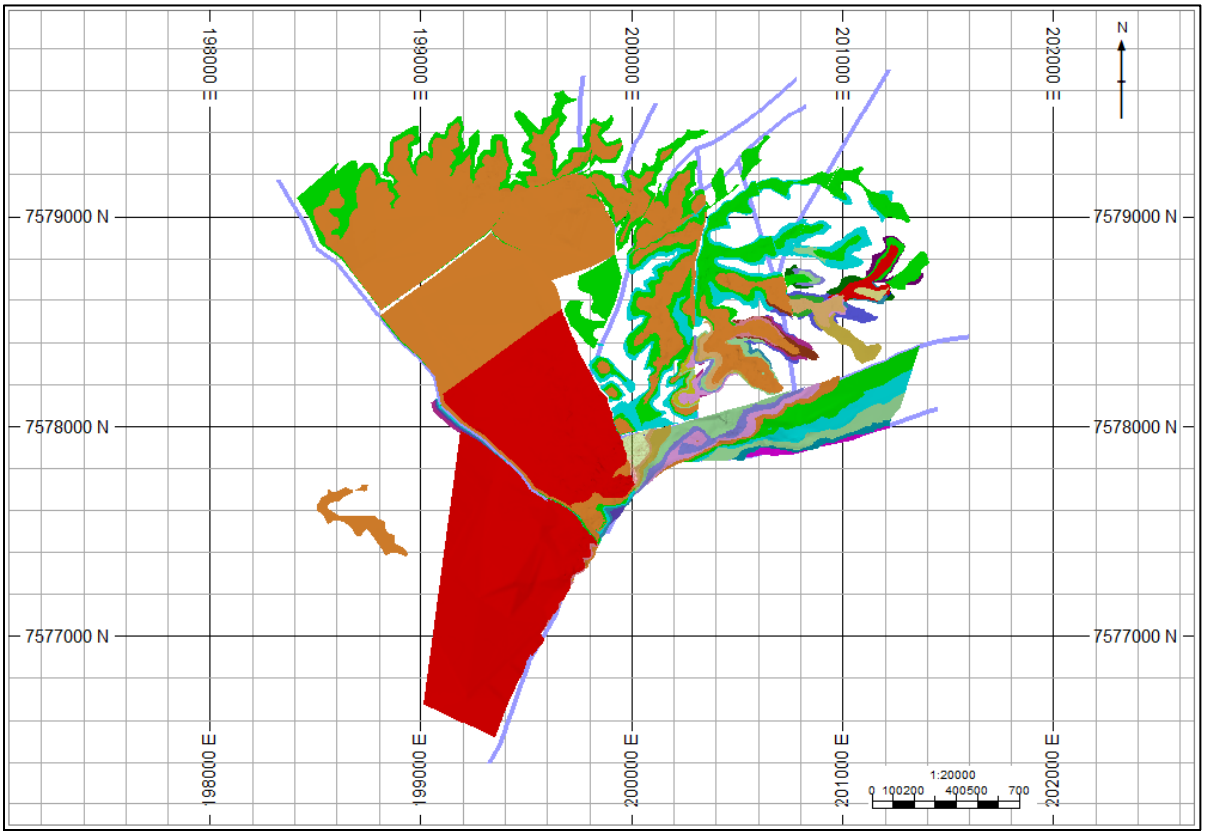


Figure 14.11. Spatial extent of the mineralization wireframes used in the estimate (Datamine image).

The mineralization wireframes produced in Vulcan were imported into Datamine and have been used to code the drillhole database by fault block, lag type, lag number and mineralization domain. The domain code is assigned based on individual wireframes made up from adding together the fault block, lag type and lag number. The estimation domain (DOMAIN field in Datamine) is the field used for estimation, within which all analysis, estimation and validation has been undertaken (Table 14.4).

Table 14.4. Summary of estimation domains.

2207 MRE Wireframe Name	Style	DOMAIN	FBLOCK	LAG TYPE	LAGNO	Description
2207_mre_ghs_110	Solid	110	100	10	0	Marine Lag M0 - Grant's Hill South
2207_mre_ghs_111	Solid	111	100	10	1	Marine Lag M1 - Grant's Hill South
2207_mre_ghs_112	Solid	112	100	10	2	Marine Lag M2 - Grant's Hill South
2207_mre_ghs_113	Solid	113	100	10	3	Marine Lag M3 - Grant's Hill South
2207_mre_ghs_114	Solid	114	100	10	4	Marine Lag M4 - Grant's Hill South
2207_mre_ghs_115	Solid	115	100	10	5	Marine Lag M5 - Grant's Hill South
2207_mre_ghs_116	Solid	116	100	10	6	Marine Lag M6 - Grant's Hill South
2207_mre_ghs_117	Solid	117	100	10	7	Marine Lag M0b - Grant's Hill South
2207_mre_ghs_118	Solid	118	100	10	8	Marine Lag M1b - Grant's Hill South
2207_mre_ghs_120	Solid	120	100	20	0	Marine Lag - Grant's Hill Splay
2207_mre_ghs_121	Solid	121	100	20	1	Marine Lag - Grant's Hill Splay
2207_mre_ghs_122	Solid	122	100	20	2	Marine Lag - Grant's Hill Splay
2207_mre_ghs_123	Solid	123	100	20	3	Marine Lag - Grant's Hill Splay
2207_mre_ghs_124	Solid	124	100	20	4	Marine Lag - Grant's Hill Splay
2207_mre_ghs_125	Solid	125	100	20	5	Marine Lag - Grant's Hill Splay

2207 MRE Wireframe Name	Style	DOMAIN	FBLOCK	LAG TYPE	LAGNO	Description
2207_mre_fw_129	Solid	129	100	20	9	Grant's Hill South - isolated mesa lag
2207_mre_gh_210	Solid	210	200	10	0	Marine Lag M0 - Grant's Hill
2207_mre_gh_211	Solid	211	200	10	1	Marine Lag M1 - Grant's Hill
2207_mre_gh_212	Solid	212	200	10	2	Marine Lag M2 - Grant's Hill
2207_mre_gh_213	Solid	213	200	10	3	Marine Lag M3 - Grant's Hill
2207_mre_gh_214	Solid	214	200	10	4	Marine Lag M4 - Grant's Hill
2207_mre_gh_215	Solid	215	200	10	5	Marine Lag M5 - Grant's Hill
2207_mre_gh_216	Solid	216	200	10	6	Marine Lag M6 - Grant's Hill
2207_mre_sh_340	Solid	340	300	40	0	Channel Lag 1 - South Hill
2207_mre_sh_341	Solid	341	300	40	1	Channel Lag 2 - South Hill
2207_mre_sh_342	Solid	342	300	40	2	Channel Lag 3 - South Hill
2207_mre_sh_343	Solid	343	300	40	3	Channel Lag 4 - South Hill
2207_mre_sh_344	Solid	344	300	40	4	Channel Lag 5 - South Hill
2207_mre_sh_345	Solid	345	300	40	5	Channel Lag 6 - South Hill
2207_mre_sh_346	Solid	346	300	40	6	Channel Lag 7 - South Hill
2207_mre_sh_347	Solid	347	300	40	7	Channel Lag 8- South Hill
2207_mre_sh_348	Solid	348	300	40	8	Channel Lag 9 - South Hill
2207_mre_sh_349	Solid	349	300	40	9	Channel Lag 10 - South Hill
2207_mre_sh_350	Solid	350	300	40	10	Channel Lag 11 - South Hill
2207_mre_sh_351	Solid	351	300	40	11	Channel Lag 12 - South Hill
2207_mre_central_411	Solid	411	400	10	1	Marine Lag M1 - Central
2207_mre_central_412	Solid	412	400	10	2	Marine Lag M2 - Central
2207_mre_central_413	Solid	413	400	10	3	Marine Lag M3 - Central
2207_mre_central_431	Solid	431	400	30	1	Channel Lag 1 - Central
2207_mre_central_433	Solid	433	400	30	3	Channel Lag 2 - Central
2207_mre_central_434	Solid	434	400	30	4	Channel Lag 3 - Central
2207_mre_nth_west_sub_512	Solid	512	500	10	2	Marine Lag M2 - Northwest sub-block
2207_mre_nth_west_611	Solid	611	600	10	1	Marine Lag M1 - North
2207_mre_nth_west_612	Solid	612	600	10	2	Marine Lag M2 - North
2207_mre_north_b_711	Solid	711	700	10	1	Marine Lag M1 - Northwest (east of internal fault)
2207_mre_north_b_712	Solid	712	700	10	2	Marine Lag M2 - Northwest (east of internal fault)
2207_mre_north_a_721	Solid	721	700	20	1	Marine Lag M1 - Northwest (west of internal fault)
2207_mre_north_a_722	Solid	722	700	20	2	Marine Lag M2 - Northwest (west of internal fault)
2207_mre_central_nth_811	Solid	811	800	10	1	Marine Lag M1 - Central North
2207_mre_central_nth_812	Solid	812	800	10	2	Marine Lag M2 - Central North
2207_mre_gc_911a	Solid	911	900	10	1	Marine Lag M1 - Golden Crown
2207_mre_gc_912a	Solid	912	900	10	2	Marine Lag M2 - Golden Crown fault block a
2207_mre_gc_912b	Solid	912	900	10	2	Marine Lag M2 - Golden Crown fault block b
2207_mre_gc_912c	Solid	912	900	10	2	Marine Lag M2 - Golden Crown fault block c
2207_mre_gc_912d	Solid	912	900	10	2	Marine Lag M2 - Golden Crown fault block d
2207_mre_gc_913a	Solid	913	900	10	3	Marine Lag M3 - Golden Crown fault block a
2207_mre_gc_913b	Solid	913	900	10	3	Marine Lag M3 - Golden Crown fault block b
2207_mre_gc_913c	Solid	913	900	10	3	Marine Lag M3 - Golden Crown fault block c
2207_mre_gc_931	Solid	931	900	30	1	Channel Lag 1 - Golden Crown fault block a
2207_mre_gc_932	Solid	932	900	30	2	Channel Lag 2 - Golden Crown fault block a
2207_mre_gc_933	Solid	933	900	30	3	Channel Lag 3 - Golden Crown fault block a
2207_mre_gc_934	Solid	934	900	30	4	Channel Lag 4 - Golden Crown fault block a
2207_mre_gc_935	Solid	935	900	30	5	Channel Lag 5 - Golden Crown fault block a
2207_mre_gc_936	Solid	936	900	30	6	Channel Lag 6 - Golden Crown fault block a

2207 MRE Wireframe Name	Style	DOMAIN	FBLOCK	LAG TYPE	LAGNO	Description
2207_mre_gc_937	Solid	937	900	30	7	Channel Lag 7 - Golden Crown fault block a
2207_mre_gc_938	Solid	938	900	30	8	Channel Lag 8 - Golden Crown fault block a
2207_mre_gc_951a	Solid	951	900	50	1	Channel Lag 1 - Golden Crown fault block a
2207_mre_gc_951b	Solid	951	900	50	1	Channel Lag 1 - Golden Crown fault block b
2207_mre_gc_952	Solid	952	900	50	2	Channel Lag 2 - Golden Crown fault block b
2207_mre_gc_953	Solid	953	900	50	3	Channel Lag 3 - Golden Crown fault block b
2207_mre_gc_954	Solid	954	900	50	4	Channel Lag 4 - Golden Crown fault block b
2207_mre_gc_955	Solid	955	900	50	5	Channel Lag 5 - Golden Crown fault block b
2207_mre_gc_956	Solid	956	900	50	6	Channel Lag 6 - Golden Crown fault block b
2207_mre_gc_957a	Solid	957	900	50	7	Channel Lag 7 - Golden Crown fault block a
2207_mre_gc_957b	Solid	957	900	50	7	Channel Lag 7 - Golden Crown fault block b
2207_mre_gc_958	Solid	958	900	50	8	Channel Lag 8 - Golden Crown fault block b
2207_mre_gc_959	Solid	959	900	50	9	Channel Lag 9 - Golden Crown fault block b
2207_mre_gc_960	Solid	960	900	50	10	Channel Lag 10 - Golden Crown fault block b
2207_mre_gc_961a	Solid	961	900	50	11	Channel Lag 11 - Golden Crown fault block a
2207_mre_gc_961b	Solid	961	900	50	11	Channel Lag 11 - Golden Crown fault block b
2207_mre_gc_962	Solid	962	900	50	12	Channel Lag 12 - Golden Crown fault block b
2207_mre_gc_963a	Solid	963	900	50	13	Channel Lag 13 - Golden Crown fault block a
2207_mre_gc_963b	Solid	963	900	50	13	Channel Lag 13 - Golden Crown fault block b
2207_mre_gc_964	Solid	964	900	50	14	Channel Lag 14 - Golden Crown fault block b
2207_mre_gc_965	Solid	965	900	50	15	Channel Lag 15 - Golden Crown fault block b
2207_mre_gc_966	Solid	966	900	50	16	Channel Lag 16 - Golden Crown fault block b
2207_mre_nth_west_1011	Solid	1011	1000	10	1	Marine Lag M1 - Edwards
2207_mre_nth_west_1012	Solid	1012	1000	10	2	Marine Lag M2 - Edwards

The pre-mining topographic surface wireframe has been used to code all data below the topography, and the wireframe representing the top of the fresh material has been used to code the data according to oxide and fresh weathering. This coding is summarized in Table 14.5.

Table 14.5. Coding for oxide/fresh boundary and topography.

Wireframe name	Field	Code	Description
oxide_base_20220519 (above)	OX	10000	Oxide material
oxide_base_20220519 (below)	OX	20000	Fresh material
topo_highres (above)	TOPO	0	Above topography
topo_highres (below)	TOPO	1	Below topography

The lag type codes are summarized in Table 14.6. The fault block codes are summarized in Table 14.7 and the layout of fault block codes is illustrated in Figure 14.12.

Table 14.6. Lag type coding.

LAGTYPE	Description
10	Marine Lag type
20	Marine Lag type, internal fault block
30	Golden crown channels, fault block a
40	South Hill channels
50	Golden crown channels, fault block b

Table 14.7. Fault block coding.

FBLOCK	Description
100	Grant's Hill South
200	Grant's Hill
300	South Hill
400	Central
500	Northwest sub
600	North
700	Northwest
800	Central North
900	Golden Crown
1000	Edwards

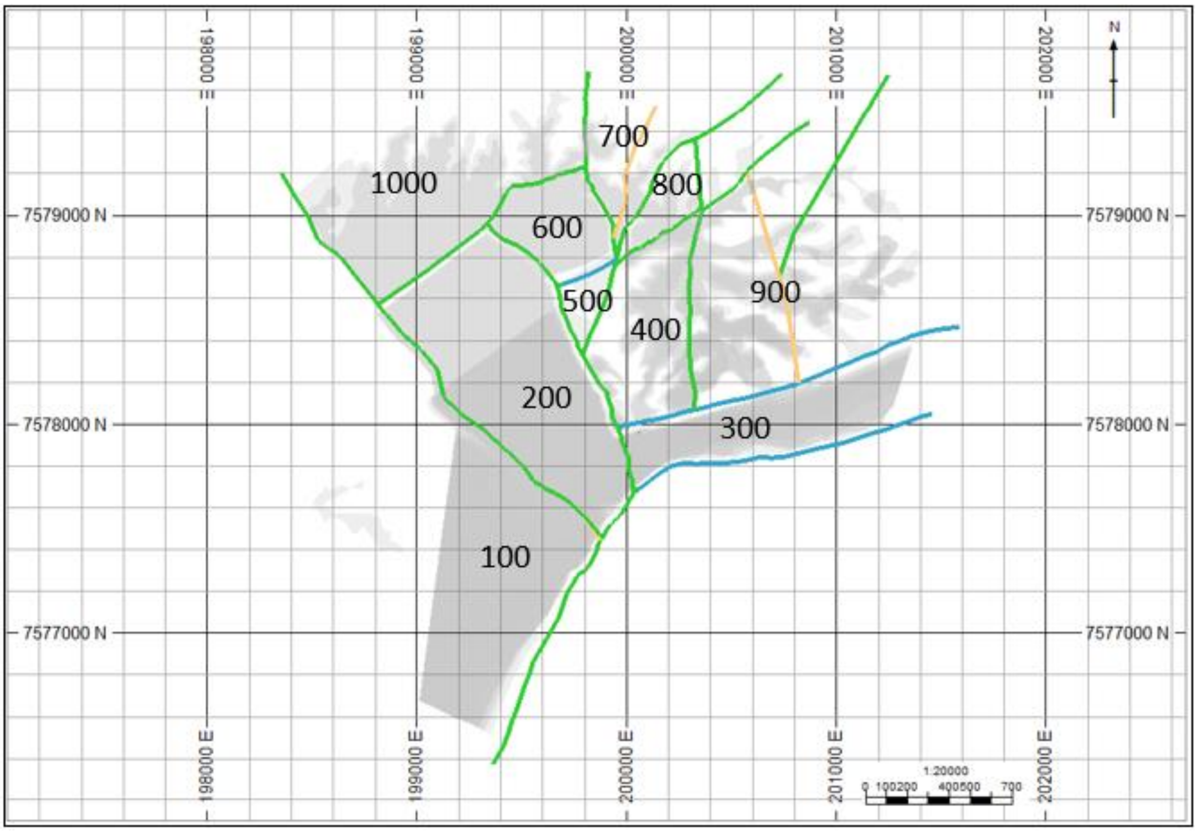


Figure 14.12. Fault block coding.

14.7 Statistical Analysis

14.7.1 Contact analysis

A contact analysis has been undertaken, reviewing the boundary between the oxide and fresh material for all the combined mineralization, the marine lags for Grant's Hill and the marine lags for Grant's Hill South. A contact boundary analysis was performed using contact plots, statistics, box-and-whisker plots and Q-Q plots. A contact plot displaying all mineralization is provided in Figure 14.13 and a box-and-whisker plot of the oxide and fresh gold grades is in Figure 14.14. While in general the fresh material does tend to have an overall higher grade, it is not a sharp/hard boundary across the contact and is more diffuse. Based on the analysis and for the purposes of estimation, a decision was made to use a soft boundary between oxide and fresh.

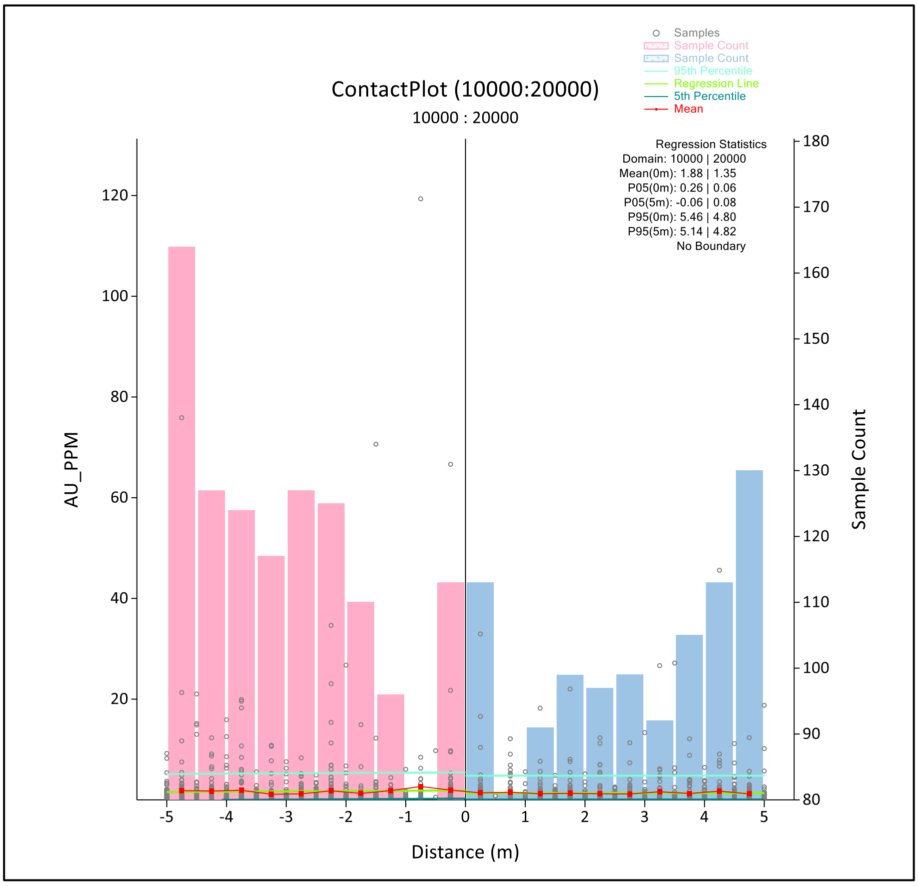


Figure 14.13. Contact analysis plot of all mineralization using DH10 above and below the oxide/fresh boundary.

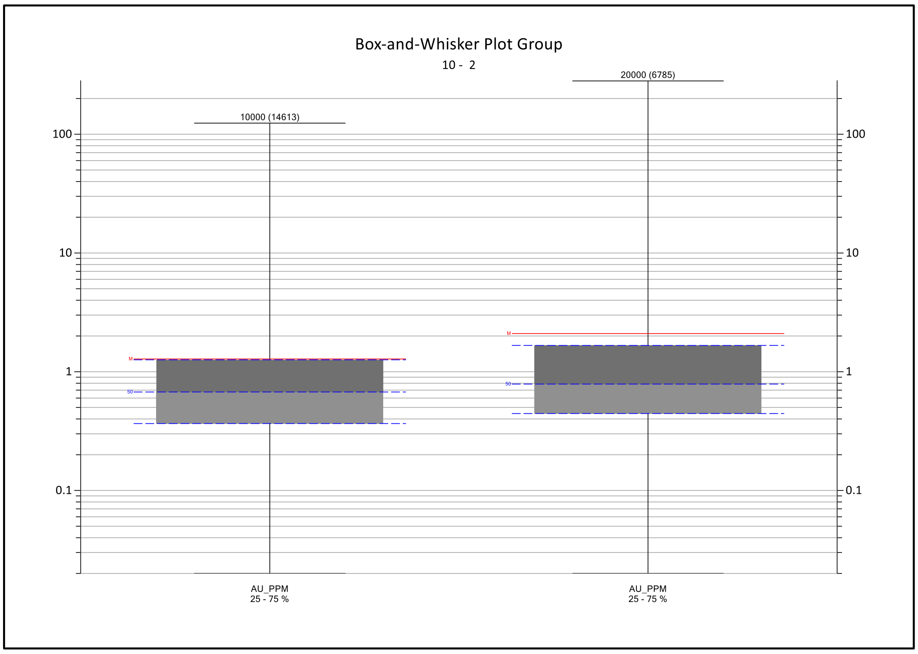


Figure 14.14. Box-and-whisker plot of all mineralization using DH10 between oxide and fresh.

14.7.2 Raw sample analysis

Analysis of the raw samples within all the mineralization domains for the DH10 dataset indicated that the modal sample length of the raw data is 0.5 m, with the average sample length also being 0.5 m (Figure 14.15). This is due to most samples being RC grade control following the 0.5 m sampling protocol.

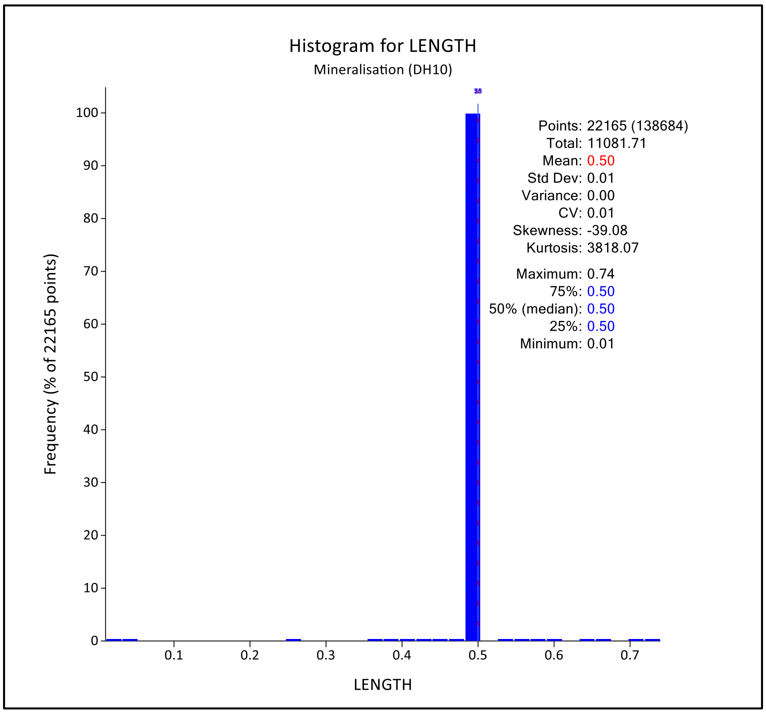


Figure 14.15. Histogram of sample length DH10.

Analysis of the raw samples within all the mineralization domains for the DH20 dataset indicated that the modal sample length of the raw data is 0.5 m, with 85% of the data being at this length. Approximately 12% of the data is at 1 m sample lengths (Figure 14.16). This is due to most samples being RC grade control following the 0.5 m sampling protocol, with the exploration RC and DD samples being sampled at 1 m.

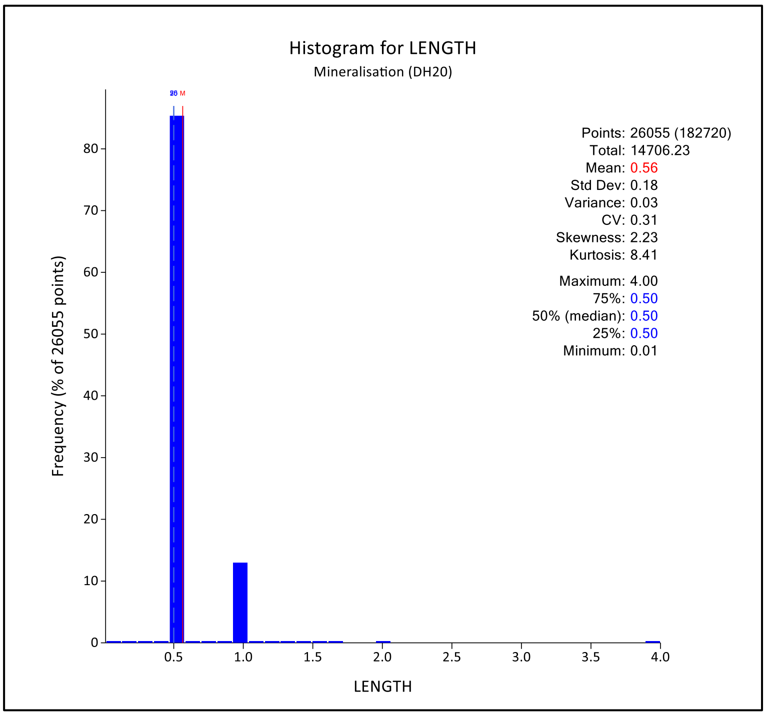


Figure 14.16. Histogram of sample length DH20.

14.8 Compositing of Assay Intervals

Despite the modal sample length being 0.5 m, a compositing length of 1 m has been selected to reduce the variability of the data; this is considered reasonable given that selective mining across the mineralization is not anticipated.

Samples have been composited to 1 m lengths within each domain using the Datamine function COMPDH and the parameter MODE = 1, ensuring that all residuals will be incorporated into the composites and no data lost. A minimum composite length of 0.25 m has been applied.

A comparison between the raw sample and composite sample statistics for each mineralization domain is shown in Table 14.8 (DH10) and Table 14.9 (DH20). There has been a reduction in the grade of the mineralized intercepts due to compositing; however, both the length and metal have been maintained.

Table 14.8. Raw sample and composite sample statistics for each mineralization domain (DH10).

Domain	Number of samples		Mean grade			SD		COV	
	Raw	Composite	Raw	Composite	Difference	Raw	Composite	Raw	Composite
110	205	119	0.99	0.96	-2%	1.01	0.80	1.02	0.83
111	271	160	2.35	2.40	2%	3.66	3.35	1.56	1.39
112	160	100	2.22	2.05	-8%	4.16	2.66	1.87	1.30
117	120	94	0.85	0.80	-5%	1.12	1.11	1.33	1.38
118	141	102	1.61	1.49	-8%	3.61	2.62	2.25	1.76
120	9	7	0.62	0.60	-3%	0.53	0.55	0.86	0.92
121	22	13	2.23	2.20	-1%	2.70	2.33	1.21	1.06
122	16	11	1.89	1.67	-11%	2.25	1.79	1.19	1.07

Domain	Number of samples		Mean grade			SD		COV	
	Raw	Composite	Raw	Composite	Difference	Raw	Composite	Raw	Composite
123	26	15	2.83	3.18	12%	5.64	5.35	1.99	1.69
124	7	6	0.88	0.91	3%	0.57	0.56	0.65	0.61
125	8	5	0.59	0.59	-2%	0.27	0.22	0.46	0.37
210	712	542	1.01	0.86	-14%	4.89	3.34	4.86	3.88
211	1730	1016	4.47	4.37	-2%	12.23	8.85	2.74	2.03
212	2292	1293	2.59	2.52	-3%	5.74	4.50	2.22	1.79
213	1089	726	1.28	1.20	-7%	2.22	1.54	1.74	1.29
214	98	81	0.57	0.54	-4%	0.57	0.53	1.00	0.97
215	6	4	0.90	0.86	-4%	0.76	0.52	0.85	0.60
340	20	15	0.99	0.86	-13%	1.18	0.89	1.19	1.04
341	24	17	1.11	1.10	-1%	0.78	0.60	0.70	0.54
342	37	22	1.50	1.43	-5%	2.11	1.37	1.41	0.96
343	129	84	0.89	0.87	-3%	1.79	1.28	2.01	1.48
344	292	178	0.94	0.90	-4%	1.18	0.82	1.27	0.91
345	270	178	1.06	0.96	-10%	1.57	1.09	1.48	1.14
346	270	176	0.93	0.90	-3%	0.92	0.84	0.99	0.94
347	279	169	1.22	1.14	-7%	1.82	1.42	1.50	1.25
348	243	148	1.23	1.17	-5%	1.37	1.06	1.11	0.91
349	48	29	1.20	1.19	-1%	1.31	0.89	1.09	0.75
350	25	15	1.37	1.31	-4%	1.92	1.21	1.40	0.93
351	10	8	0.89	0.88	-1%	0.56	0.34	0.62	0.38
411	606	380	1.17	1.13	-4%	1.83	1.48	1.57	1.31
412	518	357	0.82	0.79	-4%	1.01	0.88	1.23	1.12
413	294	246	0.67	0.58	-14%	1.77	1.40	2.64	2.42
431	173	103	1.30	1.28	-2%	1.99	1.58	1.53	1.24
433	401	222	1.69	1.67	-1%	2.71	1.98	1.60	1.18
434	236	139	1.30	1.23	-5%	1.73	1.27	1.33	1.03
611	329	197	1.54	1.59	4%	1.64	1.41	1.07	0.89
612	43	36	0.45	0.43	-4%	0.72	0.46	1.60	1.07
711	229	145	1.24	1.17	-5%	1.54	1.12	1.24	0.95
712	211	165	0.80	0.75	-6%	0.79	0.59	0.98	0.79
721	129	83	2.69	2.58	-4%	3.61	2.97	1.35	1.15
722	68	59	0.73	0.70	-4%	0.81	0.77	1.10	1.09
811	244	173	1.32	1.27	-4%	1.46	1.20	1.11	0.95
812	193	158	0.74	0.70	-6%	0.50	0.44	0.68	0.64
911	1023	605	1.08	1.07	-2%	1.55	1.30	1.43	1.22
912	746	543	0.75	0.74	-2%	0.73	0.68	0.98	0.92
913	632	444	0.68	0.68	-1%	1.40	1.21	2.06	1.79
931	178	128	1.76	1.65	-6%	3.72	2.83	2.12	1.71
932	772	437	1.09	1.08	0%	1.78	1.31	1.64	1.21
933	749	429	1.13	1.12	-1%	1.41	1.07	1.25	0.96
934	1381	792	1.28	1.26	-1%	1.78	1.34	1.39	1.06
935	690	394	1.02	1.00	-1%	1.27	0.95	1.25	0.95
936	472	278	1.16	1.15	-1%	1.81	1.34	1.56	1.17
937	89	54	0.86	0.88	3%	0.64	0.57	0.75	0.65
938	198	127	0.96	0.97	0%	0.86	0.67	0.89	0.70
951	226	147	0.97	0.97	0%	1.04	0.87	1.07	0.89
952	7	5	0.83	0.88	6%	0.40	0.41	0.48	0.46

Domain	Number of samples		Mean grade			SD		COV	
	Raw	Composite	Raw	Composite	Difference	Raw	Composite	Raw	Composite
953	23	18	0.94	0.91	-4%	0.89	0.77	0.95	0.85
954	26	18	0.90	0.85	-5%	0.94	0.65	1.05	0.77
955	113	69	0.79	0.80	1%	0.59	0.44	0.74	0.56
956	94	59	1.09	1.04	-4%	0.89	0.60	0.82	0.57
957	364	235	0.74	0.75	1%	0.73	0.58	0.98	0.79
958	51	34	0.79	0.73	-7%	0.56	0.39	0.71	0.53
959	136	80	1.17	1.15	-2%	1.06	0.75	0.90	0.65
960	65	45	0.93	0.87	-6%	0.85	0.63	0.92	0.73
961	232	140	1.22	1.20	-2%	1.82	1.30	1.49	1.08
962	13	9	1.33	1.41	7%	1.00	1.06	0.75	0.75
963	781	496	0.75	0.74	-1%	0.72	0.58	0.96	0.79
964	80	58	0.77	0.78	1%	0.65	0.54	0.84	0.70
965	11	10	0.65	0.64	-2%	0.36	0.37	0.56	0.58
966	150	94	0.79	0.81	2%	0.64	0.54	0.81	0.67
1011	525	331	1.70	1.63	-5%	2.35	1.57	1.38	0.96
1012	105	102	0.48	0.48	0%	0.33	0.33	0.69	0.69
0	105997	57548	0.16	0.16	1%	0.33	0.25	2.10	1.60

Table 14.9. Raw sample and composite sample statistics for each mineralization domain (DH20).

Domain	Number of samples		Mean grade			SD		COV	
	Raw	Composite	Raw	Composite	Difference	Raw	Composite	Raw	Composite
110	276	188	0.97	0.96	-2%	0.99	0.86	1.02	0.90
111	391	253	2.96	2.94	-1%	5.37	4.96	1.81	1.69
112	233	166	1.76	1.70	-3%	3.22	2.22	1.84	1.30
113	46	41	1.38	1.39	0%	2.48	2.43	1.79	1.75
114	18	13	3.45	3.30	-4%	3.61	3.35	1.05	1.02
115	19	13	1.07	1.09	2%	1.46	1.24	1.37	1.14
116	13	10	0.66	0.68	3%	0.61	0.55	0.93	0.81
117	183	155	0.66	0.67	2%	0.89	0.94	1.34	1.39
118	200	155	1.26	1.24	-2%	2.97	2.34	2.36	1.89
123	35	24	2.39	2.64	11%	4.61	4.52	1.93	1.71
124	16	15	1.83	1.68	-8%	2.65	2.45	1.45	1.45
125	15	12	1.07	1.02	-4%	1.32	1.27	1.23	1.24
129	7	7	0.62	0.62	0%	0.43	0.43	0.69	0.69
210	845	670	0.90	0.81	-10%	4.21	3.02	4.67	3.70
211	2036	1296	4.43	4.37	-1%	11.66	9.03	2.64	2.07
212	2683	1635	2.65	2.59	-2%	5.82	4.86	2.20	1.88
213	1305	921	1.22	1.17	-4%	2.02	1.50	1.66	1.28
214	249	220	0.53	0.53	-1%	0.76	0.72	1.43	1.37
215	103	101	0.58	0.58	0%	0.73	0.72	1.27	1.25
216	38	37	0.94	0.95	0%	1.06	1.06	1.13	1.12
340	33	28	0.99	0.92	-7%	1.16	1.02	1.18	1.11
341	39	32	0.67	0.73	10%	0.68	0.61	1.01	0.83
342	71	56	1.03	1.03	0%	1.40	1.05	1.37	1.02
343	184	139	0.83	0.82	-1%	1.54	1.24	1.86	1.51
344	347	231	0.90	0.87	-3%	1.11	0.83	1.24	0.95
345	313	221	0.97	0.90	-7%	1.44	1.05	1.48	1.16
346	310	216	0.85	0.84	-1%	0.88	0.82	1.03	0.97
347	334	218	1.08	1.04	-4%	1.65	1.32	1.53	1.28
348	299	200	1.09	1.06	-2%	1.48	1.18	1.36	1.11
349	81	60	0.90	0.92	2%	1.04	0.83	1.16	0.90

Domain	Number of samples		Mean grade			SD		COV	
	Raw	Composite	Raw	Composite	Difference	Raw	Composite	Raw	Composite
350	45	35	1.02	1.04	2%	1.56	1.19	1.53	1.15
351	24	18	0.56	0.62	10%	0.54	0.46	0.97	0.75
411	731	503	1.21	1.18	-2%	1.71	1.45	1.41	1.23
412	615	454	0.81	0.79	-3%	0.95	0.85	1.16	1.08
413	370	322	0.69	0.61	-12%	1.63	1.38	2.35	2.24
512	10	10	1.19	1.19	0%	0.85	0.85	0.72	0.72
611	361	228	1.52	1.57	3%	1.56	1.37	1.03	0.87
612	60	53	0.40	0.40	0%	0.57	0.41	1.44	1.04
711	251	167	1.26	1.20	-5%	1.47	1.10	1.16	0.92
712	228	182	0.75	0.72	-4%	0.76	0.59	1.02	0.82
721	135	89	2.53	2.46	-3%	3.50	2.91	1.39	1.18
722	72	63	0.70	0.69	-2%	0.78	0.75	1.12	1.10
958	60	43	0.71	0.68	-4%	0.54	0.41	0.77	0.60
1011	651	454	1.54	1.51	-2%	2.09	1.49	1.35	0.99
1012	153	149	0.41	0.43	5%	0.41	0.38	0.99	0.89
0	145793	94693	0.14	0.14	1%	0.36	0.29	2.66	2.15

14.9 Consideration of Extreme Grades and Estimation Methodology

Composites within each of the domains have been analyzed to ensure that the grade distribution is indicative of a single population, with no requirement for additional sub-domaining. Each domain has been reviewed using histograms, log-probability plots and mean -variance plots to identify whether extreme values exist which may unduly influence the estimate. Where extreme grades have been identified, the impact of top-cutting and the values at which top-cuts should be applied has been assessed, and top-cuts selected with the aim of reducing the COV to less than 1.8. Not all domains required a top-cut. Top-cut statistics are provided for DH10 and DH20 in Table 14.10 and Table 14.11, respectively.

Table 14.10. Top-cuts applied to estimation domains (DH10).

Domain	Number of samples		Mean grade			Top-cut value	SD		COV		Max uncut grade
	Uncut	Top-cut	Uncut	Top-cut	Difference		Uncut	Top-cut	Uncut	Top-cut	
111	160	1	2.40	2.35	-2%	20	3.35	3.00	1.56	1.27	28.21
112	100	1	2.05	2.04	0%	20	2.66	2.60	1.87	1.28	20.90
118	102	1	1.49	1.37	-8%	12	2.62	1.75	2.25	1.27	23.79
121	13	2	2.20	2.02	-8%	6	2.33	1.91	1.21	0.95	8.05
123	15	1	3.18	2.34	-26%	10	5.35	2.45	1.99	1.05	22.56
210	542	2	0.86	0.74	-14%	18	3.34	1.23	4.86	1.66	70.55
211	1016	8	4.37	4.12	-6%	40	8.85	6.34	2.74	1.54	165.87
212	1293	5	2.52	2.43	-4%	30	4.50	3.56	2.22	1.47	70.78
342	22	1	1.43	1.35	-6%	5	1.37	1.08	1.41	0.80	6.75
343	84	1	0.87	0.84	-4%	7	1.28	1.07	2.01	1.28	9.77
347	169	1	1.14	1.12	-1%	10	1.42	1.29	1.50	1.16	12.80
350	15	1	1.31	1.23	-6%	4	1.21	0.97	1.40	0.79	5.18
411	380	2	1.13	1.11	-1%	11	1.48	1.37	1.57	1.23	15.92
413	246	1	0.58	0.53	-8%	8	1.40	0.86	2.64	1.63	19.34
431	103	2	1.28	1.25	-2%	7.5	1.58	1.45	1.53	1.16	9.21
434	139	3	1.23	1.18	-4%	5	1.27	1.08	1.33	0.91	8.18
612	36	1	0.43	0.41	-6%	2	0.46	0.34	1.60	0.84	2.86
721	83	2	2.58	2.50	-3%	15	2.97	2.55	1.35	1.02	20.46
722	59	1	0.70	0.68	-4%	3	0.77	0.65	1.10	0.95	4.62
811	173	6	1.27	1.25	-2%	5	1.20	1.11	1.11	0.89	7.67
911	605	1	1.07	1.06	-1%	12	1.30	1.21	1.43	1.14	17.10

Domain	Number of samples		Mean grade			Top-cut value	SD		COV		Max uncut grade
	Uncut	Top-cut	Uncut	Top-cut	Difference		Uncut	Top-cut	Uncut	Top-cut	
913	444	2	0.68	0.66	-3%	12	1.21	0.94	2.06	1.44	19.81
931	128	11	1.65	1.20	-27%	3.5	2.83	0.99	2.12	0.82	18.93
932	437	1	1.08	1.07	-1%	13	1.31	1.17	1.64	1.10	18.23
936	278	1	1.15	1.13	-1%	10	1.34	1.20	1.56	1.06	14.60
962	9	1	1.41	1.21	-15%	2.5	1.06	0.50	0.75	0.42	4.36
0	57548	1384	0.16	0.15	-7%	0.5	0.25	0.11	2.10	0.76	30.91

Table 14.11. Top-cuts applied to estimation domains (DH20).

Domain	Number of samples		Mean grade			Top-cut value	SD		COV		Max uncut grade
	Uncut	Top-cut	Uncut	Top-cut	Difference		Uncut	Top-cut	Uncut	Top-cut	
111	253	13	2.94	2.43	-17%	10	4.96	2.81	1.69	1.16	39.92
112	166	2	1.70	1.65	-3%	12	2.22	1.81	1.30	1.10	20.90
113	41	1	1.39	1.21	-13%	8	2.43	1.49	1.75	1.23	15.30
114	13	1	3.30	2.85	-14%	8	3.35	2.02	1.02	0.71	13.90
115	13	3	1.09	0.65	-41%	1.2	1.24	0.42	1.14	0.66	4.45
118	155	1	1.24	1.18	-5%	15	2.34	1.85	1.89	1.56	23.79
122	14	1	1.56	1.49	-4%	5	1.67	1.51	1.07	1.01	5.92
123	24	1	2.64	2.28	-14%	14	4.52	3.02	1.71	1.32	22.56
124	15	1	1.68	1.44	-15%	6	2.45	1.69	1.45	1.18	9.71
125	12	1	1.02	0.87	-15%	3	1.27	0.81	1.24	0.94	4.88
210	670	2	0.81	0.72	-11%	20	3.02	1.22	3.70	1.70	70.55
211	1296	12	4.37	4.10	-6%	40	9.03	6.55	2.07	1.60	165.87
212	1635	7	2.59	2.50	-3%	35	4.86	3.88	1.88	1.55	78.11
213	921	2	1.17	1.16	-1%	15	1.50	1.40	1.28	1.20	21.00
214	220	2	0.53	0.51	-3%	4	0.72	0.61	1.37	1.19	6.80
347	218	1	1.04	1.01	-2%	8	1.32	1.16	1.28	1.14	12.80
411	503	5	1.18	1.15	-2%	8	1.45	1.25	1.23	1.09	15.92
412	454	2	0.79	0.78	-1%	8	0.85	0.81	1.08	1.03	9.38
413	322	2	0.61	0.58	-6%	8	1.38	0.99	2.24	1.70	19.34
721	89	2	2.46	2.39	-3%	15	2.91	2.50	1.18	1.05	20.46
1011	454	32	1.51	1.38	-9%	4	1.49	1.08	0.99	0.78	9.19
0	94693	2280	0.14	0.12	-9%	0.5	0.29	0.11	2.15	0.92	33.97

Given the low degree of skewness and the presence of only a small number of samples with extreme grades, it was determined that estimation of grades using ordinary kriging with a top-cut would be appropriate for estimation. Due to the undulating nature of the wireframes, dynamic anisotropy (DA) was applied. This approach uses a surface to orient the search ellipsoid according to the local dip and strike within each model parent cell.

14.10 Variogram Analysis

Grade continuity analysis has been undertaken in Snowden Supervisor software for the mineralized domains. Due to the positively skewed nature of the grade distributions, normal scores experimental variograms were modelled for the gold domains. The normal scores models were back-transformed prior to use in estimation. Variograms were modelled using two structures, the first structure exponential and the second a spherical structure. At the estimation stage, the exponential structure was changed to a spherical structure to ensure correct ranges were used.

A downhole variogram was modelled to establish the nugget; however, given the narrowness of the marine lags, it was not always possible to model a downhole variogram as some of the drillholes had a single sample intercept. Where a downhole variogram was not possible, the nugget was established based on the major or semi-major axial variograms. Back-transformed nuggets ranged from 35% to 68% of the sill. The high nugget values were not surprising, given the inherently nuggety nature of the conglomerates.

Variograms were modelled separately for individual domains using the close-spaced (best quality) DH10 data where there were sufficient sample data. For remaining individual lodes that did not have sufficient samples for modeling variography, a variogram determined on similar grade/fault block was used, e.g., the 213 variogram was used for the lower marine lags in Grant's Hill - M4, M5 and M6. For the Golden Crown area, there was insufficient sample data for individual domain variography analysis on the channels in fault block B, so data from the largest four domains were combined and used to model variograms. Similarly, data from five of the largest channel domains in the South Hill area were combined for variographic analysis.

A variogram was modelled for each of these groupings. Where a variogram was modelled for the M1 but insufficient data existed for the M2 within the same fault block, the variogram from the same fault block was used. The variograms for the main mineralization domains at Grant's Hill (Domain 211 and Domain 212) are illustrated in Figure 14.17.

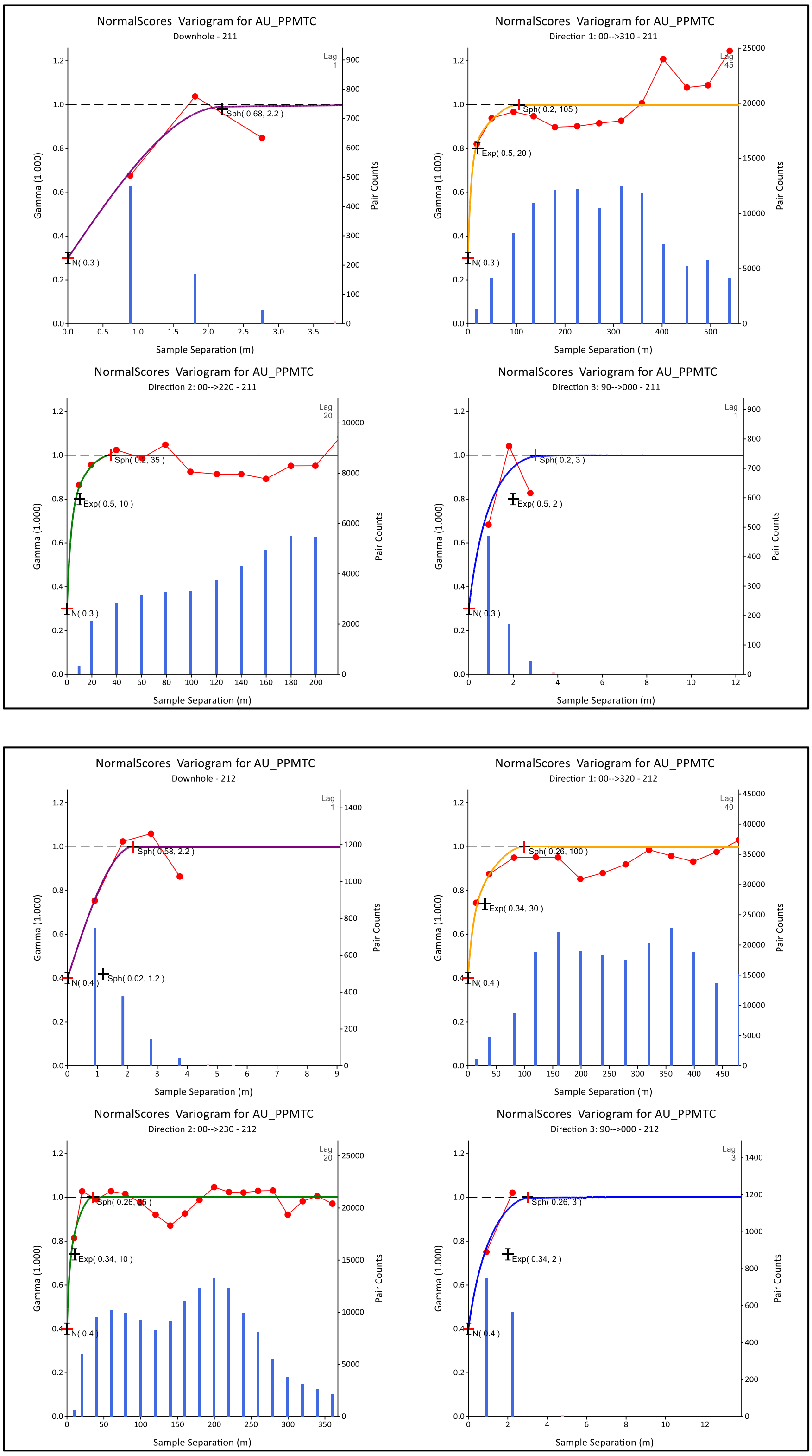


Figure 14.17. Variogram for the Grant's Hill M1 mineralization (Domain 211) top, and M2 mineralization (Domain 212) bottom.

The variogram model parameters for all key domains are provided in Table 14.12.

Table 14.12. Gold grade variogram model parameters.

Domain	Variogram Orientations			Datamine Rotations			Variographic parameters – back-transformed							Sill check	Comments
	Dir 1	Dir 2	Dir 3	Z	X	Z	C0	C1		A1	C2		A2		
110	-002->200	-010->260	-080->100	100.0	170.0	-10.0	0.44	Dir 1	0.33	90	Dir 1	0.24	120	1.000	Used for 117
								Dir 2		30	Dir 2		40		
								Dir 3		1	Dir 3		4		
111	-003->199	-020->291	-070->100	100.0	160.0	-10.0	0.39	Dir 1	0.49	65	Dir 1	0.12	80	1.000	Used for 118
								Dir 2		10	Dir 2		30		
								Dir 3		1	Dir 3		3		
112	-003->199	-020->291	-070->100	100.0	160.0	-10.0	0.47	Dir 1	0.52	45	Dir 1	0.01	55	1.000	Used for 113, 114, 115, 116
								Dir 2		25	Dir 2		40		
								Dir 3		1	Dir 3		2		
210	000->320	000->230	090->000	0.0	0.0	-130.0	0.68	Dir 1	0.12	35	Dir 1	0.20	165	1.000	
								Dir 2		40	Dir 2		120		
								Dir 3		2	Dir 3		4		
211	000->310	000->220	090->000	0.0	0.0	-140.0	0.41	Dir 1	0.47	20	Dir 1	0.12	105	1.000	Used for 129, 120, 121, 122, 123, 124, 125
								Dir 2		10	Dir 2		35		
								Dir 3		2	Dir 3		3		
212	000->320	000->230	090->000	0.0	0.0	-130.0	0.53	Dir 1	0.32	30	Dir 1	0.15	100	1.000	
								Dir 2		10	Dir 2		35		
								Dir 3		2	Dir 3		3		
213	000->330	000->240	090->000	0.0	0.0	-120.0	0.54	Dir 1	0.25	30	Dir 1	0.21	120	1.000	
								Dir 2		35	Dir 2		100		
								Dir 3		1	Dir 3		3		
951, 957, 961, 963	019->134	005->226	-070->150	150.0	160.0	105.0	0.59	Dir 1	0.20	50	Dir 1	0.22	75	1.000	Used for all 340 channels
								Dir 2		15	Dir 2		45		
								Dir 3		10	Dir 3		15		
411	-005->140	001->050	085->150	150.0	5.0	-100.0	0.53	Dir 1	0.26	85	Dir 1	0.21	200	1.000	
								Dir 2		25	Dir 2		75		
								Dir 3		3	Dir 3		5		
412	-005->150	000->060	085->150	150.0	5.0	-90.0	0.61	Dir 1	0.38	100	Dir 1	0.01	115	1.000	Used for 413, 512

Domain	Variogram Orientations			Datamine Rotations			Variographic parameters – back-transformed							Sill check	Comments
	Dir 1	Dir 2	Dir 3	Z	X	Z	C0	C1		A1	C2		A2		
								Dir 2		40	Dir 2		50		
								Dir 3		1	Dir 3		4		
433	-004->340	002->070	-085->130	130.0	175.0	-120.0	0.52	Dir 1	0.35	40	Dir 1	0.13	50	1.000	Used for 431, 433 and 434
								Dir 2		40	Dir 2		45		
								Dir 3		1	Dir 3		4		
611	000->340	000->250	090->000	0.0	0.0	-110.0	0.49	Dir 1	0.31	65	Dir 1	0.20	80	1.000	Used for 612
								Dir 2		40	Dir 2		50		
								Dir 3		1	Dir 3		3		
711,721	000->340	000->250	090->000	0.0	0.0	-110.0	0.40	Dir 1	0.45	90	Dir 1	0.15	120	1.000	Used for 711,721
								Dir 2		30	Dir 2		70		
								Dir 3		1	Dir 3		3		
712,722	000->350	000->260	090->000	0.0	0.0	-100.0	0.50	Dir 1	0.04	70	Dir 1	0.46	75	1.000	Used for 712,722
								Dir 2		40	Dir 2		55		
								Dir 3		2	Dir 3		3		
811	000->340	000->250	090->000	0.0	0.0	-110.0	0.53	Dir 1	0.33	30	Dir 1	0.14	90	1.000	Used for 812
								Dir 2		25	Dir 2		50		
								Dir 3		2	Dir 3		3		
911	000->340	000->250	090->000	0.0	0.0	-110.0	0.35	Dir 1	0.46	40	Dir 1	0.19	145	1.000	
								Dir 2		40	Dir 2		50		
								Dir 3		3	Dir 3		5		
912	000->340	000->250	090->000	0.0	0.0	-110.0	0.46	Dir 1	0.29	50	Dir 1	0.25	120	1.000	
								Dir 2		40	Dir 2		75		
								Dir 3		2	Dir 3		4		
913	000->350	000->260	090->000	0.0	0.0	-100.0	0.45	Dir 1	0.40	35	Dir 1	0.15	140	1.000	
								Dir 2		20	Dir 2		100		
								Dir 3		4	Dir 3		5		
932	000->320	000->230	090->000	0.0	0.0	-130.0	0.57	Dir 1	0.36	10	Dir 1	0.07	45	1.000	Used for 931,932
								Dir 2		10	Dir 2		20		
								Dir 3		3	Dir 3		4		
933	000->330	000->240	090->000	0.0	0.0	-120.0	0.63	Dir 1	0.17	25	Dir 1	0.20	50	1.000	

Domain	Variogram Orientations			Datamine Rotations			Variographic parameters – back-transformed							Sill check	Comments
	Dir 1	Dir 2	Dir 3	Z	X	Z	C0	C1		A1	C2		A2		
								Dir 2		25	Dir 2		45		
								Dir 3		1	Dir 3		3		
								Dir 1		40	Dir 1		120		
934	000->330	000->240	090->000	0.0	0.0	-120.0	0.53	Dir 2	0.28	20	Dir 2	0.20	80	1.000	Used 934 and 937
								Dir 3		4	Dir 3		6		
								Dir 1		20	Dir 1		60		
935	-005->340	002->070	-085->140	140.0	175.0	-110.0	0.54	Dir 2	0.28	10	Dir 2	0.18	45	1.000	
								Dir 3		3	Dir 3		4		
								Dir 1		15	Dir 1		50		
936	-005->330	002->060	-085->130	130.0	175.0	-110.0	0.45	Dir 2	0.46	10	Dir 2	0.09	35	1.000	Used 936 and 938
								Dir 3		4	Dir 3		5		
								Dir 1		35	Dir 1		55		
951, 957, 961, 963	000->340	000->250	090->000	0.0	0.0	-110.0	0.37	Dir 2	0.40	40	Dir 2	0.23	50	1.000	Used for 950 to 966
								Dir 3		2	Dir 3		3		
								Dir 1		30	Dir 1		90		
1011	000->340	000->250	090->000	0.0	0.0	-110.0	0.61	Dir 2	0.27	15	Dir 2	0.13	80	1.000	Used for 1011 and 1012
								Dir 3		2	Dir 3		4		
								Dir 1		35	Dir 1		300		
0	000->330	000->060	-090->000	0.0	0.0	-120.0	0.38	Dir 2	0.43	35	Dir 2	0.19	150	1.000	Waste domain
								Dir 3		5	Dir 3		40		

14.11 Quantitative Kriging Neighborhood Analysis

A quantitative kriging neighborhood analysis (KNA) has been undertaken for gold in the Grant's Hill M2 marine lag, using the DH10 dataset to determine the block size and estimation parameters for the block model and gold estimate. This marine lag has been selected as it has the greatest number of composites and the most extensive coverage. The KNA was carried out in an area of good sample support.

Determining the optimal block size is the first step in the KNA process. A range of block sizes were evaluated (Figure 14.18), with a 10 m by 10 m by 1 m block selected. Although the 5 m by 5 m by 1 m gives a better kriging efficiency and slope, the drill spacing across the area is variable and a block size of 5 m by 5 m by 1 m is considered too small/not appropriate across the full area.

The number of informing samples was then analyzed using a block size of 10 m by 10 m by 1 m (Figure 14.9). A minimum of eight and maximum of 22 samples were selected based on this analysis.

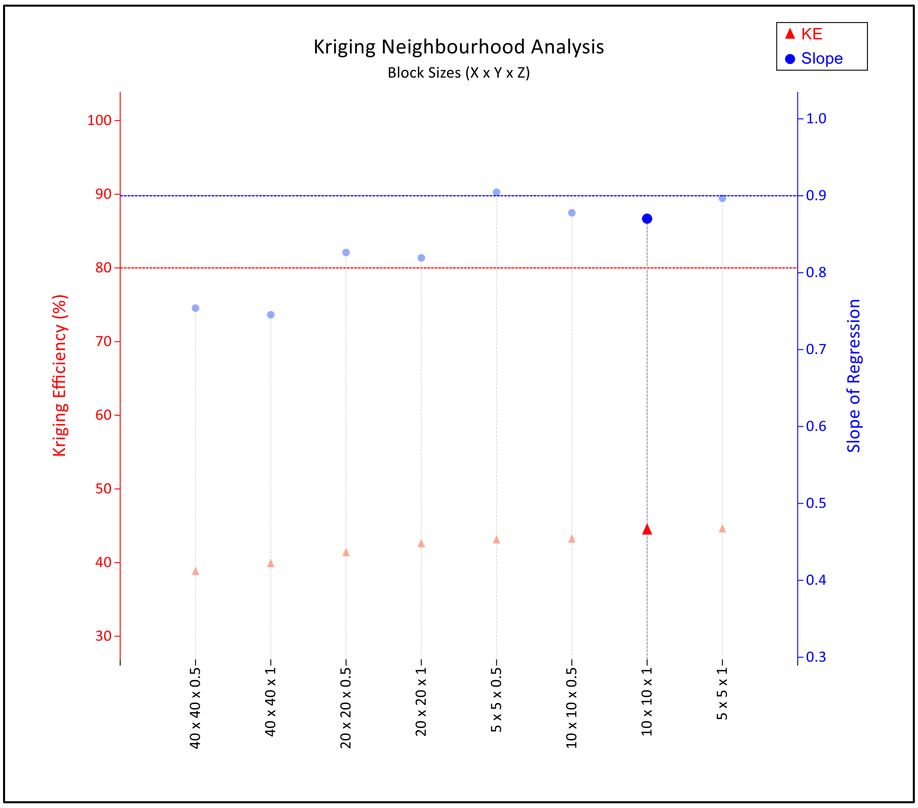


Figure 14.18. KNA plot for block size optimization.

Search ellipse parameters and discretization were also reviewed; the initial search volume was a multiple (generally half) of the variogram ranges.

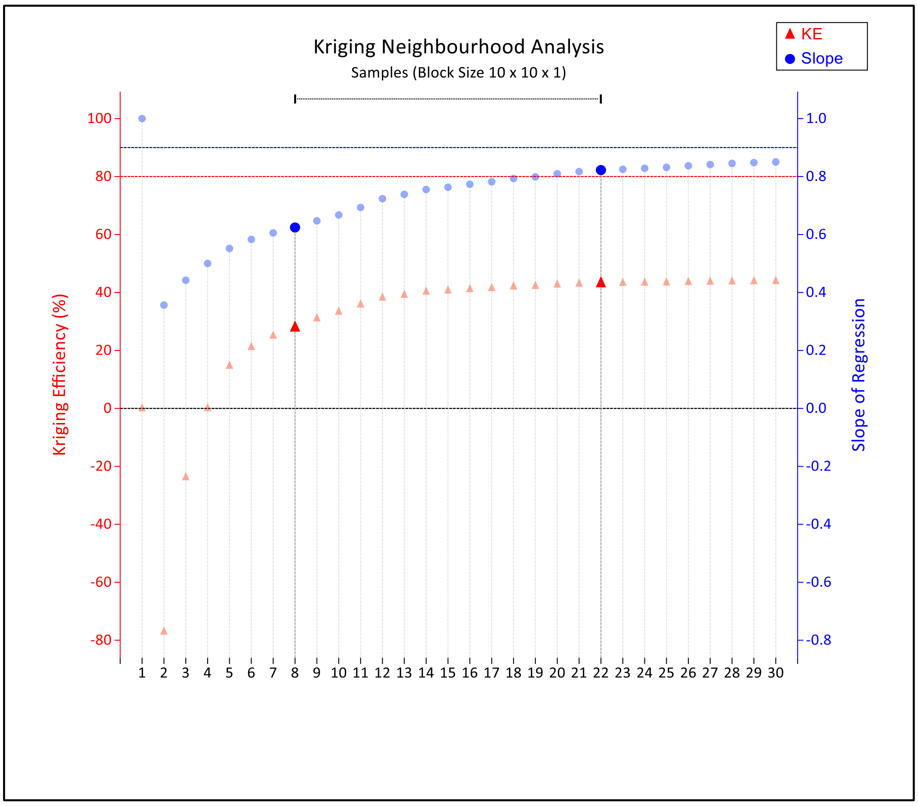


Figure 14.19. KNA plot for optimizing the number of informing samples.

14.12 Creation of Block Models

A block model was created encompassing the mineralization at Beatons Creek, with the final Datamine block model file called *bc_fin_2207.dm*.

Due to the variable drill spacing, three block models, with different parent block sizes, were constructed to cover the extents of the mineralization. The drill spacing ranges from 10 m by 10 m, through 20 m by 20 m in the DH10 dataset, up to areas with 200 m by 200 m in the DH20 dataset. The close-spaced drilling informs areas with a block size of 10 m by 10 m by 1 m, with the block model parent size selected using the KNA (Section 4.11). The selected block size is half the nominal drill spacing. Outside the areas that have been grade control drilled, and where the data spacing is up to 40 m by 40 m, the data spacing supports a block size of 20 m by 20 m. For the more widely spaced drilling, i.e., 100 m by 100 m up to 200 m by 200 m, a block size of 40 m by 40 m by 1 m was selected. For all block models, the sub-blocking goes down to 2.5 m (X) by 2.5 m (Y) by 0.25 m (Z) for effective boundary and volume definition. The same sub-block size was selected to ensure a smooth combination of the models when they were ultimately consolidated. Figure 14.20 shows the model extents (outlined in black) with the 10 m by 10 m area within the pink boundary and the 40 m by 40 m area within the blue boundary.

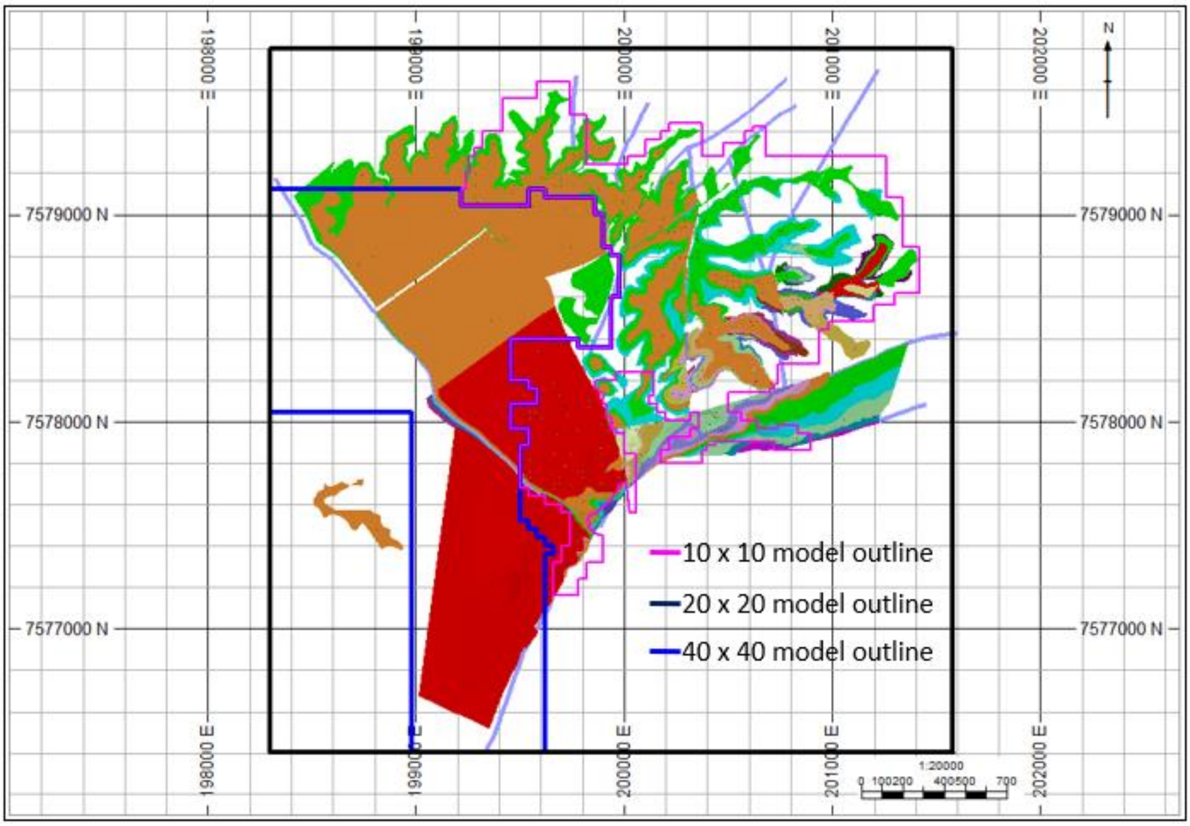


Figure 14.20. Extents of the 10 m by 10 m, 20 m by 20 m and 40 m by 40 m estimation block sizes used in the resource estimate.

All sub-blocks have been estimated at the scale of the parent block and therefore have the same estimated grade as their respective parent cell. The final block model extents are summarized in Table 14.13.

Table 14.13. Final block model extents.

Parent	Block model origin			Block model maximum			Parent block size			Sub-block size		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
20 × 20	198,300	7,576,400	-100	201,580	7,579,800	510	20	20	1	2.5	2.5	0.25

The BM10 model has been estimated using all the data within the relevant domains (DH10 dataset), and the BM20 model and BM40 models have been estimated using all the data within the relevant domains (DH20 dataset). Both the estimated BM10 and BM40 models were constrained within the relevant BM model area wireframe and sliced onto the 20 m by 20 m model prototype. Both models were then overprinted onto the BM20 model, resulting in the combined final model. The block model fields are summarized in Table 14.14.

Table 14.14. Summary of block model fields.

Variable	Description
DOMAIN	Individual Wireframed mineralization domains
OX	0 = air, 10000 = oxidised material, 20000 = fresh material
FBLOCK	Fault block - 100 = Grant's Hill South, 200 = Grant's Hill, 300 = South Hill, 400 = Central, 500 = North West Sub, 600 = North West, 700 = North, 800 = Central North, 900 = Golden Crown, 1000 = Edwards
TOPO	0 = air, 1 = fresh rock below topography
LAGNO	Lag number (0, 1, 2, 3, 4, 5, 6, 7, 8)
LAGTYPE	Lag type, 10 = Marine Lag, 20 = Marine Lag internal fault block, 30 = Golden Crown channels fault block A, 40 = South Hill channels, 50 Golden Crown channels fault block B
BM	10 = 10 × 10 block model, 20 = 20 × 20 block model, 40 = 40 × 40 block model
MINED	1 = Mined, 0 = In-situ
TRDIPDIR	True dip direction used for dynamic anisotropy
TRDIP	True dip used for dynamic anisotropy
AU_PPM	Estimated gold grade using OK
AU_ID0	Check estimate - gold grade using inverse distance power 0
AU_UNCUT	Check estimate - gold grade OK no top-cuts applied
AU_NODA	Check estimate - gold grade using fixed search ellipse (no DA)
NUMSAMAU	Number of samples used to estimate each block
SVOLAU	Estimation pass
DISTAU	Transformed distance to nearest sample
VARAU	Variance
AU_NOH	Number of drillholes used for each block estimate
KE_AU	Kriging efficiency
SLOPE_AU	Slope of regression
DENSITY	Bulk density assigned - 2.5 mineralized oxide, 2.5 unmineralized oxide, 2.8 mineralized fresh, 2.75 unmineralized fresh material
RESCAT	1 = Measured, 2 = Indicated, 3 = Inferred, 4 = Unclassified
MTYPE	1= NAF, 2= AO, 3 = PAF

14.13 Grade Interpolation Parameters

Ordinary kriging (OK) was used as the interpolation method at Beatons Creek. The interpolations have been constrained within the domains and undertaken in three passes. All domains have been estimated using hard boundaries. Dynamic anisotropy has been used for each domain. Three check estimates were completed: inverse distance to the power of zero (ID0 - effectively the sample average within the search volume), an OK estimate without top-cuts applied, and an OK estimate with no dynamic anisotropy.

Dynamic anisotropy involves the estimation of the dip and dip direction of the mineralization wireframes into the block model, allowing both the search and variogram to be oriented locally for each parent block, according to the dip and dip direction of the mineralization.

The domains were coded based on the mineralization wireframe domains. For the marine lags in Golden Crown (M2 and M3) that exist across internal fault block boundaries, the domain was created to allow data coded for the same marine lags to be used across the internal faults. The vertical offset between the internal fault blocks is minimal, and the search ellipse allows data to be used across the boundaries.

The main/key mineralization domains are the M1 and M2 in Grant's Hill (Domain 211 and Domain 212, respectively).

In general, the first estimation search pass is half the variogram range, the second search pass is at the variogram range and the third pass up to three times the range. A minimum of 8 samples and maximum of 22 samples have been used for passes 1 and 2, and a minimum of 3 samples and a maximum up to 15 or 22 have been used for pass 3. For all searches, a maximum of 2 samples per drillhole has been applied.

The search parameters for each estimation domain for each model (BM10, BM20 and BM40) are summarized in Table 14.15, Table 14.16 and Table 14.7, respectively.

Table 14.15. Search parameters for each domain – BM10.

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
110	60	20	5	8	22	120	40	10	8	22	300	100	25	3	15	2
111	40	20	5	8	22	80	40	10	8	22	200	100	25	3	15	2
112	30	20	5	8	22	60	40	10	8	22	150	100	25	3	15	2
113	30	20	5	8	22	60	40	10	8	22	150	100	25	3	15	2
114	30	20	5	8	22	60	40	10	8	22	150	100	25	3	15	2
115	30	20	5	8	22	60	40	10	8	22	150	100	25	3	15	2
116	30	20	5	8	22	60	40	10	8	22	150	100	25	3	15	2
117	60	20	5	8	22	120	40	10	8	22	300	100	25	3	15	2
118	40	20	5	8	22	80	40	10	8	22	200	100	25	3	15	2
120	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
121	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
122	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
123	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
124	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
125	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
129	55	20	5	8	22	110	40	10	8	22	275	100	25	3	15	2
210	85	60	5	8	22	170	120	10	8	22	425	300	25	3	15	2
211	55	20	5	8	22	110	40	10	8	22	275	100	25	3	15	2
212	50	20	5	8	22	100	40	10	8	22	250	100	25	3	15	2
213	60	50	5	8	22	120	100	10	8	22	300	250	25	3	15	2
214	60	50	5	8	22	120	100	10	8	22	300	250	25	3	15	2
215	60	50	5	8	22	120	100	10	8	22	300	250	25	3	15	2
216	60	50	5	8	22	120	100	10	8	22	300	250	25	3	15	2
340	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
341	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
342	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
343	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
344	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
345	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
346	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
347	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
348	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
349	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
350	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
351	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
411	100	40	5	8	22	200	80	10	8	22	500	200	25	3	15	2
412	60	25	5	8	22	120	50	10	8	22	300	125	25	3	15	2
413	60	25	5	8	22	120	50	10	8	22	300	125	25	3	15	2
431	25	25	5	8	22	50	50	10	8	22	125	125	25	3	15	2
433	25	25	5	8	22	50	50	10	8	22	125	125	25	3	15	2
434	25	25	5	8	22	50	50	10	8	22	125	125	25	3	15	2
512	60	25	5	8	22	120	50	10	8	22	300	125	25	3	15	2
611	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
612	40	25	5	8	22	80	50	10	8	22	200	125	25	3	15	2
711	60	35	5	8	22	120	70	10	8	22	300	175	25	3	15	2
712	40	30	5	8	22	80	60	10	8	22	200	150	25	3	15	2
721	60	35	5	8	22	120	70	10	8	22	300	175	25	3	15	2
722	40	30	5	8	22	80	60	10	8	22	200	150	25	3	15	2
811	45	25	5	8	22	90	50	10	8	22	225	125	25	3	15	2
812	45	25	5	8	22	90	50	10	8	22	225	125	25	3	15	2
911	75	30	5	8	22	150	60	10	8	22	375	150	25	3	15	2
912	60	40	5	8	22	120	80	10	8	22	300	200	25	3	15	2
913	70	50	5	8	22	140	100	10	8	22	350	250	25	3	15	2
931	25	15	5	8	22	50	30	10	8	22	125	75	25	3	15	2

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
932	25	15	5	8	22	50	30	10	8	22	125	75	25	3	15	2
933	25	25	5	8	22	50	50	10	8	22	125	125	25	3	15	2
934	60	40	5	8	22	120	80	10	8	22	300	200	25	3	15	2
935	30	25	5	8	22	60	50	10	8	22	150	125	25	3	15	2
936	25	20	5	8	22	50	40	10	8	22	125	100	25	3	15	2
937	60	40	5	8	22	120	80	10	8	22	300	200	25	3	15	2
938	25	20	5	8	22	50	40	10	8	22	125	100	25	3	15	2
951	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
952	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
953	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
954	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
955	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
956	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
957	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
958	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
959	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
960	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
961	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
962	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
963	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
964	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
965	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
966	35	20	5	8	22	70	40	10	8	22	175	100	25	3	15	2
1011	45	40	5	8	22	90	80	10	8	22	225	200	25	3	15	2
1012	45	40	5	8	22	90	80	10	8	22	225	200	25	3	15	2

Table 14.16. Search parameters for each domain – BM20.

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
110	60	20	5	8	22	120	40	10	8	22	360	120	30	3	22	2
111	40	20	5	8	22	80	40	10	8	22	240	120	30	3	22	2
112	30	20	5	8	22	60	40	10	8	22	180	120	30	3	22	2
113	30	20	5	8	22	60	40	10	8	22	180	120	30	3	22	2
114	30	20	5	8	22	60	40	10	8	22	180	120	30	3	22	2
115	30	20	5	8	22	60	40	10	8	22	180	120	30	3	22	2
116	30	20	5	8	22	60	40	10	8	22	180	120	30	3	22	2
117	60	20	5	8	22	120	40	10	8	22	360	120	30	3	22	2
118	40	20	5	8	22	80	40	10	8	22	240	120	30	3	22	2
123	55	20	5	8	22	110	40	10	8	22	220	80	20	3	22	2
124	55	20	5	8	22	110	40	10	8	22	220	80	20	3	22	2
125	55	20	5	8	22	110	40	10	8	22	220	80	20	3	22	2
129	55	20	5	8	22	110	40	10	8	22	220	80	20	3	22	2
214	60	50	5	8	22	120	100	10	8	22	240	200	20	3	22	2
215	60	50	5	8	22	120	100	10	8	22	240	200	20	3	22	2
216	60	50	5	8	22	120	100	10	8	22	240	200	20	3	22	2
340	40	25	5	8	22	80	50	10	8	22	240	150	30	3	22	2
341	40	25	5	8	22	80	50	10	8	22	240	150	30	3	22	2
342	40	25	5	8	22	80	50	10	8	22	240	150	30	3	22	2
343	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
344	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
345	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
346	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
347	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
348	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
349	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2
350	40	25	5	8	22	80	50	10	8	22	160	100	20	3	22	2

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
351	40	25	5	8	22	80	50	10	8	22	240	150	30	3	22	2
411	100	40	5	8	22	200	80	10	8	22	600	240	30	3	15	2
412	60	25	5	8	22	120	50	10	8	22	360	150	30	3	15	2
413	60	25	5	8	22	120	50	10	8	22	360	150	30	3	15	2
611	40	25	5	8	22	80	50	10	8	22	240	150	30	3	15	2
612	40	25	5	8	22	80	50	10	8	22	240	150	30	3	15	2
711	60	35	5	8	22	120	70	10	8	22	360	210	30	3	15	2
712	40	30	5	8	22	80	60	10	8	22	240	180	30	3	15	2
721	60	35	5	8	22	120	70	10	8	22	360	210	30	3	15	2
722	40	30	5	8	22	80	60	10	8	22	240	180	30	3	15	2
958	35	20	5	8	22	70	40	10	8	22	210	120	30	3	15	2
1011	45	40	5	8	22	90	80	10	8	22	270	240	30	3	15	2
1012	45	40	5	8	22	90	80	10	8	22	270	240	30	3	15	2

Table 14.17. Search parameters for each domain – BM40.

Domain	Search			No. of samples		Second Pass			No. of samples		Third Pass			No. of samples		Max samples per hole
	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	Major	Semi-major	Minor	Min	Max	
110	60	20	5	8	22	120	40	10	8	22	360	120	30	3	15	2
111	40	20	5	8	22	80	40	10	8	22	240	120	30	3	15	2
112	30	20	5	8	22	60	40	10	8	22	180	120	30	3	15	2
113	30	20	5	8	22	60	40	10	8	22	180	120	30	3	15	2
114	30	20	5	8	22	60	40	10	8	22	180	120	30	3	15	2
115	30	20	5	8	22	60	40	10	8	22	180	120	30	3	15	2
116	30	20	5	8	22	60	40	10	8	22	180	120	30	3	15	2
117	60	20	5	8	22	120	40	10	8	22	360	120	30	3	15	2
118	40	20	5	8	22	80	40	10	8	22	240	120	30	3	15	2
210	85	60	5	8	22	170	120	10	8	22	510	360	30	3	15	2
211	55	20	5	8	22	110	40	10	8	22	330	120	30	3	15	2
212	50	20	5	8	22	100	40	10	8	22	300	120	30	3	15	2
213	60	50	5	8	22	120	100	10	8	22	360	300	30	3	15	2
214	60	50	5	8	22	120	100	10	8	22	360	300	30	3	15	2
215	60	50	5	8	22	120	100	10	8	22	360	300	30	3	15	2
216	60	50	5	8	22	120	100	10	8	22	360	300	30	3	15	2
512	60	25	5	8	22	120	50	10	8	22	360	150	30	3	15	2
611	40	25	5	8	22	80	50	10	8	22	240	150	30	3	15	2
612	40	25	5	8	22	80	50	10	8	22	240	150	30	3	15	2
1011	45	40	5	8	22	90	80	10	8	22	270	240	30	3	15	2
1012	45	40	5	8	22	90	80	10	8	22	270	240	30	3	15	2

Blocks that did not achieve a grade estimate in the third pass (for reasons of insufficient samples or orientation) have been assigned a gold grade of 0.1 g/t Au. Interburden/waste material has been estimated using the same strategy as the mineralization. All unmineralized blocks that did not estimate in the third pass have been assigned a grade of 0.05 g/t Au.

14.14 Density Analysis and Assignment

Bulk density has been measured using the standard water immersion technique on diamond core.

Novo undertook additional bulk density determination from metallurgical drillholes in 2022 using Minalyzer CS technology (Figure 14.21; Artursson et al., 2021). Minalyzer bulk density determination is based on the caliper method. The core volume is derived from the use of the 3D scanned volume acquired as part of the scanning process (LiDAR scan). The method is applied per full or partly filled core tray. Each core tray is first weighed, and then the weight of an empty tray is subtracted from the measured weight to derive the core weight.

[A] [B]

Figure 14.21. [A] Minalyzer CS unit at Intertek Perth; and [B] 0.5 m lengths of drill core, where each one was scanned separately by Minalyzer CS (Photographs: S.C. Dominy, May 2022).

The next step defines a reference geometry by scanning a tray. The volume is derived by determining the average height in a raster on both the reference geometry as well as the sample geometry in the tray. The difference between a point in the reference geometry and the sample geometry is the integrated volume of the sample at that point. Performing this exercise over the tray will generate the volume of the total sample in the tray. Having derived the weight and the volume, the bulk density of the sample is calculated from weight/volume.

All 2022 core was scanned using the Minalyzer CS unit at Intertek Perth. Conglomerate mineralization and interburden intervals were scanned in 0.5 m lengths. A reference cylinder was scanned as part of the QC process to validate the results. Prior to laboratory submission, selected core lengths were subjected to standard water immersion technique at the Golden Eagle core farm. The correlation between the immersion vs Minalyzer CS bulk density values was >90%.

Bulk density has been allocated on the basis of analysis of 1,255 measurements: 203 measurements from oxide mineralization and 1,052 measurements from fresh mineralization.

Bulk density for mineralized oxide material has been assigned based on 24 samples sourced from drill core within the mineralized domains (Table 14.18). Bulk density for fresh mineralized material has been assigned based on 151 samples sourced from drill core within the mineralized domains.

Table 14.18. Summary of bulk density data.

Material type	Oxide code	All data		Bulk density assigned (t/m^3)
		No. of measurements	Avg. density (t/m^3)	
Mineralization oxide	10000	24	2.49	2.50
Mineralization fresh	20000	151	2.80	2.80
Unmineralized oxide	10000	179	2.48	2.50
Unmineralized fresh	20000	901	2.74	2.75

14.15 Model Validation

In addition to conducting validation checks on all stages of the modeling and estimation process, final grade estimates and models have been validated by undertaking global grade comparisons with the input drillhole composites; visual validation of block model plan sections and by grade trend (swath) plots. In general, the BM10 model validated well. A domain-by-domain comparison between the declustered and top-cut composites and the output volume-weighted block model grades in the BM10 model for the 67 domains shows block grades are almost all within an acceptable error tolerance (±10%) (Table 14.19).

Table 14.19. Domain-by-domain comparison between the declustered composites and the output 10 by 10 block model grades for the 67 domains.

Domain	No. of composites	Composite grade (cut) (g/t Au)	Declustered composite grade (cut) (g/t Au)	Estimated grade (model) (g/t Au)	Difference – estimate vs composite (%)	Difference – estimate vs declustered composite (%)
110	119	0.96	0.94	0.98	1.76	4.83
111	160	2.35	2.36	2.59	10.25	9.78
117	94	0.8	0.75	0.75	-6.38	0.88
118	102	1.37	1.32	1.32	-3.87	-0.11
120	7	0.6	0.56	0.61	2.61	10.39
121	13	2.02	2.01	2.11	4.4	5.03
122	11	1.67	1.4	1.5	-10.18	7.45
123	15	2.34	2.65	1.75	-25.06	-33.89
210	542	0.74	0.63	0.65	-12.38	3.32
211	1016	4.12	3.7	3.77	-8.34	1.99
212	1293	2.43	2.06	2.05	-15.73	-0.88
213	726	1.2	1.07	1.07	-10.17	0.04
340	15	0.86	0.87	0.91	5.7	3.99
341	17	1.1	1.1	1.04	-5.46	-5.38
342	22	1.35	1.29	1.15	-14.28	-10.52
343	84	0.84	0.82	0.84	1.04	2.61
344	178	0.9	0.81	0.81	-9.78	-0.27
345	178	0.96	0.89	0.98	2.6	9.78
346	176	0.9	0.85	0.77	-14.36	-9.42
347	169	1.12	0.94	0.97	-13.24	3.39
348	148	1.17	1.11	1.14	-2.62	2.87
349	29	1.19	1.24	1.13	-5.25	-8.64

Domain	No. of composites	Composite grade (cut) (g/t Au)	Declustered composite grade (cut) (g/t Au)	Estimated grade (model) (g/t Au)	Difference – estimate vs composite (%)	Difference – estimate vs declustered composite (%)
350	15	1.23	1.18	1.02	-17.14	-13.8
351	8	0.88	0.87	0.9	2.11	2.69
411	380	1.11	1.11	1.21	8.57	9.06
412	357	0.79	0.77	0.81	2.98	5.51
413	246	0.53	0.53	0.61	15.23	15.93
431	103	1.25	1.27	1.32	6.1	4.05
433	222	1.67	1.53	1.59	-4.8	3.66
434	139	1.18	1.07	1.21	1.83	12.23
611	197	1.59	1.67	1.48	-6.93	-11.42
612	36	0.41	0.41	0.41	0.71	-1.54
711	145	1.17	1.1	1.13	-3.34	2.6
712	165	0.75	0.74	0.76	0.89	2.53
721	83	2.5	2.25	2.2	-11.91	-2.11
722	59	0.68	0.68	0.79	16.16	14.84
811	173	1.25	1.26	1.4	12.61	11.43
812	158	0.7	0.66	0.7	0.8	7.07
911	605	1.06	1.06	1.04	-1.29	-1.62
912	543	0.74	0.71	0.74	0.53	4.57
913	444	0.66	0.65	0.69	4.61	5.12
931	128	1.2	1.21	1.45	20.61	19.27
932	437	1.07	0.98	1.03	-3.99	4.18
933	429	1.12	1.05	1.1	-2.09	4.26
934	792	1.26	1.2	1.16	-7.93	-2.85
935	394	1	0.98	0.98	-2.49	-0.24
936	278	1.13	1.17	1.15	1.32	-1.78
937	54	0.88	0.83	0.87	-1.22	5.39
938	127	0.97	0.94	0.93	-4.35	-1.37
951	147	0.97	1.06	1.05	8.15	-1.4
952	5	0.88	0.95	0.92	4.46	-3.94
953	18	0.91	0.9	0.96	5.09	5.86
954	18	0.85	0.83	0.82	-3.34	-0.18
955	69	0.8	0.82	0.79	-0.83	-3.33
956	59	1.04	1.02	1.01	-3.44	-1.07
957	235	0.74	0.75	0.74	-0.77	-1.85
958	34	0.73	0.73	0.76	3.69	3.28
959	80	1.15	1.1	1.13	-2.19	2.67
960	45	0.87	0.89	0.92	5.87	4.19
961	140	1.2	1.11	1.15	-3.47	4.38
962	9	1.21	1.22	1.18	-2.5	-3.76
963	496	0.74	0.73	0.75	1.59	2.2
964	58	0.78	0.78	0.79	2.05	1.7
965	10	0.64	0.66	0.64	0.14	-2.85
966	94	0.81	0.85	0.8	-0.51	-4.8
1011	331	1.63	1.66	1.75	7.46	5.51
1012	102	0.47	0.47	0.49	2.42	3.23

The BM20 model validated well in general, although it was of lower grade than the sample grades in some domains in South Hill and the low-grade deeper domains (M4, M5 and M6) at Grant's Hill (Table 14.20).

Table 14.20. Domain-by-domain comparison between the declustered composites and the output BM20 model grades.

Domain	No. of composites	Composite grade (cut) (g/t Au)	Declustered composite grade (cut) (g/t Au)	Estimated grade (model) (g/t Au)	Difference – estimate vs composite (%)	Difference – estimate vs declustered composite (%)
110	188	0.96	0.92	0.99	3.06	7.57
111	253	2.43	2.41	2.66	9.78	10.77
112	166	1.64	1.53	1.59	-3.48	3.97
113	41	1.21	1.05	0.86	-28.52	-17.93
114	13	2.85	2.86	3.09	8.38	8.05
115	13	0.65	0.65	0.95	46.55	44.73
117	155	0.67	0.61	0.6	-11.3	3.24
118	155	1.18	1.05	0.94	-20.76	-9.08
122	14	1.49	1.25	1.37	-7.8	7.45
123	24	2.28	2.48	2.53	10.83	1.56
124	15	1.44	1.37	1.26	-12.22	-8.55
125	12	0.87	0.88	0.99	13.87	11.76
129	7	0.62	0.63	0.64	2.15	1.21
214	220	0.51	0.46	0.38	-25.33	-18.06
215	101	0.58	0.56	0.42	-28.21	-25.65
216	37	0.95	0.86	0.78	-18.17	-9.43
340	28	0.92	0.72	0.65	-28.76	-9.82
341	32	0.73	0.68	0.54	-26.37	-20.61
342	56	1.03	1.02	0.91	-11.28	-10.31
343	139	0.82	0.79	0.81	-0.84	2.72
344	231	0.87	0.79	0.7	-20.1	-11.38
345	221	0.9	0.81	0.77	-14.75	-4.98
346	216	0.84	0.77	0.64	-23.45	-16.93
347	218	1.01	0.84	0.6	-40.46	-28.13
348	200	1.06	0.99	0.82	-23.28	-17.86
349	60	0.92	0.87	0.84	-8.08	-3.09
350	35	1.04	0.97	0.91	-12.2	-6.14
351	18	0.62	0.59	0.74	20.2	24.83
411	503	1.15	1.11	1.21	4.79	8.28
412	454	0.78	0.76	0.8	1.45	5.21
413	322	0.58	0.58	0.64	9.9	10.61
611	228	1.57	1.64	1.65	5.24	0.3
612	53	0.4	0.4	0.38	-4.03	-4.73
721	89	2.39	2.19	1.79	-24.98	-18.25
722	63	0.69	0.69	0.62	-9.02	-9.95
958	43	0.68	0.66	0.64	-5.27	-3.1
1011	454	1.38	1.31	1.18	-14.4	-9.66
1012	149	0.43	0.43	0.44	3.07	2.25

Swath plots have been generated and reviewed for each of the estimation domains. In general, the trend of the model follows the trend of the composites. In areas of high drillhole data density, the block model grade is seen to closely mimic the declustered and top-cut composite grade; however, in areas of low drillhole data density, the block model grade deviates from the declustered composite grade. Some domains have very few samples, which impacts the accuracy of the estimate. Scenario testing (using different estimation parameters) has been undertaken to optimize the estimation. In domains where there is overestimation, these are towards the margins of the mineralization in areas with less sample support, and this has been considered in the Mineral Resource classification. Figure 14.22 shows the trend plot for M1 and M2 in Grant's Hill (Domain 211 and Domain 212, respectively).

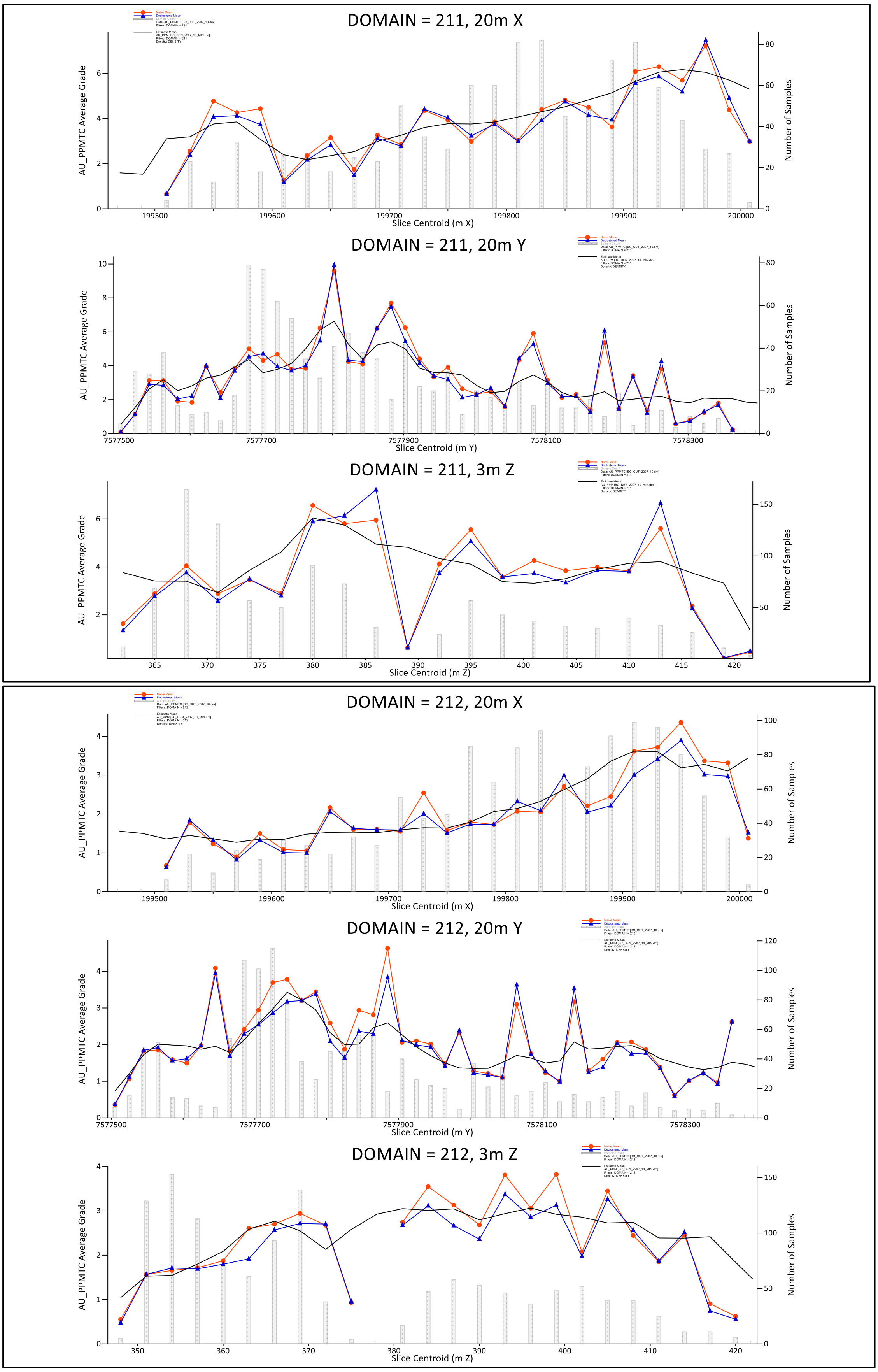


Figure 14.22. Validation trend plot for M1 (Domain 211) top and M2 (Domain 212) bottom.

Visual validation for each estimation domain was completed, validating the model grade against the composite grade. The gold estimates show a good visual correspondence with the input composite grades. Figure 14.23 and Figure 14.24 show the visual grade comparison for M1 and M2, respectively.

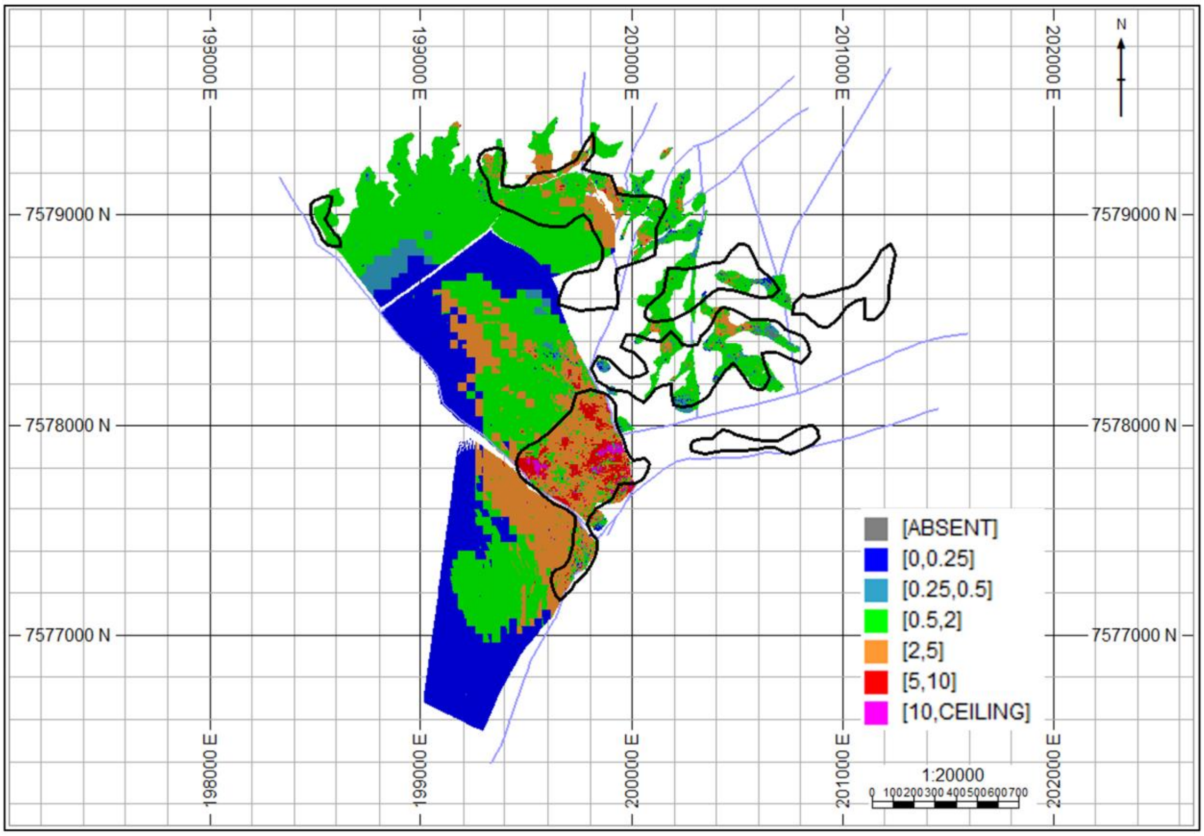


Figure 14.23. Grade comparison for M1. Black outline is optimized RPEEE pit shell.

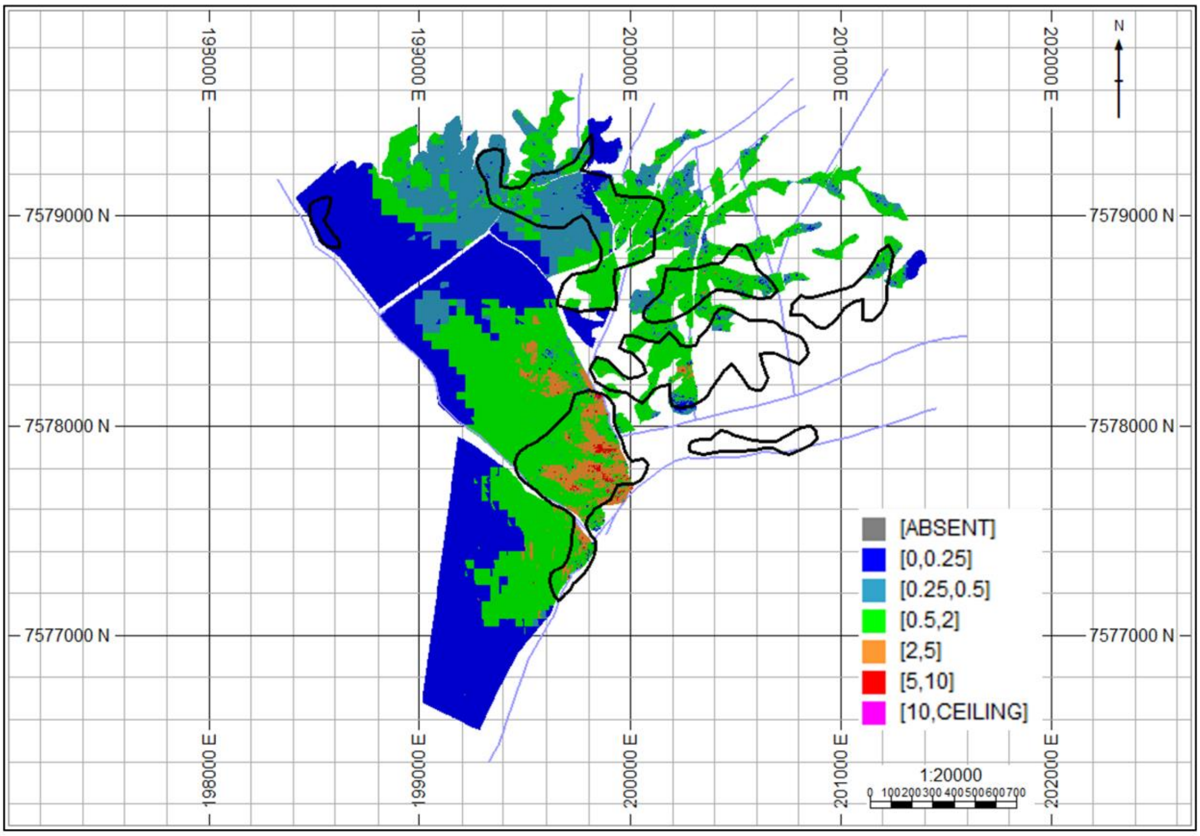


Figure 14.24. Grade comparison for M2. Black outline is optimized RPEEE pit shell.

14.16 Mineral Resource Classification

Mineral Resources have been classified according to the classification definitions (the CIM Definition Standards) published by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM, 2014).

The model has been classified on a domain-by-domain basis; a string for each domain and for each classification category was created to delineate and code the model. Both Indicated and Inferred Mineral Resources have been defined at Beatons Creek.

No areas of the resource have been classified as Measured Mineral Resources.

Areas classified as Indicated Mineral Resources are informed by close-spaced drilling (ranging from less than 10 m by 10 m up to 20 m by 20 m spacing) and estimated within the first or second pass, with a slope of regression (an estimation quality metric) greater than 0.2. Individual domains have been reviewed and classified accordingly. Areas classified as Inferred Mineral Resources are informed by drilling spaced from 20 m up to 100 m, and have been estimated within the first, second, or the third estimation pass. Individual domains have been reviewed and classified accordingly. Areas that have not been estimated in the third pass have been categorized as 'unclassified' and have not been reported or used for the optimized pit shell.

Figure 14.25 shows the model colored on Mineral Resource classification, with collar locations shown as grey dots.

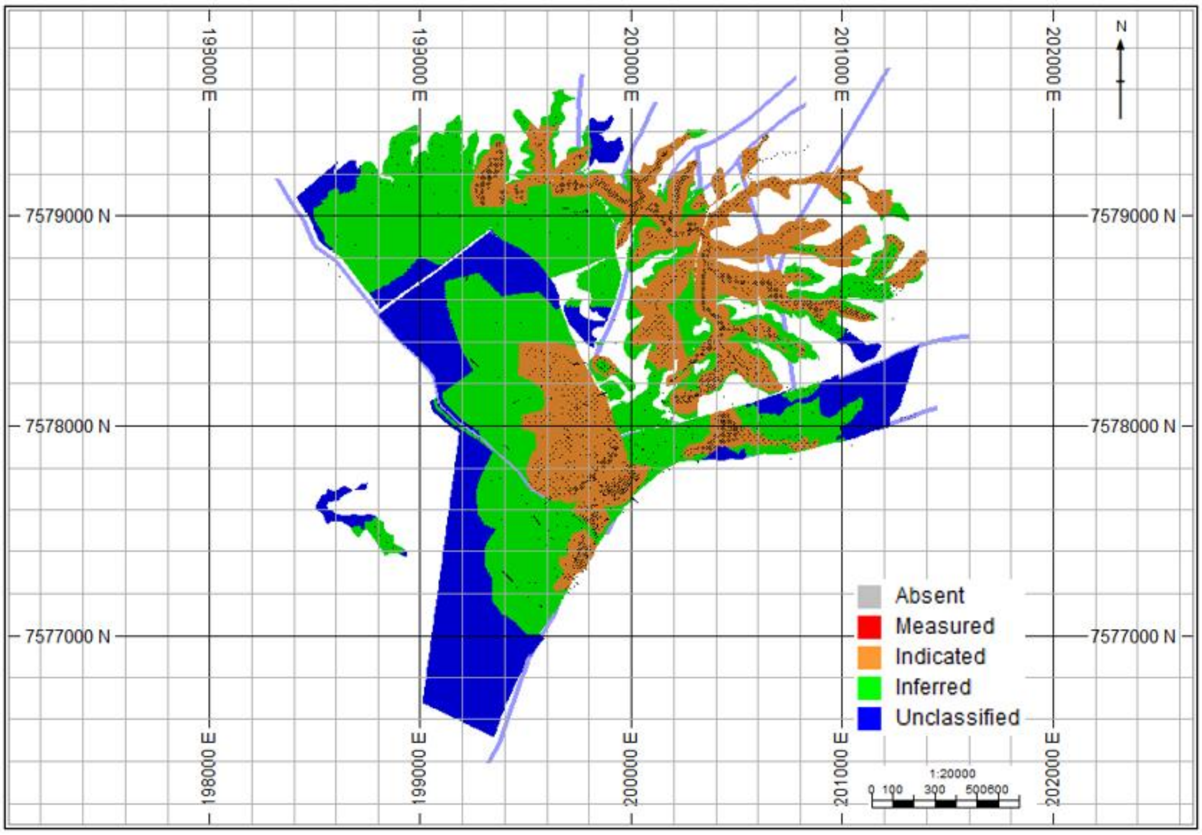


Figure 14.25. Model colored on Mineral Resource classification.

14.17 Resource Pit Shell Optimization

Open pit Mineral Resources contain oxide and fresh mineralization within a Whittle optimized shell and constrained within a mineralized wireframe. RPEEE have been evaluated within a potentially exploitable pit shape. A cut-off grade of 0.5 g/t Au was applied.

The pit shell was estimated with the following economic, mining and processing parameters:

1) Gold price: A$2,600/oz (US$1,690/oz) of gold;
2) Nominal processing rate of 1.8 Mt/a with gold recoveries of 93% (oxide) and 91% (fresh);
3) Bulk density applied: oxide mineralization 2.50 t/m^3 (waste 2.50 t/m^3) and fresh mineralization 2.80 t/m^3 (waste 2.75 t/m^3);
4) A$5.15/t (US$3.35/t) mining cost for oxide and A$5.45/t (US$3.54/t) for fresh;
5) A$37.47/t (US$24.36/t) processing cost (incl. G&A) for oxide and A$38.37/t (US$24.94/t) for fresh;
6) 25% dilution and 5% loss;
7) Royalties 5.25%. In addition to the 5.25% gross royalties, the Company has an obligation to pay deferred consideration in the form of a fee on future gold production equal to 2% of all gold revenue generated by the Company up to the latter of cumulative gold production of 600,000 oz Au or cumulative payments of A$20M having been made to IMC Resources Gold Holdings Pte Ltd. Considering that this deferred consideration is payable on any production by the Company from any of its projects, the Company has determined that it should not specifically

encumber Beatons Creek, and while it is factored into any financial analyses prepared by the Company, it is not incorporated in the optimizations used to determine the Beatons Creek RPEEE pit shells;

8) Discount factor 6%; and

9) A$ to US$ exchange rate of 0.65:1.

Mining costs are based on a conventional open pit truck/excavator mining fleet and actual contract rates scaled to planned future production. The costs reflect the sharp relief in topography and backfill requirement to cover any exposed fresh material to meet expected environmental obligations imposed as part of the approvals process. Mining dilution and loss factors are derived based on the style of mineralization and mining methods.

14.18 Mineral Resource Reporting

Mineral Resources have been reported above a cut-off grade of 0.5 g/t Au within the optimized pit. RPEEE have been evaluated within a potentially exploitable pit shape (Table 14.21 and Table 14.23 and Section 14.17).

Table 14.21. Open pit Mineral Resources for Beatons Creek by classification; columns may not total due to rounding.

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Indicated	Oxide	0.5	815,000	1.3	33,000
	Fresh	0.5	2,240,000	2.8	201,000
	Total	**0.5**	**3,050,000**	**2.4**	**234,000**

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Inferred	Oxide	0.5	445,000	1.3	18,000
	Fresh	0.5	385,000	1.9	24,000
	Total	**0.5**	**830,000**	**1.6**	**42,000**

Table 14.22. Open pit Mineral Resources for Beatons Creek by oxidation state.

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Indicated	Fresh	0.5	2,240,000	2.8	201,000
Inferred	Fresh	0.5	385,000	1.9	24,000

Mineral Resource classification	Oxidation state	Cut-off grade (g/t Au)	Tonnes (t)	Grade (g/t Au)	Contained ounces Au
Indicated	Oxide	0.5	815,000	1.3	33,000
Inferred	Oxide	0.5	445,000	1.3	18,000

No underground Mineral Resources have been reported for 2022.

This Technical Report is an update of the 2021 Technical Report titled ‘Preliminary Economic Assessment on the Beatons Creek Gold Project, Western Australia’, dated effective February 5, 2021 and filed under Novo’s profile on SEDAR (www.sedar.com) on April 30, 2021 (Froud, Glacken, Grubb, and Gosling, 2021).

The QPs (Ms Graham and Dr Dominy) have, through examination of Novo data, including QC reporting and personal inspections on site and discussions with Novo personnel, verified the data in this report and satisfied themselves that the data are adequate for use in an MRE. The final database and geological model are of a suitable quality to support the 2022 MRE.

The 2022 MRE was peer reviewed by Mr Ian Glacken, FAusIMM(CP) FAIG FIMMM, an Executive Consultant at Snowden Optiro. Mr Glacken has endorsed the estimation approach and classification. In addition, the 2022 MRE was audited by Mr Danny Kentwell, FAusIMM, a Principal Consultant of SRK Consulting. Mr Kentwell has endorsed the estimation approach and classification (SRK, 2022b). Both Mr Glacken and Mr Kentwell are independent of the Company for the purposes of NI 43-101.

The terms 'Mineral Resource', 'Inferred Mineral Resource' and 'Indicated Mineral Resource' have the meanings given in the *CIM Definition Standards for Mineral Resources and Mineral Reserves* adopted by the Canadian Institute of Mining, Metallurgy and Petroleum Council (CIM, 2014). Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability; it is uncertain if applying economic modifying factors will convert Measured and Indicated Mineral Resources to Mineral Reserves. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues, however, no issues are known at this time. The quantity and grade of reported Inferred Mineral Resources in this estimation are uncertain in nature and there has been insufficient exploration to define these Inferred Mineral Resources as an Indicated or Measured Mineral Resource. It is expected that most of the Inferred Mineral Resource could be upgraded to Indicated Mineral Resources with continued exploration.

14.19 Comparison with Previous Mineral Resource Estimate

There are key differences between the 2022 MRE and the 2019 MRE, which was also included in the previous Technical Report (Optiro, 2021). The 2022 MRE incorporates updates to input assumptions which collectively result in an estimate that the Company believes is more robust overall and which aligns more closely with the mining of the oxide Mineral Resource to date. The development of the understanding of the Beatons Creek mineralization controls has been an iterative process over the past two years, and has been informed by a greatly expanded geological mapping and drillhole dataset, plus observations from mining and grade control. Table 14.23 is a comparison of 2019 MRE (model 1902) versus 2022 MRE (model 2207) for tonnes, grade and contained ounces.

Table 14.23. Comparison of 2022 MRE with 2019 MRE.

Resource	State	RESCAT	Model 1902 (2019)			Model 2207 (2022)			Difference		
			Tonnes	Au (g/t)	Au (oz)	Tonnes	Au (g/t)	Au (oz)	Tonnes	Au (g/t)	Au (oz)
Open pit	Oxide	Indicated	4,500,000	1.9	272,000	813,000	1.3	33,000	-3,687,000	-0.6	-239,000
		Inferred	765,000	1.8	44,000	444,000	1.3	18,000	-321,000	-0.5	-26,000
		Total oxide	**5,265,000**	**1.9**	**316,000**	**1,257,000**	**1.3**	**51,000**	**-4,008,000**	**-0.6**	**-265,000**
	Fresh	Indicated	2,145,000	2.7	185,000	2,240,000	2.8	201,000	95,000	0.1	16,000
		Inferred	2,645,000	2.9	250,000	384,000	1.9	24,000	-2,261,000	-1.0	-226,000
		Total fresh	**4,790,000**	**2.8**	**435,000**	**2,624,000**	**2.7**	**225,000**	**-2,166,000**	**-0.1**	**-210,000**
Underground	Fresh	Inferred	885,000	5.3	152,000	0	0.0	0	-885,000	-5.3	-152,000
Total			**10,940,000**		**903,000**	**3,881,000**		**276,000**	**-7,059,000**		**-627,000**

Notes:
1. Open pit 2019 and 2022 MREs reported at a 0.5 g/t Au cut-off grade.
2. The 2019 and 2022 open pit MREs reported in different RPEEE pit shells.
3. Underground 2019 MRE reported at a 3.5 g/t Au cut-off grade.

Figure 14.26 is a waterfall graph showing a breakdown of the changes in contained gold ounces at Beatons Creek between the 2019 and 2022 MREs. The 'Mining Depletion' portion is the quantity of ounces depleted from the 2019 MRE using the June 2022 mined surface. The actual mined and processed mineralization from Beatons Creek was 2.51 Mt at 1.17 g/t Au for contained metal of 94,248 oz Au. The 'Mining Depleted' ounces comprise the actual mined and processed (as above); changes to the model due to the removal of the channel samples; mining loss; and metallurgical recovery loss. The 'Model' ounces in Figure 14.26 relate in aggregate to the ounces no longer reporting to the model due to the matters listed below.

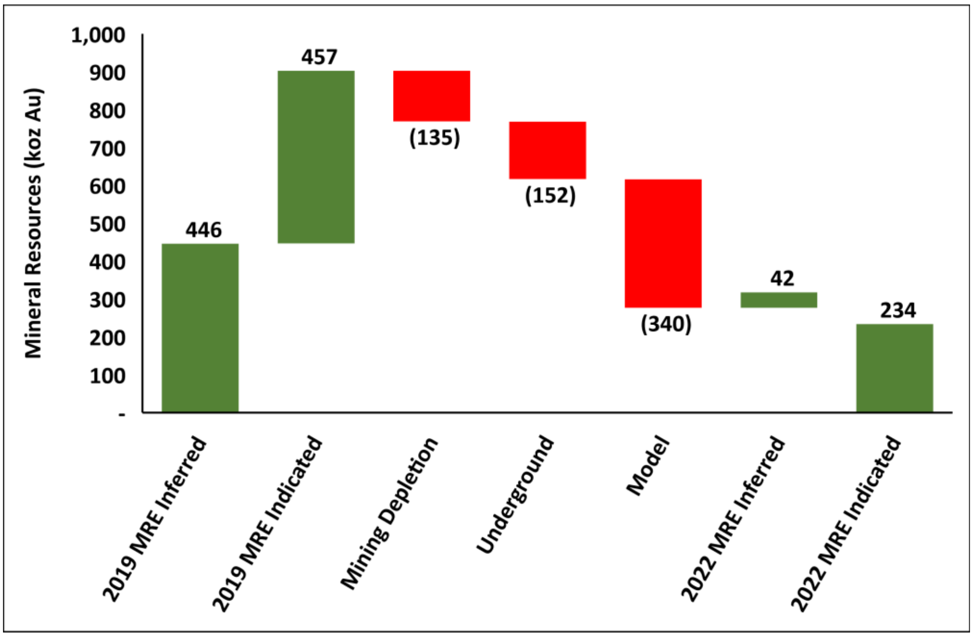


Figure 14.26. Waterfall graph showing the changes in contained gold ounces at Beatons Creek from 2019 MRE to the 2022 MRE.

The 2022 MRE includes decreases in open pit tonnes and contained ounces. The update also sees the removal of the underground Mineral Resource. These changes in the open pit Mineral Resource are driven by the following:

- The significant addition of 3,238 new close-spaced RC drillholes, providing an additional 22,116 samples used for estimation;
- Optimized 'coarse gold' sampling protocol using PhotonAssay to achieve assay charge sizes of 5 kg and 2.5 kg, and reduction of sampling errors by not pulverizing samples;
- Removal of 1,128 potentially biased trench channel samples from the estimate;
- Inclusion of previously excluded RC data, adding 595 samples (only informing the Inferred Mineral Resource area) based on a comparison with new drilling and conclusion that the level of bias was not material, considering the Mineral Resource categories applied;
- Revised geological interpretation, featuring more constrained mineralized conglomerate wireframes with local changes in width and position, based on drilling and experience from mining;
- Changes in the location and orientation of faults that cut/bound the mineralized conglomerates, together with additional faults identified by pit mapping;
- Different block model sizes, with smaller blocks (e.g., 10 m by 10 m by 1 m) informed by grade control drilling (e.g., 10 m by 10 m) based on QKNA;

- Updated variography based on the dataset applied within new wireframes;
- Revised bulk density values based on additional data from the 2022 fresh diamond drilling program;
- Updated oxide-fresh weathering surfaces based on drilling and pit mapping;
- Different pit shell based on new optimization parameters; and
- Depleted model based on mining activity to date.

The underground Inferred Mineral Resource included in the 2019 MRE (at Grant's Hill, Grant's Hill South, and South Hill) has been removed in the 2022 MRE. The reasons for this include:

- Addition of close-spaced RC drillholes, resulting in a lower grade estimate;
- Removal of potentially biased trench channel (costean) samples, resulting in a lower grade estimate;
- Inclusion of previously excluded RC samples, which provides more data at lower grades, thus lowering the overall grades;
- Different geological interpretations, resulting in more constrained mineralized conglomerate wireframes with local changes in width and position based on drilling;
- Changes in the locations and orientations of faults that cut/bound the mineralized conglomerates, together with additional faults identified by pit mapping, resulting in higher-grade holes being excluded by changes in fault block interpretations;
- A change in estimation strategy, where the search is now restricted to an individual domain and where previously it searched across fault boundaries into the same domain due to limited data; and
- Mineralization previously reported in the underground Mineral Resource now sits within the optimized pit shell.

Figure 14.27 shows the superposition of the 2019 MRE and 2022 MRE RPEEE pit outlines, together with the 2022 MRE data spacing. The 2021 to 2022 mined portion is also shown.

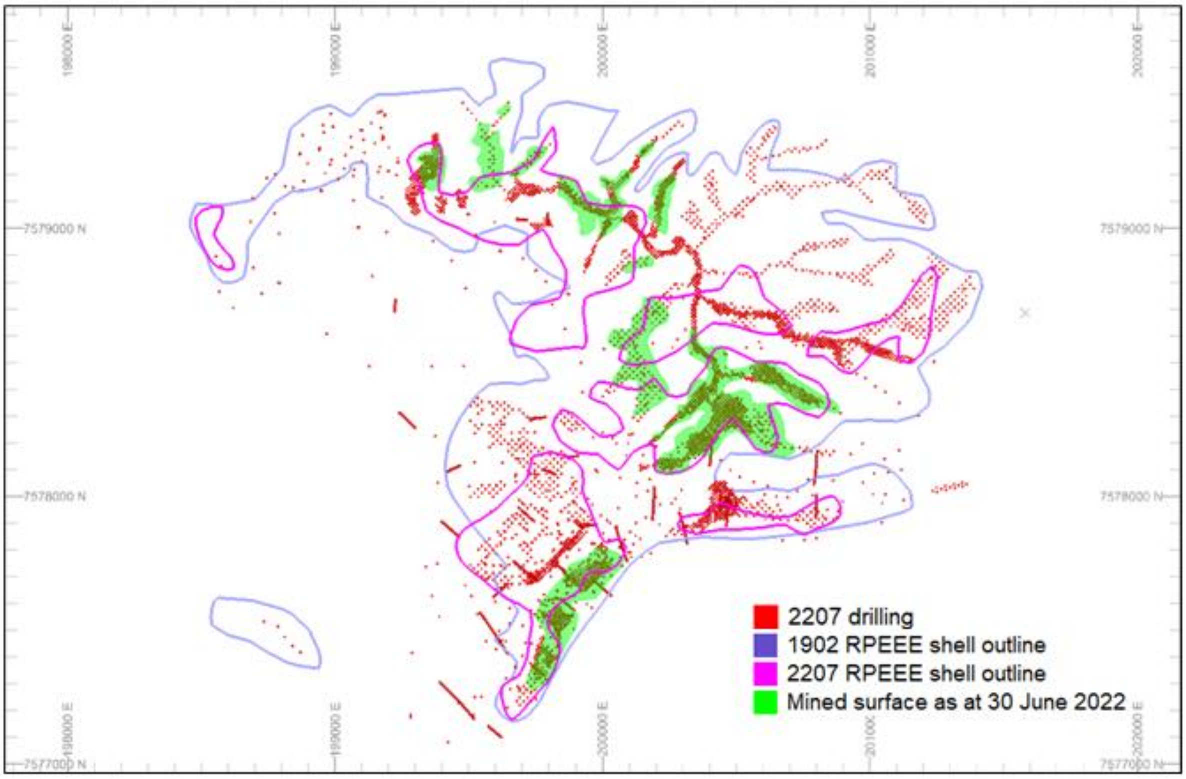


Figure 14.27. The 2019 MRE and 2022 MRE RPEEE pit shell outlines, together with the 2022 MRE data spacing. The 2021 to 2022 mined portion is also shown.

The 2022 MRE was estimated from 26,041 samples (17,650 composites), comprising 54 bulk samples (57 composites), 580 diamond core samples from 60 holes (354 composites), 25,350 RC samples from 3,877 holes (17,186 composites) and 57 trench channel samples (53 composites). The pre-2020 assays used for the estimate were determined using the LeachWELL (cyanide leaching) technique (13%). Samples were assayed by FA or SFA (1% each respectively). Assays from 2020 onwards, and solely informing the Indicated Mineral Resource, are based on the PhotonAssay technique (85% of total assays used) using either a 2.5 kg (65% of PhotonAssay) or 5 kg (35% of PhotonAssay) assay charge, split into multiple individual 500 g samples and averaged.

In comparison, the 2019 MRE was estimated from 3,909 samples (3,767 composites), comprising 302 diamond core samples from 42 holes (229 composites), 2,422 RC samples from 481 holes (2,422 composites) and 1,185 costean channel samples (1,116 composites). The assays used for the estimate were determined using the LeachWELL technique (88%), with other samples assayed by FA or SFA (7% and 5% each, respectively).

Table 14.24 provides a comparison between the 2022 model with the 2019 model, depleted to the 2207 (July 2022) mined surface and reported within the 2022 optimized pit shell.

Table 14.24. Comparison of 2022 MRE with 2019 MRE depleted to 2022 mined surface and reported within the 2207 optimized pit shell.

Resource	State	RESCAT	Model 1902 (2019)			Model 2207 (2022)			Difference		
			Tonnes	Au (g/t)	Au (oz)	Tonnes	Au (g/t)	Au (oz)	Tonnes	Au (g/t)	Au (oz)
Open Pit	Oxide	Indicated	840,000	1.8	49,000	815,000	1.3	33,000	-25,000	-0.6	-16,000
		Inferred	95,000	2.0	6,000	445,000	1.3	18,000	350,000	-0.8	12,000
		Total oxide	**935,000**	**1.9**	**55,000**	**1,260,000**	**1.3**	**51,000**	**325,000**	**-0.6**	**-4,000**
	Fresh	Indicated	1,450,000	2.9	136,000	2,240,000	2.8	201,000	790,000	-0.1	65,000
		Inferred	910,000	2.8	82,000	385,000	1.9	24,000	-525,000	-0.9	-58,000
		Total fresh	**2,360,000**	**2.8**	**218,000**	**2,625,000**	**2.7**	**225,000**	**265,000**	**-0.1**	**7,000**
Total			**3,295,000**		**273,000**	**3,885,000**		**276,000**	**590,000**		**3,000**

Figure 14.28 displays a cross-section through the Grant's Hill pit showing outlines of the 2019 and 2022 RPEEE pit shells.

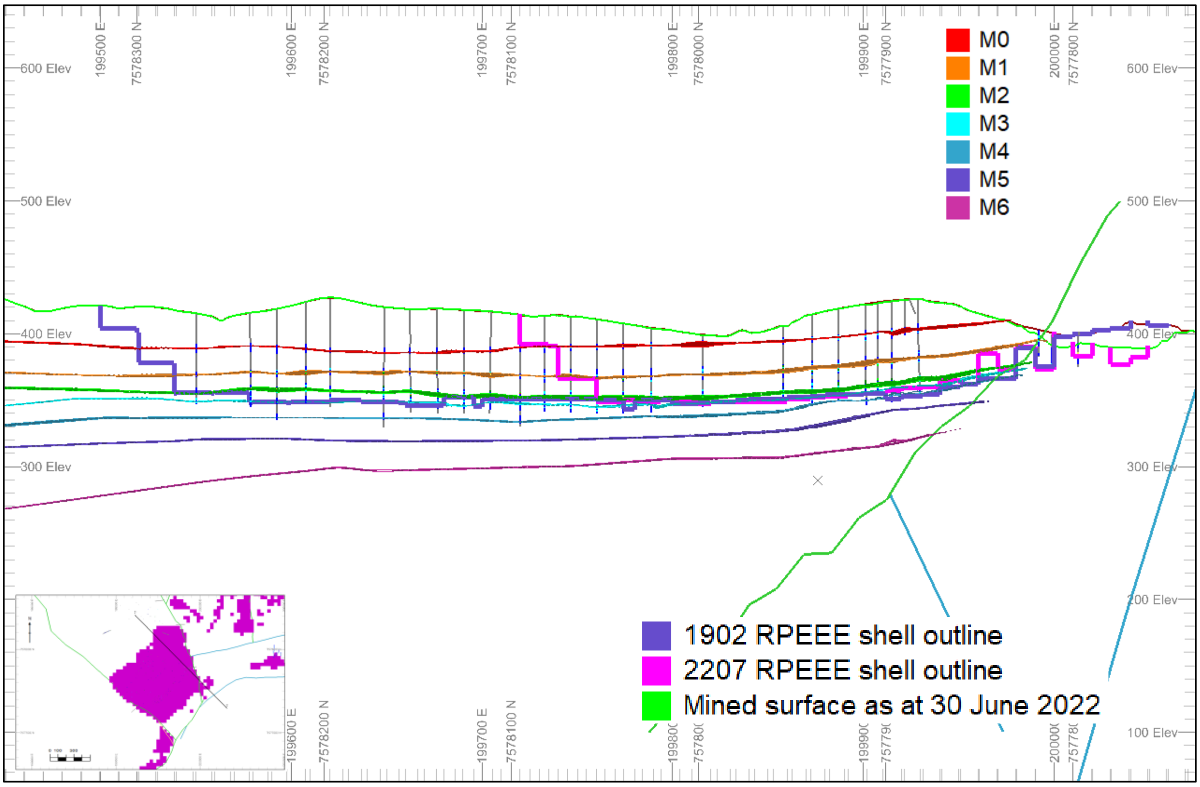


Figure 14.28. Cross-section through the Grant's Hill pit (pink = 2022 RPEEE [model 2207] pit shell; blue = 2019 RPEEE [model 1902] pit shell). Inset shows the Grant's Hill 2022 RPEEE pit shell and location of the cross-section.

14.20 Mining Depletion

The model has been depleted to June 29, 2022, using a wireframe surface provided by the site team [220629_bc_mined]. The depletion field is MINED, where 1 is mined out and 0 is in-situ. The mineralization depleted is summarized in Table 14.25. The mined zones by area are shown in Figure 14.29.

Table 14.25. Comparison of depleted 2019 MRE and 2022 MRE depleted to 2207 mined surface.

Model	Mined	Tonnes	Grade (g/t Au)	Au (oz)
2019 MRE	2207	1,773,996	2.37	135,109
2022 MRE	2207	1,992,372	1.57	100,370
Difference		218,375	-0.80	-34,739
Difference as a percentage		12%	-34%	-26%

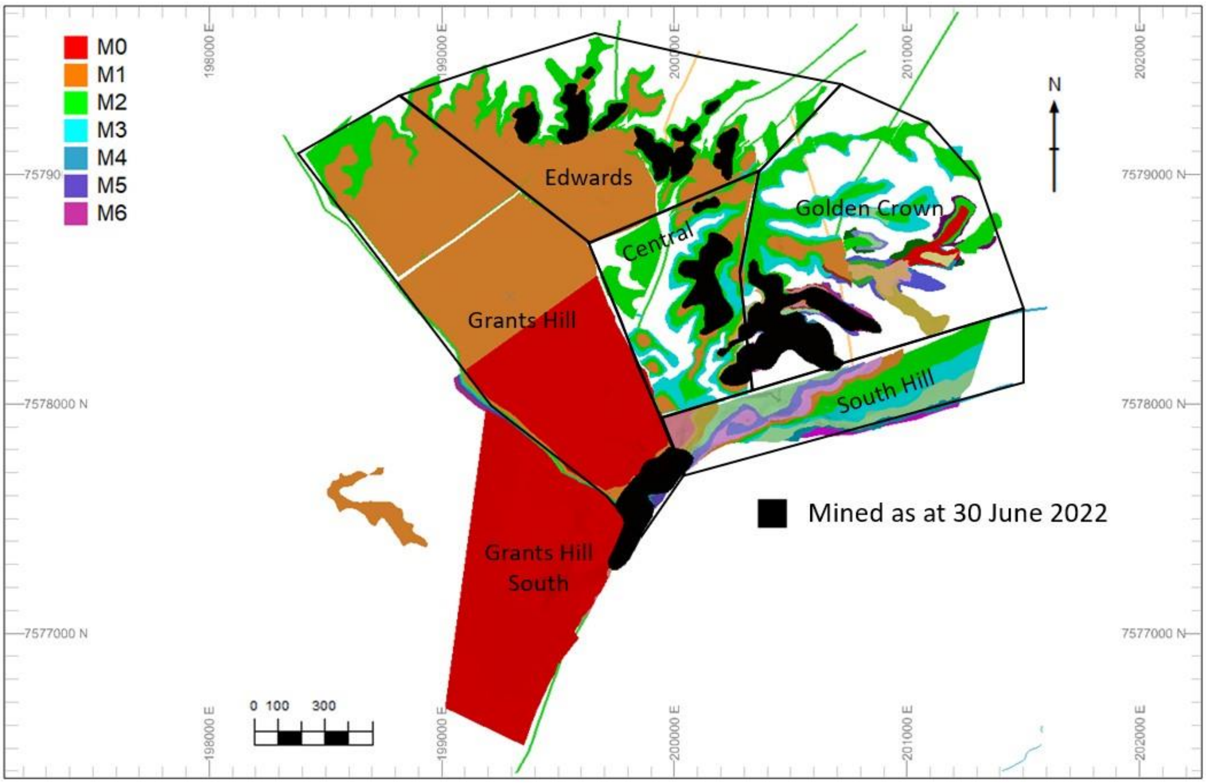


Figure 14.29. Beatons Creek extents of mineralization and mined areas to June 2022.

For comparison purposes, the previous model (MRE 2019) has been depleted using the same (end of June 2022) depletion surface. The MRE 2019 model has fewer tonnes (-12%) for a much higher grade (34%), and overall, more contained ounces (26%). This can be compared to mill-reconciled production data, which between January 2021 and September 2022 gave 2.510 Mt at 1.17 g/t Au for 94,148 oz Au (contained) of dominantly oxide and some fresh mineralization (approximately 160,000 t) from Beatons Creek. Some 87,313 oz Au from Beatons Creek were recovered during the period from the processing plant.

This shows that the MRE 2019 model was overcalling the grade in comparison to the new model. The MRE 2022 model is more reflective of the gold grades and contained ounces realized through mining and processing. Note that the production figures include dilution through the mining process, whereas the MRE models are not diluted. In addition, an unquantified amount gold is likely to have been liberated and lost during blasting and materials handling (e.g., during haulage, stockpiling and handling). Gold loss (to tails) in the processing plant is approximately 7.3%.

14.21 Reconciliation

Reconciliation of different estimates with the final plant reconciled numbers is summarized in Table 14.26. The mined zones by area are shown in Figure 14.27.

Table 14.26. Reconciliation of various models with final plant output.

Model	Tonnes (Mt)	Grade (g/t Au)	Contained ounces Au	Diluted	Notes
MRE 2019	1.773	2.37	135,109	No	Depleted block model to 2022 surface
Grade control	1.511	1.50	72,665	No	Period Aug 2021 to Sep 2022 only
Mine claim	2.622	1.22	102,676	Yes	Production prediction based on truck count Grade based on MRE 2019 model or grade control model
Plant reconciled	2.510	1.17	94,148	Yes	Plant reconciled figures for the life of operation period

The MRE 2019 and grade control models are undiluted. All other comparisons are diluted, given they are post-mining metrics. The higher grade of the MRE 2019 model reflects the influence of the trench channel samples, as previously discussed in sections 10.6.4 and 14.19.

The grade control models were not applied until after August 2021, reflecting notable delays in assay turnaround time from the MinAnalytical laboratories (Perth and Kalgoorlie) during January to July 2021. This reflected scheduling issues and COVID-related personnel shortages.

The mine claim is the production derived prediction, based on truck counts for tonnage, and grade assigned from either the 2019 MRE or grade control models.

Plant reconciled production from January 2021 to September 2022 was 2.51 Mt at 1.17 g/t Au for 94,148 oz Au (contained) of dominantly oxide and some fresh mineralization (approximately 160,000 t). The actual quantity of recovered gold was 87,313 oz Au. These figures pertain to production from Beatons Creek only.

14.22 Mineral Resource Risk Factors

A summary of key risk factors related to the 2022 MRE is given in Table 14.27.

Table 14.27. Risk summary for the Beatons Creek MRE.

Factor	Risk	Comment
Sample collection, preparation and assaying	Moderate	The resource input data is noisy – as reflected by a moderate to high nugget effect of up to 60%, with the principal mineralization such as M1 and M2 displaying nugget effects of 39% and 42%, respectively. This reflects to some extent multiple data types (e.g., DD vs RC) and sample/assay approaches (e.g., different submission weights, preparation routes and assays via FA, SFA and LeachWELL). Improved sampling protocol instigated for the 2020 to 2022 grade control and resource drilling based on 0.5 m RC composites and 5 kg or 2.5 kg assay charges by PhotonAssay. PhotonAssay based on crushed not pulverized material, thus reducing GSE and PE effects. The 0.5 m samples were composited to 1 m for the estimate, resulting in lowered nugget effects compared to the 2019 MRE (e.g., M1 and M2 reduced from 60% nugget). Channel (costean) trench samples were removed from the 2022 MRE, except for 57 in the Edwards area (Inferred Mineral Resource only).
QA/QC	Low-Moderate	Low quality QC over several historical programs where CRMs, blanks and duplicates were not submitted. For some early programs where CRMs are present, their performance is below average. These only inform the Inferred Mineral Resources. Recent drilling from 2020 to 2022 has a full QC program applied and yields satisfactory results. These inform the Indicated Mineral Resources. Rig duplicates indicate a pairwise RSV of ±45%–50%, with laboratory splits indicating a pairwise RSV of ±40%. Both duplicate sets are indicative of the presence of coarse gold in the samples. This poses some risk in relation to the 0.5 g/t Au indicator grade used during wireframe construction.
Geological data and model	Moderate-High	Reasonable control based on extensive grade control RC drilling, limited core drilling and mapping during mining. The marine lag conglomerate bodies have good global continuity. The channelized conglomerate bodies are complex and more difficult to resolve from RC drilling. The use of 0.5 m RC sampling leads to dilution of the true mineralization thickness as the 0.5 g/t Au cut-off results in samples spanning the true thickness boundaries. This dilution is unavoidable given the nature of the RC drilling and sampling process. This results in a partially diluted geological model, whose effects will not be uniform across the deposit. The presence of dromedary boulders in the marine lags has the effect of locally diluting the mineralization as drillholes pass through all or part of them. Their scale is no more than a few meters. Where such low grades are returned, the model will be lower grade.
Grade estimate	Moderate	Smoothed estimate based on moderate-high nugget effect, leading to poor selectivity in the model, particularly with a drill spacing of ≥20 m by 20 m. A relatively large estimation block size was applied (20 m by 20 m by 1 m and 40 m by 40 m by 1 m) to reduce conditional bias.
Tonnage estimate	Moderate	Risk due to relative lack of spatially distributed bulk density data. Dilution of mineralization width due to RC drilling and 1 m composites, which will locally increase tonnage.
Economic factors including mineral processing	Moderate-High	Beatons Creek has RPEEE and is reported within an optimized pit shell. 2019 and 2022 metallurgical testwork on the fresh mineralization and test-milling indicates gold recovery is achievable using gravity and

Factor	Risk	Comment
		cyanide leaching methods. Increasing mining costs and a high stripping ratio poses some risk to the project. Higher mining costs also relate to the rehandling of PAF rock. Little dilution has been factored into the Mineral Resource; this will require consideration during economic studies and careful control during any future mining operation. Some risk exists in context of the fresh mineralization approvals process. No economic assessment has been undertaken. No Mineral Reserves have been defined.
Accuracy of the estimate	Moderate	No simulation studies have been undertaken to quantitatively evaluate grade uncertainty at Beatons Creek. The QPs qualitatively assess the following, based on Mineral Resource category: Indicated: ±15% to 25% at the 80% confidence level over a half year period. Inferred: ±25% to 50% at the 80% confidence level over an annual period.
Overall rating	**Moderate-High**	**The current Mineral Resource estimate carries Moderate-High uncertainty and risk. This rating is reflected by the use of the 'Inferred Mineral Resource' and 'Indicated Mineral Resource' categories.**

15. MINERAL RESERVE ESTIMATES

This Technical Report does not disclose Mineral Reserves.

16. MINING METHODS

Item 16 of Form 43-101F1 applies to advanced properties only and has not been addressed in this Technical Report.

17. RECOVERY METHODS

17.1 Introduction

The Golden Eagle plant, which is owned by Millennium Minerals, a wholly owned subsidiary of Novo, was designed for a feed rate of 1.5 Mt/a but has historically operated closer to 1.8 Mt/a. Comparison of feed parameters has confirmed that these rates should be achievable with the Beatons Creek fresh feed. Figure 17.1 shows the existing plant layout.

Figure 17.1 Existing processing plant layout (Source: Novo).

17.2 Process Description

The processing plant consists of the following unit operations:

- Single-stage crushing using a jaw crusher with design capacity of 400 t/h, operating 12 hours per day. Historical plant data indicate that the crusher operated at an average of 284 t/h for 18 hours per day on oxide feed and 293 t/h for 19 hours per day during the three trials.
- Single-stage grinding, closed-circuit milling to a target grind size of P_{80} -150 µm using a semi-autogenous grinding (SAG) mill. The SAG mill has historically achieved average rates of 203 t/h and 209 t/h on oxide feed and during fresh feed trials, respectively.

- Gravity gold is recovered by a centrifugal concentrator and intensive cyanidation leach reactor. Historical plant data indicate an average gravity gold production rate of 3,090 g/day and 4,720 g/day for the oxide and fresh feed trials, respectively. The gravity recoveries were respectively reported at 55% and 65% for the oxide and fresh trials.
- The leach circuit contains nine leach tanks, with leaching in two 890 m^3 tanks followed by carbon adsorption in seven carbon-in-leach (CIL) tanks (four 890 m^3 and three 777 m^3) with oxygen addition to the first three tanks. Historical leach recoveries were reported at 41% and 44%, respectively, to achieve an overall recovery of 92.0% and 92.1% from the combined gravity and CIL circuit when processing the oxide and fresh material, respectively.
- Tails are thickened to 55% w/w solids prior to disposal in the TSF; decant return water is recycled through the process.
- Stripping of loaded carbon using a split AARL (Anglo American Research Laboratories) system occurs in a single 3 t column. Regeneration of carbon is completed in a diesel-fired carbon regeneration kiln prior to returning to adsorption circuit.
- Gold is recovered from pregnant solution by electrowinning in three electrowinning cells.
- Reagents are delivered in bulk and stored on site for distribution to the plant.

17.2.1 Crushing

The crushing circuit is a conventional single-stage jaw crusher operating in open circuit. Product from the crushing circuit is conveyed to a primary coarse mineralization stockpile. The circuit was designed to crush 400 dry t/h to a P_{80} product size of 125 mm, based on a utilization of 45% to achieve the annualized plant nameplate capacity of 1.5 Mt/a.

Recent operating data (Table 17.1) indicate that the crushing circuit can achieve this rate on the Beatons Creek fresh mineralization.

The jaw crusher is a 200 kW Metso C140 single toggle jaw crusher which is fed from the run of mine (ROM) bin at a controlled rate by a variable speed apron feeder and discharged into the jaw crusher. A rock breaker is installed to fragment any oversize material. The crusher product is discharged onto the stockpile feed conveyor which discharges onto the coarse mineralization stockpile. The coarse stockpile has a storage capacity of 10,000 t.

Table 17.1. Primary crushing rate.

	Baseline data		Fresh mineralization trial	
	Tonnes per day	Tonnes per hour	Tonnes per day	Tonnes per hour
Max	11,335	575	7,304	469
Average	4,953	284	5,438	293
P_{90}	6,531	396	6,583	359
P_{80}	6,118	330	6,178	337
P_{50}	5,057	267	5,550	283
P_{20}	3,731	231	4,764	245
P_{10}	2,870	212	3,936	233

17.2.2 Coarse Ore Storage and Handling

Mill feed is reclaimed from the coarse mineralization stockpile via an apron feeder below the stockpile, which discharges onto the mill feed conveyor. An emergency reclaim apron feeder is located at the stockpile area, which also discharges onto the mill feed conveyor.

An 82 t capacity lime silo, fitted with a variable speed rotary valve and screw feeder, doses lime onto the mill feed conveyor to provide pH control in the leaching and adsorption circuit. Delivered quicklime is pneumatically transferred into the silo from triple or quad road train tankers.

17.2.3 Grinding and Classification

The grinding circuit consists of a single-stage SAG mill operating in closed circuit with a hydrocyclone classification system. The original circuit design grind rate was 187 dry t/h of feed material to a P_{80} product size of 150 µm, based on a utilization of 91%. Table 17.2 indicates that the circuit can achieve this on the Beatons Creek fresh mineralization.

The SAG mill is a 6.7 m diameter by 5.65 m EGL (effective grinding length) variable speed mill, fitted with a 4,000 kW motor. The mill is designed to operate at a ball charge of 12% to 26% of total mill volume and is charged with 105 mm steel ball grinding media. The SAG mill product discharges through a trommel and the oversize is collected in the scats bunker.

The SAG mill trommel undersize flows by gravity into the mill discharge hopper. One of two centrifugal slurry pumps, arranged in a duty/standby configuration, pumps the ground slurry to the hydrocyclones for classification. The hydrocyclone cluster consists of eight 400 mm diameter hydrocyclones (typically six on duty and two standby). The hydrocyclone overflow gravitates to the trash screens. A portion of the hydrocyclone underflow feeds the gravity circuit with the remainder returning directly to the mill feed chute.

Clean-up from the floor of the grinding area is achieved by a vertical spindle centrifugal sump pump.

Table 17.2. Milling circuit rate.

	Baseline data (t/h)	Fresh mineralization trial (t/h)
Max	257	241
Average	203	209
P_{90}	234	229
P_{80}	229	221
P_{50}	211	207
P_{20}	184	198
P_{10}	163	191

17.2.4 Gravity Recovery

The gravity circuit consists of a centrifugal concentrator to process the cyclone underflow with the gravity concentrate being intensively leached in a reactor to yield a pregnant solution from which precious metals are recovered by electrowinning.

The cyclone underflow is screened on a 1.8 m wide by 3.6 m long, horizontal, wet vibrating screen with the screen oversize returned to the mill feed. The screen undersize feeds a 1.02 m diameter centrifugal gravity concentrator, with the tailings from the gravity concentrator returning to the mill discharge hopper. Concentrate from the gravity circuit discharges to the intensive leach reactor. The batch leach process is initiated daily with the leaching sequence controlled by a programmable logic controller. After leaching, the residue is returned to the mill discharge hopper by a centrifugal slurry pump and the pregnant solution is forwarded to the electrowinning circuit. Electrowinning is conducted in a dedicated 600 mm by 600 mm electrowinning cell fitted with nine cathodes and ten anodes. Electrical current is supplied from a rectifier.

Historical operating data indicate the gravity circuit achieved gold recoveries of 55% for the oxide feed and 65% during the Beatons Creek fresh feed trials (Table 17.3).

Table 17.3. Gravity circuit gold recovery.

	Baseline oxide (%)	Fresh mineralization trial (%)
Max	88	83
Average	55	65
P_{90}	71	78
P_{80}	67	74
P_{50}	58	68
P_{20}	45	55
P_{10}	36	51

17.2.5 Leaching and Adsorption

The hydrocyclone overflow from the grinding circuit is screened through a 1.5 m by 4.5 m horizontal, wet vibrating trash screen before leaching with cyanide in a nine-stage hybrid CIL circuit. A second, standby trash screen is also available.

The trash screen underflow slurry reports to the leach feed distribution box that allows the slurry to be directed to either the first leach tank or the second leach tank. The hybrid CIL circuit consists of two leach tanks (two by 890 m^3) and seven adsorption tanks (four by 890 m^3 and three by 777 m^3). The design includes the ability to bypass any tank in the train should this be required.

Cyanide is dosed into the leach feed distributor. Pipe spargers are installed on the first three tanks to enable the injection of oxygen.

Carbon is suspended in all adsorption tanks which are fitted with a mechanically wiped, inter-tank screen with 1 mm aperture to retain carbon. Carbon is advanced through the CIL circuit counter current to the pulp, on a batch basis, using recessed impeller pumps. Loaded carbon from Tank 3 is pumped to the loaded carbon recovery screen. The carbon recovery screen is a 1.5 m wide 3.1 m long, horizontal, wet vibrating screen with 1 mm apertures. Loaded carbon from the carbon recovery screen gravitates to the acid wash surge hopper.

The CIL area is serviced by a vertical spindle centrifugal slurry pump for clean-up.

17.2.6 Carbon Handling and Gold Recovery

The carbon handling and gold recovery system comprises the following:

- 3 t mild rubber steel acid wash/carbon surge hopper;
- 3 t elution column;
- 1,500 kW elution heater;
- split AARL elution system;
- LPG fired carbon regeneration kiln;
- an electrowinning circuit of three 600 mm by 600 mm electrowinning cells, with each cell fitted with nine cathodes and ten anodes and a dedicated rectifier;
- A100 smelting furnace and crucible to produce gold doré; and
- secure gold room with a vault and safe for the storage of bullion.

The acid wash and rinse cycles are performed in the rubber-lined acid wash/carbon surge hopper located beneath the carbon recovery screen. Following the acid wash and water rinse cycle, the carbon in the hopper is transferred into the elution column. The elution circuit is a split AARL design.

The pre-soak and rinse water passes through the two eluate filters to either one of the two pregnant solution tanks via a recuperative heat exchanger to pre-heat the incoming strip solution.

The pregnant liquor from the carbon elution is delivered to one of two dedicated electrowinning cells operating in parallel by a pregnant solution pump. At the completion of the electrowinning cycle, the barren solution from the electrowinning cells is returned to the leaching circuit by pumping it back via the barren solution pump.

At the completion of the elution cycle, barren carbon is educted from the elution column to the regeneration kiln feed hopper. The hopper is located on top of the carbon regeneration kiln, which in turn sits above CIL Tank 9. If required, the kiln can be bypassed, and the barren carbon can be educted directly into CIL Tank 9. Prior to regeneration, the barren carbon is de-watered over a small carbon dewatering sieve bend screen above the kiln feed hopper. The rotary kiln feed chute drains any residual water from the carbon prior to it entering the kiln. At the end of the regeneration process, the regenerated carbon discharges onto the carbon sizing screen. The oversize carbon drops into CIL Tank 9 and the undersize carbon reports to the carbon safety screen.

The gold from the gravity circuit and the elution circuit electrowinning cells is calcined and smelted using fluxes in an LPG-fired smelting furnace to produce the final gold product doré bars, which are weighed, and then stored in the gold safe (located inside a concrete vault). The gold from the gravity circuit is refined separately from that of the elution circuit to allow separate accurate metallurgical accounting of the gravity circuit.

17.2.7 Tailings Thickening

The final tails from the CIL circuit gravitates to a 19 m diameter high-rate thickener via the carbon safety screen. Flocculant is added to the thickener feed to improve thickener overflow clarity, settling rates and underflow density. The thickened tails (underflow) is pumped to the TSF. The tailings thickener overflow gravitates to the process water dam for recycling to the processing plant.

17.2.8 Sulfide gravity recovery circuit

The plant includes a sulfide gravity recovery circuit consisting of spirals, vertical ultra-fine grinding (UFG) mills and other equipment. The circuit has been bypassed in the current configuration and will not be required to treat material from the Beatons Creek deposit.

17.3 Reagent Mixing, Storage and Distribution

17.3.1 Lime

An 82 t quicklime silo delivers lime directly onto the mill feed conveyor via a rotary valve controlled by a proportional controller with a set-point related to the mill feed conveyor rate.

The quicklime is transferred to the silo from pressurized road tanker deliveries. The lime handling system consists of the following items:

- 82 t silo capacity, which stores and delivers the lime onto the SAG mill feed conveyor;
- pneumatic bin discharge activator, which mobilizes the quicklime to discharge from the silo;
- slide gate for isolation of the discharge point;
- rotary valve, which controls the discharge rate of the lime to the mill feed conveyor; and
- dust collector installed on the top of the lime silo to contain the dust emissions during; and the pneumatic loading process, including maintenance access.

17.3.2 Cyanide

Cyanide is delivered as 98% NaCN (sodium cyanide) briquettes which are sparged and dissolved with the solution transferred to the cyanide storage tank via a leased vendor sparging plant. The sparging plant is complete with a dissolution tank, a 45 m^3 cyanide storage tank and a sparging system pump which combines both the mixing recirculation and storage transfer duties.

Two cyanide recirculation pumps, operating in duty standby arrangement, deliver cyanide via a ring main to the CIL circuit and the intensive leach reactor. A separate cyanide dosing pump delivers cyanide from the ring main to the elution circuit in a controlled manner.

The cyanide mixing and storage tanks are contained within a concrete bund, with a collection sump in place to recover spillage. The sump pump recovers minor spillage and clean-up, and delivers it to the CIL feed distributor.

17.3.3 Sodium Hydroxide

Sodium hydroxide is delivered in liquid form in road tankers and stored in a 30 m^3 sodium hydroxide storage tank located in the same bunded containment as the cyanide sparging plant. A dosing pump draws the reagent from the sodium hydroxide storage tank and doses it to the elution circuit and intensive leach reactor.

17.3.4 Hydrochloric Acid

Concentrated hydrochloric acid is delivered in liquid form in road tankers and stored in a 30 m^3 concentrated HCl (hydrochloric acid) storage tank. The concentrated acid is transferred from the storage tank by an acid dosing pump, then diluted with the water pumped from the water tank to create a 3% w/w HCl solution that is added to the acid wash hopper for the carbon acid wash cycle.

The concrete containment bund surrounding both tanks complies with the dangerous goods statutory requirements.

17.3.5 Activated Carbon

Activated carbon is delivered in 600 kg bulka bags. When required, carbon is lifted to the top of CIL Tank 9 and added directly into the tank.

17.3.6 Oxygen

Oxygen gas is produced on site using a pressure swing adsorption (PSA) plant.

17.3.7 Flocculant

Flocculant is added to the tailings thickener by a vendor-supplied flocculant mixing package.

17.4 Air and Water Services

Typical air and water supply and distribution services are provided for the plant.

17.5 Projected Energy and Water Requirements

Plant and infrastructure power consumption, averaged over the last six months of operation, was 3,235,000 kWh/month, equivalent to a continuous electrical load of 4.85 MW.

Water requirements are projected to be 0.7 m^3 per tonne of mineralization processed, or approximately 1,050 ML per annum for 1.5 Mt/a throughput.

18. PROJECT INFRASTRUCTURE

18.1 Roads and Site Access

Vehicle access to the mine and processing facility is via the part sealed Newman to Port Hedland Road (State Route 138 Marble Bar Road). The existing Nullagine airstrip is located 10.4 km from Nullagine.

Access to the Beatons Creek project is along State Route 138, turning off onto an existing unsealed access road approximately 800 m north of Nullagine. The existing Beatons Creek project facilities are 600 m off State Route 138.

The Golden Eagle plant site is accessed from Nullagine by travelling approximately 8.9 km south along State Route 138 to the existing site access road. The processing plant is approximately 3.5 km from the intersection. The plant site access road crosses the Cajuput Creek (tributary to the Nullagine River and De Grey system) via a floodway. The creek is dry for most of the year. The frequency of road closure and its impact on operations will need to be quantified by Novo as part of any mine re-start.

18.2 Airstrip

The workforce was employed on a fly-in, fly-out basis. Most flew in via the Newman or Port Hedland commercial airports, which have frequent services to and from Perth. The operations workforce was transferred from the preferred airport to the plant site by a bus service provided by Novo.

Several private airstrips closer to Nullagine may provide alternative transport options; however, access to these airstrips will need to be negotiated. The existing airstrip at Nullagine is unsealed, 1,600 m long and 30 m wide. It is understood that it would need to be investigated and refurbished, if necessary, to be certified by the Civil Aviation Safety Authority.

18.3 Beatons Creek Mine Infrastructure

The mine offices, crib rooms and toilets were established at the existing Beatons Creek site. They were powered by a local diesel generator. The mobile equipment workshop, fuel farm and wash-down facilities were located adjacent to the Golden Eagle plant.

18.4 Processing Plant Site Infrastructure

The plant site (Figure 18.1) includes the existing processing plant facilities and associated infrastructure, TSF and the accommodation village.

Infrastructure supporting the processing plant consists of administration buildings, workshop, warehouse, laboratory, power station, communications network, water supply and storage, water treatment and wastewater treatment.

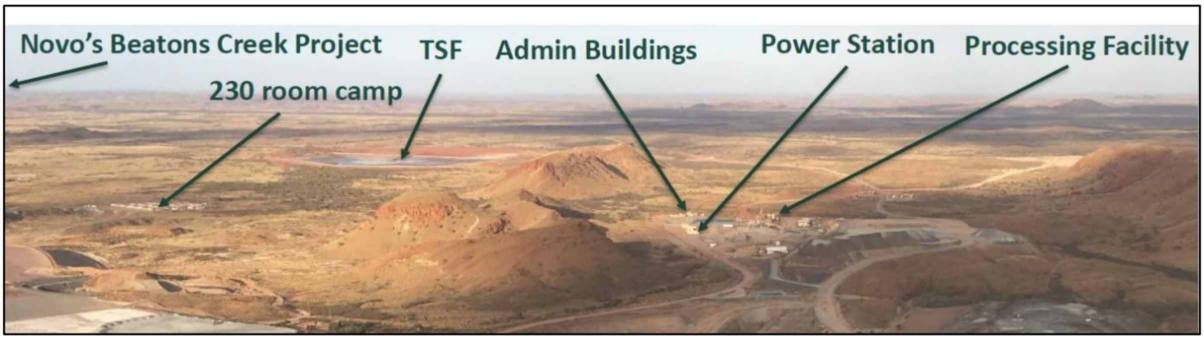


Figure 18.1. Golden Eagle plant and infrastructure (Source: Novo).

The administration building area comprises the main administration office building, toilet block and a first aid, mine rescue and training building.

The existing processing plant comprises comminution, gravity gold recovery, conventional CIL, elution, electrowinning and smelting, reagents, air and water services (see Section 17). Six LPG tanks (7,500 L each) are installed to supply fuel for the gold recovery process equipment.

18.5 Power Station and Fuel Storage

The plant site includes a diesel generator powerhouse equipped with 10 by 1 MW diesel generators, which is owned and operated by Kalgoorlie Power Systems. Power is reticulated at 11 kV to the processing plant and via overhead transmission line to the accommodation village.

The TSF decant pumps are powered by local generators.

An existing fuel farm comprises six diesel storage tanks with a total storage capacity of 560 kL. It is used to supply the power station and provide mobile equipment refueling.

18.6 Water Supply

Water supply for the plant site is via borefield networks, pit dewatering and tailings decant, with capture of stormwater. The water supply is sufficient to sustain plant production at approximately 1.5 Mt/a.

A raw water pond and process water pond have been constructed at the processing plant site to store water for operations.

Potable water for the site and accommodation village is supplied by reverse osmosis plants.

18.7 Sewage Treatment and Disposal

Plant sewage for the existing facilities is treated via a fully contained/semi-buried BioMAX wastewater treatment plant system, with a design capacity of 80,000 L per day. The DWER licence conditions provide for the treated effluent to be disposed of into the rock ring of TSF1.

18.8 Tailings Storage Facility

The plant site has a decommissioned tailings storage facility (TSF1) and an active storage facility (TSF2) as shown in Figure 18.2.

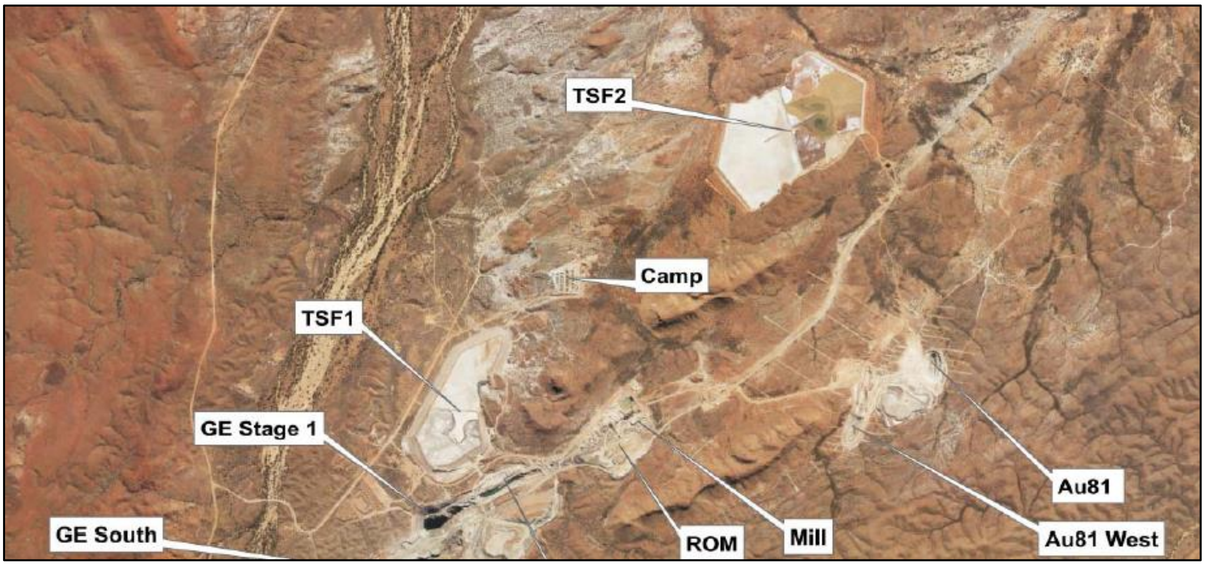


Figure 18.2. TSF locations (Source: Novo).

TSF2 is ready for the re-commencement of operations and is configured in a single cell with a central decant. The current design and constructed TSF2 embankment is to an elevation of 399 mRL, giving a remaining capacity of 1.4 Mm^3 and is expected to provide storage capacity for 14 months of operations assuming and annual mill throughput of 1.8 Mt/a.

18.9 Accommodation Village

A 230-room accommodation village is located 4 km from the mine site (Figure 18.3).

Figure 18.3. Accommodation village (Source: Novo).

The village is equipped with facilities typical of remote mine operations, including accommodation units, kitchen and dining room, recreation room, gymnasium, and laundries.

18.10 Communications

Telecommunication facilities and Wi-Fi network are available at the Golden Eagle plant site. Mobile telephone communications are available at the Beatons Creek site.

19. MARKET STUDIES AND CONTRACTS

Item 19 of Form 43-101F1 applies to advanced properties only and has not been addressed in this Technical Report.

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Summary

A summary of the environmental studies, permitting and socio-economic considerations is provided in the following sections. The focus of the environmental studies section is on the Beatons Creek project, as it is understood Golden Eagle plant and TSF2 will continue to be managed under their own licences issued by the Department of Water and Environmental Regulation (DWER). The Golden Eagle plant can accept feedstock from assets other than Beatons Creek.

The Fresh Rock Expansion (FRE) of Beatons Creek has been in planning for the last decade. Novo has engaged with the Western Australian Department of Mines, Industry Regulation and Safety (DMIRS) and the DWER over many years and has undertaken many environmental and social assessments. The key consideration in accessing the fresh rock component of the resource is the project's location within a Priority 1 Public Drinking Water Supply Area (PDWSA) and therefore the security of the Nullagine water supply. Extraction of fresh rock requires consideration of the environmental factors *Terrestrial Environmental Quality* and *Inland Waters*, as defined below:

- Terrestrial Environmental Quality – the Environmental Protection Authority's (EPA) environmental objective is '…to maintain the quality of land and soils so that environmental values are protected'
- Inland Waters – the EPA's environmental objective is '…to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected'.

The interaction between these two factors is a classic source-pathway-receptor model with geochemical properties of the fresh rock being a source, the hydrogeological setting being a potential pathway, and the town's water supply being the receptor.

Mitigations proposed in the design and site management at Beatons Creek, together with almost a decade of data and studies, have demonstrated that there is negligible risk of impact to the P1 PDWSA due to an incomplete pathway between the receptor and source. There is no viable pathway for potential contaminants (if generated) at Beatons Creek to reach the town's water supply.

20.2 Environmental studies

20.2.1 Landscape

The site lies predominantly within the Pilbara Bioregion, an area of approximately 178,500 km^2 in the northwest of Western Australia, which is characterized by vast coastal plains and inland mountain ranges with cliffs and deep gorges (Bastin and ACRIS Management Committee, 2008).

The Beatons Creek project area is located within the Capricorn and Mosquito land systems of the Pilbara Region (Van Vreeswyk et al., 2004):

- Capricorn: consists of hills and ridges of sandstone and dolomite supporting shrubby hard and soft spinifex grasslands; steep, rocky upper slopes, gently sloping stony foot slopes and stony lower plains and valleys (Van Vreeswyk et al., 2004).

- Mosquito: the land system consists of stony plains and prominent ridges of schist and other metamorphic rocks, supporting hard spinifex grasslands. Past and present mining activity on the Mosquito Land System has resulted in localized disturbance and degradation (Van Vreeswyk et al., 2004).

Northcote et al. (1960–1968) describe the landforms in the Beatons Creek area as steep hills and low ranges associated with dolomite, chert breccia, folded quartzite, shale and slate rock types, with extensive areas of exposure. Dominant soils are shallow, stony, earth loams (Northcote et al., 1960–1968).

20.2.2 Topography

Most of the Beatons Creek project area lies between 200 m to 500 m above sea level. Two large rivers, the Nullagine and the Oakover, flow northwards across the area and eventually join to form the De Grey River. The Oakover River flows along the axis of a major Proterozoic syncline but the Nullagine River's course bears little relation to currently exposed geology, suggesting that it is superimposed (as are several other major rivers to the west). The area can be divided into seven physiographic provinces: plateau, dissected plateau, range, low granite hills, plain, valley, and desert.

20.2.3 Soils

Regional soil mapping indicates that soils within the site area primarily consist of stony soils, with some areas containing shallow red loams and to a lesser extent, shallow red/brown non-cracking clays (Van Vreeswyk et al., 2004). Mine Earth (2015) conducted a review of the baseline soil and sediment data for soil handling and revegetation, to provide a map of land systems and document the difference in the soil types with the project area, as well as provide topsoil management and handling recommendations.

Soils have low pH and high acidity (Mine Earth, 2015), typical of the local area. Given that the soils are representative of natural conditions, it is likely that vegetation has adapted to these acidic conditions (Mine Earth, 2015). The baseline surface soil review has recorded higher concentrations of Al, Fe and Mn; given that vegetation is present across the site, it is likely that the plants in the region have adapted to these parameters (Mine Earth, 2015).

20.2.4 Surface hydrology

The hydrology of the Pilbara has been described as one of extremes, ranging from severe droughts to major floods (Ruprecht and Ivanescu, 2000). Streamflow occurs in direct response to rainfall and infiltration excess, when the rate of rainfall exceeds the infiltration capacity of the soil, the primary mechanism for runoff generation. This mechanism is commonly associated with high-intensity cyclonic and monsoonal rainfall and impervious catchments. With the low rainfall in the region and general lack of groundwater contribution to surface water flow, extended periods of low flow or even zero flow are common.

The Beatons Creek project is located west of the Nullagine River, a major, ephemeral watercourse in the Nullagine area, which has a catchment area of 7,240 km^2. All creeks in the project area are seasonal drainage lines, usually only flowing briefly following significant rainfall events. Average annual evaporation of the Pilbara region is about 3,600 mm, which is ten times the total annual rainfall. Away from the few major rivers with permanent surface pools or shallow groundwater, vegetation is relatively sparse.

A water-holding dam is located on the eastern edge of Mining Lease M46/11. This dam was constructed by Metana Minerals NL in 1982 and was used for its alluvial mining operations.

Five surface water catchments have been identified as part of surface water assessments that have supported approvals and operations to date (360 Environmental, 2016):

- Catchments 1, 2 and 3 flow separately to the Nullagine River.
- Rainfall falling within Catchment 4 is retained within its boundary and existing reservoir.
- Catchment 5 drains northward to an unnamed seasonal creek, then to Taylor Creek and eventually into the Nullagine River.

The current and proposed mining operation sits predominantly in catchments 1 and 4. Surface water is generally fresh, with less than 500 mg/L total dissolved solids (TDS). Hydrological modeling for operations and closure has been undertaken for the approved Mining Proposal (MP) and Mine Closure Plan (MCP) and will require updating to encompass mining the revised footprint associated with the fresh rock mine schedule.

20.2.5 Groundwater

Groundwater resources in the project area are located within three aquifers: the Mosquito Creek Formation Aquifer (MCFA), the Hardey Formation Aquifer (HFA) and the alluvial aquifer system (SRK, 2022a):

- The MCFA and HFA are fractured bedrock systems with secondary porosity and are part of the Pilbara Fractured Bedrock Aquifer (FBA) system. Available data suggest these fractured bedrock aquifer systems are highly compartmentalized, with limited regional connection and poor hydraulic connectivity between compartments. For example, water quality within the aquifers across the project area is highly variable, with significant differences in analyte concentrations (i.e., salinity, sulfate) observed between proximal bores. This compartmentalization has been extensively tested and described by SRK for approximately a decade, through its work at Beatons Creek and for surrounding operations (SRK, 2022a).
- The alluvial aquifers comprise unconsolidated alluvial deposits associated with surface water drainage systems in the project area, including Cadjuput Creek, Beatons Creek and the Nullagine River.

Field investigations suggest that the MCFA is highly compartmentalized, with poor hydraulic connectivity between compartments. Water quality across the project area is highly variable, with significant differences in analyte concentrations (i.e., salinity, sulfate) observed between bores in proximity. Groundwater abstraction commenced in December 2020. There has been a lack of drawdown response in monitoring bores located in the Grant’s Hill area since the commencement of water abstraction (for dust suppression purposes) which supports the interpretation of a highly compartmentalized groundwater system.

Groundwater storage within the MCFA is considered limited due to the low effective primary porosity of the basement rocks. However, variations in storage occur where the basement rocks are fractured due to secondary faulting.

Existing information on the HFA is limited. Observations during a site visit in February 2014 and results of hydrogeological exploration drilling indicate that groundwater in the HFA occurs within faults and fractures (i.e., secondary permeability). Groundwater levels taken from open boreholes and monitoring bores indicate that water in fractures roughly follows the topography of the site. Importantly, many open holes were dry, and several holes drilled to construct monitoring bores did not encounter any water and remained dry after drilling. This, along with the highly variable water chemistry of the HFA, suggests that the system is highly compartmentalized, with limited interconnection between fracture systems. The ability of the HFA to sustain extraction of water has not been established.

Unconsolidated sediments are located within, and adjacent to, the river and creek beds throughout the area. The alluvium associated with these drainage systems predominantly comprises sand, silt, gravels and cobbles. These systems form unconfined aquifers which overlie the basement rocks and are inferred to be hydraulically connected with the basement rock only where the underlying lithology is weathered and fractured. These sediments are of limited areal extent within the project area and are confined to thin deposits (i.e., less than 2 m thick) in valley bottoms. Alluvial aquifers are expected to have fluctuating water levels corresponding to seasonal rainfall patterns and are therefore not considered to form a sustainable aquifer with respect to long-term water supply.

Available groundwater level data collected from monitoring bores during the July 2021 sampling round have been used to develop an interpreted groundwater contour map (Figure 20.1). Groundwater levels generally follow topography and surface catchments throughout the area, apart from the area surrounding the Beatons Creek Reservoir. The increase in water levels around the dam and resultant deflection of groundwater contours suggest that the dam is a losing water body and forms a hydraulic barrier to groundwater flow. As a result, water from the southern portion of the project site flows in a southerly direction towards Nullagine, while groundwater from the northern portion of the project site flows eastward towards the Nullagine River.

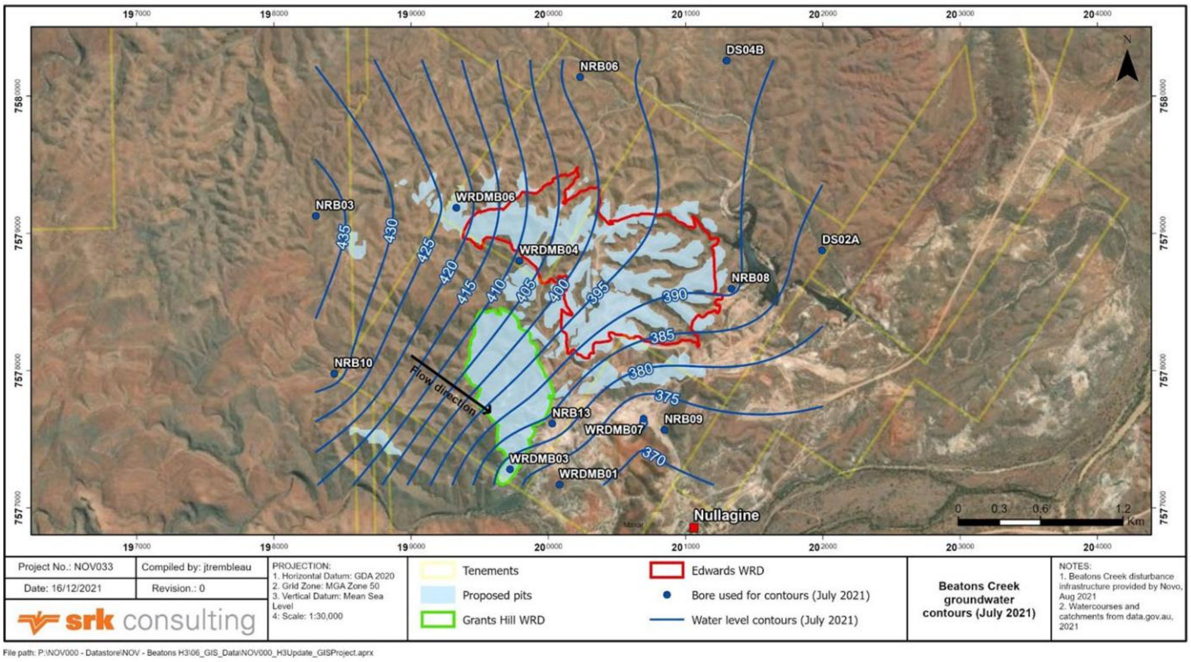


Figure 20.1. Groundwater elevation and flow (Source: SRK, 2022a).

Background groundwater quality results for the project are typical of the MCFA in the area (SRK, 2022a), and are marginal to brackish, with salinity averaging 2,216 mg/L and TDS values ranging from 600 mg/L to 18,000 mg/L. Where groundwater salinity in the MCFA is highest, this is attributed to significantly higher concentrations of magnesium, sodium, chloride and sulfate. Surface water is generally fresh, with TDS less than 500 mg/L.

The Beatons Creek area contains bores that show heterogenous chemistry and relatively poor water quality, with no clear long-term trends or seasonal variability. In general, water is brackish, with one bore, NRB09, recording high electrical conductivity values (up to 19,300 µS/cm). Water quality in regional bore holes upgradient of the historically mined area are better quality (typically less than 4,000 µS/cm) than samples collected from within the historical workings area and next to the sediment pond, where impacts from historical mining-related activities are more likely.

Although water quality in the Beatons Creek area is relatively poor, there were no trends to indicate it is worsening and the water quality has likely been poor for some time. There are large differences in parameter concentrations spatially, which indicates a lack of connectivity between compartmentalized aquifer systems in the fractured rock in which the monitoring bores are screened.

The Beatons Creek project is located within a P1 PDWSA (Nullagine Water Reserve). The Priority 1 protection areas are defined to ensure that there is no degradation of the water source.

To ensure the protection of water resources, the DWER advises that all activities within the water reserve should be conducted in accordance with the Nullagine Water Reserve Water Source Protection Plan (DOW, 2017) and mining activities are to be managed using current best practice and should comply with the DWER's *Water Quality Protection Notes and Guidance*. The approved mining of the alluvial and oxide deposits (December 2020) was determined to comprise activities compatible to protect water quality within the PDWSA.

The mine schedule includes mining of significant volumes of potentially acid forming (PAF) waste material and mining activities below the groundwater table. The compatibility of these activities within the P1 PDWSA and the impact of mining below the water table (and associated drawdown) was the subject of a referral by Beatons Creek Gold Pty Ltd (a subsidiary of Novo) to the EPA in 2022 (see Section 20.3).

The Beatons Creek project has existing groundwater licences and surface water abstraction licences. Consideration of amendments to the groundwater licence to increase the abstraction rate or to add additional draw points (i.e., pits) will require consideration.

20.2.6 Mine waste

Investigations undertaken since 2015 have comprised both static and kinetic testing programs, and the resulting database of information has resulted in a thorough understanding of both the geochemical nature and weathering behavior (including solubility characteristics) of the key mine-waste streams being produced during the oxide component of the project, which will continue to be encountered during the FRE. Importantly, the FRE is not anticipated to encounter any different waste streams to the oxide operation, and continued grade control drilling for the oxide operation has resulted in very detailed information about the contact zones of the different lithologies. Few gold deposits in Western Australia would have had as much technical investigatory work on mine-waste environmental geochemistry as has been done (and is ongoing) at Beatons Creek (G. Campbell, pers. comm.).

The approved MP identifies mineralization at the site as being in two distinct zones: oxide zone and fresh zone underlying the oxide horizon.

Waste characterization has identified two types of oxidized waste: non-acid forming (NAF) waste and alunitic oxide (AO). AO is a source of solution aluminum acidity, and although it is significantly less acidic than the strong acidity generated from pyritic PAF waste rock, it should not be placed on the outside of landforms or in drainage lines which carry ephemeral surface water flows generated during major wet spells.

Waste rock to be mined at the Beatons Creek project comprises:

- NAF oxide;
- alunitic oxide (AO);
- PAF fresh;
- mineralized oxide waste; and
- mineralized fresh waste.

Routine characterization and quantification of NAF oxide/AO occurred during grade control drilling, resulting in a constantly improving understanding of relative volumes, and location of the boundary between these two waste types. This is important because NAF oxide is the more valuable resource for closure, given its benign nature. Grade control drilling undertaken between 2020 and 2022 on 40 m grid spacing was conducted in the Edwards area. Modeling indicates the oxide profile comprises 30% to 35% NAF oxide (compared with 20% NAF oxide that was estimated prior to the initial approval of oxide mining by DMIRS in Mining Proposal REGID 89775). While the infill drilling conducted to date has been undertaken in the Edwards area, similar geology, and thus testing outcomes, are expected for the Golden Crown and Grant's Hill mining areas with confirmation (or refinement) based on infill drilling for these domains as the project advances.

NAF oxide has been, and will be, stockpiled separately from the other waste streams given its value as a surface treatment to cover PAF material and AO in the final landform. Where possible, the mine will be scheduled to minimize the rehandling of NAF material to encapsulate PAF material, but some rehandle will be required, particularly as the PAF fresh rock will be mined last.

The increased occurrence of exposed PAF material within pit floor and walls following mining of the FRE operation will require consideration to ensure there is no seepage of PAF material into the surrounding groundwater. The potential occurrence of PAF in the mined pits has been raised by regulators, particularly given the Beatons Creek location within a P1 PDWSA. To further mitigate any impact of the FRE on the PDSWA, all PAF waste is proposed to be encapsulated and the fresh rock pits backfilled to re-establish pre-existing surface water drainage, resulting in the majority of all waste generated needing to be rehandled. Further, a 10 m buffer of NAF/AO material will need to be placed at the final water table level and underneath pre-existing surface water drainage to the water table, adding significantly to the closure costs of Beatons Creek.

20.2.7 Tailings

Tailings characterization of mineralized material (to be stored at the Golden Eagle Mill TSF2) has been limited largely to oxide mineralization. The tailings had total sulfur <0.3 S%, essentially all as SO_4-S, with the sulfur primarily occurring as alunites. Soluble sulfates inhibit alunite dissolution via the 'common-ion' effect and sulfate concentrations of several hundred milligrams per liter in the tailings-pore-waters for tailings greatly exceed the threshold of 20-40 mg/L needed for alunite stabilization (Strategen, 2020). As the alunites are stabilized by the sulfates, the tailings is functionally classified as NAF.

In comparison to the historical tailings, the DWER (2021) considered that all the enriched elements in the tailings (e.g., As, Sb, Mo, Se) are already captured in the DWER Operating Licence.

Tailings from fresh rock mineralized material from the project shows long lag PAF characteristics, due to trace amounts of pyrite. Further characterization of tailings generated from this material will be required.

20.2.8 Vegetation

The Beatons Creek project area is lightly vegetated, with a ubiquitous ground cover of Spinifex grass and scattered shrubs of Hakea, Acacia, and Grevillea. Larger trees, including Eucalyptus and Melaleuca species, are confined to the immediate vicinity of drainage lines.

A detailed Level 2 flora survey was completed in September 2014 at the Beatons Creek project, which identified three flora species of conservation significance protected under the *Biodiversity Conservation Act 2016* (BC Act):

- *Acacia aphanoclada* (Priority 1);
- *Acacia cyperophylla var. omearana* (Priority 1); and
- *Ptilotus wilsonii* (Priority 1).

A small number of Priority 1 flora are located within the southern operations of the Beatons Creek project; however, given the number of records of the species at sites outside of the project area, this is not expected to have a significant impact on the species.

Given the timing since the previous survey, updated database searches should be completed to identify any new records or change in conservation listings since the 2014 surveys to ensure compliance with the BC Act and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The eastern half of Beatons Creek is located within the buffer of the Mosquito Land System Priority Ecological Community (PEC) (Priority 3). This system encompasses an area of 1,840 km² within the Pilbara Bioregion, and the project covers <0.1% of this area. Thus, further development activities will not have a significant impact on the environmental values of the PEC.

20.2.9 Terrestrial fauna

A detailed fauna survey was completed in October 2014 and five species of conservation significance were directly observed (one species has since been de-listed and is not discussed further):

- black-lined Ctenotus (*Ctenotus nigrilineatus*) listed as Priority 1 under the BC Act;
- northern quoll (*Dasyurus hallucatus*) listed as Endangered under the EPBC Act and the BC Act;
- Pilbara leaf-nosed bat *(Rhinonicteris aurantia*) listed as Vulnerable under the EPBC Act and the BC Act; and
- western pebble-mouse (*Pseudomys chapmani*) listed as Priority 4 by DBCA.

After the October 2014 fauna survey, targeted surveys for the northern quoll (October 2015) and Pilbara leaf-nosed bat (December 2014) were undertaken. The surveys concluded there would be no significant impact to these species from the Beatons Creek project.

At the time of survey, *Macroderma gigas* (ghost bat) was listed as a Priority 4 species on the DBCA Priority list. This species is now listed as vulnerable under both the BC Act and EPBC Act. No calls of this species were identified in the bat echolocation survey, but it is acknowledged there were no detector sites in the Northern Operations area of the Beatons Creek project. Novo considered there to be no suitable roost sites for the ghost bat and thus no key foraging habitat for the ghost bat.

As the biological surveys were undertaken more than seven years ago, it is recommended that database searches be completed to identify any additional records of conservation significant fauna in the local area since the surveys, and any changes to the conservation ratings to fauna species.

20.2.10 Short range endemic species

A desktop review of short range endemic (SRE) species was completed by Bennelongia Environmental Consultants in 2018 for the northernmost section of Northern Operations on M46/532. The Beatons Creek project comprises highly exposed hills and ridges that support only hummock grasslands and are not likely habitat for SRE species. No listed invertebrates or confirmed or potential SRE species were recorded at the Beatons Creek project.

The highly exposed, widespread, and uniform nature of habitat at the Beatons Creek project, together with research results, suggests there is likely to be a depauperate community of terrestrial invertebrates present at Beatons Creek. None would be actual SRE species, making it unlikely the Beatons Creek project will affect the conservation status of any SRE species in the local region (Bennelongia, 2018).

It is noted that the assessment was restricted to M46/352; however, this was not considered to be a limitation in the project's referral to the EPA given the consistent nature of habitats across the project's footprint.

20.2.11 Subterranean fauna

A desktop assessment of stygofauna and troglofauna was undertaken by Pendragon Environmental Solutions Pty Ltd to evaluate the risk associated with the mining of the oxide deposits above the groundwater table (SRK, 2022a). Work completed for the oxide component of the project concluded that both the stygofauna and troglofauna populations in the area are part of a regional system within an interconnected aquifer, and that no significant impacts on stygofauna or troglofauna would be anticipated from mining activities. SRK (2022a) considered that any stygofauna or troglofauna populations that may occur within the area are not restricted in their distribution as the system is regionally interconnected.

As mining development will occur below the groundwater table and more than 70% of the material to be mined as part of the six-year life-of-mine (LOM) is PAF, further consideration of the associated risks and their potential impact on subterranean fauna species has completed by Bennelongia (2022) alongside SRK (2022a). Bennelongia identified records of 3,837 stygofauna specimens from 74 species in a 100 km by 100 km desktop search area around the project area. The field survey collected 125 stygofauna specimens belonging to at least 15 species from 11 families. Overall, the community in the project area and its immediate surrounds is considered a relatively rich stygofaunal community. The predicted extent of groundwater drawdown in aquifers within the project area will result in the in the removal of only 5% of the potential stygofauna habitat, noting that community value for these species declines with depth.

Significant impacts to subterranean fauna are not predicted to result from development of the FRE for the reasons listed below:

- Studies to date suggest the project will not result in the change of conservation status for any subterranean taxa.
- Dewatering (the primary potential impact) will be managed by a licence issued by DWER under the RIWI Act.

20.2.12 Greenhouse gas

SLR Consulting (2022) conducted a greenhouse gas (GHG) assessment to access the direct and indirect GHG emissions. The GHG assessment was based on identifying the key related GHG emissions sources from the project's operation and estimating the annual and total quantities of GHG emissions generated from these sources over its lifetime.

The assessment considers GHG emissions from the project and includes estimates of direct GHG emissions as well as indirect emissions from fuel production and supply. This assessment concluded annual emissions from the project are estimated to be:

- Scope 1 (direct): 45,308 t CO_2-e.

Scope 1 emissions are produced from sources within the boundary of and because of the project's activities. These direct emissions will arise from sources associated with the project's activities and may include combustion of liquid fuels for stationary or transport purposes, combustion of petroleum-based oil and greases, fugitive emissions and/or vegetation clearing.

- Scope 3 (indirect): 1,714 t CO_2-e.

Scope 3 indirect emissions are related to the upstream emissions generated in the extraction and production of fossil fuels and in the emissions from contracted/outsourced activities.

The total lifetime emissions from six years of operation of the project are estimated to be:

- Scope 1 (direct): 221,332 t CO_2-e.
- Scope 3 (indirect): 10,281 t CO_2-e.

The annual value is below the EPA's annual trigger level of 100,000 t CO_2-e of Scope 1 emissions.

20.3 Permitting

20.3.1 Legal framework

Environmental impacts in Western Australia are regulated by both federal and state legislation. The key mining legislation in Western Australia is the *Mining Act 1978* which provides the regulatory framework for onshore exploration and mining activities. A summary of the principal legislation and framework is provided in Table 20.1.

Table 20.1. Principal legislation for managing environmental impact.

Legislation	Purpose
Mining Act 1978	Administered by DMIRS. Controls the allocation of land for prospecting, exploration, and mining purposes on all but Federal owned lands in Western Australia. The Act also provides for environmental assessment, approval, and closure of mining projects to enable them to proceed, operate and close.
Mining Rehabilitation Fund Act 2016	Administered by DMIRS. Annual contribution by operators of mines in Western Australia (except those operating under State Agreement Acts) of 1% of the estimated total rehabilitation costs at each project, with funds used to rehabilitate abandoned mine sites in Western Australia.
Environmental Protection Act 1986 (EP Act) 1986 - Part IV	Administered by DWER. EP Act provides standards for environmental protection in Western Australia. It also ensures that environmental impact assessments are undertaken for those projects that ‘may have a significant impact on the environment’ and the Minister for the Environment approves projects with conditions (Part IV).
Environmental Protection Act 1986 - Part V	Administered by DWER. DWER regulates industrial emissions and discharges to the environment through a works approval and licensing process, under Part V. DWER manages environment and the environmental impacts of the clearing of native vegetation through the provisions of the EP Act (Part V) and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).
Contaminated Sites Act 2003	Administered by DWER. Addresses contamination and legacy issues not regulated under the EP Act.
Country Areas Water Supply Act 1947	Administered by DWER. Protects public drinking water sources, i.e., proclaimed catchment areas, water reserves and pollution areas (underground water pollution control areas). Public drinking water source areas (PDWSAs) are surface water catchments and groundwater areas that provide drinking water to cities, towns and communities throughout the state and are proclaimed under this Act.
Rights in Water Irrigation Act 1914	Administered by DWER. Provides for the regulation, management, use and protection of water resources (surface and groundwater) of Western Australia.
Biodiversity Conservation Act 2016	Administered by Department of Biodiversity, Conservation and Attractions (DBCA). Provides for species, subspecies, or populations of native animals (fauna) to be listed as Specially Protected, Threatened (Critically Endangered, Endangered or Vulnerable) or Extinct in Western Australia. Provides for protection of flora species of conservation significance as well as Priority Ecological Communities (PEC).

Legislation	Purpose
Environmental Protection & Biodiversity Conservation Act (EPBC) 1999 (Commonwealth)	Administered by Commonwealth Department of Agriculture, Water and the Environment (DAWE). Australia's central piece of environmental legislation which provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places — defined in the EPBC Act as matters of 'national environmental significance' (MNES).
Aboriginal Heritage Act 1972	Administered by the Department of Planning, Lands and Heritage (DPLH). Protects all Aboriginal sites and objects in Western Australia.
Native Title 1993 (Commonwealth)	Native Title determined by the Federal Court of Australia. Recognises the rights and interests of Aboriginal and Torres Strait Islander people in land and waters according to their traditional laws and customs.

20.3.2 Current permitting

Beatons Creek Project

Novo has Mining Act approval via an MP and MCP (Reg. ID 89975) from DMIRS for:

- Alluvial Operations – scraping of up to 20,000 t of alluvial material along 12 ephemeral creek lines on tenements M46/10 and M46/11 (8 ha) and processing via a gravity plant approved under Reg. ID 59827 in the processing domain on M46/11;
- Northern Operations on M46/10, M46/11 and M46/532 – mining of oxide mineralization from Edwards Lease and Golden Crown;
- Southern Operations on tenements M46/9, M46/10 and M46/11 – mining of two main oxide deposits from Grant's Hill and South Hill; and
- Associated waste rock disposal, including provision for disposal of PAF material in PAF cells in the Edwards waste rock dump, and Grant's Hill pits, was included with processing of oxide mineralization from the Northern and Southern operations off site.

Registered ID 89975 covers a two-year mine life. An expanded oxide MP was approved in May 2022 (Reg. ID 100338) to expand the footprint of mining and waste rock dumps. The expansion was still under construction when operations were paused in September 2022.

A clearing permit (CPS 7440/4) for 270 ha of native vegetation is current until April 1, 2027.

The following RIWI Act approvals for surface water and groundwater abstraction are in place:

- Groundwater licence (GWL178635) allows for the abstraction of 90,000 kL/year from the fractured rock aquifer.
- Surface water licence (SW183394) granted on September 22, 2016, for the abstraction of 80,000 kL/year of water from the dam.

If increased abstraction or new draw points are contemplated in the future, amendment to the groundwater licence will be required.

Golden Eagle Plant

A MP and MCP (Reg. ID 90227) was approved in December 2020, which included a revised TSF2 design to that previously approved and haulage and processing of mineralized material from the Beatons Creek project for gold processing at the Golden Eagle plant with tailings discharge to TSF2.

A revised DWER Licence (L8675/2012/1) was issued on February 3, 2021, that included TSF2 conversion from two cells to a single cell facility, TSF2 stage 1 raise construction, licence consolidation, update conditions to capture compliance matters resolved, and processing and discharge of mineralized material into TSF2 (2 Mt/a).

The compliance matters, which all occurred prior to Novo's acquisition of the Golden Eagle plant and have since been resolved, were:

- Construction of TSF2 differently to what was approved and started operating the TSF prior to submitting compliance documents.
- Approved TSF design incorporated two decant structures whereas only one decant structure was constructed.
- Construction compliance documentation to TSF2 Cell 2 (5 February 2018) – non-compliant in relation to permeability across the base of TSF2 Cell 2.
- Since the start of operation by Millennium in 2010, 29 incidents/non-compliances have been recorded.
- DWER site inspection in June 2018 identified further non-compliances and in May 2020, Millennium was convicted in the Magistrates Court of Western Australia.

It is noted that both the DWER Licence and MP refer to the discharge of oxide tailings (from Beatons Creek mineralized material) to TSF2. It is recommended that further assessment of the tailings generated from the fresh rock material (part of the six-year mine life) be undertaken to obtain data on any potential emissions/seepage/closure impacts.

Prior to the construction of TSF2, the TSF2 project was referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) because of potential impact to the Bilby (protected under the EPBC Act). Approval for the project was issued by the Federal Minister for the Environment on January 17, 2012, due to an assessment of Millennium's project triggering a controlled action for the potential impact of the project on Greater Bilby (*Macrotis lagotis*). It is understood no additional clearing is required, and no further approvals from DAWE are expected to be required.

The life of TSF2 with the current potential final elevation of 399 mRL is expected to extend for the initial 3.5 years of any future operation. Two lifts are predicted, with each lift being in 2 m increments. There is potential for additional lifts to increase beyond 399 mRL. However, lifts above 399 mRL will require additional geotechnical testing, such as cone penetrating testing and analysis of vibrating wire piezometer data to ascertain the consolidation of tailings and the phreatic surface within the embankments and across the tailings profile, and will require additional DMIRS and DWER approvals.

20.3.3 Future permitting

The FRE was referred to the EPA under Section 38 of the EP Act in March 2022. In July 2022, the EPA considered that the likely environmental effects of the MP do not warrant formal assessment and, therefore, published the decision not to assess the MP under Part IV of the EP Act. No public advice was given.

One appeal against the EPA decision not to assess the MP was received. The Appeals Convenor provided an opportunity for the EPA and Novo to respond to the matters raised in the appeal by August 30, 2022, and Novo met this timeframe. The Appeals Convenor is continuing to engage with the appellant and a timeline on resolution cannot yet be estimated. Following receipt of responses from the EPA and Novo, and ongoing consultation with the appellant, the Office of the Appeals Convenor will prepare a report for the consideration of the Minister for Environment, who will decide the appeal. There is no statutory timeframe for preparation of the report for the Minister. The Office of the Appeals Convenor aims to submit 80% of reports within 60 days of receipt of responses from the decision-making authority and the proponent; this timeframe has now been exceeded. There is no further right of appeal on the Minister's decision.

If the Minister dismisses the appeal, further assessment of the FRE MP under Part IV of the EP Act will not be required. If the Minister upholds or partially upholds the appeal, the MP will likely require assessment under the EP Act. The key risk for the FRE MP is the extended timeframe required for assessment under Part IV of the EP Act if the Minister upholds the appeal.

The FRE will also require approval of an MP and MCP under the Mining Act. Most of the studies required to support the MP were conducted during preparation of the referral to the EPA. Additional studies are underway to provide more specific mining details that are required for the MP. The MCP for the expanded oxide proposal will be revised to incorporate the FRE MP. The key risk for approval of the FRE MP is demonstrating PAF waste rock material will not result in impacts to the PDWSA underlying Beatons Creek.

20.4 Socio-economic considerations

20.4.1 Aboriginal heritage

The Nyamal and Palyku groups have determined native title claims across the project area and have had Mining Agreements in place with Beatons Creek since 2017. The Mining Agreements have ensured that both the Nyamal and Palyku groups are continually engaged on the proposed activities with mining at Beatons Creek. Several heritage surveys have been undertaken across the greater project area and have formed part of the project's native title agreements. The surveys were undertaken by suitably qualified archaeologists and anthropologists; the detailed results are confidential to the Mining Agreement parties.

The heritage sites which have been identified around the greater project area are managed, relocated or removed in a manner which is compliant with the *Aboriginal Heritage Act 1972*, compliant with the Mining Agreements in place with both the Palyku and Nyamal groups and is done with full consultation and consent from both the Nyamal and Palyku groups.

New native title claims and Aboriginal heritage issues may delay or otherwise affect Novo's ability to pursue exploration, development, and mining on the Beatons Creek area. The resolution of native title and Aboriginal heritage issues is an integral part of exploration and mining operations in Australia and Novo is committed to managing any issues that may arise effectively. However, no assurance can be given that material adverse consequences will not arise.

20.4.2 Community

The Nullagine townsite is located east of Beatons Creek (1 km southeast of the Southern Operations area and therefore noted as the closest sensitive receptor). To ensure no impact to the Nullagine community from the project, an air quality assessment, noise emission modeling, landscape and visual impact assessment and social impact assessment were undertaken as described in the following sections.

20.4.2.1 Air quality

Ramboll (2021) conducted an air quality assessment considering the impacts from the FRE project at Beatons Creek, assuming worst case (i.e., high) throughput rates as well as the potential cumulative impacts of particulate emissions from Novo's operations using representative background dust concentrations for the region. The air dispersion modeling was conducted using AERMOD (version 18081) which is widely used in Australia for regulatory approvals applications and is accepted for use by the DWER. Ground level concentrations of PM10 and PM2.5 were predicted across the modeling domain and at the sensitive receptor location nearest to the operations and located in the township of Nullagine, using conservative emissions inventory and modeling assumptions. The modeling indicated that, assuming sufficient controls on haul roads are implemented, emissions from the proposed operations are predicted to result in ambient air concentrations well below the nominated ambient air quality criteria at Nullagine. It should be noted that the modelled scenario assumed the largest annual movement of mineralization and waste and considered operations to be occurring at the mineralized body closest to Nullagine. Once operations move from this zone to the mineralization further north, with the corresponding increase in distance from the nearest receptors and the decrease in distances required to transport the product and waste, it is expected that concentrations of particulates will decrease further.

20.4.2.2 Noise Impact

The noise assessment determined that the predicted noise emissions comply with the 'assigned level' (as per the Noise Regulations) for both the daytime mining and for night-time mining given existing adaptive management techniques and for worst case wind conditions. (Herring Storer Acoustics, 2022; Lister, 2022).

20.4.2.3 Landscape and visual amenity

360 Environmental (2022a) undertook a Landscape and Visual Impact Assessment (LVIA) to assess the effects of change on the landscape caused by the FRE. This comprises of the characterization of the existing landscape, the identification of valued places and points, and the assessment of potential visual amenity and landscape impacts the project could have in relation to existing and potential future impacts.

The most significant and most impacted viewpoint is from the Nullagine Lookout which will be permanently changed. However, the view will be blended into the existing natural setting, diminishing the initial impact over time as closure and rehabilitation progresses (360 Environmental, 2022a).

The assessment concluded that though the significance of the impact is deeply subjective and personal, the overall impact is low. The change in view at Nullagine Lookout will be from a predominantly natural view with some mining elements to a predominantly mining view with natural elements (360 Environmental, 2022a).

20.4.2.4 Social impact assessment

A Social Impact Analysis (SIA) and Management Plan (SIMP) were conducted as part of the EPA referral process to analyze, monitor, and manage the social consequences of development beyond the impacts on natural resources (360 Environmental, 2022b). The SIMP offers a framework to help monitor the impacts on the key stakeholders that include the neighbors, the native title claimants, the Water Corporation, and relevant Western Australian government agencies.

The SIA concluded that the most significant social risks involved with the proposed FRE were:

- Strained relationships with key stakeholders – regulators, neighbors, Water Corporation and Traditional Owners:
  - Several management measures have already been implemented to engage with key stakeholders.
  - Ongoing management will require (at least) annual engagement with all key stakeholders and collaboration with the Water Corporation.
  - Novo has provided water quality data to the Water Corporation for its review and use.
- The effect of nuisance dust, noise and light to residents in the town of Nullagine:
  - Dust and noise can (and have been) managed through operational controls.
  - Dust impacts in the town will be significantly reduced once the proposed MRWA (Main Roads Western Australia) diversion road is operational.
  - Lighting impacts to the town will reduce over time but will always be present to some extent until mining operations stop.
  - Directional lighting will be used to reduce impacts.

The FRE does offer positive opportunities that extend beyond the existing benefits that mining in the area presents. These benefits are related to:

- The presence of trained personnel, mining equipment and the camp provide benefits associated with emergency management, maintenance works and accommodation support
- Support is provided to community initiatives and employment/contracting opportunities will continue to be realized with the extended mine life that the FRE will bring.

The SIA determined that the risks and opportunities discussed in the SIMP are not considered to be a significant constraint to the progression of fresh rock mining.

20.4.3 Stakeholder consultation

Novo engages its key stakeholders, including native title parties, the Nullagine Township and its residents, and government regulators on the status of the Beatons Creek project and plans for its development.

A stakeholder consultation register contains details of the consultation undertaken to date and a stakeholder engagement strategy has been developed and implemented to ensure ongoing consultation is undertaken.

20.5 Key environmental or social issues impacts

The potential interaction between PAF material and the groundwater is the key issue for the FRE project. It is a classic source-pathway-receptor model with geochemical properties of the fresh rock being a source, the hydrogeological setting being a potential pathway, and the town water supply being the receptor.

Mitigations proposed in the design and site management at Beatons Creek, together with almost a decade of data and studies have demonstrated there is negligible risk of impact to the P1 PDWSA due to an incomplete pathway between the receptor and source.

There is no viable pathway for potential contaminants (if generated) at Beatons Creek to reach the town's water supply.

20.6 Environmental management

The following business as usual management tools are in place:

- An Environmental Management System (EMS) manual in place that has been developed to align with the International Standard 14001:2015 and prepared as per specifications from the DMIRS (2020).
- Novo has a *Beatons Creek PAF Management Procedure* to identify, separate, store and encapsulate PAF and AO material.
- Novo has a Groundwater Quality Management Plan which will be implemented. It includes water quality trigger action levels from baseline water quality data, as well as an action plan for managing any exceedances and potential impacts on the local groundwater system.
- Ongoing groundwater and surface water monitoring will continue in accordance with the project's DWER licences to ensure the project does not cause any adverse impacts on local water quality.
- Monitoring bores established around TSF2 will be used to monitor groundwater levels and water quality, to allow possible impacts of depositing tailings into TSF2 on the surrounding groundwater system to be assessed.

Mitigation of the key risks associated with the waste streams focuses on erosional stability and encapsulation of geochemically active waste streams. These risks are already managed for the oxide component of the project, as approved by DMIRS.

20.6.1 Operational Mitigation

Operational controls during construction of the waste rock dumps to prevent uncontrolled release of water and sediment from partly constructed landforms can be managed through the implementation/installation of:

- Windrows and back-sloping top surfaces to manage water on waste rock dump top surfaces during construction; and
- Downstream sediment ponds, baffles and toe bunds will control sediment shedding from waste rock dump surfaces during construction (note that shedding will decrease over time).

In addition, lift heights are limited to 10 m, with final angles limited to 18° to minimize the shedding of sediment from the waste rock dumps' surfaces.

20.6.2 Mitigation at Closure

Mitigation of perceived risks to the P1 PDWSA have largely been addressed through the landform design for the project. Identification, development, and evaluation of landform closure design options for the project has been a collaborative process over several years between Novo and its consultants.

20.7 Mine closure

20.7.1 Closure requirements

The DMIRS's objective for rehabilitation and closure is that: 'mining activities are rehabilitated and closed in a manner to make them physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/non-contaminating, and capable of sustaining an agreed post-mining land use without unacceptable liability to the State'.

Any residual liabilities relating to the agreed land use are expected to be identified and closure management agreed to by the key stakeholders.

20.7.2 Closure planning

The *WA Mining Act 1978* defines a mine closure plan as a 'document that: (a) is in the form required by Part 1 'Statutory Guidelines for MCP (b) contains information of the kind required by the guidelines about the decommissioning of each proposed mine, and the rehabilitation of the land, in respect of which a mining lease is sought or granted, as the case may be'.

The MCP includes a closure work program for achieving the closure outcomes, with implementation strategies and timeframes for each domain and/or feature of the mining operations, closure designs for landforms and contingencies for premature or early closure or suspension of operations.

The MCP is considered a dynamic document that needs to be regularly reviewed and refined over time to ensure that it reflects the current knowledge relevant to the development and rehabilitation status of the project.

Novo has an approved MCP that covers the oxide mining (small amount of fresh rock) at the Beatons Creek project (Reg. ID 89775), and at the Golden Eagle plant and TSF (Reg. ID 90227).

A revised MCP, covering the mining of PAF until Year 6, will need to be developed and submitted to DMIRS for approval. A key component of the MCP will be to ensure adequate encapsulation of PAF material at closure and in the long term to ensure all water resources are protected. Closure concepts were considered by the EPA during its assessment of the Section 38 referral.

Novo will continue to pay 1% of the overall Beatons Creek rehabilitation liabilities annually to the WA Mining Rehabilitation Fund 2016.

21. CAPITAL AND OPERATING COSTS

Item 21 of Form 43-101F1 applies to advanced properties only and has not been addressed in this Technical Report.

22. ECONOMIC ANALYSIS

Item 22 of Form 43-101F1 applies to advanced properties only and has not been addressed in this Technical Report.

23. ADJACENT PROPERTIES

The Novo tenure over Beatons Creek covers the most prospective part of the Beatons Creek Basin. The project area is directly adjacent to the Nullagine project area, that comprises the Golden Eagle plant and the Millennium Minerals Ltd assets. The boundary between the projects is essentially the geological contact between the Hardey Formation sediments, which host Beatons Creek, and the Mosquito Creek Formation, which hosts numerous orogenic gold deposits along three major structures (Figure 23.1).

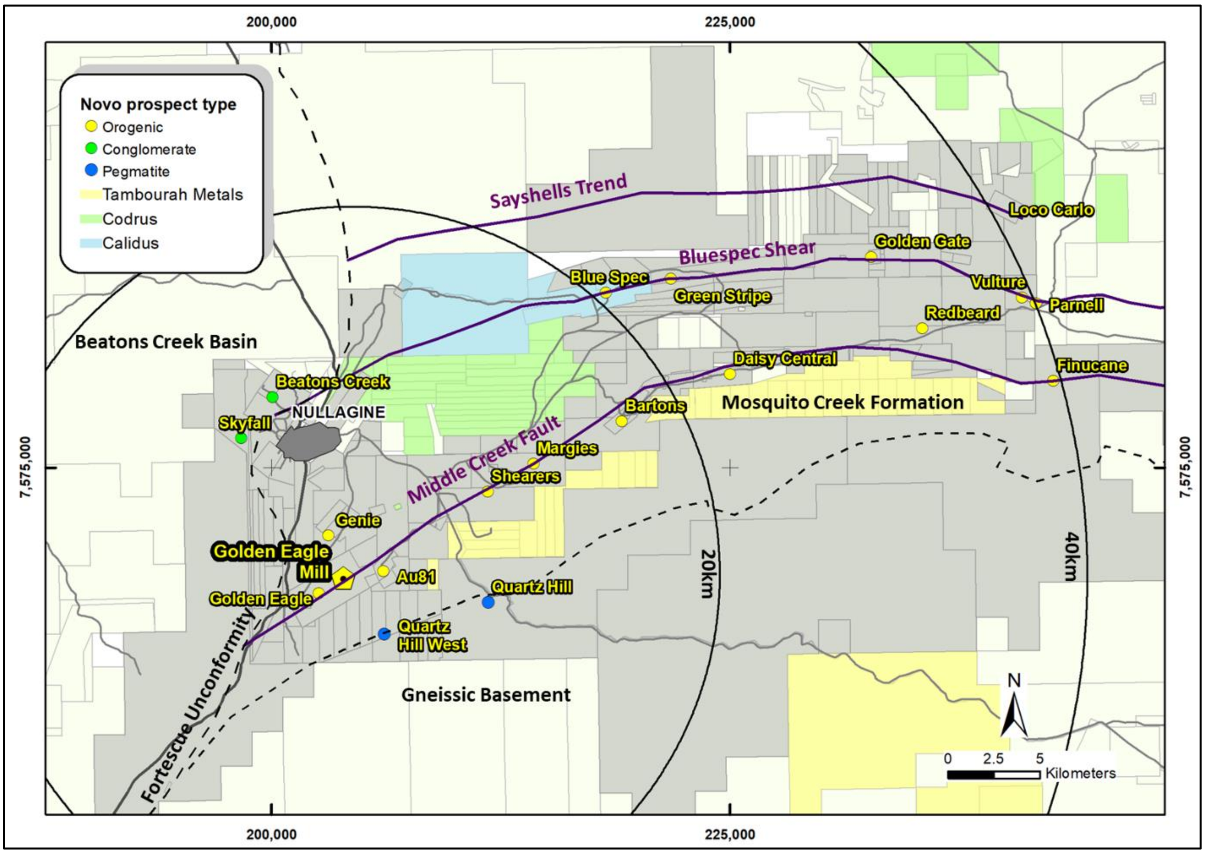


Figure 23.1. Tenement map showing all tenure (light yellow) and highlighting Novo tenure (grey) and the three larger competitors.

A series of large exploration licences cover the remainder of the Beatons Creek basin, held by several smaller companies. Most of these licences cover stratigraphy further away from a likely gold source and/or higher or lower in the prospective stratigraphy, and Novo does not consider these areas prospective for conglomerate mineralization.

Novo acquired Millennium Minerals in 2020, which included the Golden Eagle processing facility and allowed mining operations to commence at Beatons Creek, with the first gold pour announced on February 16, 2021.

The project comprises numerous small and larger pits where orogenic gold resources were mined until 2019 by Millennium. Millennium maintained a Mineral Resource and Ore Reserve statement compliant with the *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (JORC Code, 2012) until February 2019. Novo chose not to adopt these inventories due to queries around relevance and reliability of the estimates. In particular, some of the mineralization is known to be refractory. Novo is currently assessing the various targets and is developing an exploration program to generate new Mineral Resources to supplement that at Beatons Creek.

The orogenic targets at the Nullagine project are hosted primarily along the Middle Creek Fault, which is largely held by Novo (Figure 23.1). Other deposits are located along the Blue Spec Shear and the Sayshells Fault, of which Novo holds approximately 50% each. Most of the remaining structural trend is held by smaller prospectors, some of whom have small-scale workings.

The bulk of previous work was completed by Millennium, with a significant focus on the Middle Creek Fault at a distance of <20 km from the processing facility and at the high-grade Golden Gate project area. Tenure >40 km from the mill along the Middle Creek Fault, parts of the Blue Spec Shear, and the entire Sayshells Trend are poorly explored, and have potential to deliver additional oxide mineralization for future processing at the Golden Eagle plant.

In September 2020, Novo announced the sale of two tenements along the lode gold and stibnite Blue Spec prospect to Calidus Resources Limited.

24. OTHER RELEVANT DATA AND INFORMATION

Relevant data and information at this stage of project development has been included in the respective sections in this Technical Report.

25. INTERPRETATION AND CONCLUSIONS

The QPs have generated a new MRE for the Beatons Creek gold project. This includes Indicated Mineral Resources of 234,000 oz Au (3.05 Mt at an average grade of 2.4 g/t Au) and Inferred Mineral Resources of 42,000 oz Au (0.83 Mt at an average grade of 1.6 g/t Au). The Mineral Resources are reported at a cut-off grade of 0.5 g/t Au and have been constrained by optimized pit shells using a gold price of A2,600/oz (US1,690/oz), in accordance with the principles of RPEEE.

The 2022 MRE is based on verified historical drilling data, along with extensive new drilling and geological data collected by Novo between 2021 and 2022. Some 3,238 new RC drillholes provide 22,116 additional samples, compared to 481 holes and 2,422 samples used in the 2019 MRE. The 2022 MRE is based on revised mineralization wireframes developed in 2022 that incorporate new grade control and resource development drilling. This Mineral Resource is one of the first to be estimated based on samples dominantly assayed via the innovative PhotonAssay technique. PhotonAssay is a non-destructive, fast, robust and sustainable method for gold assay.

In 2019 and 2022, diamond core drilling was undertaken to support gravity and leach metallurgical testwork on 584 kg of fresh mineralization. A fresh mineralization trial parcel from Grant's Hill (M2 lag) totaling 38,208 t (Batch #1) was run through the Golden Eagle processing plant in August 2021. The trial parcel and metallurgical testwork results indicate that the fresh mineralization is amenable to both gravity and leach gold recovery. For the 2022 MRE, a global fresh mineralization recovery of 91% was applied for RPEEE purposes.

26. RECOMMENDATIONS

The MRE update at Beatons Creek indicates that the project warrants further work to support a Feasibility Study.

The following recommendations are made:

1) Carry out RC drilling to add to the Mineral Resource base;
2) Carry out RC drilling to upgrade current Inferred Mineral Resources to Indicated Mineral Resources;
3) Undertake further diamond core drilling to support metallurgical testwork on fresh mineralization and undertake further bulk density determinations across fresh mineralization;
4) Undertake waste characterization, particularly for acid formation potential, on fresh mineralization and inter-mineralization material, with the aim of producing a 3D geoenvironmental block model;
5) Continue environmental and permitting activities; and
6) Undertake a Feasibility Study.

The potential cost for further work is given in Table 26.1.

Table 26.1. Approximate costs of recommended work programs.

Work program	Quantity	Unit cost (A$)	Cost (A$)
Drilling to increase the resource base, incl. development drilling (Inferred to Indicated)	15,000 m	150	2,250,000
Diamond core drilling	1,500 m	400	600,000
Metallurgical testwork	-	-	300,000
Waste characterization	-	-	50,000
Environmental and permitting studies	-	-	100,000
Feasibility Study	-	-	1,250,000
Total	**-**	**-**	**4,550,000**

As at the effective date of this Technical Report, the A$/C$ foreign exchange rate is approximately 0.93:1.

All additional drilling activities must be supported by a robust QA/QC program.

The accumulated additional information may form the basis to define Mineral Reserves to elevate the project study level to that of a Feasibility Study.

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28. DATE AND SIGNATURE PAGE

CERTIFICATE OF QUALIFIED PERSON

Dr Simon C. Dominy
Level 1, 46 Ventnor Avenue, West Perth, WA 6005, Australia.

I, Dr Simon C. Dominy, do hereby certify the following:

- I am a co-author of this Technical Report titled *NI 43-101 Technical Report: Mineral Resource Update, Beatons Creek Gold Project, Nullagine, Western Australia* (the ‘report’), with an effective date of June 30, 2022.
- I take responsibility for sections 1–16 and 19–27 of this report.
- I have read the definition of ‘Qualified Person’ set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (‘NI 43-101’) and certify that by reason of my education, affiliation with professional associations, and past relevant work experience, I fulfill the requirements to be a ‘Qualified Person’ for the purposes of NI 43-101.
- I am a graduate of the City University, London, UK (1989), holding a BSc Honours degree in Applied Geology; an MSc(Eng) in Mining and Minerals Engineering from the Camborne School of Mines, UK (1990); and a Doctor of Philosophy (PhD) degree in Orebody Modelling from Kingston University London, UK in 1993.
- I am a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM #205232) and Chartered Professional; Fellow of the Australian Institute of Geoscientists (FAIG #1576) and Registered Professional Geoscientist (Mining), and Chartered Geologist and Fellow of the Geological Society of London (CGeol #17580).
- I have worked in my profession as a mining geologist/engineer for over 30 years, both as an employee of mining and exploration companies, Universities, and as a consultant and contractor. I have worked on a range of gold mining and resource development projects across Africa, Australia, Europe, and the Americas.
- I have read NI 43-101, Companion Policy 43-101CP, and Form 43-101F1; and the Technical Report has been prepared in compliance with that instrument and form.
- As of the effective date of the report, to the best of my knowledge, information and belief, the portions of the report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those portions of the report not misleading.
- I completed a site inspection of the subject property during May 8–12, 2022, inclusive, having made previous visits in 2018 and 2019.
- I am not independent of Novo Resources Corp. (‘Novo’) as defined by Section 1.5 of NI 43-101.
- I have acted as a consultant and advisor to Novo since October 2017, being involved in the design, planning and undertaking of the 2018 Beatons Creek bulk sampling program; 2019 diamond core drilling and metallurgical testwork program; 2019 Mineral Resource estimate; and matters pertaining to resource development and grade control (2020-2022). I have also been involved in Novo’s activities at Egina and Karratha, and in Victoria.

Dated December 16, 2022

‘*Simon C. Dominy*’ - Signed

Simon C. Dominy
Print name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

Ms Janice C. Graham
Level 19, 140 St Georges Terrace, Perth, WA 6000, Australia

I, Janice C. Graham, do hereby certify the following:

- I am a co-author of this Technical Report titled *NI 43-101 Technical Report: Mineral Resource Update, Beatons Creek Gold Project, Nullagine, Western Australia* (the 'report'), with an effective date of June 30, 2022.
- I take responsibility for sections 1–12, 14–16, 19, and 21–27 of this report.
- I have read the definition of 'Qualified Person' set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ('NI 43-101') and certify that by reason of my education, affiliation with professional associations, and past relevant work experience, I fulfill the requirements to be a 'Qualified Person' for the purposes of NI 43-101.
- I am a graduate of the University of Plymouth, UK (2002), holding a BSc Honours degree in Geological Sciences; and an MSc in Mining Geology from the Camborne School of Mines, UK (2003).
- I am a Member of the Australian Institute of Geoscientists (MAIG #7814).
- I have worked in my profession as a geologist for over 15 years, as an employee of contracting and consultancy companies. I have worked on a variety of gold mining and resource development projects across Australia, West Africa and Europe.
- I have read NI 43-101, Companion Policy 43-101CP, and Form 43-101F1; and the Technical Report has been prepared in compliance with that instrument and form.
- As of the effective date of the report, to the best of my knowledge, information and belief, the portions of the report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those portions of the report not misleading.
- I completed a site inspection of the property from May 8–12, 2022.
- I am independent of Novo Resources Corp. ('Novo') as defined by Section 1.5 of NI 43-101.
- As an employee of Mining Plus Pty Ltd (February 2017 to January 2021) then Snowden Optiro (February 2021 to present), I have acted as a consultant to Novo since January 2019, including the 2019 Mineral Resource estimate, and matters pertaining to mining grade control (2020–2022).

Dated December 16, 2022.

'*Janice C. Graham*' - Signed

Janice C. Graham
Print name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

Mr Jeremy Ison
31 Wessex Street, Carine, WA 6020, Australia

I, Jeremy Ison, do hereby certify the following:

- I am a co-author of this Technical Report titled *NI 43-101 Technical Report: Mineral Resource Update, Beatons Creek Gold Project, Nullagine, Western Australia* (the 'report'), with an effective date of June 30, 2022.
- I take responsibility for Section 13 of this report.
- I have read the definition of 'Qualified Person' set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ('NI 43-101') and certify that by reason of my education, affiliation with professional associations, and past relevant work experience, I fulfill the requirements to be a 'Qualified Person' for the purposes of NI 43-101.
- I am a graduate of the University of South Australia (1991), holding a BEng degree in Metallurgical Engineering.
- I am a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM #107238).
- I have worked in my profession as a metallurgical engineer for over 30 years, as an employee of mining and consultancy companies. I have worked on a variety of projects across the globe relating to metallurgical and mineral processing design including scoping, pre-feasibility and feasibility studies. I also have experience in detailed design and commissioning of processing plants.
- I have read NI 43-101, Companion Policy 43-101CP, and Form 43-101F1; and the Technical Report has been prepared in compliance with that instrument and form.
- As of the effective date of the report, to the best of my knowledge, information and belief, the portions of the report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those portions of the report not misleading.
- I completed a site inspection of the property on December13–14, 2021.
- I am independent of Novo Resources Corp. ('Novo') as defined by Section 1.5 of NI 43-101.
- I am Director and Principal Consultant of Ison Design Pty Ltd and have acted as a consultant to Novo since 2021, undertaking testwork programs at the Golden Eagle deposit and latterly at Beatons Creek.

Dated December 16, 2022.

'*Jeremy Ison'* - Signed

Jeremy Ison
Print name of Qualified Person

CERTIFICATE OF QUALIFIED PERSON

Mr Royce McAuslane
Suite 2, 77 Hay Street, Subiaco, WA 6008, Australia

I, Royce McAuslane, do hereby certify the following:

- I am a co-author of this Technical Report titled *NI 43-101 Technical Report: Mineral Resource Update, Beatons Creek Gold Project, Nullagine, Western Australia* (the 'report'), with an effective date of June 30, 2022.
- I take responsibility for sections 17 and 18 of this report.
- I have read the definition of 'Qualified Person' set out in National Instrument 43-101 *Standards of Disclosure for Mineral Projects* ('NI 43-101') and certify that by reason of my education, affiliation with professional associations, and past relevant work experience, I fulfill the requirements to be a 'Qualified Person' for the purposes of NI 43-101.
- I am a graduate of Murdoch University with a BSc degree in Science (1999).
- I am a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM #211257).
- I have worked as a Metallurgist and Study Manager for a total of 22 years since graduation, 12 of which has been as a Study Manager. Relevant experience includes 12 years' continuous experience on brownfields and greenfields studies in Australia, Asia and Africa; completion of multiple audits; and studies of projects and operations containing conventional and refractory technology.
- I have read NI 43-101, Companion Policy 43-101CP, and Form 43-101F1; and the Technical Report has been prepared in compliance with that instrument and form.
- As of the effective date of the report, to the best of my knowledge, information and belief, the portions of the report for which I am responsible contain all scientific and technical information that is required to be disclosed to make those portions of the report not misleading.
- I completed a site inspection of the property from August 30 to September 1, 2022.
- I am independent of Novo Resources Corp. ('Novo') as defined by Section 1.5 of NI 43-101.
- As a Director and Principal Consultant of MineScope Services Pty Ltd, I have acted as a consultant to Novo since May 2022.

Dated December 16, 2022.

'*Royce McAuslane*' - Signed

Royce McAuslane
Print name of Qualified Person