CAUTIONARY STATEMENTS

The Preliminary Economic Assessment has been undertaken with respect to the Waihi District Study in the North Island of New Zealand ("Technical Study"). It is a preliminary technical and economic study of the potential viability of the whole of Waihi District Projects including Martha Underground Mine, Martha Open Pit Phase 5 Project (the final cutback of the Martha Pit), Gladstone Open Pit Project, and Wharekirauponga Underground Project.

The Technical Study contains an average of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources over the life of the Waihi District Study projects. The estimation of Mineral Resources is inherently uncertain and involves subjective judgements about many relevant factors. Mineral Resources do not have demonstrated economic viability. The accuracy of such estimates is a function of the quantity and quality of available data, and of the assumptions made and judgements used in engineering and geological interpretation. These assumptions and judgments may prove to be unreliable and may depend, to a certain extent, upon the analysis of drilling results and statistical inferences that may ultimately prove to be inaccurate.

Further, there is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources. Under ASX reporting guidelines the Technical Study is considered to be a "Scoping Study" as defined by the JORC Code (2012 Edition) clause 38 for reporting purposes, and does not provide a basis for OGC to publish a production target or forecast financial information derived from a production target.

While the Technical Study has been conducted to a degree of accuracy consistent with a pre-feasibility study, the Mineral Resource is insufficient to support the estimation of ore reserves or to provide an assurance of economic development. For ASX reporting purposes, the Technical Study therefore cannot be classified or referred to as a "pre-feasibility study" as defined by JORC Code (2012 Edition) clause 39. The Technical Study is based on the material assumptions set out in the document. These include assumptions about the availability of funding. While OGC considers that all material assumptions are based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes in the Technical Study will be achieved. Further drilling and evaluation are required before OGC will be in a position to estimate any ore reserves or provide any assurance of an economic development case.

Given the uncertainties involved, the outcomes of the Technical Study and the Company's current expectations of future results or events should not be solely relied upon by investors when making investment decisions.

Waihi District Study

Preliminary Economic Assessment

NI 43-101 Technical Report

STU-063-REP-001-A

Qualified Persons

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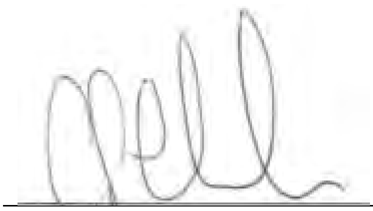
Report Date: 30 August 2020

Effective Date: 1 January 2020

TECHNICAL REPORT CERTIFICATION

The effective date of this Technical Report and sign off is January 01, 2020.

Trevor Maton	Date:	30 August 2020



Peter Church	Date	30 August 2020

David Carr	Date	30 August 2020

Forward-Looking Information

This report contains forward-looking statements. All statements, other than statements of historical fact regarding OceanaGold Corporation or Waihi Operations, are forward- looking statements. The words "believe", "expect", "anticipate", "contemplate", "target", "plan", "intend", "project", "continue", "budget", "estimate", "potential", "may", "will", "can", "could" and similar expressions identify forward-looking statements. In particular, this report contains forward-looking statements with respect to cash flow forecasts, projected capital, operating and exploration expenditure, targeted cost reductions, mine life and production rates, potential mineralisation and metal or mineral recoveries, and information pertaining to potential improvements to financial and operating performance and mine life at the Waihi Operations that may result from. All forward-looking statements in this report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. Material assumptions regarding forward-looking statements are discussed in this report, where applicable. In addition to such assumptions, the forward-looking statements are inherently subject to significant business, economic and competitive uncertainties and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, but are not limited to: fluctuations in the spot and forward price of commodities (including gold, diesel fuel, natural gas and electricity); the speculative nature of mineral exploration and development; changes in mineral production performance, exploitation and exploration successes; risks associated with the fact that the Waihi Operations is still in the early stages of evaluation and additional engineering and other analysis is required to fully assess their impact; diminishing quantities or grades of reserves; increased costs, delays, suspensions and technical challenges associated with the construction of capital projects; operating or technical difficulties in connection with mining or development activities, including disruptions in the maintenance or provision of required infrastructure and information technology systems; damage to OceanaGold Corporation’s or Waihi Operations reputation due to the actual or perceived occurrence of any number of events, including negative publicity with respect to the handling of environmental matters or dealings with community groups, whether true or not; risk of loss due to acts of war, terrorism, sabotage and civil disturbances; uncertainty whether the Waihi Operation’s will meet OceanaGold Corporation's capital allocation objectives; the impact of global liquidity and credit availability on the timing of cash flows and the values of assets and liabilities based on projected future cash flows; the impact of inflation; fluctuations in the currency markets; changes in interest rates; changes in national and local government legislation, taxation, controls or regulations and/or changes in the administration of laws, policies and practices, expropriation or nationalisation of property and political or economic developments in Canada; failure to comply with environmental and health and safety laws and regulations; timing of receipt of, or failure to comply with, necessary permits and approvals; litigation; contests over title to properties or over access to water, power and other required infrastructure; increased costs and physical risks including extreme weather events and resource shortages, related to climate change; and availability and increased costs associated with mining inputs and labour. In addition, there are risks and hazards associated with the business of mineral exploration, development, and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold bullion, copper cathode or gold or copper concentrate losses (and the risk of inadequate insurance, or inability to obtain insurance, to cover these risks).

Many of these uncertainties and contingencies can affect OceanaGold Corporation’s actual results and could cause actual results to differ materially from those expressed or implied in any forward- looking statements made by, or on behalf of, OceanaGold Corporation. All of the forward-looking statements made in this report are qualified by these cautionary statements and OceanaGold Corporation and the Qualified Persons who authored this report undertake no obligation to update publicly or otherwise revise any forward-looking statements whether as a result of new information or future events or otherwise, except as may be required by law.

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1 SUMMARY

1.1 Overview

OceanaGold has prepared this Preliminary Economic Assessment Technical Report (PEA or Technical Report) on the Waihi District (the District), located around the world class gold mining town of Waihi located on the North Island of New Zealand.

OceanaGold is listed on the Toronto and Australian stock exchanges under the code "OGC" and is the Issuer of this Technical Report. This Study was prepared as a PEA Canadian National Instrument 43-101 (NI 43-101) Technical Report (Technical Report) for the OceanaGold Waihi District.

The projects included in the Waihi District comprise the following:

- Martha Underground Mine (MUG);
- Martha Open Pit Phase 5 Project (MOP5), the final cutback of the Martha Pit;
- Gladstone Open Pit Project (GOP);
- Wharekirauponga Underground Project (WKP); and
- Processing Plant.

Other key elements of the project include:

- Upgrade and expansion of the Processing Plant;
- Two additional lifts on Tailings Storage Facility (TSF) 1A, and one additional lift on TSF2;
- TSF3, a new Tailings Storage Facility;
- Further TSF capacity, which may include GOP as a new Tailings Storage Facility post mining, or additional raising of TSF1A;
- A new rock stack, the Northern Rock Stack (NRS); and
- Upgrade of the power supply to the operation.

This Technical Report has been prepared to conform with the National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). The purpose of the Report is to disclose the results of the PEA. The economic assessment contained in this Technical Report is based, in part, on Inferred Mineral Resources, is preliminary in nature and Mineral Reserves are not being reported.

Inferred Mineral Resources are considered to be too geologically speculative to have mining and economic considerations applied to them to be categorised as Mineral Reserves. There is no certainty that the production and economic forecasts on which this PEA is based or the conclusion of the PEA will be realised.

OceanaGold is undertaking exploration drilling at MUG and WKP for the purpose of identifying potential further discoveries and resource conversion to increase mining inventories and extend mine plans.

1.2 Property Description, Location and Ownership

The Waihi District Projects, 100% owned by wholly owned subsidiary OceanaGold (New Zealand) Limited, are located with the Hauraki District on the North Island of New Zealand. Waihi has a notable history of gold production. Underground mining originally commenced in the 1800s and continued through till the 1950s. Between 1879 and 1952, 12 million tonnes of ore had been mined to yield 1,217 tonnes of gold-silver bullion. The historic mine extracted four main parallel lodes, the Martha, Welcome, Empire and Royal, together with numerous branch and cross lodes.

Mining was revived in 1988 with commencement of the Martha Pit, and modern underground operations commenced in 2004. Open pit mining ceased in 2015, while mining of the Correnso Underground mine was recently concluded. OceanaGold (New Zealand) Limited holds the necessary permits, consents, certificates, licences and agreements required to operate MUG and the Processing Plant.

MUG, MOP5, GOP and the Processing Plant are located within the township of Waihi. All projects are located within the existing Favona Mining Permit (MP 41808).

The WKP Project is located approximately 10 km to the north of Waihi and held under the Hauraki mineral exploration permit 40598 (EP 40 598). The project is located on land owned by the Crown and administered by the Department of Conservation (DOC).

1.3 Geological Setting and Mineralisation

Both the Waihi and WKP Projects are located within the Coromandel Peninsula which hosts over 50 gold and silver deposits that make up the Hauraki Goldfield. The peninsula is built up of Miocene to Quaternary volcanic rocks (the Coromandel Volcanic Zone) overlying a Mesozoic basement. It is bound to the west by the Hauraki Rift, a large graben filled with Quaternary and Tertiary sediments, and to the south by volcanics deposited by the presently active Taupo Volcanic Zone (TVZ).

The Coromandel Volcanic Zone (CVZ) is of Miocene to Pliocene in age and formed during three main phases of volcanism. The first phase constitutes the widespread andesites and dacites of the Coromandel group (18 – 3 Ma). The second phase encompasses the predominantly rhyolitic units of the Whitianga Group (9.1-6 Ma) and the third phase is dominated by Strombolian volcanoes and dykes of the Mercury Bay Basalts (6.0-4.2 Ma). Epithermal veins and hydrothermal alteration are observed within the Coromandel and Whitianga Groups.

The Au-Ag deposits of the Waihi District and WKP are classical low-sulphidation adularia-sericite epithermal quartz vein systems associated with north to northeast trending faults. Larger veins have characteristically developed in dilational sites in the steepened upper profile of extensional faults with narrower splay veins developed in the hanging wall of major vein structures. Moderate to steeply dipping veins are characterised by 200 to 2000 m of strike, 170 to 700 m vertical range and typically 1 to 5 m vein widths (but up to 30 m locally). The main gold bearing minerals are electrum and silver sulphides developed within quartz veins.

The geological control on mineralisation is well understood and is sufficient to support the estimation of Mineral Resources. The current experience and geological knowledge of the area is also considered sufficiently acceptable to reliably inform mine planning.

1.4 Exploration Drilling

Approximately 566,000 m of diamond core has been drilled on the MUG, MOP5 and GOP since 1980. The WKP deposit has had 42,120 m of diamond drilling in 104 holes since 1980. OceanaGold continues to drill in the Waihi area, currently targeting resource infill and reserve conversion for the MUG Project and resource infill and extension for the WKP Project. Most exploration drilling is diamond core drilling done by triple tube wireline methods.

No exploration results are being presented in this report, rather this report is focused on advanced projects that have well defined geological models and associated resources estimates completed.

1.5 Mineral Processing and Metallurgical Testing

The Waihi mill has treated ore sourced from the Martha Pit as well as several underground ore bodies over the last 30 years. Considerable operating experience and data has been accumulated on the vein structures running through MOP5 that has contributed the majority of the mill feed over this time.

1.5.1 Process Flowsheet

The current Processing Plant has a proven capacity to treat approximately 1.3 Mtpa of open pit feed from Martha, or up to 0.9 Mtpa of underground sourced feed. The plant will be upgraded to a capacity of 1.6 Mtpa, to accommodate feed from the four mining sources, being MUG, GOP, MOP5 and WKP. Mill feed is treated in a conventional semi autogenous ball mill crushing (SABC) grinding circuit followed by cyanide leaching of gold and silver in a hybrid carbon in leach (CIL) / carbon in pulp (CIP) circuit. Each section of the plant has been reviewed to identify modifications required to increase capacity to 1.6 Mtpa. A progressive upgrade and expansion is planned.

Metallurgical test work on mill feed has been carried out in multiple phases to provide throughput and recovery data for design and to develop variability testing campaigns that reflect the expected mine plan. Prior production history in the Martha deposit provides a higher level of confidence in recovery assumptions compared to other greenfield projects. Higher mill feed hardness presents a risk to achieving expected throughput rates at target grind sizes. Ongoing infill drilling work is planned in 2020 to generate additional variability composites for both grinding and recovery test work to improve confidence in the plant design criteria.

Installed mill power is based on modelling to the 75 percentile of test work to date and an allowance of reserve installed power. Direct leach test work is planned in 2020 at sizes above and below the selected optimum to allow for increased understanding of the mill feed characterisation and trade-off between grind size (throughput) and leach recovery.

Further variability and comminution testing will be undertaken on MUG and WKP deposits as core becomes available to increase the confidence in the recovery estimates and to investigate potential alternative flowsheets that may further increase overall metallurgical performance.

1.5.2 Metallurgical Recovery

Metallurgical test work and associated analytical procedures were performed by recognised testing facilities, and the tests performed were appropriate to the mineralisation type. Samples selected for testing were representative from a range of depths within the deposit of the various types and styles of mineralisation within the Waihi and WKP areas. Sufficient samples were taken so that tests were performed on adequate sample mass. Average recoveries have been assumed based on test work completed. These recoveries are appropriate to be used in support of Mineral Resource and Mineral Reserve estimation, based on the drill hole spacing and sample selection.

Historical metallurgical results on the MOP5 deposit support an expected gold recovery assumption of 90% for treatment through the existing process plant flowsheet. Metallurgical recoveries of 94% for MUG, 90% for WKP and 71% for GOP have been estimated based on recent testwork results. Testwork will continue as part of future evaluation phases for these projects.

1.6 Mineral Resources Estimate

The PEA is based upon the resource models publicly reported in the company's 2019 annual resource and reserve statement which was released on 31 March 2020, with the following changes.

- The Martha Phase 4 (MOP4) Open Pit cutback has been superseded by the larger MOP5 cutback. Consequently, the Martha Stage 4 resource has been merged into the larger MOP5 resource;
- The larger MOP5 has, in turn, depleted the upper portions of the MUG Mineral Resource; and
- A review of the cut-off grade applicable to the GOP has resulted in a small increase in both Indicated and Inferred Resources for the project area.

The net result of these changes is an increase of 0.15 Moz Indicated Mineral Resource and 0.25 Moz of Inferred Mineral Resource respectively.

Definitions of resource categories used in the report are consistent with the CIM definitions incorporated by reference into NI 43-101. A summary of the Mineral Resources is provided in Table 1-1.

Table 1-1: Resources Included in Waihi District Study as at 1 January 2020

Resource Area	Resource Cut-Off Grade	Indicated Resource					Inferred Resource				
		Mt	Au g/t	Au Moz	Ag g/t	Ag oz	Mt	Au g/t	Au Moz	Ag g/t	Ag Moz
MOP5	0.5 g/t Au	4.0	2.0	0.26	20	2.6	4.9	1.9	0.29	19	2.9
GOP	0.5 g/t Au	2.8	1.6	0.14	3.8	0.3	0.6	1.1	0.02	2.5	0.0
Open Pit Total		6.8	1.8	0.40	13	2.9	5.4	1.8	0.31	17	3.0
MUG	2.15 g/t Au	4.4	5.2	0.74	18	2.5	3.7	4.6	0.55	16	2.0
WKP	2.5 g/t Au	1.0	13.4	0.42	26	0.8	1.9	12	0.72	20	1.2
Underground Total		5.4	6.7	1.2	19	3.3	5.7	7.0	1.3	18	3.2
Waihi District Total		12	4.0	1.6	16	6.2	11	4.4	1.6	17	6.2

Notes

- A gold price of NZD$2,083/oz (US$1,500/oz @ USD:NZD 0.72) for all Resources;
- MUG Resources are reported below the MOP5 design and are constrained to within a conceptual underground design, based upon the incremental cut-off grade of 2.15 g/t;
- WKP Resources are constrained to within a conceptual underground design based upon the cut-off grade of 2.5 g/t Au;
- The tabulated Resources are estimates of metal contained as troy ounces;
- No dilution is included in the reported figures and no allowances for processing or mining recoveries have been made;
- All figures are rounded to reflect the relative accuracy and confidence of the estimates and totals may not add correctly;
- There is no certainty that Mineral Resources that are not Mineral Reserves will be converted to Mineral Reserves;
- Development mining in Martha Underground commenced in 2019 following receival of Resource Consents in December 2018. Mining has not commenced at any of the other projects; and
- Resources that are not Mineral Reserves have not demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource will be converted into Mineral Reserve.

The modelling process employed in the grade estimation for the projects is performed using numerous Vulcan and Leapfrog processes summarised in the steps outlined below:

- Input data Validation;
- Update lithological domains, geological model construction;
- Data selection, drill hole data selection from an AcQuire drill database;
- Exclusion of drill holes not used for estimation by data type;
- Flag data files by lithology;
- Composite drill holes to fixed length composites within defined geological boundaries, typically 1 m using length weighting;
- Exploratory data analysis by domain, generation of domain and data type summary statistics;
- Variography;
- Assign top caps by domain and data type to input data files;
- Block Model construction based upon lithological wireframes;

- Run estimation for all domains for Au, Ag, As, Resource Classification;
- Assign density, mining depletions, back fill grade, stripping of negative values from non-estimated blocks, assignment of grade to dilution domains; and
- Resource Classification of the model.

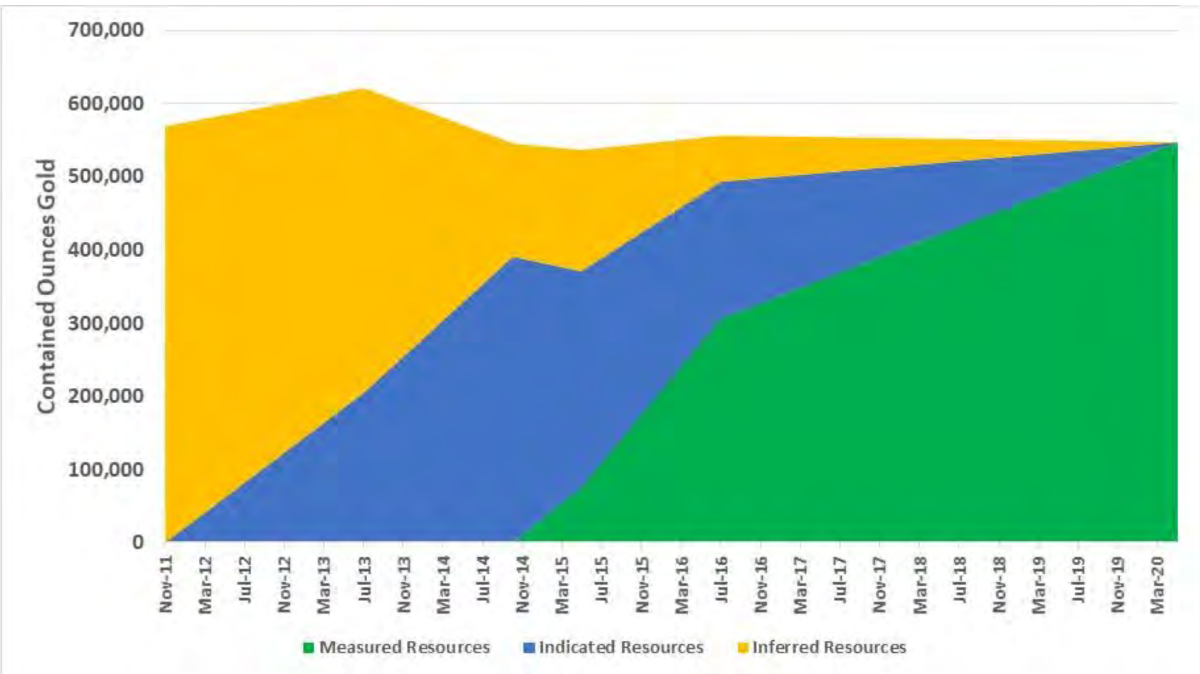
The data verification programs undertaken on the data collected from the projects adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in Mineral Resource estimation.

Mineral Resources were classified in accordance with CIM Definition Standards. For all projects the Resource Classification is based on the average distance of the block to the closest three holes within specified ranges, with the ranges having been determined through drill spacing analysis of mineralisation continuity and site experience with similar veins. Mineral Resource Classification reflects the confidence levels in the geological understanding and supporting data. Mineral Resources are reported on a 100% basis. The Resources are depleted for mining as at 31 December 2019.

OceanaGold consider Inferred Mineral Resources for the Waihi projects to carry lower risk than might be the case for development projects elsewhere. This is particularly the case for MUG and MOP5 where mining is centred on a set of mineralised lodes (the Martha, Welcome, Empire and Royal) that were mined historically underground between 1879 and 1952 and then more recently by open pit methods from 1988 until 2015. The extensive mining history of the Waihi District has allowed OceanaGold to construct a substantive three-dimensional historical geological database as well as providing OceanaGold's Waihi technical team with significant open pit and underground operational experience. These factors allow the Waihi team to produce robust geological interpretations to support the resource estimates as well as modifying factors.

The reliability of Inferred Resources is reflected in the high resource conversion rates of Inferred Resources during modern mining at Waihi. The Correnso mine, OceanaGold's most recently completed underground mine at Waihi is a particularly meaningful example because it tracks the resource progression from discovery right through to the completion of mining (see Figure 1-1). Correnso, which is not included in the PEA, was a new discovery and consequently the geological framework was less defined in the early stages of the exploration of this deposit. Notwithstanding this initial uncertainty, an Inferred Resource in excess of 500koz was defined in 2011 and development of this project commenced in 2014. Throughout the life cycle of the project there were no material resource write-downs and by the completion of mining of the deposit, the entirety of the initial Inferred Resource had been realised.

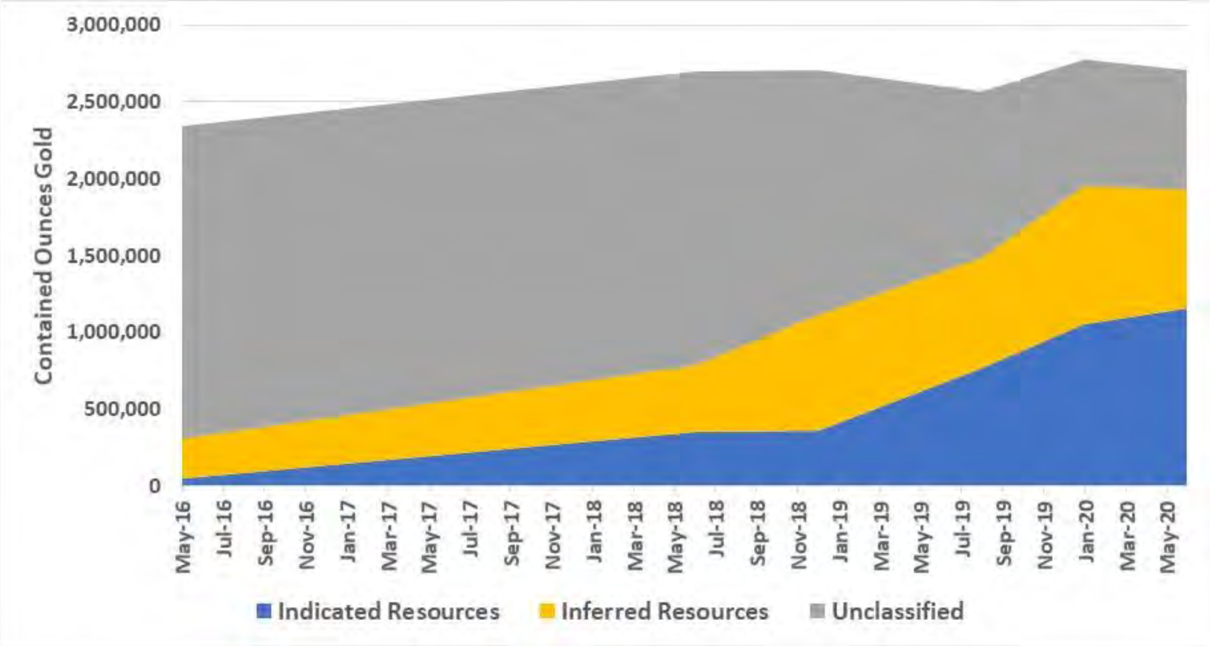
Figure 1-1: Resource Development History for the Correnso Underground Mine



The resource development profile for MUG to date since 2016 is shown in Figure 1-2 below and reveals a rapid progression from unclassified mineralisation to Inferred Mineral Resources and subsequently to

Indicated Mineral Resources[1]. This chart is significant in that it shows the veracity of the estimates, even prior to significant infill drilling. The high resource conversion rate reflects the extent to which MUG estimates are defined by the underlying geological interpretation. In the case of unclassified mineralisation[2], the geological models are commonly constructed on the basis of pre-1953 data with very limited subsequent diamond core drilling. As additional drilling is completed in these areas, improved local estimates result and the geological models are refined. At this stage they are converted to Inferred Mineral Resources with a large component of resource risk already reduced.

Figure 1-2: Resource Development History MUG



The veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion, mean that OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere.

Additionally, the average drill hole spacing for MUG Inferred Resources is 48m which is 20% larger than the threshold of 40m required by OceanaGold for Indicated Resources. This does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme, particularly when the robust geological interpretation underpinning the estimates is considered.

With all of the considerations above, OceanaGold believe that there are reasonable grounds to include Inferred Resources for the purposes of mine scheduling and determining the mill feed.

1.7 Mineral Reserve Estimate

Mineral Reserves are not being reported for the project as the PEA includes a large proportion of Inferred Mineral Resources.

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[1] Note that drilling specifically targeted to convert Inferred Resources to Indicated Resources only commenced in 2019 and is reflected in an upward inflection in conversion rate.

[2] For clarity, unclassified mineralisation is not a publicly recognised resource reporting category and was not used in the PEA. It is represented here graphically only to illustrate the importance of the underlying geological interpretation to support the resource estimates. A proportion of the unclassified mineralisation has previously been included in reported Exploration Targets after careful consideration. To-date infill drilling has confirmed the Exploration Target.

1.8 Mining Methods

1.8.1 MUG

Permits and consents have been granted for MUG and all selected mining methods are in accordance with the licence, permit and consent conditions, principally related to placement of backfill, blast vibration limits, method of working and hydrogeological controls. Exploration drives were completed on 800 mRL and 920 mRL in 2018. Development of MUG commenced in mid-2019 and 2,169m of lateral development and a 120m ventilation raise were completed by the end of 2019.

Mining in MUG will comprise both areas unaffected and clear of historic mining, as well as areas in proximity to historic mining. The mining method to be applied at MUG is the Modified Avoca mining method, similar to the methods employed by OceanaGold at Favona and Correnso, which will be adapted as required when mining in proximity to historic workings. In some circumstances this will involve filling of historic stope voids with cemented rock fill (CRF) prior to adjacent mining using Modified Avoca. The mining method selection, geotechnical engineering, ventilation design and hydrogeological assessment is supported by work undertaken by mining consultants, including AMC, Entech, SRK and PSM.

A small proportion of the mining will involve the extraction of remnant skins in the footwall and/or hangingwall of previously mined stopes, without filling the historic stope void with CRF. Historical backfill may also be mined. Experience with open pit mining shows this material may be above the cut-off, however, it is not included as mill feed in this PEA evaluation. The mining method for the extraction of remnant skins will use conventional remote drilling and loading methods, combined with remote load haul dump machines (LHD) equipment. SRK and Entech concluded that once established, the method is expected to achieve acceptable mining recovery with few safety issues anticipated.

AMC investigated the stability of the underground workings and reported that based on the current understanding of ground conditions, planned ongoing investigations and the proposed cautious approach to development using close ground control techniques where required, the proposed MOP5 can be developed and brought into production without any compromise to underground or surface stability. AMC concluded that stable stope strike spans of up to 30m can be mined.

Mill Feed will be trucked to surface using conventional 50t diesel haulage trucks.

1.8.2 Martha Open Pit

Martha Open Pit operated from 1988 until April 2015, when a localised failure of the north wall undercut the main access ramp. Future open pit mining process will be similar to those employed prior to April 2015. Ore and waste were mined by conventional drill, blast, load and haul methods from the open pit. Waste and ore were categorised into hard and soft material and waste further categorised into potentially acid forming or non-acid forming rock. Ore sampling was conducted in-pit by Reverse Circulation (RC) drilling. Ore blocks were defined on the basis of this sampling and considered the capacities of the equipment to selectively mine these blocks. Soft material was ripped by D9 dozer whereas hard material was blasted. Strict controls on blast vibration determined the blast hole spacing and the maximum allowable charge weight per delay. Ore was generally blasted in 5 metre vertical intervals and excavated in two flitches. The presence of historic workings in the open pit required probe drilling to identify voids or weak pillars which created both a safety hazard and an operating constraint. Underground voids were either bunded off or marked with hazard tape. All ore and waste were loaded by 190 tonne backhoe excavators into 85 tonne rear dump trucks and trucked via a 1 in 10 ramp and generally direct tipped to a jaw crusher or Stamler breaker station. Small quantities of ore and waste were stockpiled close to the jaw crusher.

The open pit design has been defined in consideration of surface limits, including proximity to buildings and other infrastructure, geotechnical assessments and estimation of gold bearing mineralisation. Currently the MOP4 cutback of the pit is consented, however, a more extensive cutback, MOP5, represents the final mining limits of the pit. MOP4 and MOP5 will largely be mined together. The pit design includes 15-20m vertically between berms on final walls. Wall angles vary from 50-60 degrees on the east wall to 65-70 degrees on the north wall.

1.8.3 GOP

The GOP design pit slopes are based on a geotechnical study completed by PSM in early 2018 including three additional geotechnical holes and associated geotechnical modelling. Geotechnical domains were re-defined based on drilling. Pit design parameters take into account rock type and include 10-15m high vertical intervals between berms on final walls and 40-60^0 face slopes.

The hydrogeology model identified / interpreted two aquifers across the site, being an upper aquifer and lower aquifer. Groundwater inflows during the operational phase from the shallow groundwater system are estimated at 1.5m^3/day. As the Favona portal is considered to underdrain the shallow groundwater system, no significant inflows to the pit are predicted from the deep groundwater system.

GOP will use similar equipment and mining methods as proposed for MOP5. MOP5 is scheduled to commence after completion of GOP.

1.8.4 WKP

Mining consultants SRK undertook a mining method review for WKP. SRK noted that the orebody is dipping between 65 and 70 degrees and is between 2m and 7m in width. SRK considered that the orebody geometry is not suitable for block or sub level caving because of the vein nature of the deposit; as well, surface disturbance caused by caving is not acceptable for the area in which the deposit is sited.

SRK reviewed the resource model for shape, size and continuity at different cut-off grades and determined that both pillar and artificially supported methods are suitable for the WKP deposit. The use of in-situ pillars was not considered in this study due to the high-grade nature of the Mineral Resource.

The Modified Avoca mining method used by OceanaGold at Correnso, Favona and MUG is considered appropriate for the WKP deposit. The Modified Avoca method is a semi-selective and productive underground mining method, and well suited for moderately dipping deposits of varying thickness. It is typically one of the most productive and lower-cost mining methods applied across many different styles of mineralisation.

SRK assessed the geotechnical data from the exploration drill holes to establish the geotechnical characteristics and conceptual design elements for the underground mine. A sub level spacing of 20m and a strike length of 15m has been applied to the mine design for this PEA These parameters are based on the current geotechnical and geological understanding and will need to be reviewed as the Mineral Resource changes and the geotechnical knowledge increase.

The PEA assumes mill feed and waste is delivered from underground to surface stockpiles located approximately 6 km from the deposit, and then trucked on the surface approximately 4km to the process plant using conventional on-road trucks.

Hydrogeological consultants GWS have provided a preliminary assessment of the hydrogeology for WKP, based on the current limited data available. GWS report that the catchment area for the Wharekirauponga Stream is approximately 15 km^2 and with 2.17 m/year rainfall, the average daily rainfall volume reporting to the catchment is in the order of 89,000 m^3/d. Other preliminary findings include:

- Surface soils in the locality are highly clay altered and are unlikely to drain abnormally as a result of mine dewatering;
- The host rocks are generally low permeability and are expected not to dewater. Some amount of dewatering may occur in the silicified rock mass;
- The East Graben (EG) Vein is expected to be dewatered via the Stream exposures, resulting in discharge and gains in surface water flows; and
- Understanding the changes to the catchment water balance as a consequence of dewatering is still deemed the critical element of the hydrogeologic assessment.

Further work is still required to understand how groundwater interacts with surface waters around WKP and with the stream channels.

1.8.5 Mill Feed Estimates

The mining inventories are referred to as mill feed as they have been derived from 51% Indicated and 49% Inferred classified resource (no Measured resource currently exists). In addition, regulatory approvals to enable some of the proposed developments to take place are yet to be received. Inferred Mineral Resources are considered to be too geologically speculative to have mining and economic considerations applied to them to be categorised as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realised.

As discussed in section 1.6 above, OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere. This is based upon the veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion. Additionally, in the case of MUG which provides over 90% of the PEA mill feed planned for the first 6 years, the average drill hole spacing for Inferred Resources is 48m which is only 20% larger than the threshold of 40m required by OceanaGold for Indicated Resources. This drill hole spacing does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme.

The modifying factors are well understood and are based on over 50 independent studies which have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 years comprising air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, Iwi, landscape, mine design, mine planning, noise, pit lake limnology, property values, pumphouse, social impact assessments, surface stability, tailings disposal, traffic, vibration, water management and, hydrogeology.

OceanaGold and its predecessors, have extended the original permitted Martha Pit Project with Mineral Reserves of 0.7Moz, (extracted from 1988 to 1997) to extract 2.1Moz. (from 1988 to 2015) through ongoing conversion of Resources focused on the same vein zones. In addition, nearby underground Resources have been successfully converted to extract 1.1Moz. over the last fifteen years.

Taking these factors into account, and the sensitivity test for the removal of Inferred Resources in section **Error! Reference source not found.**, OceanaGold believe that there are reasonable grounds to include I nferred Resources for the purposes of mine scheduling and determining the Mill Feed. estimate

1.8.6 Mill Feed Schedule

Assumptions for project sequencing are as follows:

- Consents received for WKP late 2022, MOP5 and GOP mid-2023.
- Continue to develop MUG to be in production by Q2 2021.
- Prioritise development of WKP, for production as soon as possible.
- Mine GOP early, to provide rock for mine backfill and TSF construction to provide tails storage capacity.
- Expand the process plant to 1.6 Mtpa, as production builds to support this throughput.
- Mine waste rock from MOP5, until waste rock is available from GOP, for backfill for MUG and construction of the upper lifts on TSFs 1A and 2.
- Use the upper lifts on TSFs 1A and two for tailings storage, followed by GOP and then TSF3.
- Commence mining of MOP5 later in the development sequence, to maintain production at 1.6 Mtpa as other mining sources deplete, and to provide waste rock for construction of TSF3.
- Use NRS for intermediate storage of mined rock waste, prior to use in mine backfilling operations and TSF construction.

In relation to the PEA mine schedule, OceanaGold has prioritised those resources with higher proportions of Indicated Resources ahead of the other Resources, i.e. MUG and GOP ahead of WKP and MOP5. This mine development sequencing will allow OceanaGold to continue to convert and de-risk Inferred Mineral Resources in advance of the mining front. Notwithstanding the inclusion of Inferred Resources, they are high confidence Inferred Resources.

In the case of MUG, OceanaGold has adopted a conservative case by including only about half of the stated Mineral Resources pending further geotechnical study, specifically regarding extraction close to historic workings. Given the mining methods employed at Waihi, where extraction is in a series of small horizontal slices from bottom up, some Inferred material would always be extracted with Indicated material. Previous experience at the Waihi underground mines have shown that mine planning would normally include around 20% of Inferred Resource but this is removed for determining Mineral Reserves. For the PEA this included Inferred Resource ranges from 30% in the early years to 50% in the later years.

Cautionary Statement

There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the mill feed target itself will be realised.

1.9 Project Infrastructure

The project will utilise the facilities that have been in place since 1988 and were upgraded in the late 1990s.

Site preparation works required for MUG include the establishment of a new portal which is incorporated in the GOP development works, as well as a suitable pad and foundations for the cemented back fill batch plant.

The proposed project is expected to require the following infrastructure works:

1.9.1 MOP5

- Partial relocation or demolition of the existing workshop, wheel wash and other mobile plant facilities; and provision of new duplicated facilities;
- Relocation of the open pit administration and ablution facilities / offices and fuel bowser;
- Relocation and upgrade of the crushing and conveying facility;
- Relocation of public roads, relocation or demolition of company owned buildings and relocation of the historic Cornish Pumphouse; and
- Partial diversion of the Empire Stream.

1.9.2 GOP

- A new crusher at the mill run-of-mine (ROM) area;
- A 15m to 20m wide haul road from the GOP to the NRS and Polishing Ponds Stockpile (PPS) including a bridge across the Ohinemuri River and the existing underpass below the overland conveyor;
- A new laydown to the north of the conveyor and cut to the 1120 mRL contour is proposed of 1.7 Ha which provides a services area for MUG;
- Clean water diversion drains as required; and
- A realigned gravel road from the end of Clark Street for public access to the BMX / mountain bike track.

1.9.3 WKP

- Establishment of a portal, access roads, earthworks and civils for the proposed mine surface facilities;
- Diversion drains, water treatment facilities, settling and collection ponds;
- Construction of a pad for temporarily stockpiling waste rock from the mine development;
- Laydown area for mining infrastructure and consumables;

- Security fencing and screening;
- Additional TSF capacity, which may include expansion of the current TSFs, a new TSF and conversion of GOP to a TSF; and
- Other supporting infrastructure, which may include a new rock stack, process plant upgrades and power upgrades.

1.10 Market Studies and Contracts

Contracts are in place covering underground mining, transportation and refining of bullion, purchase and delivery of fuel, electricity supply, explosives and other commodities. These agreements conform to industry norms.

OceanaGold maintains a number of operating permits for the importation of reagents into New Zealand. New Zealand has an established framework that is well regulated and monitored by a range of regulatory bodies.

Risk associated with renewal of importation permits, is regarded as manageable.

1.11 Environment Studies, Permitting and Social or Community Impact

1.11.1 Environmental Technical Assessment

Modern mining has operated in Waihi since 1987 to today, when mining of the Martha Pit commenced. Since then, underground mining has also been introduced at Correnso and Favona and most recently at MUG. Over this period OceanaGold has undertaken technical assessment and monitoring of relevant amenity aspects and implemented mitigation strategies where required. This approach will continue for the assessment and ongoing management of the proposed projects. The amenity aspects include, but are not limited to blasting, vibration, terrestrial ecology, aquatic ecology, water management, ground settlement, air quality, property, heritage and socioeconomic impacts.

1.11.2 Social / Community

Waihi has a long history of mining. With operations within the town and the proximity of the community, the need to understand and manage how mining affects the community and society at large is integral to positive relationships and successfully operations. This has led to mining becoming part of the social fabric and identity of Waihi today, creating strong community connections built through trust by sharing information. To identify and analyse how mining affects the Waihi community, reliable information is gathered through various monitoring methods across a broad section of disciplines. To continue to build upon the foundation of baseline data, a Social Impact Assessment (SIA) is planned for the projects such that effective and fit-for-purpose strategies can be implemented to enhance potential benefits and mitigate potential negative impacts. These management measures are to be monitored, reviewed and adapted through an effective Social Impact Management Plan (SIMP) framework to ensure ongoing effectiveness. The SIA will identify and define the potential social impacts, including the identification of potentially impacted communities. This will build a knowledge base to inform integrated and adaptive impact and risk assessment using local knowledge and participatory processes. Overall, the desired outcome is to uphold strong practices of social performance to ensure the company is a good neighbour and provides a positive legacy.

1.11.3 Cultural

OceanaGold (and its predecessors) have engaged with Iwi who have a special interest in Waihi in relation to various mining proposals over the last 30 years, and engagement is currently occurring in relation to proposed projects.

The nature of the engagement between OceanaGold and Iwi has been wide-ranging. It has included the establishment of Memorandums of Understanding, which have sought to recognise the relationship of Iwi with some of the areas that are subject to mining activities and their role as kaitiaki, as well as for Iwi to recognise the perspectives and interests of the company. It has also included engagement in relation to the potential cultural effects of resource consent applications for new mining proposals, including through the preparation of cultural impact assessments, acknowledging that at times there has been a need for Iwi to submit on resource consent applications by the company. OceanaGold has also worked with Iwi to implement ongoing cultural awareness training of its staff.

OceanaGold will continue to engage with Iwi during the approvals and operational phases of the projects.

1.11.4 Consenting Timeline

The project configuration is underpinned by the progression of consent applications and assumes that consents are received to commence the WKP exploration tunnel in 2022, and all other projects are consented by 2023. Based on these timelines a project schedule was prepared and based on the mining inventories.

1.12 Capital and Operating Costs

With cash generated from the Waihi District Study projects starting in 2021 (i.e. MUG), as well as cash generated from the company's other operating mines throughout much of the Waihi District Study project life, and given the progressive nature of the development, OceanaGold expects to generate sufficient funds to finance the project from the group cashflow once MUG goes into production. In the alternative, and dependent on corporate preference for gearing at that time, OGC may finance development by increasing debt relative to current low gearing levels.

Capital and operating costs are well known from the 30 years of operations and have been appropriately applied to develop cut-off grades and inputs into economic analysis.

- The operating cost estimate has an expected accuracy range of ±30% and has been developed in NZD;
- The estimate includes the underground mining, open pit mining, processing and G&A operating costs derived from historical data and forward cost estimates; and
- The capital cost estimates have an expected accuracy of ±30% that includes direct and indirect costs, owner's costs and contingency associated with mine and process facilities and on-site infrastructure.

For capital cost estimation, engineering work, in the range of 5–10% of total engineering for the project, was carried out to support the estimate. Where possible costs were estimated from similar constructions at Waihi, sourced from Original Equipment Manufacturer (OEM) or otherwise factored, end-product units and physical dimensions methods were used to estimate costs. The main items included in the capital cost estimate include:

- Underground mine development, pre-strip, equipment fleet (lease charges), infrastructure and services;
- Process plant upgrade to 1.6 Mtpa with and supporting infrastructure and services;
- TSFs including TSF1A, TSF2, TSF3, GOP TSF and NRS;
- On-site infrastructure (water treatment and distribution, electrical substation and distribution and other general facilities);
- Pit rim works - relocation of public roads, relocation or demolition of buildings and monuments;
- Off-site infrastructure (water and power supply, and new external access) for WKP;
- Land acquisition and property divestment; and
- Mine site rehabilitation.

1.13 Economic Analysis

1.13.1 Assumptions

Assumptions for economic analysis include:

- Processing plant production rate of 1.6 Mtpa;
- Gold Price of USD 1,500/oz, with a Spot Price scenario of USD 1,750/oz;
- Exchange Rate - NZD: USD 0.65;
- Metallurgical recovery assumptions of 94% for MUG, 90% for MOP5, 71% for GOP and 90% for WKP;
- Royalty payments include higher of 1% of net sale revenue or 5% accounting profit to the Crown, and a WKP specific 2% third-party payment;
- Revenue is recognised at the time of production;
- Discount 5%; and
- Corporate tax rate 28%.

1.13.2 Cash Flow Analysis

The study results are positive for a number of scenarios including the exclusion of all Inferred Resources from the mine schedule. Historically for Inferred Resources at Waihi, conversion rates approaching 100% are typical. The results justify OceanaGold continuing to fund the project development and proceeding to PFS and FS level studies.

<u>Cautionary Statement</u>

The project economics are based upon mining inventories comprised of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case.

1.14 Conclusions

The following conclusion have been drawn from this Technical Report:

- The Mineral Resources have been estimated in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standard Definitions for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions);
- The economic evaluations are to a PEA level of study. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability and there is no certainty that the results described in the PEA will be realised;
- The mine design, mine dewatering designs, mining plans, surface infrastructure and processing assumptions are based upon preliminary conceptual designs and evaluations; and
- The areas requiring further study and design are:
    - Increasing geological resource confidence and reducing resource risk;
    - Mine design, scheduling and cost modelling;
    - Environmental and social studies to support permitting;
    - Community and stakeholder engagement;
    - Hydrogeological conditions around WKP;

- Methods of extraction of remnant resources around the Martha, Empire, Edward and Royal lodes;
- Re-evaluation of MUG cut-off grades;
- TSF constructions and liners;
- Geotechnical interactions between MUG and MOP5;
- Metallurgical recoveries; and
- All surface infrastructure works.

1.15 Recommendations

Based on the conclusions of the Technical Report and PEA, the following actions are recommended:

- Continue drilling to expand resources to support future Mineral Reserves.
- Completion of a Feasibility Study for MUG, to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Completion of a Prefeasibility Study for WKP, to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Completion of a Feasibility Study for GOP, MOP5, GOP TSF and TSF3 to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Progress work to consent the projects, prioritising the development of WKP, in line with target dates assumed in the PEA.

2 INTRODUCTION

2.1 Terms of Reference

The PEA is preliminary in nature and includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the PEA will be realised. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. However, with respect to the current milling facility which has been in operation for the better part of 30 years, OceanaGold chooses to call historical mill feed as “ore” without any judgement of past profitability. Furthermore, OceanaGold chooses to use “ore” in various parts of Section 16 to describe certain existing physical mine infrastructure assets such as ore pass, ore stockpile area, ore bin, etc. without implying economic value.

This report provides Mineral Resource Estimates, and a classification of Mineral Resources prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014 (CIM, 2014).

References in this report to “OceanaGold” include OceanaGold Corporation, Oceana Gold (New Zealand) Limited, Waihi Gold Company Limited and their subsidiaries and associates, as the context requires. This report has been prepared to satisfy OceanaGold obligations as a reporting Issuer in Canada.

2.2 Principal Sources of Information

This Technical Report was prepared by OceanaGold. Information for the report was based on published material as well as the data, professional opinions and unpublished material obtained from work completed by OceanaGold, and materials provided by and discussions with, third-party contractors / consultants retained by OceanaGold. Reports and documents listed in Appendix A were also used to support preparation of the report. Additional information was sought from OceanaGold personnel where required to support preparation of this report.

Table 2-1: Specialist Consultants who provided information for the study

Consulting Company	Consulting Package
PSM Consultants Pty Ltd. (“PSM”)	Geotechnical engineering - open pits
SRK Consulting Pty Ltd (“SRK”)	Geotechnical engineering and mine engineering - WKP Mining engineering – MUG Geotechnical engineering - MUG
GWS Ltd.	Hydrogeology and groundwater
Engineering Geology Ltd.	Waste rock disposal and tailings storage
Entech Pty Ltd.	Mining engineering - MUG Geotechnical engineering - MUG
GHD Pty Ltd. (GHD)	Materials handling - WKP
AECOM Pty Ltd	Materials handling - MOP5
AMC Pty Ltd	Paste fill and cemented fill engineering Geotechnical engineering - MUG
Outotec Pty Ltd	Paste backfill engineering

2.3 Qualified Persons and Inspections of the Property

The QPs for the report are OceanaGold employees engaged for the preparation of this Technical Report, as listed in Table 2-2. All the QP's except David Carr are based permanently on-site in Waihi. David Carr is based in the Brisbane OceanaGold office and has inspected the property several times throughout 2019.

Table 2-2: QPs who are responsible for preparing this Technical Report

QP's	Employer	Position	Technical Report Item(s) Contributed to or Reviewed
Trevor Maton (not Independent) BSc., M.Sc. MAusIMM (CP Mining), ARSM,	OceanaGold	Study Manager	Sections 1.1 – 1.5, 1.16 - 1.22, 2, 5, 16, 18 – 26.
Peter Church (not Independent) BSc., MAusIMM (CP Geology)	OceanaGold	Principal Resource Development Geologist	Sections 1.7 – 1.11, 1.13, 1.21, 2, 3 – 4, 6- 12, 14, 23 - 26.
David Carr (not Independent) BSc., MAusIMM (CP Metallurgy)	OceanaGold	Chief Metallurgist	Sections 2, 3, 13, 17, 21.2, 23 – 26.

2.4 Effective Dates

The effective date of this Technical Report is 1 January 2020.

2.5 Information Sources and References

OceanaGold has sourced information from appropriate reference documents as cited in the text and as summarised in Section 27 of this report. Additional information was provided by OceanaGold site personnel. The QPs have relied upon OceanaGold experts in the fields of mineral tenure, surface rights, permitting, social responsibility and environment.

2.6 Units of Measure

The metric system has been used throughout this report except for contained metal which is expressed in troy ounces. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in New Zealand dollars (NZD) unless otherwise stated.

3 RELIANCE ON OTHER EXPERTS

3.1 External Consultants

The authors, Qualified, Independent and Non-Independent Persons as defined by NI 43-101, were contracted by the Issuer to study technical documentation relevant to this report, to contribute to or review the Technical Report on the Waihi Operation, and to recommend a work program if warranted. The authors relied on reports detailed in Section 27 and opinions as follows for information that is not within the authors' fields of expertise:

1. EGL Ltd. was retained by OceanaGold to provide professional services with respect to the tailing's storage facilities and waste rock storage for the Waihi Operation and WKP Project. The scope of services was to provide concept designs, construction schedules and cost estimates for the various tailing's storage facilities and the NRS. The EGL reports were used to as inputs to this report;
2. PSM Consultants Pty Ltd ("PSM") was retained by OceanaGold to provide professional services with respect to the MOP5 and GOP. The scope of services was to determine the geotechnical engineering parameters for the open pit operations and mining inputs. The PSM reports have been referenced for inputs to this report;
3. SRK Consultants Pty Ltd ("SRK") was retained by OceanaGold to provide professional services with respect to the WKP and the MUG operation. The scope of services was to determine the geotechnical engineering parameters for the underground operations, backfill requirements (underground) and mining inputs. The SRK reports have been referenced for inputs to this report;
4. GWS Ltd. was retained by OceanaGold to provide professional services with respect to the Waihi Operation and WKP Project. The scope of services was to determine the hydrology (surface water) and hydrogeology (groundwater) parameters of the Waihi Operation and provide inflow estimates and management plans for water. The GWS reports were used to as inputs to this report;
5. Entech Consultants Pty Ltd ("Entech") was retained by OceanaGold to provide professional services with respect to the MUG operation. The scope of services was to determine the geotechnical engineering parameters for the underground operations, backfill requirements (underground) and mining inputs. The Entech reports have been referenced for inputs to this report;
6. AMC was retained by OceanaGold to provide professional services with respect to the MUG operation. The scope of services was to determine the geotechnical engineering parameters for the underground operation; and
7. Outotec and AMC Pty Ltd (AMC) were retained by OceanaGold to provide professional services with respect to the use of paste backfill in MUG. The scope of services was to determine the geotechnical engineering parameters for the paste backfill, appropriate plant design use of paste in underground operations. Both the Outotec and AMC reports have been referenced for inputs to this report.

The authors consider the information used to prepare the report and formulate its conclusions and recommendations is valid and appropriate considering the operational nature of the project and the purpose for which the report is prepared. The authors, by virtue of their technical review of the project's exploration potential, affirm that the work program and recommendations presented in the report are in accordance with NI 43-101 and CIM technical standards.

3.2 Trevor Maton

Mr. Maton has relied, and believes he has a reasonable basis to rely, on information provided by the following third parties for the following areas of the report.

Table 3-1: Specialist Consultants who provided Information for the study

Section Ref	Subject Matter	Information Source	Date
Sections 14	Resource block model used in mine design and planning	Peter Church MAusIMM (CP Geology)	2015, 2016, 2018,2019
Sections 16	Geotechnical design criteria – open pit	PSM (Australia)	2015, 2016, 2017 2018,2019
Sections 16	Geotechnical design criteria – underground	Entech, SRK, AMC	2011, 2012, 2016, 2018,2019.
Sections 16	Mine design and mining methods	Entech, SRK, AMC	2011, 2012, 2016, 2018,2019, 2020.
Sections 13, 17	Metallurgical recoveries and throughput rates Processing costs	David Carr MAusIMM(CP Metallurgy), OceanaGold Chief Metallurgist	2019
Sections 16, 18	Tailings and waste rock disposal	EGL	2015, 2016, 2018, 2019.
Section 21	Mining costs	Entech, SRK, EGL	2018, 2019

3.3 Peter Church

None.

3.4 David Carr

None.

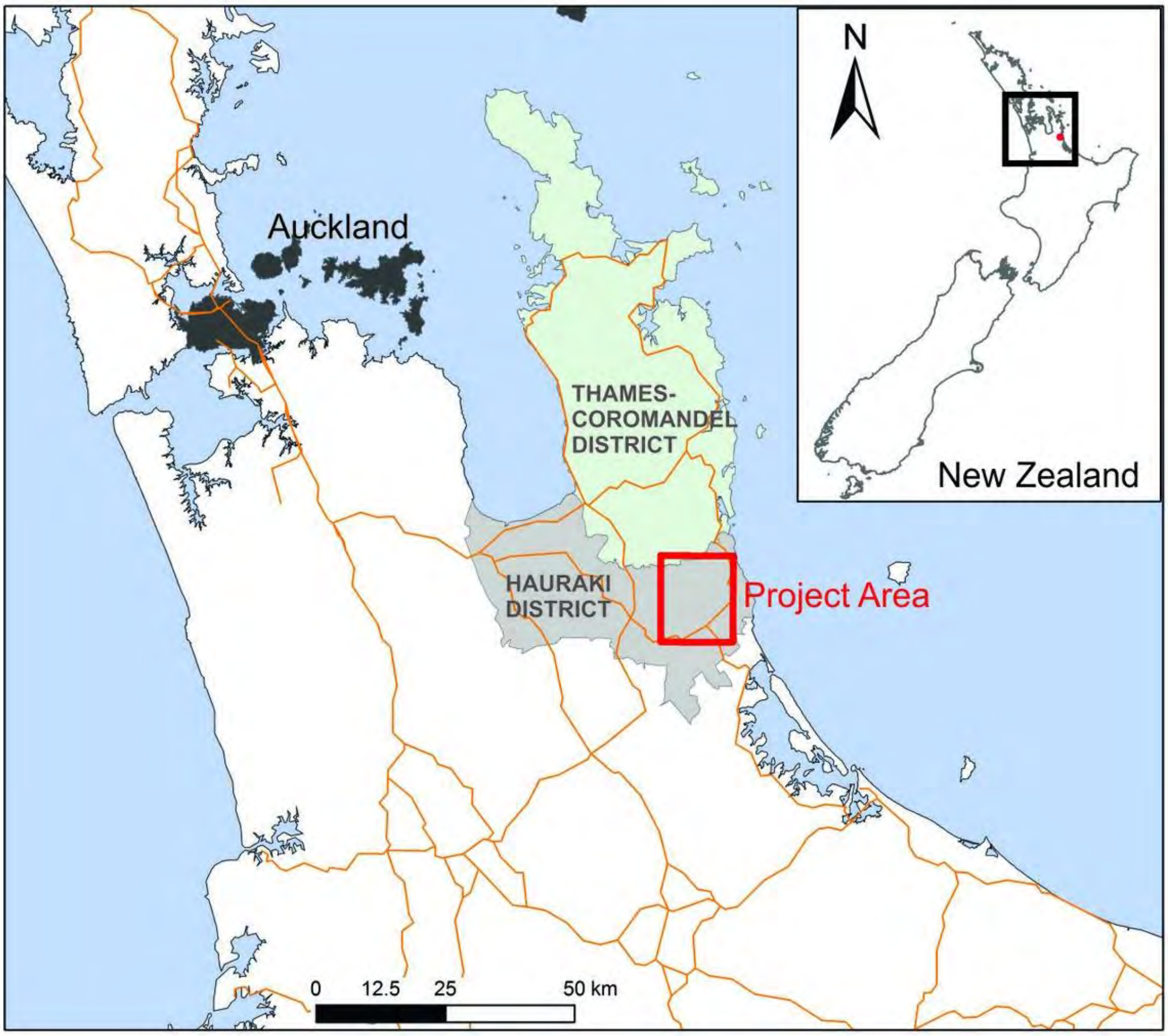
4 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The project area is located within the Hauraki District (Figure 4-1) and the Waikato region in the North Island of New Zealand. Martha operations are located within the world class gold mining town of Waihi.

Waihi is a small town situated approximately 142 km southeast of Auckland city. The MUG, MOP5 and GOP Projects are within the Waihi town. The WKP Project is located approximately 10 km north of Waihi.

Figure 4-1: Project Location Map



4.2 Mineral Tenure

All naturally occurring gold and silver minerals in New Zealand are owned by the Crown. Rights to prospect, explore or mine for these minerals are granted by permits issued under the Crown Minerals Act 1991 (CMA). Mineral exploration permits provide a permit holder the exclusive rights to explore for the specified minerals in an area. Minerals mining permits grant the holder to exclusive rights to mine for the specified minerals. The right to exchange a permit for a subsequent mining permit may occur provided certain criteria specified in the CMA are met, available at:

http://www.legislation.govt.nz/act/public/1991/0070/latest/whole.html#DLM246338

Figure 4-2 shows the location and extent of minerals permits held by OceanaGold within the Waihi WKP area as at 31 May 2020. The MUG, MOP5 and GOP Projects fall within Favona Mining Permit 41808 (MP

41808). A small portion of the MUG Project (mainly the south-western extent of the Rex vein) falls within an area that was formally Waihi West Exploration permit (EP40767) and is currently under an application lodged with New Zealand Petroleum and Minerals (NZPAM) for an extension to Mining Permit MP41808, refer Figure 4-2 The WKP Project falls within the Hauraki Exploration Permit 40 598 (EP 40598). Each of these permits are discussed in more detail below.

4.2.1 Favona Mining Permit MP 41 808

Of the projects outlined within this document, the MUG, MOP5 and GOP Projects lie within MP 41808.

Favona MP 41808 was granted to Welcome Gold Mines Limited and AUAG Resources Limited on the 22 March 2004 for the duration of 25 years, for gold and silver minerals. Work began on this permit with the development of the Favona decline in 2004 and the extraction of ore in late 2006. Two extensions of land to MP 41 808 were obtained in 2006 and 2017 firstly to include the Trio and potential extensions to Martha ore bodies and secondly to incorporate the land area previously covered by Mining Licence 32 2388 (ML 32 2388) prior to its expiry in July 2017.

MP 41808 currently extends across an area of 1485.38 hectares utilised by urban, rural and mining land use. All gold mining activities by OceanaGold in Waihi including the current underground mining operation, the ore Processing Plant, tailings facility and the inactive MOP lie within the existing MP 41808. The permit is 100% owned by OceanaGold (New Zealand) Limited. The permit will expire on 21 of March 2029.

An application for an extension of land to the Favona Mining Permit was made to NZPAM on the 19 December 2019. The area under this application is 87.26 ha and incorporates a portion of the Waihi West Exploration permit (EP40767) which otherwise expired on the 20 December 2019. A decision on the application is currently pending as at 1 June 2020.

On MP41808 the higher of a 1.0% royalty on net sales revenue from gold and silver or 5% accounting profits is payable to the Crown. The area under an application to extend MP41808 is subject to an additional 2% royalty payable to Osisko (acquired from Geoinformatics and BCKP).

4.2.2 Hauraki Exploration Permit EP 40598

The WKP Project is situated within the Hauraki Exploration Permit 40598 (EP 40598). EP 40598 was granted on the 22 May 2003 for the duration of 5 years. Since then it has undergone numerous changes in land area and ownership. More recently a second four-year appraisal extension of duration was granted in May 2017.

The permit currently covers an area of 3762.94 hectares which is held (100%) by OceanaGold (New Zealand) Limited. The current term of the exploration permit expires in May 2021 and confers rights to exchange the EP within that time for a subsequent mining permit upon meeting certain criteria specified in the CMA.

An application for a mining permit covering a portion of EP 40598 (and EP 51771) over 5124.77 ha was submitted to NZPAM on the 6 May 2019. As at 1 June 2020 a decision on the application was pending.

OceanaGold holds 100% of the WKP permit interest. Third-party rights to receive an interest in the project are confined to a Crown royalty of 1% of the turn over or 5% of the accounting profits whichever is higher and a 2% royalty payable to Osisko (acquired from Geoinformatics and BCKP) with respect to certain “target” areas. In both cases the royalties are fixed and quantifiable for the purposes of inclusion in the business plan.

4.2.3 Other Exploration Permits

Figure 4-2 details the full set of permit interests held by OceanaGold (New Zealand) Limited on the North Island of New Zealand as at 31 May 2020 including rights to explore for minerals in the vicinity of the Waihi Mine and within the wider Hauraki and Thames Coromandel area. An application for a four-year appraisal extension of duration on EP 40813 has been lodged with NZPAM and a decision is currently pending as at 1 June 2020. An application for an appraisal extension of duration on EP 51771 has also been lodged with NZPAM as a precaution, in order to keep the permit active, should the entire area under the current application for a mining permit over WKP not be granted.

Figure 4-2: Location of OceanaGold Tenements near the Waihi and WKP Projects

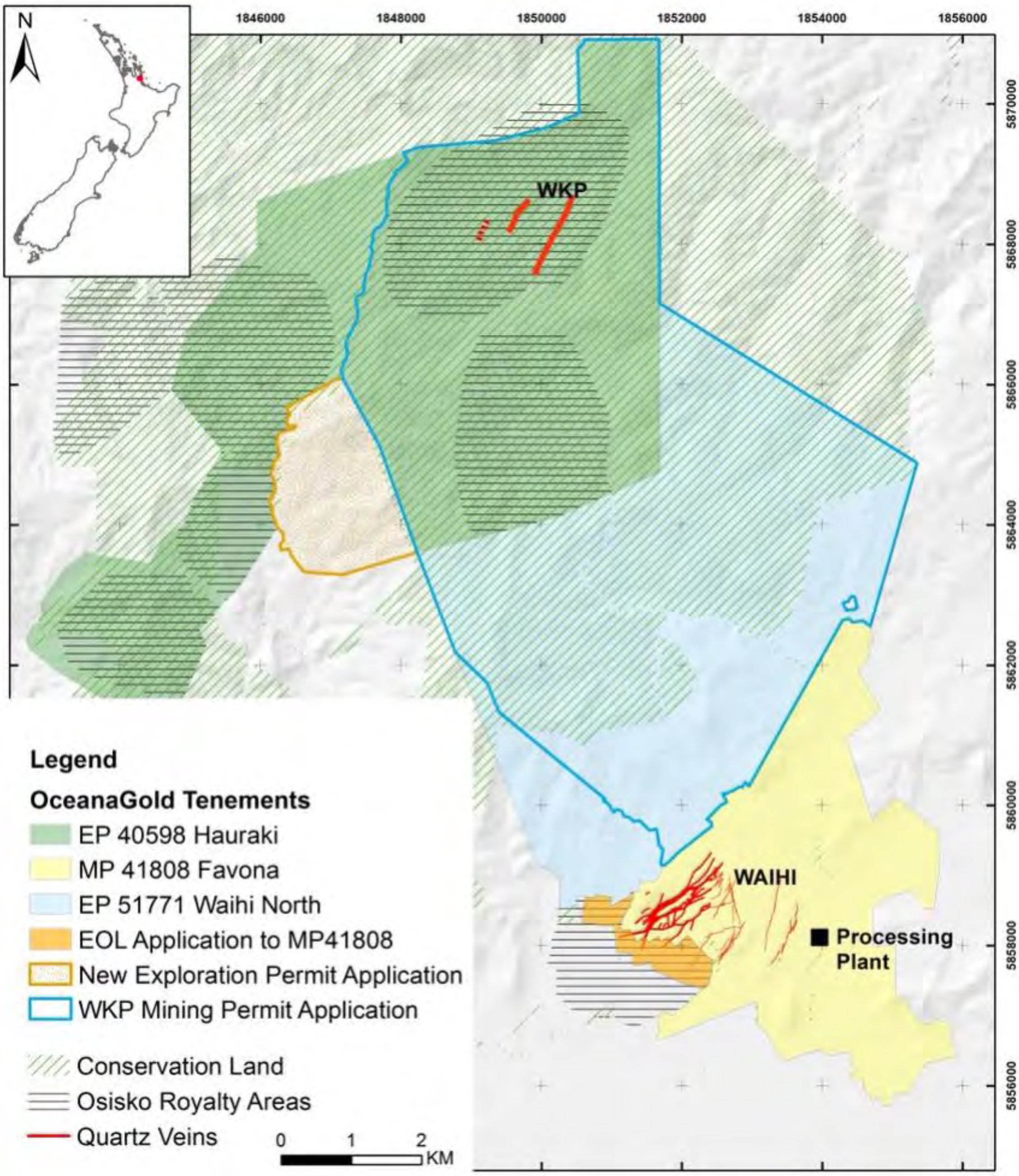


Table 4-1: Tenement Status 1 May 2020

Permit	Location	Permit Type	Status	Granted	Term (years)	Expires	Area (ha)
41808	Favona	Mining	Active	22/03/2004	25	21/03/2029	1485.38
51041	White Bluffs	Exploration	Active	15/10/2008	14	14/10/2022	450.973
51630	Ohui	Exploration	Active	22/06/2019	10	21/06/2023	1490.261
51771	Waihi North	Exploration	Active	28/04/2010	10	27/04/2020	3089.32
52804	Twin Hills	Exploration	Active	17/12/2010	10	16/12/2020	3223.786
40598	Hauraki	Exploration	Active	22/05/2003	18	21/05/2021	3762.94
40813	Glamorgan	Exploration	Active	7/09/2006	14	6/09/2020	2777.005
60372	Waimata	Exploration	Active	6/12/2017	5	5/12/2022	330.675
60149	Dome Field North	Exploration	Active	1/05/2017	5	30/04/2022	7287.262
60148	Dome Field South	Exploration	Active	1/05/2017	5	30/04/2022	10044.734
40767	Waihi West	Exploration	Expired	21/12/2005	14	20/12/2019	280.4

Permit	Application Pending	Permit Type	Application date	Area (ha)
41808 and 40767	Extension of land to MP41808 to include a portion of EP40767	Mining	19/12/2019	87.26
40598 and 51771	Mining Permit Application	Mining	21/06/2019	5124.77
40813	Appraisal Extension to an existing Exploration Permit	Exploration	5/03/2020	2777.005

4.3 Property Ownership and Access Arrangements

4.3.1 The MUG, MOP5 and GOP Projects

The operating MUG mine in Waihi is managed by OceanaGold (New Zealand) Limited, a 100% owned subsidiary of the OceanaGold Corporation. The locations of the MUG, MOP5 and GOP Projects are illustrated in Figure 4-3.

All gold mining activities in Waihi including the current underground mining operation, the ore Processing Plant, tailings facility and the inactive MOP are within the existing Favona MP 41808. The land on which these activities take place is owned by various stakeholders including OceanaGold, refer Figure 4-2. In accordance with the requirements of the CMA, where mining activities involve surface disturbance on land not owned by OceanaGold an access arrangement with the landowner is required.

The MUG Project underlies land owned by various proprietors including the Crown (administered by Land Information New Zealand (LINZ)), DOC, the HDC and various private landowners. The portal to the underground mine is owned by OceanaGold which is accessed adjacent to the processing and water treatment plant.

The majority of the land covering the current Martha Open Pit is owned by the Crown and administered by LINZ. There are two parcels adjacent to the MOP that are administered for the Crown by DOC. OceanaGold has entered into an access arrangement with LINZ and a separate access arrangement with DOC providing an ongoing formal Authority to Enter and Operate on the various publicly owned land parcels for CMA purposes.

Land within the mining permit that hosts the conveyor belt corridor, the water treatment plant (and an associated pipeline for the discharge of the treated water into the Ohinemuri River), the process plant and the tailings storage facilities, is all owned by OceanaGold except for one parcel where the conveyor belt corridor runs through land adjoining the Union Hill area, which is in the name of the Commissioner of Crown Lands administered by LINZ, and portions of public roads, road reserve and river reserve. OceanaGold has entered into an access arrangement with LINZ providing an ongoing formal Authority to Enter and Operate on the conveyor belt corridor for CMA purposes.

The GOP, MOP4 and MOP5 Projects occur on land owned by OceanaGold and government agencies (Figure 4-3). No access arrangements have been made for the MOP5 and GOP Projects at this stage.

The MUG Project requires mining beneath privately owned land. Section 57 of the CMA states that:

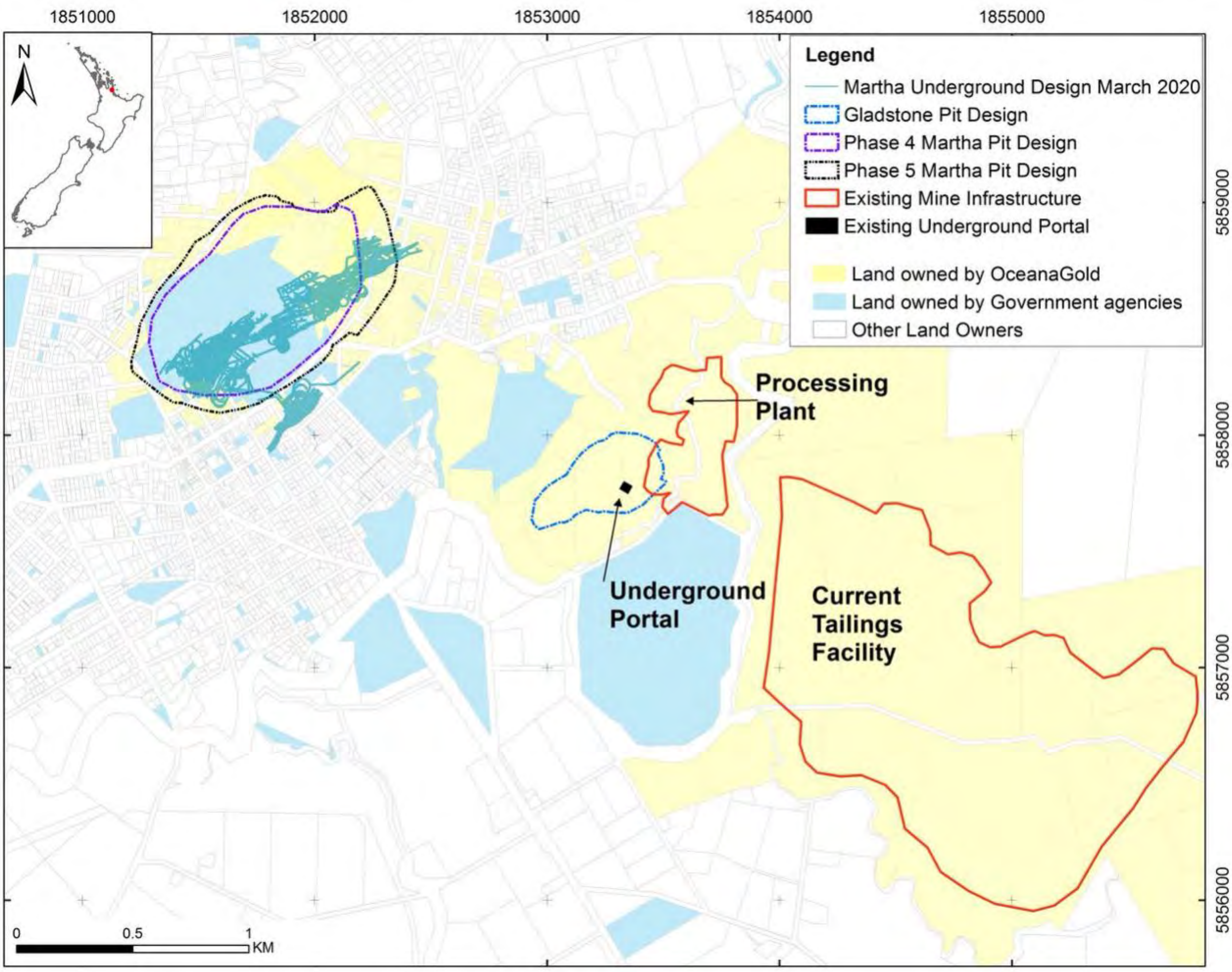
For the purposes of sections 53 to 54A, prospecting, exploration or mining carried out below the surface of any land shall not constitute prospecting, exploration or mining on or in land if it—

- Will not or is not likely to cause any damage to the surface of the land or any loss or damage to the owner or occupier of the land; or
- Will not or is not likely to have any prejudicial effect in respect of the use and enjoyment of the land by the owner or occupier of the land; or
- Will not or is not likely to have any prejudicial effect in respect of any possible future use of the surface of the land.

Resource consents currently in place set out a process (including arbitration) for gaining access to land above stopes and development drives. Specific conditions of the Principal Land Use resource consent for the MUG Project include the following:

- At least three months prior to the placement of the first explosives for any blasts immediately beneath any part of the legal title to a residential property overlying stopes for any mining provided for under this consent, the consent holder shall offer to purchase that property from the registered proprietor at market value this offer shall be set by reference to the two independent valuations required by condition 52); or if the registered proprietor prefers, to provide an ex gratia payment equal to 5% of the property's market value to the registered proprietor.
- Prior to the placement of the first explosives for any development blasts immediately beneath any part of the legal title to a residential property for any mining provided for under this consent, the consent holder shall offer to provide an ex gratia payment equal to 5% of the property's market value to the registered proprietor of that title.
- If the company's offer is not accepted, but the registered proprietor wishes to negotiate, the consent holder shall offer to commit to a binding arbitration process in relation to the property purchase or ex gratia payment referred to above, provided that the basis for determining the ex gratia payment is not amenable to further negotiation.

Figure 4-3: Location of the Projects within Favona Mining Permit



4.3.2 The WKP Project

The WKP Project is located on land owned by the Crown and administered by DOC as a conservation / forest park. An access arrangement between DOC and OceanaGold has been made to allow for exploration activities (including surface drilling) to take place within EP 40598. Known environmental liabilities are managed through stipulated conditions in the DOC access arrangement and Regional and District Council Consents and under conditions that protect the conservation (biodiversity and amenity) values of the land.

The company has applied to DOC for a variation to the access agreement to provide for the continuation of exploration drilling upon granting of the WKP mining permit and, as at 1 June 2020, a decision is currently pending.

DOC access arrangement conditions include:

- Submission of an “Annual Work Program” to obtain an “Authority to Enter and Operate” for a twelve-month period;
- Ecological surveys are to be undertaken by suitably qualified and experienced experts over areas requiring vegetation clearance such as drill sites, campsites, pump sites and helicopter landing sites;
- A DOC approved kauri dieback management plan must be in place and followed;
- Historical and cultural sites must be protected against damage; and
- All cleared sites are to be rehabilitated to the satisfaction of the DOC manager.

4.4 Consent and Permitting

The regulatory agencies primarily responsible for consents, permits, authorities and licences associated with the projects are as follows:

- NZPAM, which is the Crown agency responsible for administering rights to explore for and extract Crown-owned minerals, including gold and silver, under any Mining and Exploration Permits under the CMA;
- The Waikato Regional Council (WRC) formerly Environment Waikato (EW) is the regional government agency appointed under the Resource Management Act 1991 (RMA) responsible for air and water quality within the Waikato region (this includes Waihi and WKP). It manages activities including water extraction and discharge, vegetation removal and earthworks that can give rise to soil erosion;
- The Hauraki District Council (HDC) is the local government agency appointed under the RMA responsible for the management of land use, community issues and resource consents for the Hauraki District which includes the Waihi Project areas (i.e. MUG, MOP5, GOP and WKP Projects);
- The Thames Coromandel District Council (TCDC) is the local government agency appointed under the RMA responsible for the management of land use, community issues and resource consents within the Thames Coromandel District, which includes some of OceanaGold’s regional exploration tenements;
- Heritage New Zealand Pouhere Taonga is the government agency appointed under the Heritage New Zealand Pouhere Taonga Act 2014 to grant authority to modify or destroy any archaeological site. Any impacts on old mine workings or old surface structures, where these pre-dates 1900 or are otherwise specifically protected by law, will require such an authority; and
- DOC is the government agency charged with conserving New Zealand’s natural and historic heritage and managing public conservation land. To undertake mining activities that have a surface expression on public conservation land permission from the Department is required. This permission is in the form of a minimum impact arrangement or an access arrangement. Additionally, DOC is responsible for managing wildlife species under the Wildlife Act 1953 and for issuing Wildlife Act Authorities for activity that includes holding, catching, handling or release of wildlife.

An updated Land Use Consent (202.2018.00000857) was granted by HDC on the 12 December 2018 and, after an appeal period expired, commenced on 1 February 2019. OceanaGold commenced development activity on the 27 of July 2019. This Land Use Consent allows for mining of the MUG resource and the remainder of the MOP4. In addition to the authorisations required by HDC, a suite of consents were obtained from WRC covering matters such as vegetation removal, water takes, diversions and discharges of water, discharges to air and construction of the tailing’s storage facilities. Both HDC and WRC have conditions in place relating to mine closure, bonds and a post closure trust.

A resource consent has been granted (12 December 2018) for the MUG and the MOP4 Project. All the land use, water discharge and intake and air discharge permits are currently in place for these Martha Projects.

The MOP5 and GOP Projects are in ‘pre-planning’ phase and have no consents in place for mining at this stage.

For exploration drilling at WKP a consent to abstract water for drilling purposes was obtained from WRC. Water take is metered, and maximum abstraction rates are stipulated within the granted permits. Restrictions apply if stream levels fall below specified thresholds during periods of reduced rainfall. Land use consents have also been obtained from HDC prior to vegetation clearance for drilling purposes and building consents are in place for drill platforms that have been erected to minimise ground disturbance.

Any development of the prospect for the purposes of advancing beyond exploration would require applications at that time under the RMA and (for surface impacts only) the CMA. Consent has not yet been sought for mining the WKP Project.

Changes to NZ government policy restricting access to mine on conservation land have been proposed, subject to a statutory consultation process that has not yet commenced. The precise nature of any proposal is not currently known.

4.5 Easements and Road Access

For MUG public road access is provided to the OceanaGold underground amenities and Processing Plant site through Baxter's Road and to the open pit mine by Seddon Street. A number of paper roads exist within the mining area. No additional agreements are required except in the event that OceanaGold imports significant quantities of waste rock from the local quarry, in which event the Company is required to fund certain road upgrades.

For the GOP, MOP4 and MOP5 Projects a number of paper roads within the mining area will be stopped and/or realigned using processes under the Public Works Act 1981 and/or Local Government Act 1974.

5 ACCESSIBILITY, CLIMATE, PHYSIOGRAPHY, LOCAL RESOURCES AND INFRASTRUCTURE

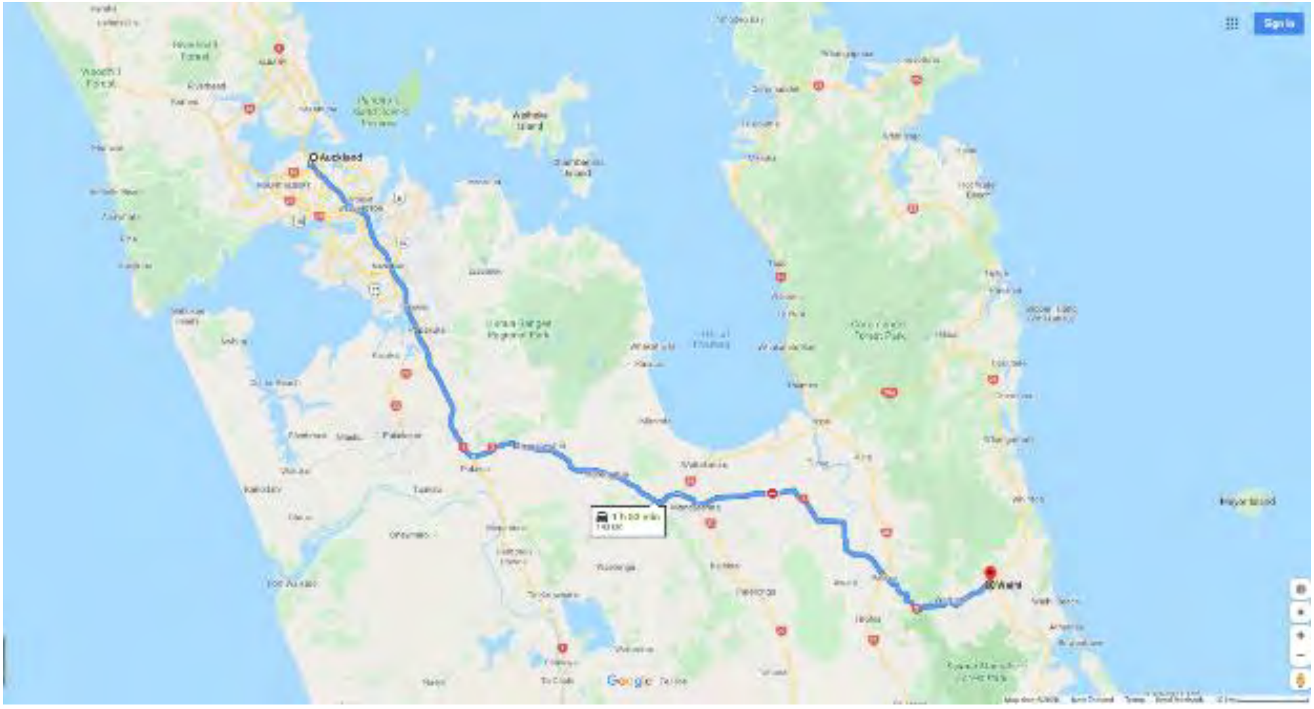
5.1 Accessibility

The Waihi site is located within the township of Waihi in the North Island of New Zealand and close to the major cities of Auckland (150 km north), Tauranga (60 km south) and Hamilton (100 km west). The project is located in North Island of New Zealand approximately 140 km southeast of Auckland, Figure 5-1.

Auckland (population approximately 2 million) is the largest city in New Zealand. The project is close to the community of Waihi (population approximately 4,000) and Waihi Beach (population approximately 3,000). The communities have supported the mining industry in the area for well over 120 years with the history of mining in the area dating back to the late 1800s. Approximately 300 employees live in the area.

Road access between Waihi and the major centres of Auckland and Tauranga is good, along a dual carriage highway (State Highway 2). No rail access is available to the site.

Figure 5-1: Project Access



Source: Google Maps 2020

5.2 Climate and Physiography

The Waihi township is at the foot of the Coromandel Peninsula, to the west are the hills of the Kaimai Ranges.

The climate is temperate. Mean temperatures range from 8 °C (46 °F) in the South Island to 16 °C (61 °F) in the North Island. January and February are the warmest months, July the coldest. New Zealand does not have a large temperature range, but the weather can change rapidly and unexpectedly. Winds in New Zealand are predominantly from the West and South-West, in winter, when the climate is dominated by regular depressions. In summer, winds are more variable with a northerly predominance associated with the regular large anti cyclones which cover all the country.

New Zealand is seismically active. In the Waihi region:

- Earthquakes are common, though usually not severe, averaging 3,000 per year mostly less than three on the Richter scale;

- Volcanic activity is most common on the central North Island Volcanic Plateau approximately 200 to 300 km from Waihi;
- Tsunamis would not have any direct impact on Waihi;
- Droughts are not regular and occur less frequently over much of the North Island between January and April; and
- Flooding is the most regular natural hazard.

5.3 Local Resources and Infrastructure

5.3.1 Workforce

Almost all of the employees reside in the nearby towns of Waihi, Waihi Beach, Katikati, Thames and Paeroa. Waihi is a relatively small community of approximately 4,500 people. Statistics New Zealand Census information shows that population numbers have remained relatively stable since 2001, with a small increase (approximately 27) from the 2006 Census. The population pyramid from the 2013 Census shows a noticeable dip in the numbers of young people in the range from 20-30.

The largest sectors for employment in Waihi are the retail trade (16.5%), health care and social assistance (14%), education and training (10%) and manufacturing (10%). Mining is relatively high at 3.2% of the usual resident population compared to the Waikato region at 0.5% and New Zealand at 0.2%. Waihi is characterised by a comparatively high level of unemployment. In 2013 the unemployment rate for Waihi was 13.2% (up from 2006 at 8.3%), compared to 8.5% for the Waikato region and 7.1% nationally. In addition, average wages in Waihi are lower than regional averages and are skewed towards lower income levels.

5.3.2 Community, Health and Education and Services

Community, health and education services are well established in Waihi with four primary schools, one secondary school, medical centres and various community health centres present. Most establishments are government funded.

5.4 Local Service Industry

A local service industry has established itself over the last 20 years to support gold mining in Waihi comprising engineering, cleaning, maintenance, drilling, rental and consumable suppliers, security, labour hire and other services. More technically advanced services are available from the regional centres in terms of heavy engineering, large equipment hire and other specialised services. Most suppliers are privately run and not affiliated with OceanaGold.

5.5 Mining Area Infrastructure

The batching of open pit mined material through the crusher conveyor system will require this material to be hauled to stockpiles. This will occur when an excavator is excavating materials not being conveyed at the time or when maintenance or modification works are being undertaken on the conveyor crusher system. The maximum stockpile capacity at the Martha Pit is 200,000 t. The existing crushing facility will be upgraded from the current 1,500tph to a nominal 4,000tph using an MMD sizer. A 1.2 Mt stockpile facility has been constructed adjacent to the process plant.

Some stockpiling of material will be required to enable waste production to be scheduled in accordance with backfill requirements and maintain consistent feed through the process facility. The stockpile areas near the Favona portal will be used for the temporary storage of waste rock.

A shortage of backfill material exists for the MUG and WKP underground mines and this will be sourced from the GOP and MOP5 pit developments.

It is expected that mill feed from the underground mine will be processed relatively quickly with the ROM material stockpiled in the ROM stockpile located near the conveyor in the processing area.

5.6 Comments on Accessibility, Climate, Local Resources, Infrastructure, and Physiography

In the opinion of the QPs:

- The existing and planned infrastructure, availability of staff, the existing power, water and communications facilities, the methods whereby goods could be transported to any proposed mine, and any planned modifications or supporting studies are well established and can support the declaration of Mineral Resources;
- Within OceanaGold land holdings, there is sufficient area to allow construction of any required project infrastructure; and
- The QPs consider it a reasonable expectation that surface rights usages will continue to be granted for the projects with appropriate negotiation.

6 HISTORY

6.1 Waihi

The town of Waihi became established when the original Martha Mine opened as an underground operation in 1879. The mine was extremely productive producing approximately 1,056 tonnes of gold-silver bullion from about 12 million tonnes of ore by 1952. The historic mine extracted five main sub-parallel lodes (the Martha, Welcome, Empire, Edward and Royal) together with numerous branch and cross lodes. All lodes dip steeply and are fillings of extensional faults and fractures. Early stoping employed the cut and fill method, but this was phased out and largely replaced after 1914 by the shrink stoping method. Stopes were generally not backfilled after 1914 but left open. The workings reached a total depth of 600m from surface on 16 levels. Seven main shafts were used to access miners and supplies underground, and numerous other shafts were developed for ventilation and exploration. In 1894, the Waihi Gold Mining Company adopted the cyanide process for gold extraction, which was first trialled in the world at a nearby mine in Karangahake.

Exploration drilling between 1979 and 1984 by Waihi Mining and Development Ltd. and AMAX Exploration Ltd. identified large open pit reserves within the confines of the historic mining area. Following the granting of permits, the Martha Mine Open Pit operation commenced operation in 1988 (under Mining Licence 32 2388) as an unincorporated joint venture between subsidiaries of Normandy Mining Limited Group and Otter Gold Mines Ltd. The Otter Gold holding was acquired by Normandy in 2002 and the Newmont Mining Corporation acquired full ownership of the Waihi Mine in 2002 through the acquisition of the Normandy Mining Group.

The Martha Mine Open Pit on Mining Licence 32 2388 (ML 322388) produced 22 Mt@3.1 g/t Au (2.2 Moz.) between 1988 and April 2015 when a localised failure of the north wall undercut the main access ramp suspending open pit mining operations. There is no open pit mining currently active in Waihi. The Mining Licence 32 2388 expired in July 2017 and was amalgamated into the existing Favona MP 41808.

MP 41808 was granted in March 2004 for a duration of 25 years to mine the Favona ore body. Underground mining resumed at Waihi in 2004 with the development of the Favona mine located approximately 2km east of the Martha Pit. Mining of the Favona ore body led to further extensions of underground development towards the nearby Moonlight, Trio and Correnso deposits. Mining of the Correnso ore body now completed other than a small amount of handheld narrow vein mining.

OceanaGold obtained full ownership of the Waihi property as an operating open pit mine, underground mine and Processing Plant in October 2015. Resource consent for underground mining of the remnant mineralisation around the Martha Vein System and the MOP4 was granted on the 12 December 2018, increasing the current underground and pit mine life in Waihi.

Table 6-1 summarizes the annual production from Waihi since 1988. Figure 6-1 shows a map of Waihi illustrating the areas mined through time.

6.2 Historical Mine Data

Historical mine data from the MUG includes development levels, open and filled stopes, shafts, ore passes and the Milking Cow caved zone. This data was initially digitised from available historic mine plan maps and long sections which were georeferenced using Vulcan software to known locations such as shafts. Level drives were adjusted to account for drainage gradients and stopes were draped onto vein models. 3-D shapes were then created of the historical workings using Vulcan software.

Continued development of the Martha Underground Project has allowed for further improvement to the 3-D historical workings model through collaborative updates by the underground survey and resource development departments. Updates to the historic workings model are made when the current underground mining activity or diamond drilling intersects historical workings. More recently, historical mine plans and maps held by the Auckland War Memorial Museum have been made digitally available which added further valuable information to the void model. Current mine development near historical voids requires targeted probe drilling and often cavity scanning of the voids, this data is used for continual, accurate adjustment to the model.

6.3 WKP

Early prospecting and mining at WKP were attempted between1893-1897, but only 19oz. of gold bullion was recovered from a 14-ton test parcel and mining was soon abandoned. Modern prospecting and exploration recommenced in 1978-1993 by Amoco, BP and others which included 5,500m of drilling in 23 drill holes. Newmont acquired a controlling interest in the property in 2005 and started a reconnaissance geological mapping, sampling, CSAMT geophysics and drilling campaigns targeting high-grade underground minable veins. In 2010, hole WKP-24 intersected the main T-Stream Vein containing 156m @ 1.6 g/t Au. Wide spaced follow up drilling confirmed the presence of three prospective vein zones each striking more than 1km in length, namely the Western Vein, the T-Stream Vein and the EG Vein. Newmont completed 7,000 m of diamond drilling in 15 holes intersecting locally high-grade gold mineralisation in each hole. Newmont ceased exploration in 2013 and the prospect remained idle until 2015 when OceanaGold acquired Newmont's New Zealand assets. Exploration then continued with additional geological mapping, sampling and geophysics leading up to further diamond drilling along the EG Vein (WKP40 to WKP 68). Drilling intersected significant Au mineralisation along the EG Vein including but not limited to 7.6m (true width) averaging 10.84 g/t Au in the first hole (WKP40). Drilling has since intercepted significant gold mineralisation along this veined structure from which a resource estimate has been calculated.

6.4 Previous Studies and Resource Estimates

Resource estimates and exploration results have previously been publicly reported for the MUG, WKP and GOP Projects. These reports are available through the OceanaGold company website at https://www.oceanagold.com/investor-centre/filings/ and include the following:

- JORC Table 1 Waihi (March 2020).
- JORC Table 1 WKP (February 2020).
- JORC Table 1 WKP (November 2019).
- JORC Table 1 Waihi (September 2019).
- Material Information Summary and JORC Table 1 Waihi (March 2019).
- Material Information Summary and JORC Table 1 WKP (February 2019).

6.5 Historical Production

It is estimated that MUG produced 4.9 Moz gold between 1883 and 1952 The underground workings extended over 15 vertical levels, 600m deep and 1.6 km along strike. The Martha Vein System was then mined from an open pit which produced approximately 2 Moz of gold between 1988 and 2015.

Underground mine production recommenced in 2006 at the Favona vein system situated approximately 2 km southeast of the Martha deposit followed by the Union-Trio-Amaranth vein system and Correnso Vein System. The Favona deposit produced approximately 400 koz of gold between 2006 and 2013, Trio produced approximately 200 koz of gold between 2013 and 2015 and Correnso approximately 350 koz between 2015 and 2018. Recent production figures from Waihi are presented in Table 6-1.

Mining of ore from the upper portions of the Correnso deposit continues at present using handheld airleg mining techniques and consequently ore extraction is insufficient to support regular ore processing. The Company intends to campaign treat the mined ore in the Q4, 2020 and resume regular ore processing by Q2, 2021.

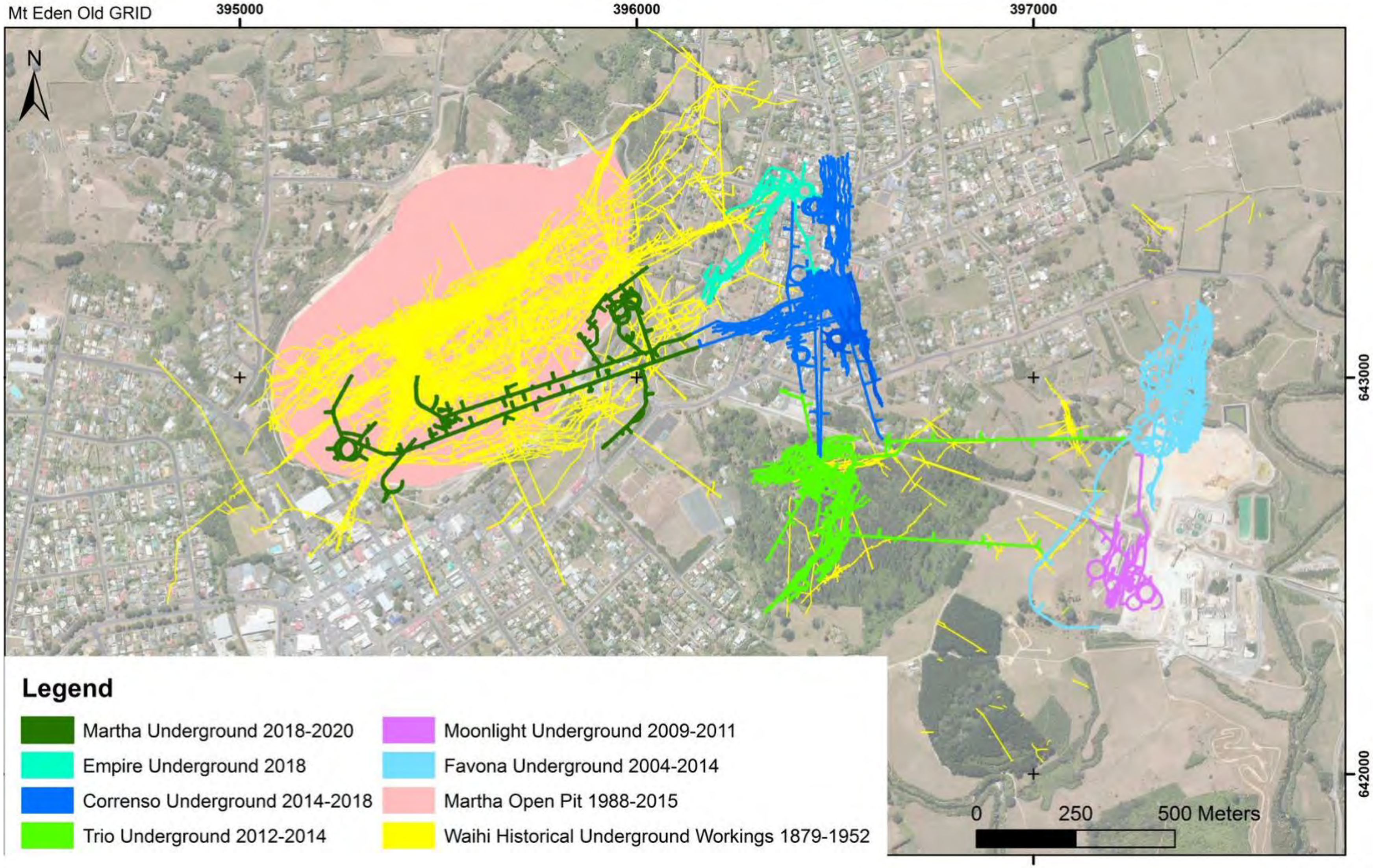
Large-scale mechanised underground mining has continued uninterrupted since 2008. Current mining is heavily focused towards the capital development associated with establishing the MUG Mining Project and productivity levels have been increased significantly in recent months to support this new project.

No significant gold production is recorded from WKP, apart from 19 oz Au recovered from a 14-ton test parcel in the late 1890s.

Table 6-1: Historic Production post 1988

	Martha Open Pit				Favona Underground (incl Moonlight)				Trio Underground				Correnso Underground (incl Empire)			
Year End	Tonnes	Au(gpt)	Mined Au(KOz)	Recovered Au(KOz)	Tonnes	Au(gpt)	Mined Au(KOz)	Recovered Au(KOz)	Tonnes	Au(gpt)	Mined Au(KOz)	Recovered Au(KOz)	Tonnes	Au(gpt)	Mined Au(KOz)	Recovered Au(KOz)
6/30/1988	68,179	2.4	5.3	3.6												
6/30/1989	775,240	2.8	69.8	63.1												
6/30/1990	879,294	3.1	87.6	78.9												
6/30/1991	858,173	3.4	93.8	84.2												
6/30/1992	834,472	3.1	83.2	74.5												
6/30/1993	817,003	3.2	84.1	75.7												
6/30/1994	800,203	3.3	84.9	77.8												
6/30/1995	880,580	2.5	70.8	66.4												
6/30/1996	892,859	2.9	83.3	79.2												
6/30/1997	915,135	3.0	88.3	82.7												
6/30/1998	917,346	3.1	91.4	85.6												
6/30/1999	907,790	3.6	105.1	95.5												
6/30/2000	1,030,062	3.3	109.3	102.0												
6/30/2001	1,202,938	2.7	104.4	95.1												
6/30/2002	1,343,925	3.3	142.6	129.9												
12/31/2002	638,210	3.5	71.6	64.4												
12/31/2003	1,231,521	3.1	120.8	109.7												
12/31/2004	1,274,790	3.4	141.0	127.6												
12/31/2005	1,158,385	4.8	180.2	167.7												
12/31/2006	794,231	4.0	102.9	97.0	135,304	7.9	34.2	30.0								
12/31/2007	273,414	1.7	15.2	13.3	225,276	11.1	80.1	72.2								
12/31/2008	536,360	1.9	32.6	29.7	330,619	11.1	118.0	101.5								
12/31/2009	951,481	2.0	62.4	57.7	333,103	8.2	87.8	79.4								
12/31/2010	564,031	2.4	44.1	39.7	367,577	6.2	73.8	66.1								
12/31/2011	691,763	2.5	54.5	48.9	304,609	6.0	58.4	51.6								
12/31/2012	15,972	4.8	2.5	2.2	51,580	5.6	9.3	8.6	340,391	5.4	59.1	54.6				
12/31/2013	165,569	2.8	14.8	12.8	52,200	4.3	7.2	6.5	463,854	6.4	95.7	88.0				
12/31/2014	684,473	3.1	68.0	61.7	6,820	7.4	1.7	1.6	301,694	7.7	75.1	69.1	7,912	2.8	0.7	0.6
12/31/2015	234,935	3.3	25.2	24.3									474,036	8.8	133.7	119.5
12/31/2016													489,300	8.1	126.1	116.0
12/31/2017													472,450	8.6	130.4	119.1
12/31/2018													433,593	6.77	94.4	83.50
12/31/2019									27,176	5.01	4.4	3.80	400,016	5.65	72.6	62.99
Totals	**22,338,334**	**3.1**	**2,240**	**2,051**	**1,807,088**	**8.1**	**470.48**	**417.4**	**1,133,115**	**6.4**	**234.3**	**215.5**	**2,277,307**	**7.6**	**557.9**	**501.7**

Figure 6-1: Map showing the mined areas in Waihi



7 GEOLOGICAL SETTING AND MINERALISATION

7.1 Regional Geology

The projects are located within the Coromandel Peninsula which hosts over 50 gold and silver deposits that make up the Hauraki Goldfield. The peninsula is built up of Miocene to Quaternary volcanic rocks (the CVZ) overlying a Mesozoic basement. It is bound to the west by the Hauraki Rift, a large graben filled with Quaternary and Tertiary sediments, and to the south by volcanics deposited by the presently active TVZ.

A schematic geological map of the Coromandel Peninsula is shown in Figure 7-1. Jurassic greywacke basement and intruded granitic stocks and dykes of the Mania Hill Group are exposed in the northern part of Coromandel, becoming progressively down faulted to the south beneath younger volcanics. Coromandel geology is dominated by the CVZ, Miocene to Pliocene aged volcanics formed during three main phases of volcanism (Christie et al. 2007). The first phase constitutes the widespread andesites and dacites of the Coromandel group (18–3Ma). The second phase encompasses the predominantly rhyolitic units of the Whitianga Group (9.1-6Ma) and the third phase is dominated by Strombolian volcanoes and dykes of the Mercury Bay Basalts (6.0-4.2 Ma) (Skinner 1986). Epithermal veins and hydrothermal alteration are observed within the Coromandel and Whitianga Groups.

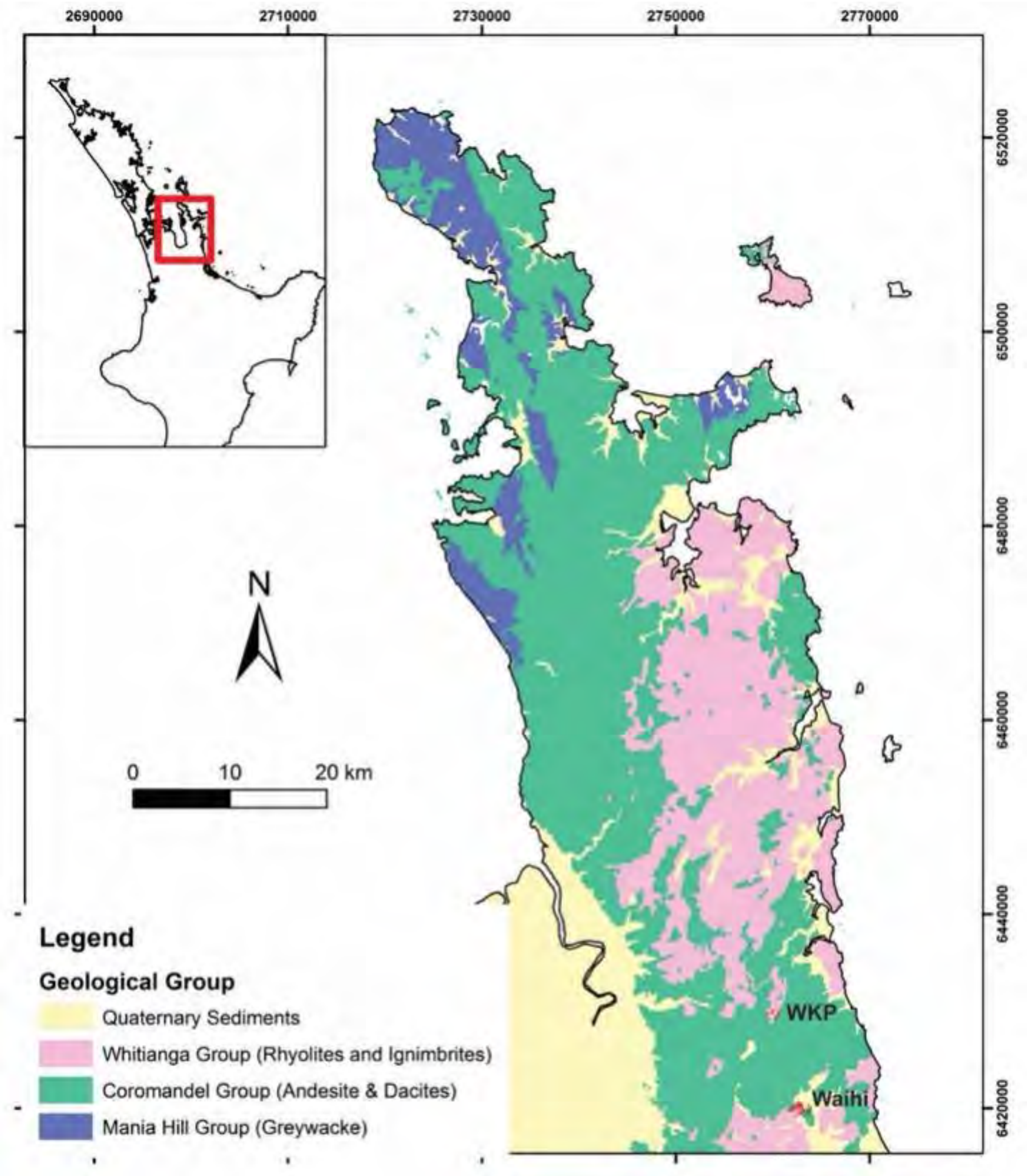
Coromandel group can be subdivided into the Kuaotunu Subgroup andesites, dacites and plutons, occurring in the northern region of the goldfield (ca. 18 to 11 Ma), the Waiwawa Subgroup andesites, dacites and rhyodacites in the south and east parts of the goldfield (ca. 10 to 5.6 Ma), and also the smaller Omahine (8.1 to 6.6 Ma) and Kaimai (5.6 to 3.8 Ma) andesite and dacite Subgroups in the southern parts of the goldfield (Edbrooke, 2001).

Mineralised sequences are overlain in places by post-mineral andesitic to dacitic flows of the Kaimai Subgroup, rhyolitic ignimbrites of the Ohinemuri Subgroup and more recent, Pleistocene age sediments and ash units. Although these post-mineral units do not blanket the mineralised units, they can be extensive and reach up to 1.5km in thickness.

The CVZ hosts low- to medium-sulphidation epithermal Au-Ag and Cu porphyry deposits along its length (Christie et al. 2007). Porphyry Cu-Mo-Au deposits are associated with diorite-granodiorite composition intrusions and volcanic rocks dated between 18.1Ma and 16.4 Ma. Epithermal deposits in the CVZ appear younger in age between 14Ma and 5Ma.

The Au-Ag deposits of the Waihi District and WKP are classical low-sulphidation adularia-sericite epithermal quartz vein systems associated with north to northeast trending faults. The main ore minerals are electrum and silver sulphides developed within quartz veins. Other minerals present within the veins include ubiquitous pyrite and more localised adularia, calcite, illite, smectite, sphalerite, galena, chalcopyrite and rhodochrosite. Base metal sulphide content is low but generally increases with depth.

Figure 7-1: Regional Geological Map of the Coromandel Peninsula



7.2 Waihi Geology

The Waihi vein system is hosted within andesitic flows and pyroclastic units of the late Miocene (7.36-6.76Ma) Waipupu Formation. The Waipupu Formation in Waihi can be subdivided into an upper quartz-phenocryst poor unit and a lower quartz-phenocryst rich unit which dip shallowly towards the SE. Some of the veining and gold mineralisation in Waihi appears to be better developed within the lower quartz-rich andesite flows, with the exception of the Favona, Moonlight and GOP deposits which are solely hosted within the upper andesite unit. Much of the mineralised andesites in Waihi are overlain by post-mineral rocks including dacite flows of the Uretara Formation (5.23Ma), Pleistocene ignimbrites and recent ash deposits. Where veining is exposed close to the surface, the quartz-adularia altered andesites form resistant paleo-topo 'highs' that project through the post-mineral cover sequences.

A generalised map of the surface geology of Waihi and the location of veining at depth is illustrated in Figure 7-2. All known Au and Ag mineralisation in Waihi is confined to veining or vein fragment within hydrothermal eruption breccia. The major mineralised veins are typically coincident with dip-slip, normal faults believed to have formed in an extensional setting related to early, back-arc rifting of the TVZ dated at ca 6.1Ma.

Some of the main mineralised veins within the Waihi area include the Martha Vein System (which includes the Martha, Empire, Welcome, Royal, Edward, Rex and Albert veins among many others) in the NW and the Correnso, Daybreak, Union, Trio, Amaranth, Favona, Moonlight and GOP veins progressively SE (Figure 7-2).

7.2.1 Martha Vein System

The Martha Vein System is the largest and most documented of the vein networks in Waihi. The veins are numerous and form a large network that extends for more than 1600m along strike and 600m below the surface. The vein network although complex in detail, simply comprises the dominant southeast-dipping Martha vein and several northwest-dipping hangingwall splays including the Empire, Welcome, Royal and Rex veins. The Martha vein is the largest vein structure reaching up to 30m in thickness in places but averages 6 to 15m wide. Increased vein widths are closely associated with the steepening of vein dips from an average of 65-70 degrees to approximately 85 degrees to the SE. Steeper portions of the vein tend to contain higher concentrations of Au and Ag. The vein itself comprises mainly intact brecciated quartz vein material evidence for vein emplacement during the late stages of dip-slip faulting. The quartz is characterised by multiphase brecciation and banding (colloform and crustiform) and quartz textures are highly variable from a fine, microcrystalline and chalcedonic character to more coarsely crystalline particularly at depth. Apart from the main Martha vein, the hanging wall splay veins are also significant mineralised structures reaching 18m in width (e.g. the Empire Vein). The hangingwall splays closest to Martha link up with the Martha vein at depth often forming a higher-grade lode at the intersection. Hangingwall splays further away from Martha either thin out at depth or are not drilled deep enough to make out their relationship with Martha at depth (e.g. the Rex and Ulster Veins). Additional, smaller-scale splay veins are present linking the larger vein structures and form a valuable contribution to the mineralisation particularly in the Martha Open Pit. These splays typically comprise smaller veins between 5 and 50cm in width infilling extensional structures with no fault displacement, dipping moderately towards the NW. Two steeply dipping, NNE-trending and well mineralised vein structures known as the Edward and Albert veins also form an important part of the overall Martha vein network.

The andesitic host rocks within proximity to veining have often undergone pervasive hydrothermal alteration, sometimes with complete replacement of the primary mineralogy. Characteristic alteration assemblages of the host rocks are dominated by argillic alteration (quartz+adularia+pyrite+illite) closest to veining and propylitic alteration (weak quartz+weak pyrite+ carbonate+ chlorite+ interlayered illite-smectite and chlorite-smectite clays) extending over tens of metres laterally from major veins. The degree of alteration within the Waihi District is variable and often dependent on the host rock lithology and the nearby veining. On rare occasions, some host rocks at or near the contact of large veins appears only weakly altered, for example the “hard bars” identified during the early historical mining of the Martha vein. Volcaniclastic units tend to have increased clay alteration compared to the flow units.

Gold occurs mostly as small inclusions of electrum (averaging 38% silver) occurring as both free grains in the quartz and as inclusions in sulphides such as pyrite, galena, sphalerite and less commonly chalcopyrite. Free gold is rarely observed. Acanthite associated with pyrite and galena is the main silver mineral.

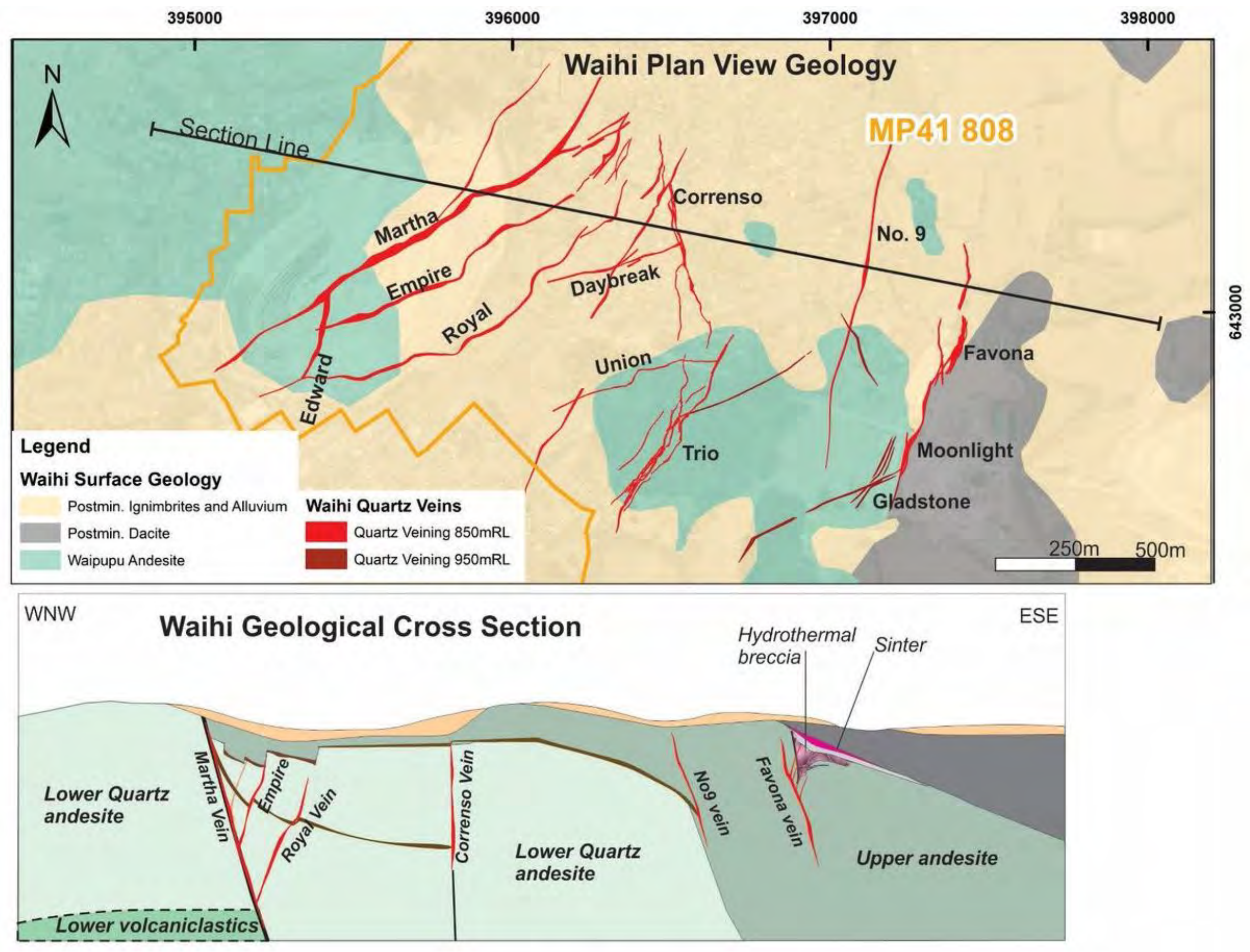
Martha ore has silver to gold ratios of > 10:1, The Favona and Trio ores had silver to gold ratios of ~ 4:1, and Correnso ore had a silver to gold ratio of less than 2:1.

The base metal sulphide content is low but is observed to increase in concentration with depth within all the Waihi veins. Sphalerite and galena are the most abundant base metal sulphides while chalcopyrite is less common and pyrrhotite is rare. Correnso ore has higher base metal content than other Waihi veins.

Oxidation extends down the vein margins to over 250m below surface however, the andesite host rocks can appear only weakly weathered at or near the surface.

Much of the Martha Vein System has been mined from underground historically between 1883 and 1952. However, significant mineralised veined material remains intact adjacent to the historical workings that was not recoverable historically.

Figure 7-2: Geological Map and section across the Waihi area



7.2.2 GOP

The GOP deposit is part of the greater Waihi epithermal vein system located approximately 2km to the east of the Martha Open Pit. It is situated along the southern strike extent of the Favona and Moonlight deposits. Veining at GOP occurs within the upper 250m below the surface, hosted within the upper andesite unit (devoid of quartz phenocrysts). The mineralisation is characterised by shallow-level, hydrothermal breccias and associated banded quartz veins interpreted to represent the top of the epithermal system. The uppermost mineralised quartz veins flare up into hydrothermal explosion breccias. The GOP veins are predominantly steeply dipping veins developed within the hanging wall of the Favona Fault that dips moderately towards the SE. GOP veining trends ENE to NNE between 010° and 070° and dips steeply towards the SE.

7.3 WKP

Low-sulphidation epithermal quartz veins at WKP are hosted in Whitianga Group rhyolites, typically rhyolite flow domes to sub-volcanic intrusions within polymict lapilli tuffs. Deep drilling to the west indicates the rhyolites are underlain by Coromandel group andesites. The mineralised sequences are partially overlain by strongly magnetic, fresh andesite flows, rhyolitic tuffs and recent ash deposits observed in drilling and regional mapping (Figure 7-3 and Figure 7-4).

Gold mineralisation occurs in association with quartz veining developed along two types of structurally controlled vein arrays. The principal veins, namely the EG-, T-Stream and Western Veins occupy laterally continuous, NE trending (025-47°), moderately dipping (60-65°) fault structures reaching up to 10m in width. More subsidiary, extensional veins (1-100cm wide) are developed between or adjacent to the principle fault hosted veins. These veins often form significant arrays that are moderate to steeply dipping with a more northerly to NNE strike and appear to lack lateral and vertical continuity compared to the principle veins.

The rhyolites have undergone pervasive hydrothermal alteration, often with complete replacement of primary mineralogy by quartz and adularia with minor illite and/or smectite clay alteration. Figure 7-3 illustrates the dominant veins at the WKP deposit in plan view.

The EG Vein is the largest and most continuous mineralised structure drilled at WKP to date. The vein strikes approximately NE (020°) for over ~1000m although the extent of veining to the north and south remains open due to limited drill data. Veining dips steeply to the west and is still considered to be open up-dip. To date the highest up-dip intersection on the EG Vein was WKP64 where abundant clay gouge was encountered in the place of veining which still carried significant Au values. The EG Vein has been well drilled to more than 400m below the surface (WKP41, WKP39, WKP37 and WKP35). Veining and grade are seen to decrease at depth (at approximately -180mRL) (Figure 7-4). Veining observed in drill core is characterised by multiphase white quartz/chalcedony with textures including colloform banding, brecciation, vein sediments and quartz replacing platey calcite.

Within the footwall of the EG Vein are a series of veins referred to as the East Graben footwall veins. These veins show unique characteristics to other WKP veins in that they appear more as sulphide-rich (pyrite-marcasite) vein breccias with slightly elevated As, Hg and Sb. The brecciated nature of these veins indicate they may be more fault controlled than extensional.

There are a series of sheeted hanging wall veins along the EG structure containing significant Au grade in places. These veins appear to have a more northerly strike with sub-vertical dips. These veins outcrop at surface and were the focus of minor historical workings (pre-1950s) and early diamond drilling in the 1980s.

The T-Stream Vein is a breccia zone within rhyolite flows containing mineralised quartz veins located approximately 500m to the west of the main EG Vein. This structure strikes approximately NE (020°) and dips moderately (65°) towards the west (Figure 7-3). The brecciated vein zone is exposed at the surface and appears oxidised and often broken at depth. Low-grade Au occurs over the entire width of the structure with narrow internal pockets of high Au grade veins. Drilling to date shows Au grade decreases below 0mRL.

The Western Vein zone is located approximately 1km to the west of the EG Vein and is the least understood of the WKP veins. Drill data contains minimal orientation data due to poor ground conditions however, veining is believed to be N to NNE-trending and steeply dipping towards the west. The vein zones contain numerous individual veins not all of which carry anomalous Au. The dominant vein textures are quartz replacing platey calcite and minor chalcedonic quartz.

7.4 Comments on Geological Setting and Mineralisation

The geological control on mineralisation is well understood and is sufficient to support the estimation of Mineral Resources and Mineral Reserves. The current experience and geological knowledge of the area is also considered sufficiently acceptable to reliably inform mine planning.

Figure 7-3: Geological Map of the WKP Prospect

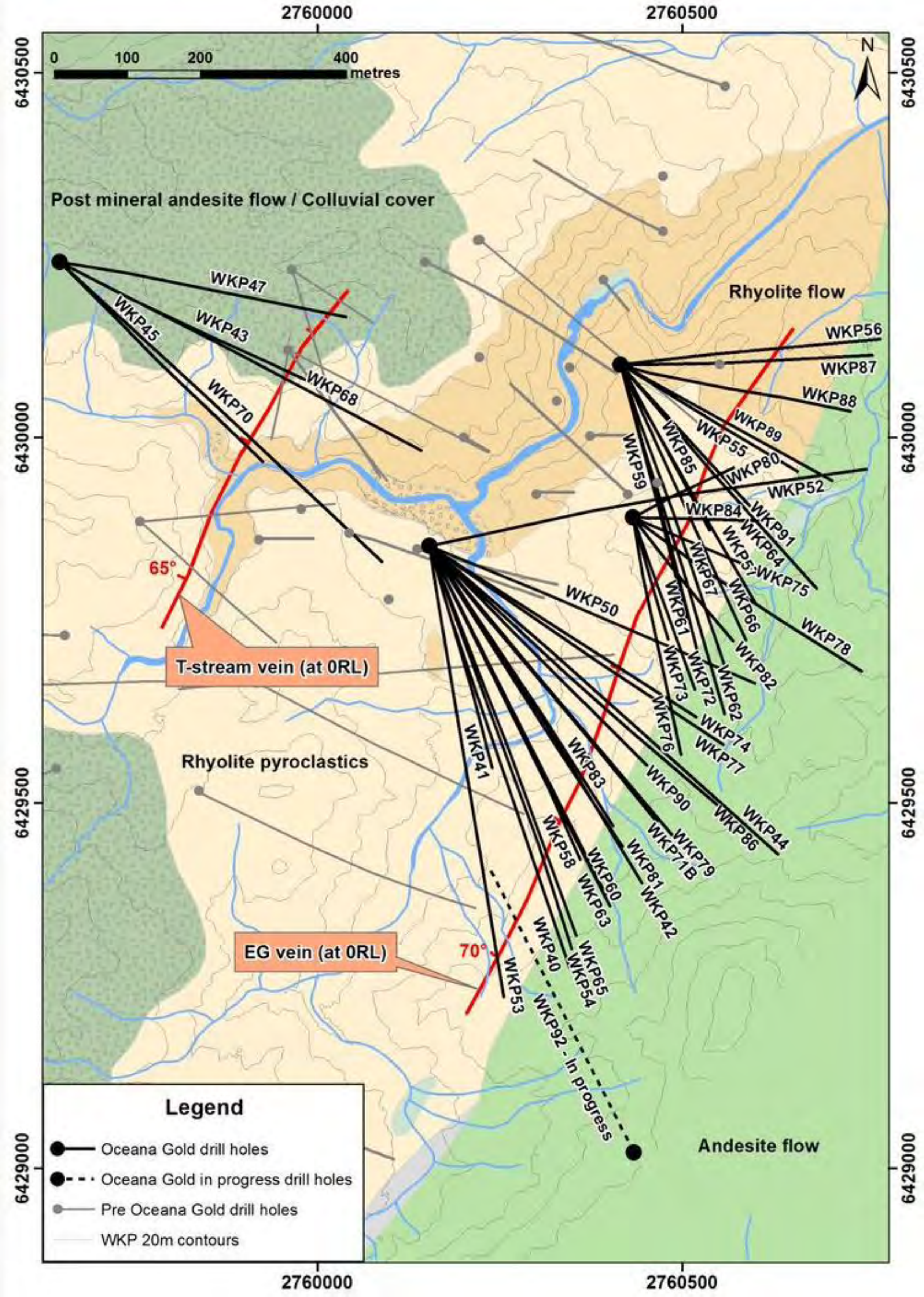
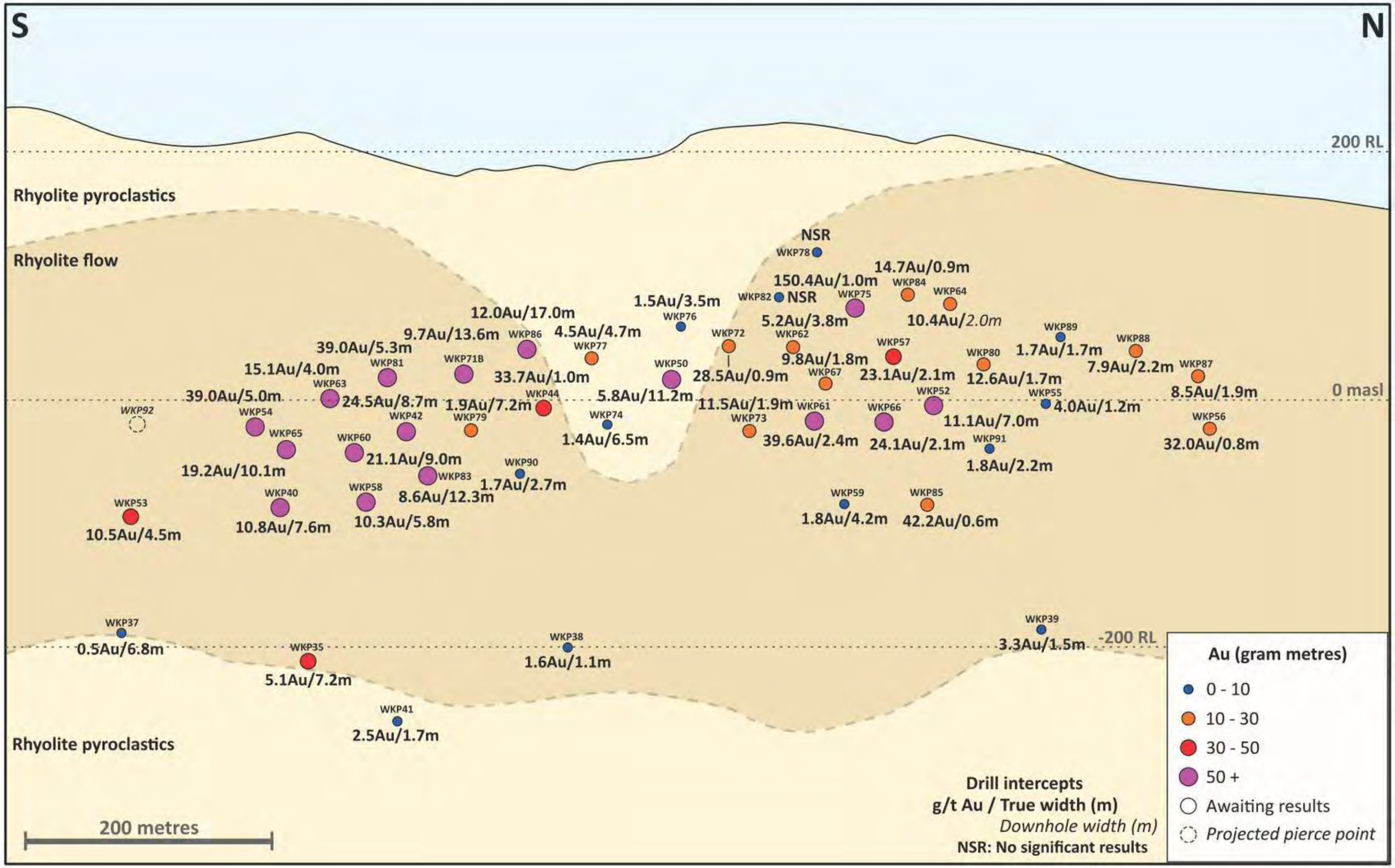


Figure 7-4: Simplified Long Section along the EG Vein at WKP (at Dec 2019).



8 DEPOSIT TYPES

All the gold deposits outlined by OceanaGold to date in this report are considered to be typical of epithermal vein gold-silver deposits.

8.1 Comments on Deposit Types

In the opinion of the QPs, features observed in Waihi and WKP deposits display the following features that are typical of epithermal gold deposits elsewhere in the world:

- Gold-silver mineralisation is predominantly confined to localised bands within multiphase quartz veins;
- Host lithologies for veins are volcanic units of andesitic and/or rhyolitic composition;
- Sphalerite, galena and chalcopyrite commonly occur with gold-silver mineralisation within the Martha Underground deposit. This base metal content increases at depth with galena reaching up to +3% Pb and sphalerite in some localised areas exceeding 2.5% Zn;
- Host rock volcanics have undergone pervasive hydrothermal alteration, often with complete replacement of primary mineralogy. Characteristic alteration minerals include quartz, adularia, albite, carbonate, pyrite, illite, chlorite, interlayered illite-smectite and chlorite-smectite clays extending over tens of metres laterally from major veins;
- The upper portion of veining at the GOP deposit contains intact hydrothermal eruption breccias. The northern strike continuation of the GOP veins at Favona also contain hydrothermal breccias and an intact siliceous sinter sheet; and
- Mineralisation is structurally controlled.

9 EXPLORATION

Various companies have undergone exploration programs across the Waihi and WKP Project areas since gold was first discovered in the late 1900s. Both the Waihi and WKP Project areas have undergone geophysical and geochemical surveys, geological mapping, diamond drilling, geological interpretation and modelling. Approximately 566,000 m of diamond core has been drilled on the MUG, MOP5 and GOP Projects since 1980. The WKP Project has had 42,120 m of diamond drilling in 104 holes since 1980. OceanaGold continues to drill in the area, with 25 km of diamond drilling planned for resource infill and reserve conversion for the MUG Project for the rest of 2020. A further 6 km of diamond drilling is planned for the WKP Project in 2020.

Most exploration drilling was diamond core drilling done by triple tube wireline methods.

No exploration results are being presented in this report, rather this report is focused on advanced projects that have well defined geological models and associated resources estimates completed.

9.1 Grids and Surveys

All historic underground mine data in Waihi was recorded in terms of Mt Eden Old Cadastral grid (MEO). This is a local, Waihi specific grid this is still utilised for all underground and exploration activity within 3km of the Waihi Mine beyond which New Zealand Map Grid or New Zealand Transverse Mercator (NZTM) is utilised. The MEO grid is offset from NZTM by 5215389.166 (shift mN) and 1456198.997 (shift mE).

The MOP5 operation has historically used a local mine grid, referred to as 'Martha Mine Grid', derived from Mt Eden Old Cadastral grid but oriented perpendicular to the main veins. The grid origin is based at No.7 Shaft (1700mE, 1600mN) and rotated 23.98° west of Mt Eden Old Cadastral North. All open pit channel and open pit grade control drilling data has been converted to Mt Eden Old Cadastral for the resource estimation of the Martha Underground resource.

Relative level (mRL) is calculated as sea level + 1000m.

New Zealand Map Grid (NZMG) is used at WKP, which is in the NZGD1949 projection. False northing 6,023,150m north; False easting 2,510,000m east.

WKP topographic control is from high resolution aerial photography and LiDAR providing 0.5m contour data.

WKP data is currently reported using NZMG, the process of migrating to the NZTM Grid for all future works has commenced. More detailed documentation on drilling is presented in Section 10 of this report.

9.2 Bulk Density

Bulk density determinations are discussed in Section 11.6

9.3 Comments on Exploration

In the opinion of the QP:

- The exploration programs completed to date support the interpretations of the epithermal style of deposit and are appropriate to that style of mineralisation; and
- The projects retain exploration potential and additional work is ongoing.

10 DRILLING

Approximately 566,000 m of diamond core has been drilled on the Waihi Project and 42,120 m on the WKP Project since 1980. Most exploration drilling was diamond core drilling done by triple tube wireline methods.

Additionally, 86,074 m has been drilled in 4,445 RC grade control holes during the Martha Open Pit Southern Stability Cut (SSC) and Eastern Layback (ELB) Projects between May 2007 and May 2015, using a 114mm hole diameter and rig-mounted cyclone sampler. Details of the various drilling programs for Waihi are summarised in Table 10-1 by year. Locations of drill hole collars drilled in Waihi are shown in Figure 10-1.

10.1 Drill Methods

Most surface DD holes were drilled by triple tube wireline methods with some holes pre-collared through post-mineral rocks by tricone or stratapac. Surface holes are collared using large-diameter PQ core, both as a means of improving core recovery and to provide greater opportunity to case off and reduce diameter when drilling through broken ground and historic stopes. Drill hole diameter is usually reduced to HQ at the base of the post-mineral stratigraphy. Underground drillholes are collared using HQ diameter core and reduced to NQ and BQ respectively, if bad ground is encountered. All drill core was routinely oriented below the base of the post-mineral stratigraphy, either by plasticine imprint or using the Ezimark or Reflex core orientation tool.

Figure 10-1: Drill Hole Collar Locations, Waihi

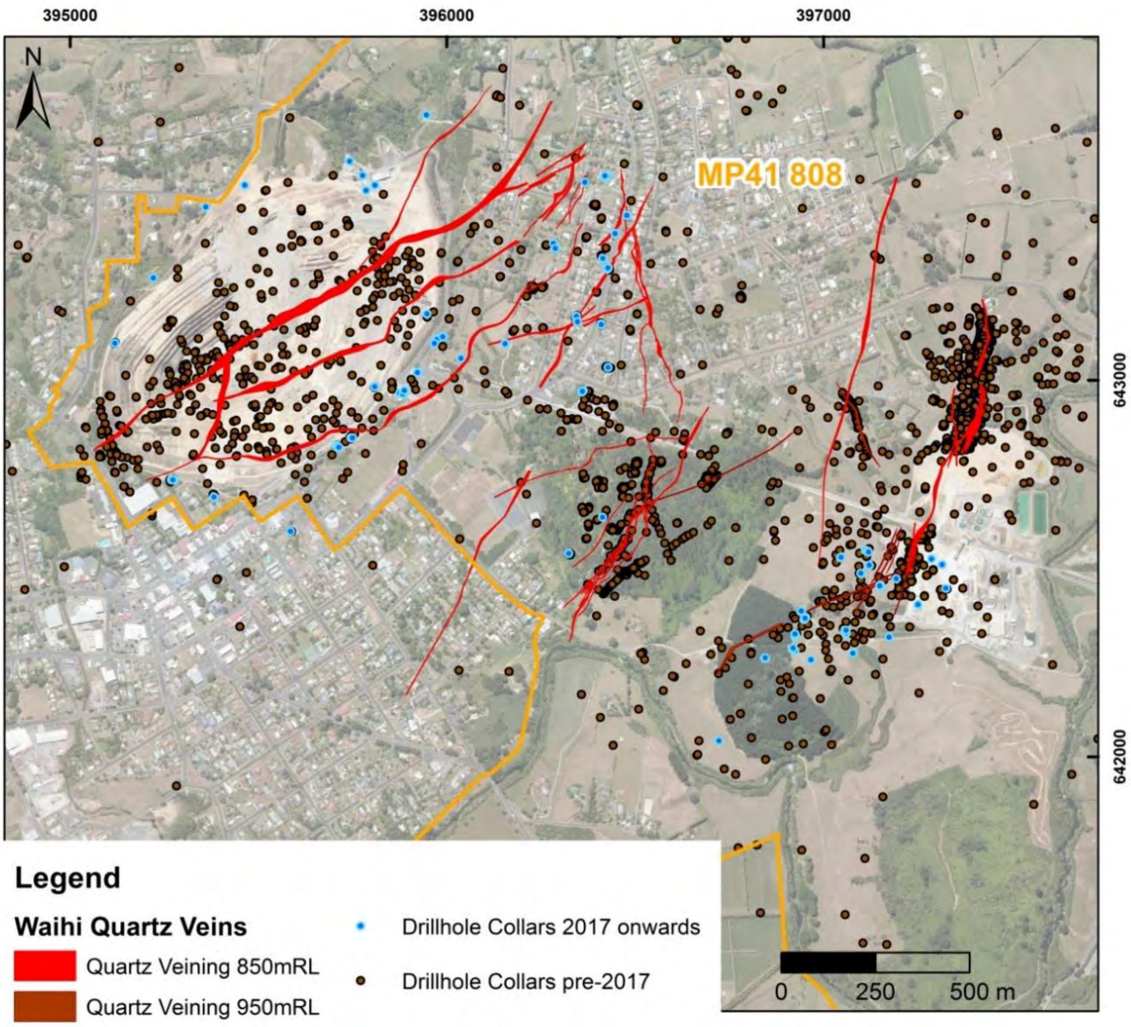


Table 10-1: Summary of Drilling by Year

Year	Waihi Near Mine				Grade Control		Other Districts	Drill hole series
	Surface exploration DD m's	Surface exploration RC m's	Underground DD m's	Total Drill m's	UG DD m's	Pit RC m's	Total Drill m's	
1980-1985	16,747			16,747				WHD, WE, WHD, WR, UW
1986	2631			2,631				WE, UW
1987	325			325				WE, WHD
1988	1095			1,095				FRC
1989	991			991				WE, WHD, WR
1990	2,273			2,273				UW
1991	3,567			3,567				WE, WHD, WR
1992	1,134			1,134				WE, WHD, WR
1993	975			975				WHD
1994	1,215			1,215				WHD
1995	90			90				WHD, WC
1996	3,768			3,768				WHD, WG, UW, WE
1997	3,052			3,052				WHD, UW, WG
1998	1,371			1,371				WHD, UW, WG
1999	3,064			3,064				UW, WHD
2000	1,442			1,442				UW, WHD
2001	12,084			12,084				UW, WHD
2002	18,893			18,893				UW, WHD
2003	12,427			12,427				UW, WHD
2004	20,434			20,434				UW
2005	23,389	330		23,719			4,118	UW, WHD, MRC
2006	15,464	1,149	*2,851*	19,464	1051		2,851	WHD, UW, MRC, FU, FD
2007	9,818	1,536	*6,129*	17,483	4353	16770	1,011	WHD, UW, MRC, MWRC, FU, FD
2008	7,572	1,972	6,892	16,436	5197	17192	2,250	WHD, UW, MRC, MWRC, MNDDH, FU, FD
2009	9,755	2,998	703	13,456	3963	13044	3,222	UW, FU, FD
2010	12,935		218	13,153	2828	7018	2,877	UW, FU, FD,
2011	15,516	4,709	3,464	23,689	13195	2479	3,243	UW, UG, MED, FU, FD, CGD
2012	8,186	1,170	4,947	14,303	15789	4186	5,016	UW, MED, CGD; TRIOUGDD
2013	0		5,290	5,290	9606	6750	1,400	TRIOUGDD and CORUGDD
2014	1,770		20,607	22,377	3200	14803		CORUGDD, DAYUGDD, GEMUGDD, UW
2015	2,681		20,035	22,716	14391	3831.8		CORUGDD, DAYUGDD, GEMUGDD, UW, WAIHIEXP
2016	14,227		21,693	35,920	6580			CORUGDD, DAYUGDD, GEMUGDD, UW, WAIHIEXP
2017	19,437		19,143	38,580	7994.7		3,750	CORUGDD, DAYUGDD, GEMUGDD, UW, WAIHIEXP, WAIHIRES, , WKF
2018	13,782		32,161	45,943	2659		12,002	CORUGDD, GEMUGDD, TRIOUGDD, UW, WAIHIEXP, WAIHIRES, WKF
2019	13,178		43,851	57,030	377.8		14,848	WAIHIEXP, UW, WKP, OHD, OND, WND
TOTALS	275,288	13,864	187,984	477,137	91,185	86,074	56,588	

10.2 Geological Logging

Since October 2015, when OceanaGold took ownership of Waihi Gold all drill core has been logged into excel spreadsheets using validated templates.

Log intervals are based on geological boundaries or assigned a nominal length of one or two metres. The geological log incorporates geotechnical parameters, lithology, weathering, alteration and veining. A dropdown menu for each field allows the geologist to enter data by selecting from the available codes. Once logging is completed, the log is validated and then uploaded into an AcQuire database. A complete digital photographic record is maintained for all drill core.

RC grade control drilling in the open pit was sampled over 1.5m intervals.

10.2.1 Lithology Codes

Lithology fields include three primary fields, composition, rock type and grain size. Secondary logging fields for lithological information (optional) include fields to record local or formal geological unit names, textural features, intensity of texture and composition of clasts.

With the increased drilling around historic workings, logging codes have been modified to sufficiently characterise material associated with the workings for example stope fill, open stope, collapsed stope and open holes such as drives.

10.2.2 Weathering Fields

Weathering is logged on a scale of one to five where five represents fresh rock and one represents intensely weathered material.

10.2.3 Alteration Fields

The primary fields for alteration use a 1-5 scale to record the intensity of hydrothermal alteration of the host rock. This includes fields for intensity of adularia, silicification, clay alteration, chlorite alteration, carbonate and hematite. A secondary field “Alteration Style” allows the style of alteration to be described, based on visual identification of the alteration mineralogy. The definitions for Alteration Style are based on mineral assemblages and associated temperature-pH charts from Corbett and Leach, 1998.

10.2.4 Structural Fields

Structural fields are used to record information about veins, secondary breccias (such as faults) and hydrothermal breccias. Fields used to record veining includes Vein Percentage, Vein Mineralogy, Vein Texture, Vein Style and Sulphide Content. Fields for secondary breccias includes Breccia Percentage, Breccia type, Matrix composition and Clast composition.

Structural data is recorded in a separate excel spreadsheet with inbuilt formulas to convert measurements taken from the core to estimate the dip and dip direction of measured structures. The calculations take into account a ‘top of core’ reference line and the drilling direction and angle of the drillhole.

The orientation log is validated during logging and uploaded into the AcQuire database once logging is complete.

10.2.5 Geotechnical Logging

Geologists record standard geotechnical parameters, including RQD, fractures per meter and hardness for all drill core. The geotechnical group then log selected mineralized and waste intervals in greater detail using geotechnical logging criteria.

10.3 Drill Core Recovery

Diamond drilling recovery is estimated by measuring the recovered core length against the drilled length. Recovery data has been captured for all sample intervals for all DD holes and there is no observed relationship between core recovery and grade. Core from the Martha Project is monitored for recovery daily to rationalise actual core loss against the intersection of historic mining voids with re-drilling actioned if necessary.

Core recovery within veined material (>40% vein in sample interval) varies between projects and is summarised as follows:

- 92.5% within MUG.
- 92.5% within MOP5.
- 89-90% for GOP.
- 96.2% for WKP.

RC drill sample recoveries were assessed using actual weights versus expected weights by the sampling technician and dispatching geologist. Samples were discarded where the recovered sample weight did not correlate well with the expected weights of the drilled interval.

Core recovery around historic workings have been increasingly difficult, so different methodologies have been trialled and adopted with relevance to the ground conditions that are encountered. Areas of core loss are broken out where possible so not to smear grade over disproportionate areas.

10.4 Collar Surveys

All historic (pre-1952) underground mine data in Waihi was recorded in terms of Mt Eden Old Cadastral grid (MEO). This grid has continued to be utilised for all underground and exploration activity within 3km of the Waihi Mine beyond which NZMG or NZTM has been utilised. The MEO grid is offset from NZTM Grid) by 5215389.166 (shift mN) and 1456198.997 (shift mE).

The MOP5 operation has historically used a local mine grid, referred to as 'Martha Mine Grid', derived from Mt Eden Old Cadastral grid but oriented perpendicular to the main veins. The grid origin is based at No.7 Shaft (1700mE, 1600mN) and rotated 23.98° west of Mt Eden Old Cadastral North. All open pit channel and drilling data has been converted to Mt Eden Old Cadastral for the resource estimation of the MUG resource. Relative level (mRL) is calculated as sea level + 1000m.

Drill collars at WKP are located using a total station in NZTM Grid.

All underground and surface drill collars used in resource and reserve estimates are surveyed using a total station by a registered professional land surveyor. At the start of the hole the drillers line up the mast in the correct azimuth using an Azimuth Aligner.

10.5 Downhole Surveys

At the start of the hole the drillers line up the mast in the correct azimuth using a Gyrocompass Azimuth Aligner. Downhole surveys are performed on all drillholes at 20m intervals up to 60m and then 30m intervals to the end of hole using a digital single shot camera. Magnetic readings from downhole surveys are loaded to the drilling database, which calculates true north and local grid north (Mt Eden Old Cadastral for Waihi and NZTM for WKP) based on the current magnetic declination.

Azimuth readings (relative to magnetic north) from the downhole camera are loaded into the database and converted to MEO azimuth based on the current magnetic declination. Magnetic declination has been validated for all holes used in resource estimations.

Where surveys are unable to be taken or inaccurate, they are replaced with an estimate. Where drillholes intercept old workings, surveys are estimated on either side of the workings to reduce the inaccuracy of the automatic curvature applied by Vulcan software irrespective of where the actual deviation occurred. All downhole surveys are validated by a geologist in the AcQuire database.

Downhole gyroscopic survey campaigns are used to validate the downhole survey data for exploration drillholes, most recently consisting of a suite of 16 holes surveyed across WKP, MUG & MOP5 Projects Q1 2019. The recorded hole dip is very similar for the two methods, and azimuth readings typically vary within a ~2-degree range.

10.6 Geotechnical Drilling

Geotechnical drilling has been carried out for GOP, MUG and WKP for the purposes of collecting samples for triaxial, uniaxial strength testing and other laboratory test work. All resource drilling has geotechnical components logged in detail which are analysed by a site-based geotechnical engineer.

Two geotechnical cover holes were drilled from the 920 level to primarily investigate ground conditions while mining the current drill drives for the Martha Project. Geotechnical data from these holes was also used to test the ground conditions associated with historic workings. Additional geotechnical cover holes included one investigating the conditions expected for the safe breakthrough into the MOP5 from the 920 level, and another covering a raise bore shaft between the 920 and 800 levels within the MUG development.

10.7 Current Drill Spacings

All resources under consideration in the integrated project have been adequately drilled to achieve an Indicated or Inferred Resource classification as summarised in Table 10-2. The MUG Project uses an average spacing to three drill holes of 60 m for Inferred and 40 m for Indicated Resource. The extensive mining history of Martha (>135 years+) has developed significant experience in assessing the continuity of mineralisation and mining the Martha Vein System and the adjacent deposits. The vein style mineralisation has a strong visual control, is well understood and has demonstrated continuity over significant ranges.

The WKP Project area has had 99 DD holes (including seven re-drills) drilled by June 2020. The bulk of recent drilling has been targeted towards the EG Vein zone. The EG Vein zone has been intersected in drilling over a strike length of ~1km, this structure is larger than those typically encountered in the Waihi Project area and on this basis the average drill hole spacing required for classification as an Inferred Resource has been increased to 70 metres average distance to the three closest drill holes.

Table 10-2: Current drill spacing per project

Project	Average distance to 3 closest holes	Average distance to 3 closest holes
	Indicated Resource	Inferred Resource
MOP5	<40 metres	40-80 metres
GOP	<40 metres	40-60 metres
MUG	<40 metres	40-60 metres
WKP	<45 metres	45-70 metres

10.8 Current Drill Orientation

Drill holes are designed to intersect known mineralised features in a nominally perpendicular orientation as much as practicable given the length of drillholes (often 250 m+) and availability of drilling platforms.

10.9 Comments on Drilling

In the opinion of the QPs, the quantity and quality of the lithological, geotechnical, collar and downhole survey data collected in the exploration and infill drill programs are sufficient to support Mineral Resource estimation as follows:

- Geological logging of drill core (surface and underground) and RC chips meets industry standards for gold exploration within an epithermal vein gold setting;
- Collar and downhole surveys have been performed using industry-standard;
- Recovery data from core drilling is acceptable;
- Geotechnical logging of drill core meets industry standards for underground and pit operations;
- Drill orientations are generally appropriate for the mineralisation style; and
- No material factors were identified with the data collection from the drill programs that could affect Mineral Resource estimation (refer to Section 14).

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Sampling Methods and Preparation

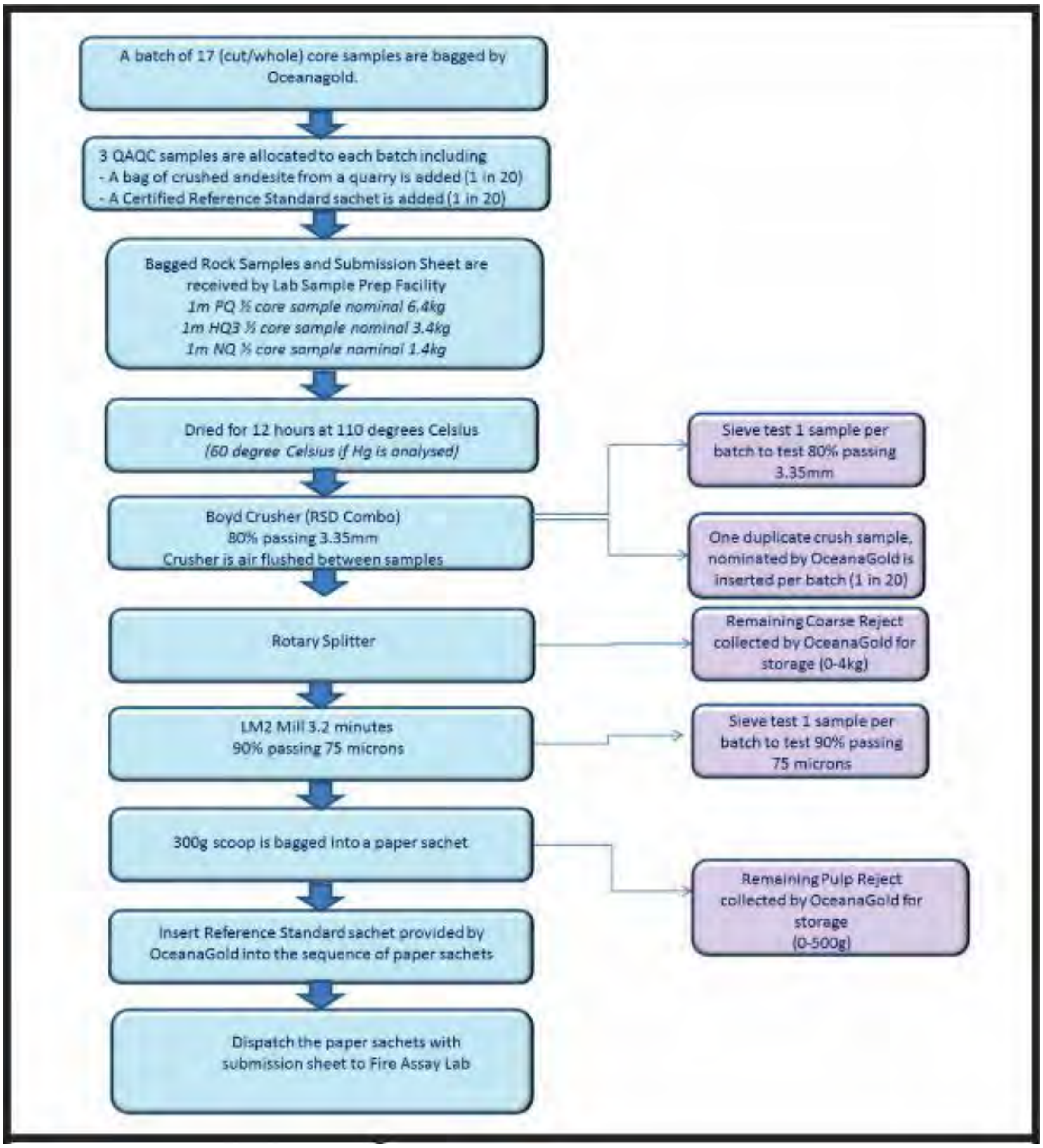
11.1.1 Drill Core and RC Drilling

Once the core is logged, photographed and sample intervals allocated, it is cut in half length ways. If a vein is present, the cut line is preferentially aligned to intercept the downhole apex of the structure. Within each sample interval, one half of the core is bagged for sampling and the other is kept in storage. Whole core is sampled under the following conditions:

- Underground grade control drilling;
- Exploration drilling on occasion where there was significant core loss coupled with visible electrum; and
- Exploration drilling all BQ core is whole core sampled due to reduced sample volumes. BQ diameter core is only rarely drilled.

Labelled calico bags containing the cut core samples are routinely transported to the local Waihi SGS Laboratory for crushing and sample preparation. Refer to the sample preparation flow sheet illustrated in Figure 11-1.

Figure 11-1: Sample Preparation Flow Sheet SGS, Waihi Quality Assurance and Quality Control



Sample preparation has been carried out at the SGS Waihi laboratory since 2006. Prior to then the sample preparation facility was located at the Martha Mine site and operated by trained site employees. Some of the early WKP core (holes WKP40-45) was sent to the Westport SGS laboratory for crushing and sample preparation.

RC drill chips were sampled as part of the grade control process during the MOP5 operation but also on a minor scale for exploration purposes (approximately 4309m used in MUG estimate). At the RC rig site, samples were collected in a bag attached to the cyclone at 1.5m intervals from which a 3-5kg sample was split using a cone splitter. Bags were then transported to the secure sample preparation facility. Sample preparation of RC chips is the same as drill core.

11.2 Quality Assurance and Quality Control

11.2.1 Exploration Drilling Samples

Analyses of drill sample pulps from exploration core was undertaken predominantly at the SGS Laboratory in Waihi but also at the ALS laboratory in Brisbane and Townsville. The quality of exploration assay results has been monitored by:

- Sieving of the jaw crush and pulp products at the laboratory;
- Monitoring of assay precision through routine generation of duplicate samples (1 every batch of 17 samples) from a second split of the jaw crush and calculation of the fundamental error; and
- Monitoring of accuracy of the results through insertion of CRM and blanks into each batch of 17 samples.

Blank, duplicate and CRM results are reviewed prior to uploading assay results in the AcQuire database and again on a weekly basis. The Waihi protocol requires CRMs to be reported to within two standard deviations of the certified value. The criterion for preparation duplicates is that they have a relative difference (R-R1/mean RR1) of no greater than 10%. Blanks should not exceed more than four times the lower detection method of the assay method. Failure in any of these thresholds triggers an investigation and re-assay.

11.2.2 Underground Face Samples

Routine grade control underground face channel sampling protocols ensure a CRM standard, a blank, a crush and field duplicate were submitted within the sample sequence of every face. A blank sample was entered into the sample sequence preferably after what appears to be the highest-grade sample in the face. A field and crush duplicate of the sample preceding the blank, was entered at the end of the sample sequence, followed by the CRM standard.

11.2.3 RC Grade Control Data

Assay quality control procedures for grade control RC data are set out in the site MOP5 grade control procedures updated in 2015. These procedures were designed to detect any poor sampling and sample preparation practices and ensure that results are within acceptable ranges of accuracy and precision. The QAQC protocols implemented for RC grade control sampling in the Martha Pit are summarised in Table 11-1.

Table 11-1: Grade Control QAQC samples for RC sampling

Check	Description	Frequency
Blanks	Coarse Post-mineral Andesite (Tirohia Quarry); Submitted Blind to the lab	1 per Drillhole
Standards	Currently using Rocklabs standards - submitted as pulp to lab	1 per Drillhole
Field Duplicates	Additional RC sample taken from reject material from drill rig split	1 every fifth Drillhole
Crush Duplicates	Split of crush residue repeat assayed by 50 g Aqua Regia Assay	1 every 50 samples
Fire Assay	Repeat Assay of Pulp by 30 g Fire Assay	30 per Month

11.3 Laboratory Analyses

The standard suite of elements analysed at SGS in Waihi for all exploration drill and RC samples are gold and silver, although a significant proportion of core is also analysed for copper, arsenic, lead, zinc and antimony. Gold is assayed using a 30g charge for fire assay with AAS finish. Between May 2007 and September 2014 pulps were assayed by SGS for gold and silver by 30g Aqua Regia digest. From September 2014 fire assay analyses were conducted on gold only. Over range gold results of >100g/t are re-assayed using an increase in dilution for the acid digest prior to instrument finish. Silver is analysed using a 0.3g charge and AAS or ICP-MS instrument finish. For all other elements, the samples undergo a 0.3g Aqua Regia digest followed by an ICP-MS instrument finish.

Generally, elements including mercury, arsenic, selenium and antimony increase at shallow levels within epithermal deposits. The presence of sinter and high level quartz vein textures in the GOP area indicate that the resource is at the top of an epithermal system. As a result, multielement data with an extended suite of elements (Au, Bi, Hg, Sb, Se, Sn, Te, Th, Ti, U, W, Ag, Al, As, B, Ba, Be, Ca, Cd, Ce, Co, Cr, Cu, Fe, Ga, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sc, Sc, Sr, Ti, V, Zn) has been undertaken at ALS Laboratories in Brisbane. Sample preparation was conducted at SGS Waihi following standardised procedures with a variation to sample drying temperature. A reduced temperature of 60 °C has been used to limit mercury volatilisation.

A selection of WKP and Waihi holes have undergone additional 42 element ICP-MS geochemical analyses at the ALS laboratory in Brisbane.

Comparison of the Ultratrace data with routine multielement data produced by SGS Laboratory in Waihi showed good correlation between the parent (SGS) and umpire (Ultratrace) data sets for silver, lead, zinc and arsenic, which gives confidence in the accuracy of SGS data for these elements. For samples with over range silver and lead, these elements are found to be extracted more efficiently by using a more dilute Aqua Regia digest (1-gram sample weight rather than the standard 10 grams per 50 ml). Antimony is not efficiently extracted by the current Aqua Digest method at SGS and consideration should be given to using the Peroxide Fusion extraction if more accurate antimony results are required.

11.4 Database

All QAQC data is managed in an AcQuire database. Blanks and CRM standards are reviewed on a weekly basis using AcQuire QAQC objects. Any patterns or concerns regarding sample preparation or assay quality are discussed directly with the laboratory.

11.5 Sample Security

All drill core is logged at a facility owned by OceanaGold and access onto site is strictly controlled. Core boxes consist of plastic which provides good protection to the core provided it is stored under cover. All core is stored in secure designated core sheds in Waihi. OceanaGold employees transport sample bags containing core samples to the Waihi SGS Laboratory on a daily basis. This laboratory is a secure facility.

11.6 Density Determinations

An updated assessment of density determinations was completed in May 2018. Weight measurements are routinely collected for representative core samples in air and in water during the logging process. The AcQuire database is set-up to automatically calculate the specific gravity (SG) from the measured weights using the following formula:

$$\text{Specific Gravity (SG)} = \frac{\text{Weight in Air}}{(\text{Weight in Air} - \text{Weight in Water})}$$

11.6.1 MUG

Specific gravities determined for rock units used in MUG are summarised in Table 11-2.

Table 11-2: Specific Gravities used in the MUG Estimation

Domain	Sample Count	Mean SG	Standard Deviation
Quartz Andesite	1,361	2.52	0.15
Vein	634	2.53	0.09
Base Metal content logged (some overlap in Vein above)	426	2.56	0.08

Domain	Sample Count	Mean SG	Standard Deviation
Global Average	2153	2.5	0.16

The SG of the host rocks and vein structures in MUG are slightly variable. The andesitic host rocks average 2.52 grams per cubic/cm with the maximum recorded at 2.8 grams per cubic/cm. Weathering and hydrothermal clay alteration generally decreases the SG while pyrite alteration increases the SG. The SG of 'vein' material in the MUG model is mostly influenced by weathering proximal to historical workings rather than surface weathering. Minerals present in large percentages within veins are the main factors contributing to variations in SG of vein material, particularly base metals, calcite and clay content.

'Stope fill' is assigned a SG of 1.8 within the resource estimate. Collapse zones associated with the 'Milking Cow' subsidence zone and the MOP5 wall failure have been assigned a SG of 1.9. Fill is captured in the model via the 'mined' variable summarised in Table 11-3.

Table 11-3: Mined Variable Values used around Historical Workings

Mean Variable Value	Material Type	Modifying Factor
0	In situ	As estimated
1	Backfilled Stopes	Density and grade modified
2	Subsidence	Density and grade modified
5	Open Stope	Density set to zero, grade removed
6	Open Development	Density set to zero, grade removed

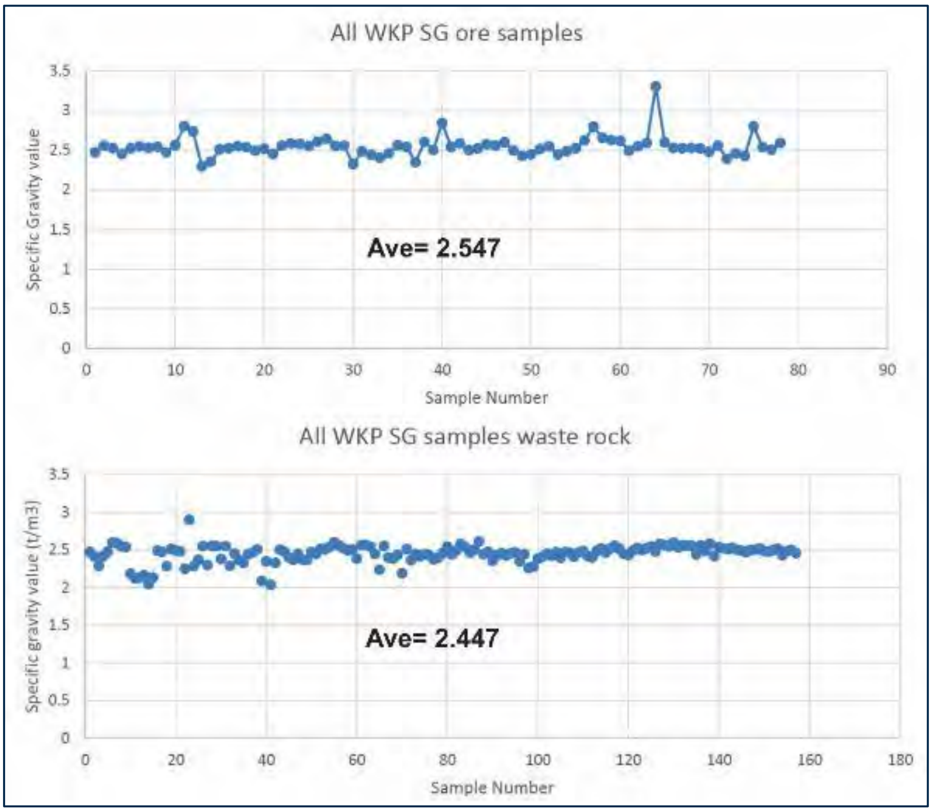
11.6.2 WKP

SG data is routinely collected during the logging of the WKP drill core. SG measurements taken from diamond core drilled at WKP is summarised in Table 11-4 and Figure 11-2. In general, the rhyolitic host rock is the least dense with an average SG of 2.45 (waste rock) compared to the quartz vein material with an average SG of 2.54.

Table 11-4: Specific Gravities used in the WKP Estimation

Domain	Sample Count	Mean SG
Waste Rock	156	2.45
Vein	79	2.54
Global Average	235	2.5

Figure 11-2: Calculated SG values for mineralisation and waste rock samples at WKP



11.6.3 GOP

The GOP resource estimate assigns a SG to material by geologic unit and oxidation level. The SG categories assigned to the model are shown in Table 11-5.

Table 11-5: Specific Gravities used in the GOP estimation

Zone	Area	Oxide Density	Primary Density
1	Black Hill Dacite	2.2	2.2
2	Rhyolite Tuff	2.1	2.3
3	Andesite	2.0	2.2
4	Volcaniclastics	2.0	2.0
5	Hydrothermal Breccias	2.2	2.2
9	Quartz Veins	2.3	2.5
Mined 1	Mined Development	0	0
Mined 2	Avoca Stopes	1.8	1.8

11.6.4 MOP5

The MOP5 model is the only model that currently has variable densities assigned to lithological units where surface hardness and weathering influence the model. Table 11-6 lists the density values assigned to the current estimation.

Table 11-6: Specific Gravities used in the current models

Project Martha	Model Density
Dig	1.60
Rip	2.00
Blast	2.30
Very Hard	2.47
Stope Fill	1.80

11.7 Comments on Sample Preparation, Analyses and Security

In the opinion of the QPs, sample collection, preparation, analysis and security for all OceanaGold drill programs are in line with industry-standard methods for gold deposits and provide data that are sufficiently bias and error free to support Mineral Resource estimation.

12 DATA VERIFICATION

Drill hole data is entered into an AcQuire database interface which includes protocols for validation. All drill collars, traces and surveys are checked for accuracy in 3D using Vulcan while holes are being drilled. Once the hole has completed drilling the collar position is picked up by a qualified surveyor and updated in AcQuire.

All geological logging is checked and validated by a second geologist on the core bench prior to core cutting. Logging data is entered into AcQuire by a geologist and then checked for completeness and errors once it is loaded into AcQuire. Laboratory results are uploaded into an AcQuire database using the files emailed directly from the laboratory.

Assay results are only successfully uploaded to AcQuire if they pass the QAQC verification. If any of the QAQC fail the verification, then further investigation is required by the geologist before the results can be uploaded to the database. Each drillhole has a checklist that needs to be completed before the hole can be classified as ‘closed out’ in the database.

Geology personnel are well trained and regularly monitored for consistency. Below level detection limit assay results are stored in the database as (negative) half the detection limit. No other modification of the assay results is undertaken. Monthly QAQC reporting and review is undertaken on all laboratory assay results. CRMs performance is regularly scrutinised, and the database QAQC function thresholds are reviewed bi-annually. CRMs are currently assigned to batches on a rotational roster in a “pigeon pair” system.

A limited number of twinned holes were completed during the initial investigations for Correnso. These indicated that there is some short-range variability in gold mineralisation. No twinned holes have been drilled for the other projects. Geologists can recognise strong visual indicators for high-grade mineralisation observed both in drill core and in underground development.

All intercepts are reviewed during the construction of the geological wireframes prior to grade estimation, this review involves visual comparison of core photography, assay and logging data and spatial relationships to adjacent data. Significant intercepts are reported internally on a weekly basis for peer review purposes.

Check assay programs have been undertaken for projects previously as a part of the project advancing past milestones such as feasibility level studies.

12.1 Internal Reviews

A number of internal reviews have taken place to verify data collected for Mineral Resource purposes. A list of some of these reviews are provided below:

12.1.1 Geology & Wireframing

Rhys, DA. 2009 Observations and exploration recommendations at Newmont exploration properties Hauraki Goldfield. Unpublished Memo to Newmont Waihi Gold.

Rhys, DA. 2010 WKP prospect: review of exploration results with recommendations. Unpublished Memo to Newmont Waihi Gold.

Rhys, DA. 2011 Observations of selected drill core from the WKP prospect (with WKP-30 information added). Unpublished Memo to Newmont Waihi Gold.

Rhys, DA. 2011. Review of the Structural Setting of the Correnso Vein System, Waihi, New Zealand. Unpublished Report to Newmont Waihi Gold.

Rhys, DA. 2017. Waihi District geology: continuing contributions to understanding structural setting and zonation as applied to exploration and mining. Unpublished Memo to OceanaGold.

Rhys, DA. 2020. Review of the structural controls of the WKP prospect. Unpublished Memo to OceanaGold.

Rhys, DA. 2020. Review of the core logging template for the Martha Underground Project. Unpublished correspondence to OceanaGold.

Richards, SD. 2019. Review of the WKP vein model. Unpublished internal validation.

12.1.2 Density

White, T. 2012 Correnso Dry Bulk Density Study. Unpublished Internal Report, Newmont Waihi Gold.

Mcarthur, F. 2019 WKP SG Data Memo. Unpublished Internal Report. OceanaGold.

Vigour-Brown, W. 2019 Martha Underground SG Memo, Unpublished Internal Report. OceanaGold.

12.1.3 Assay QAQC and Multielement Geochemistry

Inglis R. 2013. Heterogeneity Study. Unpublished Internal Report, Newmont Waihi Gold.

Barker, S., Hood, S., Hughes, R., Richards, S. 2019. The Lithogeochemical signatures of hydrothermal alteration in the Waihi epithermal District, New Zealand. New Zealand Journal of Geology and Geophysics, Vol 62, Issue 4.

Biggalow, J. 2015. Review of multielement geochemistry of Waihi drill data. Unpublished Internal Review. Newmont.

12.1.4 Static and Kinetic Testwork

Kirk, A. 2012. Geochemistry of Ore, Tailings and Waste Rock Assessment by URS New Zealand for the Correnso Underground Mine (Newmont Waihi Gold).

12.1.5 Mineralogy

Mauk J. 2009. Petrographic Examination of Samples from the Reptile North and Number Nine Veins, Waihi. Unpublished Report to Newmont Waihi Gold.

Ross, KV. and Rhys, DA. 2011. Petrographic Study of Representative Samples from the Correnso Vein System, Waihi District, New Zealand. Unpublished Report to Newmont Waihi Gold.

Menzies A. 2013 QEMSCAN Analysis of Samples from the Waihi District, New Zealand: Correnso. Unpublished report. Universidad Catolica del Norte, Antofagasta, Chile.

Coote, A. 2011 Petrological Studies of Diamond Core from WKP029 and WKP030, of the WKP South Project, Coromandel, New Zealand. Unpublished Report to Newmont Waihi Gold

Coote, A. 2012 Petrological Studies of Diamond Core from WKP024 and WKP031, of the WKP Epithermal Deposit, Coromandel, New Zealand. Unpublished Report to Newmont Waihi Gold.

Simpson, M. 2012 SWIR report for drill holes WKP-24, WKP-27 and WKP-30, Wharekirauponga, Southern Hauraki Goldfield. Unpublished Report to Newmont Waihi Gold.

12.1.6 Hydrology

GWS Limited 2012. Proposed Underground Mining Extensions – Waihi. Assessment of Groundwater Inflows and Throughflows. Prepared for Newmont Waihi Gold.

12.2 Comments on Data Verification

The QP has reviewed the appropriate reports and is of the opinion that the data verification programs undertaken on the data collected from the project adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in Mineral Resource estimation.

Database audits confirm the data are acceptable for use in estimation with no significant database errors identified. No bias corrections were considered warranted on drill and analytical data.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

A process plant expansion project is underway at Waihi to support processing mill feed from four sources, MUG, MOP5, GOP and WKP.

The testwork programs completed in 2018, 2019 and planned programs for 2020 are listed in Table 13-1,

Table 13-2 and Table 13-3.

Table 13-1: Testwork Program 2018

Project	Testwork Program
GOP	• metallurgical composites • variability • Multiple Liberation Analysis (MLA) • Comminution and water treatment plant (WTP) testing
MUG	• Metallurgical composites
FUFG	• Process Engineering Prefeasibility Study

Table 13-2: Testwork Program 2019

Project	Testwork Program
MUG	• Metallurgical variability • Comminution and WTP testing
FUFG	• Variability • Locked cycle • Diagnostic leach testwork • Signature plot testwork
WKP	• Metallurgical variability • Comminution and WTP testing

Table 13-3: Planned Testwork Program 2020

Project	Testwork Program
MUG	• Metallurgical variability • Comminution and WTP testing • Feasibility Study
FUFG	• Variability testwork for Martha and WKP
WKP	• Metallurgical variability • Comminution and WTP testing • Prefeasibility Study

13.1 Introduction

The Waihi mill has treated ore sourced from the Martha open pit as well as several underground ore bodies over the last 30 years. Considerable operating experience and data has been accumulated on the vein structures running through the Martha open pit that has contributed the majority of the mill feed over this time.

With the additional targets that have been discovered the approach has been to develop a series of Bingo charts in conjunction with the geology team to identify the main gold bearing domains and to indicate the minimum number of composites to be targeted for metallurgical testing to generate recovery and throughput estimations.

Competency testing on selected composites comprises measuring Bond Rod and Ball Mill work indices, abrasion indices and SMC ® testing on core samples for competency estimates.

13.2 MUG

Prior to 2018, metallurgical test work was completed on 30 composite samples of intercepts from the various vein structures in the MUG resource. Twenty-three samples were submitted to the Newmont Inverness testing facility. Six samples representing the Edward vein were submitted to Ammtec Laboratory in Perth. Samples were mostly submitted both as quarter core and as jaw crush reject material (95% <7 mm), if both were available.

In 2019 a further 18 composites were tested from intercepts were submitted to AMML Laboratories in Australia for testing direct leach performance.

Separately, flotation testing was done on 27 samples (Phase 1 – 9 samples, Phase 2 - 18 samples) at a grind size of 75 microns. Results from this testwork indicated that there is little to no recovery benefit at 1% sulphur grade. At an overall grade of 1.11% sulphur recovery benefits is less than 1%. Sensitivity analysis on the incremental financial model shows a 3.4% improvement benefit is needed to generate an economic return. At this recovery benefit the NPV is neutral. To generate an overall benefit of 3.4% recovery the sulphur model indicates that the overall grade should be 1.7% total sulphur. For MUG there is insufficient material from underground to make flotation & ultra-fine grind (FUFG) economically beneficial as the overall average sulphur grade is only 1.1%. Further testwork is planned in 2020 to confirm preliminary results and expand sulphur model for the mineralised domains from MUG.

A summary of the vein location and testing campaign is shown in Table 13-4.

Table 13-4: Summary of MUG Composite Samples Tested

Vein Structure	Historical (2011)	Recent (2019)	Total
Edward	18	3	21
Empire East	2	4	6
Martha	9	7	16
Grace	1	-	1
Royal	-	4	4
Total	30	18	48

A review of the composite sample locations relative to the defined resource and preliminary stope design identified 31 of the total 48 composites lay in or within 20m of expected mined areas. Bottle roll CIL tests results for the historical samples and 2019 samples are summarised in Table 13-5 and Table 13-6.

A total of 16 historical samples and 15 samples selected in 2019 have been located based on the preliminary stopes (within a 20 m halo) to be mined over the LOM for the MUG deposit. Bottle roll tests were completed at three different grinds (38 µm, 53µm and 75µm).

Table 13-5: Gold Extraction Results for Historical Composites

Domain	Hole ID	Calculated gold Grade, Au g/t	As, ppm	Au Extraction (%)		
				38 µm	53 µm	75 µm
Edward	UW388-1000	3.75	42	96.50	95.57	94.98
Edward	UW388-1000 (Dup)	4.14	50	96.52	96.20	95.17
Edward	UW388-1001	4.64	34	97.57	96.87	96.06
Edward	UW388-1001 (Dup)	4.78	33	97.34	97.02	95.83
Edward	UW395-1000	20.47	112	97.73	97.46	96.26
Edward	UW395 1000/1001	14.83	95	97.05	96.49	95.37
Edward	UW395-1001	10.39	67	96.58	95.78	93.88
Edward	UW407-1000	5.54	30	97.20	95.60	94.70
Edward	UW407-1001	3.34	20	98.40	99.00	93.10
Edward	UW409-1000	12.30	60	98.00	95.50	93.40
Edward	UW409-1001	7.72	60	97.90	94.80	93.50
Edward	UW411-1001	4.95	40	97.90	97.70	97.80
Edward	UW412-1000	1.76	30	89.06	88.08	84.83
Martha	WHD190	6.43	86	94.7	92.50	89.80
Martha	WHD213	4.31	37	97.60	96.40	95.70
Grace	UW210	13.70	516	88.60	88.10	85.30

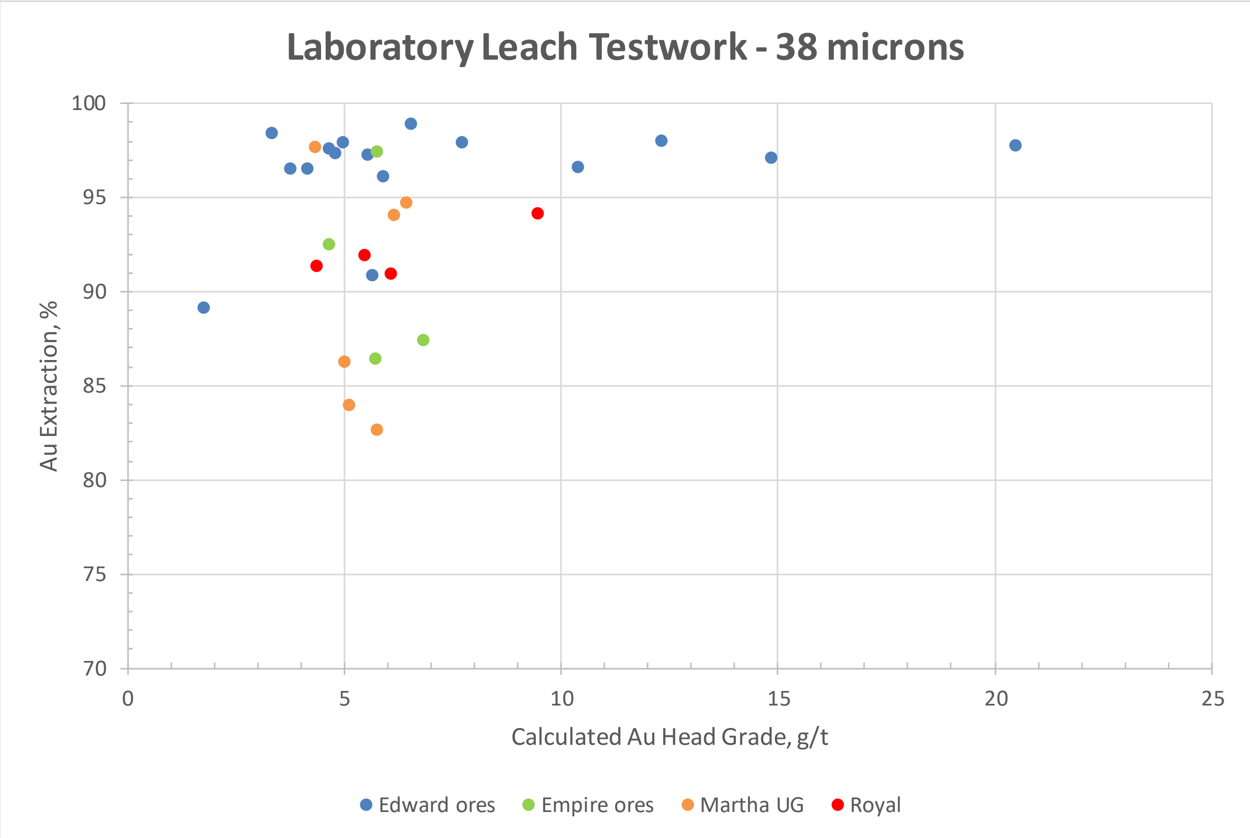
Table 13-6: Gold Extraction Results for 2019 Composites

Domain	Hole ID	Assay Head Grade, Au g/t	As, ppm	Au Extraction (%)	
				38 µm	53 µm
Edward	920SP9MR1318	6.54	11.9	98.9	98.5
Edward	920SP9MR1264 920SP9MR1320	5.89	36.1	96.1	95.8
Edward	920SP9MN1286 920SP9MN1292 920SP9MN1281	5.66	84.5	90.8	88.1
Empire	920SP7MN1303	6.82	189	87.4	89.0
Empire	920SP7MN1290	4.66	111.5	92.5	91.1
Empire	800SP1MR1224	5.75	48.5	97.4	96.0
Empire	800SP1MN1095	5.73	185	86.4	84.0
Martha	800SP3MR1227 800SP3MN1188 800SP3MR1300	5.00	301	86.2	79.4
Martha	800SP1MN1100 800SP1MN1109 800SP1MN1118 800SP1MN1100 800SP1MR1224	6.13	45.6	94.0	95.4
Martha	800SP1MN1127 800SP1MR1214	5.09	139.5	83.9	80.5
Martha	800SP1MR1317 800SP1MR1280 800SP2MN1191 800SP1MR1317	5.76	259	82.60	78.9
Royal	920SP9MN1281 920SP9MN1297 920SP9MN1301 920SP9MN1276	5.45	178	91.9	89.5
Royal	920RCCRN1266 920RCCRN1202 920RCCRN1263 920RCCRN1273	6.06	86.5	90.9	88.2
Royal	920DDCMN1162 920DDCRN1189 920DDCRN1183 920DDCRN1185 920RCCRN1275 920DDCMN1168	9.45	60.9	94.1	93.1
Royal	800DC1RN1246 800DC1RN1240 800DC1RN1255	4.35	79.2	91.3	88.5

Gold extraction results for historical and the 2019 samples at different grind sizes indicate that a 38 micron grind size provides the best gold extraction in the laboratory. In average for all metallurgical samples, gold recovery improvement between 38 microns and 53 microns is 0.94% for Edward, 0.90% for Empire, 2.65% for Martha and 2.22% for Royal. Plant operating experience has shown that an equivalent laboratory gold recovery at a P_{80} of 38 microns is equivalent to a grind size P_{80} of 53 microns in the plant. This relationship is due to the laboratory grind test work being in open circuit, whereas in the plant the grinding circuit is in closed circuit. This results in the higher density sulphides being preferentially ground finer and hence liberating more gold particles that are disseminated within the sulphides.

Figure 13-1 shows gold extraction (recovery) for the historical and 2019 samples tested at a grind size of 38 microns against calculated gold feed grades. These results show a range of recoveries from 89% to 99% for the Edward samples, 83% to 98% for Martha samples, 86% to 97% for Empire, and 91% to 94% for Royal samples.

Figure 13-1: Gold Extraction as a function of feed Grade



The recovery models developed for each of the vein structures provided below are based on the reviewed leach testwork results conducted on the historical and 2019 samples.

Multiple Linear Regression (MLR) was used to predict gold recovery with the explanatory variables being gold head grade and arsenic content in the feed. Below are the recovery models developed for Edward, Empire, Martha, Royal and Rex domains.

Edward: Recovery (%) = 98.21 + (0.455 * Au ppm) – (0.095 * As ppm), r^2=0.65

Empire: Recovery (%) = 98.81 + (0.444 * Au ppm) – (0.078 * As ppm), r^2=0.99

Martha: Recovery (%) = 101.81 - (0.852 * Au ppm) – (0.045 * As ppm), r^2=0.88

Royal: Recovery (%) = 87.86 + (0.608 * Au ppm) + (0.0034 * As ppm), r^2=0.79

Rex: Recovery[3] (%) = 92.50 + (0.469 * Au ppm) - (0.069 * As ppm), r^2=0.94

The gold recovery models developed for MUG deposit are used in the block model for MUG to forecast gold recovery in the mine schedule on a yearly basis.

Applying the recovery models to the preliminary mine schedule indicates the total gold recovery for MUG is 95.4% for the currently defined resource. As infill drilling and resource conversion continues this will allow a more representative forecast of gold production to be maintained given the variability of recovery between the different structures rather than applying a flat line recovery assumption. A process recovery of 94% has been used for MUG based on historical and 2019 leaching testwork.

Leach tests showed a range of recoveries from 89% to 98% for the Edward Mineral Resources and 87% to 99% for Martha Mineral Resources, as shown in Figure 13-1 where calculated head grade is plotted against recovery or extraction.

Six samples were submitted for comminution testing to the JKTech testing facilities in Brisbane, Australia. Comminution testing consisted of SMC drop weight, Bond Rod Mill and Bond Ball Mill work indices, and bond abrasion index. The selected samples represent mineralisation to be mined from four vein structures at MUG. Samples were submitted as quarter core (1/2 HQ). The comminution test results are summarised in Table 13-7. The characterisation conducted on the Waihi mill feed sources has indicated that MUG mineralisation is very competent (SAG milling – average Axb 36.9) and hard to grind in ball mill (BBWI 21.0 - 25.2 kWh/t). Further comminution testing on MUG mineralisation is planned in 2020.

Table 13-7: Summary of Comminution Testing of MUG mineralisation samples

Parameter	Edward	Empire	Martha 1	Martha 2	Royal 1	Royal 2	Average
Axb	34.1	30.7	37.1	38.2	36.9	37.9	36.9
SG	2.58	261	2.51	2.59	2.43	2.53	2.54
DWI	7.67	8.55	6.70	6.75	6.60	6.66	7.16
BRWI	15.4	16.1	-	14.0	-	15.7	15.3
BBWI	22.5	21.0	23.5	25.2	22.2	23.4	23.0
BAI	0.40	0.35	-	0.35	-	0.24	0.33

The comminution results provided in Table 13-7 were applied to a comminution circuit similar to the current Waihi circuit, and for mill sizing. A primary grind size of 80% passing 53 microns was utilised for the primary grind design for MUG feed.

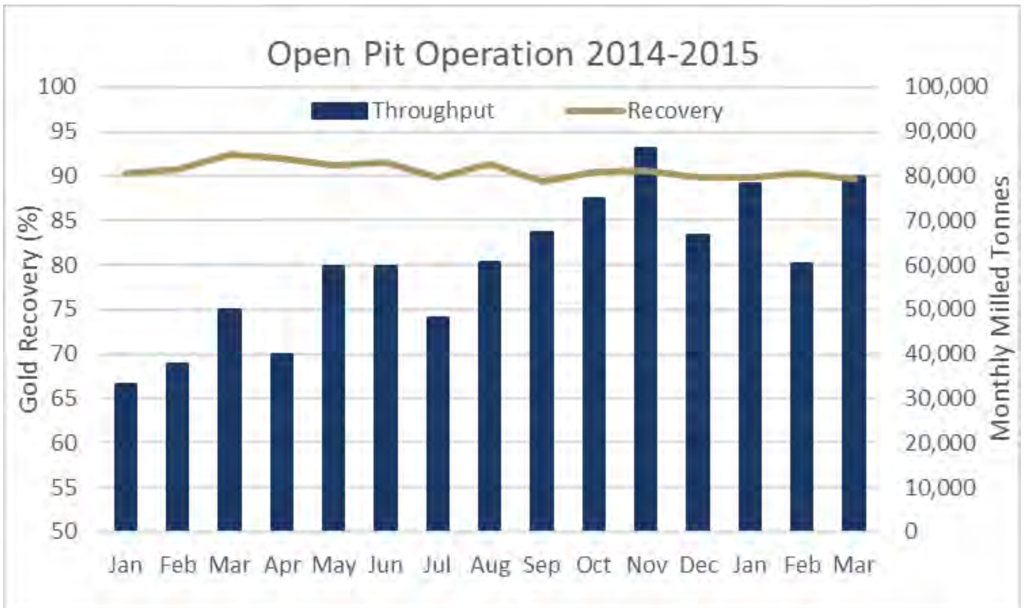
13.3 MOP5

MOP5 metallurgical recovery of gold is estimated at 90% and silver recovery is estimated at 63% based on the process plant performance and reconciliations over the last 30 years of operation extracting similar veins. Throughput and gold recovery data from the last open pit campaign through the Martha mill in 2014-15 is shown below in Figure 13-2 with the monthly reconciled recovery of 90% met or exceeded. The proposed cutback will expose mineralisation at similar or higher levels during the early years of open pit operation.

As infill drilling of the open pit resource is conducted composites will be prepared for confirmatory tests for ore competency and metal recovery to de-risk the production schedule.

[3] The Au recovery model developed for Rex was based on leach testwork data at a grind size P_{80} 75 microns as there were no tests conducted at 38 microns.

Figure 13-2: Historical Open Pit Performance



13.4 GOP

Laboratory scale test work has been conducted on the drill hole samples obtained for the GOP Mineral Resource. The key focus of the metallurgical work has been to derive gold recovery, throughput rates, reagent consumption and to confirm the suitability of current plant configuration. This test work has shown the GOP mineralisation to be amenable for processing via the existing Waihi treatment plant flowsheet.

Recovery is shown to vary with the weathering extent of the GOP mineralisation.

The weathered domain achieves higher recoveries than the primary un-weathered domain. Separate recovery relationships have been determined for the weathered and un-weathered domains. A small separate metallurgical domain characterised by the hydrothermal breccia host rock was also identified.

A grind size of P_{80} of 90 microns has been selected, as plant operating experience has shown that this is equivalent to a laboratory gold recovery at a P_{80} of 75 microns. The gold and arsenic relationship identified in Correnso resource is not observed in the GOP resource. The statistically significant drivers of recovery within the GOP resource are weathering and gold head grade.

The recovery estimate from the test work is calculated at a P_{80} of 75 microns

- Weathered: Recovery % = 100 * (0.902 – (0.049 / Head grade Au))
- Un-weathered: Recovery % = 100 * (0.85 – (0.452 / Head grade Au))
- Hydrothermal Breccia: Recovery % = 74%

This relationship predicts an average recovery for the GOP resource of 71% based on the average Mineral Resource grade of 1.49 g/t Au. An average process recovery of 71% has been used for GOP based on leaching testwork.

Four samples were submitted for comminution testing to the JKTech testing facilities in Brisbane, Australia. Comminution testing consisted of SMC drop weight and Bond Ball mill work index. The selected samples represent mineralisation to be mined from four domains in GOP. Samples were submitted as quarter core (1/2 HQ). The comminution test results are summarised in Table 13-8. The characterisation conducted on the GOP mineralisation has indicated that the material is classified as “moderately soft” (i.e. Breccia) to “medium” in terms of competency (SAG milling – average Axb 47.1). The weathered material had the softest BBWI of 17.2 kWh/t and it is categorised as “hard”, the three remaining samples are considered very hard (BBWI 20.9 – 22.6 kWh/t).

Table 13-8: Comminution Testing of GOP Mineralisation samples

Parameter	HBX	Un-weathered A	Un-weathered B	Weathered	Average
Axb	56.6	47.8	41.2	42.9	47.1
SG	2.49	2.69	2.58	2.54	2.58
DWI	4.39	5.62	6.26	5.93	5.55
BBWI	20.9	22.6	21.3	17.2	20.5

The comminution results provided in Table 13-8 were applied to a comminution circuit similar to current Waihi circuit, and for mill sizing. A primary grind size of 80% passing 75 microns was utilised for the primary grind design for GOP mineralisation.

13.5 WKP

During 2017 and 2018 a series of 10 composite samples were generated from drill core obtained from the WKP EG Vein across the long section and at varying depths in several test programs. Eight of these composites represent material in the main EG Vein with the other two testing the footwall and hanging wall structures adjacent. The composite samples were subjected to a standard suite of tests to characterise the recovery of gold from the samples via conventional mineral processing flowsheets similar to that employed at the Martha process plant.

Composite 6 lies below the main high-grade mineralisation but was included in the test program due to the slightly higher gram-metre result and to test performance of the deeper higher sulphur mineralisation. From a geo-metallurgical perspective, it is not regarded as representative of the main vein mineralisation and is not included in calculating aggregated results but shows the potential to process material at the extremities of the system. Composites 4 & 6 lie in adjacent structures and are not part of the main EG Vein. A further six composites were generated from additional drilling and tested during 2019 from both the EG Vein and EG FW Vein. The source of each composite is outlined in Table 13-9 and Table 13-10 and relative location is displayed on the long section diagram of the EG Vein in Figure 13-3.

Testing on the composites was completed by ALS Metallurgy in Perth, Australia and included:

- Head assay and screen fire assay;
- Gravity gold recovery at 106 um grind size;
- Cyanide leach of both gravity concentrate and gravity tails; and
- Sulphide flotation and leaching of flotation products.

Head grade analysis is outlined in Table 13-11 below and indicate a gold head grade ranging from 4.2 g/t to 50.6 g/t for the main EG Vein samples. Total sulphur head grades range up to 1.82% sulphur and arsenic grades range up to 580ppm, similar ranges to the Correnso north deposit processed at Waihi.

Table 13-9: 2018 WKP Composite Locations

Composite #	Metallurgical Samples		
	Hole ID	Sample No	Vein Structure
2018 Samples			
1	WKP40	WKP40-0492-0500.8	EG Vein
2	WKP42	WKP42-0430.5-0440	EG Vein
3	WKP50	WKP50-0403-0406	EG Vein
		WKP50-0413-0415	
4	WKP52	WKP52-0550	EG FW Vein
	WKP55	WKP55-0363-0364	EG FW Vein
	WKP55	WKP55-0307	EG FW Vein
5	WKP50	WKP0087, WKP50-0093,0094	EG HW Vein
6	WKP35	WKP35-576.4-587.2	EG Vein
7	WKP44	WKP44-0410-0422	EG Vein
8	WKP53	WKP53-0677-0689	EG Vein
9	WKP56	WKP56-0348-0356	EG Vein
10	WKP57	WKP57-0341-0349	EG Vein

Table 13-10: 2019 WKP Composite Locations

Composite #	Metallurgical Samples		
	Hole ID	Sample No	Vein Structure
2019 Samples			
11	WKP54	WKP054-0582-0596	EG Vein
12	WKP60-1	WKP60-0465-0475	EG Vein
13	WKP60-2	WKP60-0570-0577	EG FW Vein
14	WKP61	WKP61-0387-0394	EG Vein
15	WKP63	WKP63-0527-0545	EG FW Vein
16	WKP65	WKP65-0491-0505	EG Vein

Figure 13-3: Long Section along the EG Vein at WKP

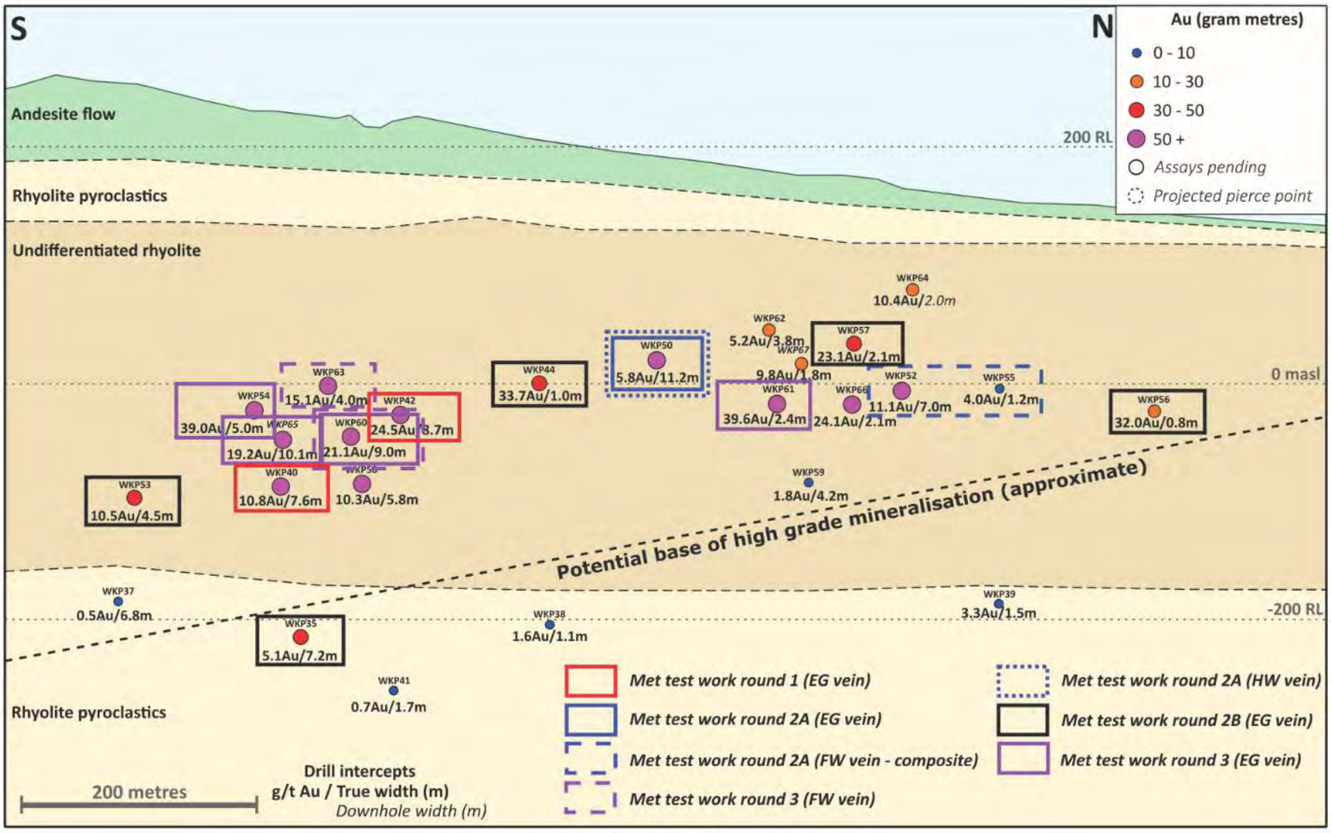


Table 13-11: WKP Composite Head Assay Results

Composite #	Au g/t FA	Ag g/t	As ppm	Hg ppm	SiO2, %	S Total, %
1	7.53	10	15	<0.1	-	-
2	26.0	35	325	0.8	-	-
3	9.47	8	100	<0.1	88.4	0.42
4	4.83	4	270	2.9	82.0	1.34
5	4.54	16	30	0.1	89.2	<0.02
6	4.20	11.4	580	0.4	80.8	1.82
7	4.60	5.4	350	0.1	84.6	0.52
8	7.00	4.5	80	<0.1	89.0	0.26
9	5.21	6.9	390	0.5	80.4	1.74
10	7.67	12.9	110	0.2	81.6	0.86
11	50.6	98	230	<0.1	82.0	0.36
12	19.4	26	80	<0.1	90.2	0.28
13	13.1	24	540	1	86.4	2.06
14	17.7	62	140	0	82.8	0.74
15	62.8	88	30	<0.1	87.6	0.04
16	22.6	24	170	<0.1	84.8	0.62

Gravity concentrates were produced using a laboratory gravity concentrate with the concentrate subject to intensive cyanide leach conditions and the gravity tail subject to standard leach conditions. The combined leach recoveries are indicative of that expected from a conventional gold processing flowsheet.

Table 13-12 shows results from the 2018 composites indicating that gravity gold recovery ranged from 8.1% to 41% averaging 18.4% for the EG Vein samples at either 53 um or 106 um grind size. The relatively low gravity recovery results and screen fire assay results suggest the majority of the gold is present as fine particles.

The average gold recovery from leaching on the main EG Vein samples (composites 1,2,3,7,8,9 &10) averages 90.7% and suggests the majority of the EG Vein material can be regarded as free milling. The lower recovery experienced in composites 4 and 6 may be attributable to the higher sulphur feed grade and likely partially refractory locked in sulphides.

Table 13-12: 2018 Composite Gold Recovery Results

Composite #	Calculated Au Grade, g/t	Au/Ag ratio	P80, µm	Gravity Au Recovery, %	Total Au Recovery (%)	
					53 µm	106 µm
1	7.96	1.0/1.2	106	35.1		95.5
2	28.7	1.0/1.2	53	15.1	89.5	
3	9.78	1.0/1.4	53	25.0	89.3	
4	5.08	1.0/1.6	53	8.1	66.4	
5	4.46	1.0/1.4	53	12.5	80.9	
6	3.78	1.0/2.7	106	11.5		68.8
7	5.35	1.0/1.2	106	10.9		91.2
8	6.65	1.0/0.6	106	41.0		95.8
9	5.72	1.0/1.3	106	9.7		84.3
10	7.58	1.0/1.7	106	15.5		89.1
Average					90.7	

The 2019 composites examined the effect of grind size on overall recovery with average recovery increasing to 94.3% at a 38 -micron grind in the laboratory. In Waihi ores typically higher recoveries are achieved with decreasing grind size from liberation of fine gold present in sulphide particles. The recovery results for these composites are shown below in Table 13-13 indicating a 1.4% improvement in overall gold recovery from grinding from 53 microns down to 38 microns, yielding approximately NZD15/tonne higher revenue based on a 15 g/t Au assumed feed grade.

Table 13-13: 2019 Composite Gold Recovery Results

Composite #	Calculated Au Grade, g/t	Au/Ag ratio	Total Au Recovery (%)				
			38 µm	53 µm	75 µm	90 µm	106 µm
11	50.7	1.0/1.9	95.3	92.6	91.1		
12	19.1	1.0/1.3	96.6	94.7	93.6	91.8	90.6
13	13.2	1.0/1.8	85.9	86.1			
14	18.9	1.0/2.8	96.1	96.2	96.5	95.0	
15	59.7	1.0/1.5	95.5	93.4	93.4	91.6	
16	23.1	1.0/1.0	96.2	94.6	92.3	91.0	
Average			94.3	92.9	93.4	92.4	90.6

Process Plant operating experience has shown that an equivalent laboratory gold recovery at a P_{80} of 38 microns is equivalent to a grind size P80 of 53 microns in the plant. This relationship is due to the laboratory grind test work being in open circuit, whereas in the plant the grinding circuit is in closed circuit. This results in the higher density sulphides being preferentially ground finer from the cyclone classification and hence liberating more gold particles that are disseminated within the sulphides.

Diagnostic leach tests were completed on direct leach tailings samples for 10 of the composites from the EG Vein. The results show there is little free milling gold remaining in the tails (6%) that would be recoverable with longer leach residence time. Up to 32% of the unleached gold appears to be silica locked and given the high silica head grade is unlikely to be recoverable via leaching or flotation without further grinding to liberate the locked gold. Unleached gold locked with sulphide minerals represents 61% of the total gold lost to tailings. The sulphide minerals may be recovered through sulphide flotation. Preliminary flotation testwork conducted at 75 microns on the EG Vein has indicated no significant recovery benefits when compared to direct cyanidation at a grind size of 38 microns (i.e. 92% (flotation) vs 96% (direct cyanidation)). Further FUFG testwork is planned in 2020 on WKP samples to confirm if there are recovery benefits.

The recovery model developed for the EG Vein structure provided below is based on the leach testwork results for the high-grade samples at a grind size of 38 microns.

MLR was used to predict gold recovery with the explanatory variables being Au head grade and arsenic content in the feed. Below is the recovery model developed for EG veins at 38 microns.

EG Vein Recovery (%) = 97.14 - (0.024 * Au ppm) – (0.0028 * As ppm), r^2=0.93.

The gold recovery model developed for WKP deposit applies for the high-gold grades i.e. >13 g/t Au.

The test work completed to date supports the adoption of a direct leach flowsheet for gold recovery at a laboratory primary grind size of 38 microns and an expected recovery of 94% or higher is a reasonable assumption at gold grades >13 g/t Au. Further leaching testwork is planned in 2020 over a wider range of Au head grades (i.e. gold head grades <13 g/t Au) to validate model recovery for WKP. A process recovery of 90% has been used for WKP in this Technical Report based on 2018 leaching testwork.

Six samples were submitted for comminution testing to the JKTech testing facilities in Brisbane, Australia. Comminution testing consisted of SMC drop weight, Bond Rod Mill and Bond Ball Mill work indices, and bond abrasion index. The selected samples represent mineralisation to be mined from two vein structures at WKP. Samples were submitted as quarter core (1/2 HQ). The comminution test results are summarised in Table 13-14. The characterisation conducted on the Waihi mineralisation sources has indicated that WKP mineralisation is very competent (SAG milling – average Axb 37.2) and hard to grind in ball mill (BBWI 18.7 – 22.1 kWh/t). Further comminution testing on WKP mineralisation is planned in 2020.

Table 13-14: Summary of Comminution Testing of WKP mineralisation samples

Parameter	EG Comp 1	EG Comp 2	EG Comp 3	FW Comp 1	FW Comp 2	FW Comp 3	Average
Axb	38.8	34.0	39.2	39.4	36.8	34.7	37.2
SG	2.49	2.53	2.53	2.59	2.62	2.59	2.56
DWI	6.43	7.51	6.45	6.55	7.07	7.38	6.90
BRWI	16.1			16.0			16.1
BBWI	18.7	22.1	19.1	19.3	20.0	20.3	19.9
BAI	0.70			0.70			0.70

The comminution results provided in Table 13-14 and Table 13-7 were applied to a comminution circuit similar to current Waihi circuit, and for mill sizing. A primary grind size of 80% passing 53 microns was utilised for the primary grind design for WKP feed.

13.6 Further Testwork

Further variability and comminution testing will be undertaken on MUG and WKP deposits as core becomes available to increase the confidence in the recovery estimates and to investigate potential alternative flowsheets that may further increase overall metallurgical performance.

When drill core becomes available for the MOP5 infill drilling additional direct leach variability testing will be undertaken to confirm the recovery assumptions from historical plant performance.

13.7 Comments on Section 13

In the opinion of the QP, the following conclusions are appropriate:

- Metallurgical test work and associated analytical procedures were performed by recognised testing facilities, and the tests performed were appropriate to the mineralisation type;
- Samples selected for testing were representative of the various types and styles of mineralisation within the Waihi and WKP areas. Samples were selected from a range of depths within the deposit. Sufficient samples were taken so that tests were performed on adequate sample mass;
- Average recoveries have been assumed based on test work completed. These recoveries are appropriate to be used in support of Mineral Resource and Mineral Reserve estimation, based on the drill hole spacing and sample selection;
- Metallurgical testwork conducted on the composites to date from the MUG deposit supports an expected gold recovery assumption of 95% for treatment through the existing process plant flowsheet based on targeting a primary grind size of 53um used in the mine optimisation;
- Metallurgical testwork on the main EG Vein samples tested from the WKP deposit supports an expected gold recovery assumption of 90% for treatment through the existing process plant flowsheet based on a similar 53um grind size;
- Historical metallurgical results on the Martha open pit deposit supports an expected gold recovery assumption of 90% for treatment through the existing process plant flowsheet based on a 90um grind size; and
- In the economic evaluation for the deposit's recovery assumptions of 94% for MUG, 90% for WKP and 71% for GOP have been assumed. The more conservative recovery assumptions used in the economic modelling and evaluation compared to that indicated by the metallurgical testwork provides a degree of risk mitigation at the current time with the number of composite samples tested and to allow for operational inefficiencies between the laboratory and plant.

14 MINERAL RESOURCE ESTIMATES

14.1 Key Assumptions/Basis of Estimate

Mineral Resource Estimates for four Projects have been prepared with close out dates for the databases used in estimation are as Indicated in Table 14-1. Data used to support the estimates include surface and underground DD core, RC chips and underground grade control channel sample chips.

Table 14-1: Model Close Out Dates

Project	Close out Date
MUG	31 December 2019
MOP5	1 November 2019
WKP	31 December 2019
GOP	February 2018

14.2 Geological Models

Open pit and underground mining since 1988 have provided a large database of mapping and grade control sampling, which has confirmed the geological interpretation to date.

The geological interpretation process routinely utilises all available drill logging data, core photography, drill assay data and oriented core measurements, all of which are systematically collected and validated. Often additional data may be available to contribute to the final geological model including surface mapping, underground face and backs mapping, Grade control channel sampling, historical underground quartz vein mapping and channel sampling.

Geological modelling of the MOP5, MUG, WKP and GOP Projects was performed in Leapfrog Geo 5.0.1 using the interval selection and vein systems tools. Drilling data in Leapfrog was linked directly to the ADMWAIHIEXP AcQuire database.

Geological models and geological concepts have been routinely reviewed by internal and external reviewers.

14.2.1 MUG

A MUG geological model update and reserve estimate was completed in January 2020.

The comprehensive Martha dataset includes diamond drilling, in-pit mapping, Grade control channel and RC data, backs mapping from modern development, historic cross cuts, historic mapping, digitised historic mining wireframes.

Comparative assessment of the January 2020 model and previous iterations indicates only modest localised vein geometry changes relative to the previous estimate and an increase in confidence classifications within the deposit as a consequence of the drilling completed in 2019. The number of veins forming the basis for the geological interpretation has increased slightly and both Indicated and Inferred Resources having grown substantially since the previous estimate. Furthermore, increased drilling density has reduced the influence of the lower quality historic cross-cut data, particularly in close proximity to the drill positions.

Updates to January 2020 model include:

- New drilling undertaken from the underground 920 and 800 drill platforms and surface platforms, with significant drilling having occurred in the western end of the drill drives after their development was completed in early 2019;

- Some additional veins defined within the geologic model;
- Additional scanned maps from the Auckland museum to refine geometry of historical voids;
- Backs mapping and channel sampling from underground development;
- Historical workings were updated including development headings, open stope and filled stope triangulations; and
- Outputs from the January model includes:
    - 78 Vein triangulations (Figure 14-1). The fundamental architecture remains consistent. Additional diamond drilling has allowed for the extrapolation of more minor structures clearly present in open pit GC data;
    - 10 Lithology triangulations; and
    - 3 Oxide triangulations.

The model was built with underground mining economics in mind, and delineation of consistently narrow or low-grade structures was not necessary.

Wireframes were created using Leapfrog Geo software. Geological logging fields of drilling data such vein textures, vein mineralogy, vein percentage, breccia type and historical voids were initially used to create representative wireframes of vein structures. These initial wireframes were then modified on a vein-by-vein basis and compared to Au and Ag grade, core photography and structural measurements to establish geological consistency between veins.

Veins defined by pit grade control data but without supporting drilling information to substantiate vein extrapolation beyond the pit boundary were not included in the wireframes.

Individual veins were validated at various stages throughout the modelling process. Upon completion of the modelling process, additional validation includes:

- A visual review in 3-axis sliced planes viewing Au grade, historical voids and logged geology;
- Drill hole review following domain flagging and filtering for Au immediately outside of vein boundaries;
- Peer review within the Waihi geology team; and
- Review against historic mining. Note that in instances where mined voids had no drilling data, relative position of stoping panels was determined using vein wireframes. This ensures a conservative approach was taken to depletion.

Figure 14-1: Martha Vein Domain Triangulations used in the January 2020 estimation

1100_Martha.00t	1302_Victoria.00t	1410_Letter_E.00t
1109_Martha_East.00t	1304_Magazine.00t	1411_Letter_M.00t
1110_Nth_Branch.00t	1305_Welcome.00t	1420_Nth_Section_Empire.00t
1111_Loop_No1.00t	1306_Welcome_Back.00t	1421_State_Branch.00t
1112_Martha_South_Secti	1307_Welcome_C.00t	1422_State_Reef.00t
1113_Loop_No2.00t	1308_Alexandra.00t	1423_Dominion.00t
1120_Mary.00t	1309_Welcome_D.00t	1424_Republic.00t
1130_No2.00t	1310_Welcome_E.00t	1425_Wowser.00t
1131_No2_West.00t	1311_Welcome_F.00t	1426_Harry.00t
1132_No2_South.00t	1320_Grace.00t	1427_Boxall.00t
1140_Flat_A.00t	1331_Vic_FW3.00t	1500_Royal.00t
1141_Flat_B.00t	1332_Vic_FW9.00t	1501_Royal_FW_A.00t
1143_Ella.00t	1333_Vic_FW7.00t	1508.00t
1144_Flat_C.00t	1334_Vic_FW10.00t	1510_Rex.00t
1201_Albert.00t	1335_Welcome_HW1.00t	1511_Princess.00t
1220_Edward.00t	1336_Welcome_HW2.00t	1512_Royal_Nth_Branch.00t
1221_Edward_Link.00t	1400_Empire.00t	1513_Dreadnought.00t
1222_Edward_B.00t	1401_Letter_H.00t	1514_Dreadnought_Sth.00t
1223_Edward_C.00t	1402_Letter_J.00t	1515.00t
1224_Edward_D.00t	1403_Letter_C.00t	1516_Roy_HW_2.00t
1225_Edward_A.00t	1404_Gordon.00t	1517_Royal_HW3.00t
1226_Edward_F.00t	1405_Letter_D.00t	1520_George.00t
1227_Edward_E.00t	1406_Letter_X.00t	1530_Ulster.00t
1228_Edward_B1.00t	1407_Letter_L.00t	1551_Louis.00t
1229_Edward_B2.00t	1408_Letter_Y.00t	1552_Emp_F1.00t
1230_Edward_FW1.00t	1409_Emp_HW1.00t	1553_Roy_HW1.00t

14.2.2 Historical Workings Model

Given the mining history of the MUG Project the accurate treatment of historic mine workings is recognised as being of high importance to the project.

A 3D model of historic workings was constructed as part of ongoing geotechnical studies and captures the extent of known stopes within the major lode structures. A 3D model of the historical stopes was initially constructed by draping digitised historical long sections of stoping blocks on to the footwall of the vein wireframe to form 3D polygons. These 3D polygons were then extruded, towards the vein hanging wall, the average width of the block as determined from historic data to form a solid wireframe. Using the historical long sections, the stope wireframes were then attributed with stoping type, to determine if filled or void. Unknown types were assumed to be voids, unless verified by current mining. A review of the historic development and stope models of the Martha and Grand Junction workings in 2009 found the original interpretation of most historic workings were modelled between 2m and 15m lower than surveyed intercepts with workings in the pit.

Recently, new data has provided an additional source from which the historical void model can be updated and remodelled. This new data includes the ongoing Martha diamond drilling program, recent underground mine development (2017 to present) and additional historical mine plans made available through the Auckland War Memorial Museum. Underground surveyors provided the geology team survey pickups of all old workings intercepted during mining.

Significant updates were applied to the historical mine workings. All the workings were separated into individual wireframes and assessed for position, orientation and width against all the newly available data. Where required, the following adjustment techniques were applied using Vulcan software:

- **Translation:** workings were shifted to match drill hole intercepts and/or vein wireframes. Translations used a 'reference point to destination point vector';
- **Rotation:** whole wireframes were rotated either in cross section or plan view to match vein wireframe orientations. Stopes that required partial or incremental rotation were sectioned into polygons then each polygon was rotated individually in cross section before the solid wireframe was recreated;
- **Reshaped:** stopes that required width change to match drill hole intercepts were also sectioned into polygons, moved and reshaped to match drill hole logging before the solid wireframe was recreated; and
- **Reclassified:** stopes were reclassified if the recent data (drilling/ development) contradicted with the void / fill classification in the original stope model.

Stope shapes and levels were validated for closure, consistency and crossing triangles to ensure they could be evaluated for volume, then re-merged into a complete set of development levels, filled stopes and open stopes. All remodelled historical workings were peer reviewed and validated against previous models. All updates are recorded in a 'stope adjustment register'. The updated model contains wireframes for development levels, open stopes, filled stopes, shafts, passes and the Milking Cow caved zone.

14.2.3 MOP5

The MOP5 Project is a cutback on the existing open pit on which the Waihi Mining District commenced modern mining operations in 1988. Mining in the open pit ceased in April 2015 as a consequence of a localised wall failure that compromised access to the active working area. At the time of the loss of access, the open pit had a remaining 70k ounce Mineral Reserve which has since been reclassified as Mineral Resource.

The Martha Open Pit mineralisation is very well understood. The open pit had operated continuously for a period from 1988 until 2015, with a number of cutbacks completed successfully during the operations history. The proposed MOP5 cutback leverages off this knowledge base and utilises knowledge gained through the successful exploration of MUG, which sits directly beneath the proposed cutback and changes in economic assumptions

Gold was first discovered at Martha in 1878 and was historically mined by underground methods between 1882 and 1952, producing some 4.9Moz of gold and 29Moz of silver from 12 Mt of ore. The deposit was worked over 1600m in strike and to a depth of 600m.

The modern open pit operation began in 1988 mining remnant material adjacent to lodes and backfill material from the workings. All material produced in the pit was crushed and conveyed 2.5km to the Processing Plant and TSF.

The quartz vein system at Martha is hosted by hydrothermally altered quartz bearing andesite flows and flow breccias inter-bedded with thin tuffaceous sediments, dipping south-east at about 40 degrees. These are unconformably overlain by a post-mineral sequence of late Pliocene to Quaternary ignimbrite and alluvial units. These units thicken to the south and east and are inferred to infill a caldera-like structure. Oxidation extends down the vein margins to over 250m below surface.

Gold-Silver mineralisation within the deposit is contained in quartz veins within a low-sulphidation epithermal vein system hosted by Miocene calc-alkaline volcanics of the CVZ. The system comprises of four main northeast trending veins (Martha, Welcome, Empire and Royal) and a two north trending cross-cutting vein structures, the Edward and Albert. The main veins are enveloped by a stockwork of subsidiary veins. Mineralisation extends for 1600 metres along strike with a width of 500 metres and was historically mined to over 600 metres below surface.

Management of historic voids within the Martha Open Pit resource is as per the processed described above in section 14.2.2.

14.2.4 WKP

The most recent WKP Mineral Resource was reported to the market in February 2020. Veins were modelled using Leapfrog Geo software. Geological logging of drill core such as vein textures, vein mineralogy, vein percentage and breccia type were initially used to create representative wireframes of vein structures. These initial wireframes were then modified on a vein-by-vein basis and compared to Au and Ag grade, core photography and structural measurements to establish geological consistency between veins. Some small, sporadic high Au grade intercepts that cannot be corelated with neighbouring drillholes have been excluded from the vein modelling.

In September 2019, geological consultant David Rhys from Panterra Geoservices Inc. completed an independent review of the geological setting, style and structural controls on mineralisation at the WKP Project based on all available surface mapping and drill hole data.

14.2.5 GOP

GOP is based on open pit/s around the Gladstone Hill and Winner Hill area. The resource model describes the mineralisation within Gladstone and Winner Hills and includes part of the Moonlight orebody, depleted for underground mining.

GOP mineralisation is characterised by shallow-level, hydrothermal breccias and associated banded quartz veins interpreted to represent the top of the epithermal system. The uppermost mineralised quartz veins flare up into hydrothermal explosion breccias. The GOP veins are predominantly steeply dipping veins developed within the hanging wall of the Favona Fault that dips moderately towards the SE. The vein trend ENE to NE between 035° and 075° and dips steeply towards the SE.

14.3 Exploratory Data Analysis

14.3.1 MUG

The MUG Project has an extensive mining history, consequently there is abundant data collected over many years that requires assessment in construction of grade estimates for the deposit. The model update incorporates all available data including exploration diamond drilling, in-pit grade control channel data and in-pit grade control RC drill data to build of the geologic model and in the grade estimate.

There are three drilling datasets from within the open pit that have been utilised in the development of this model:

- A large set of grade Control Channel data from the Open Pit collected between 1988 and 2008;
- Reverse Circulation Grade Control (RC) drilling data collected between 2008 and 2015; and
- Exploration drilling data collected over the life of the project.

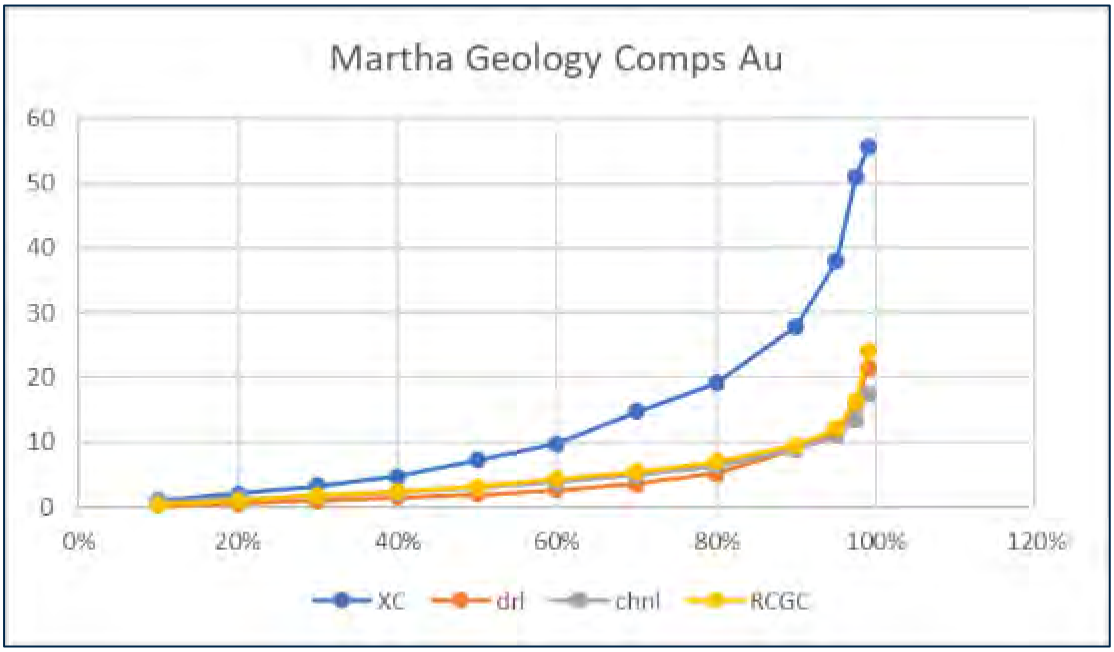
Table 14-2: Summary Statistics for MUG Major Domains (2 metre composites)

Lode	Martha	Albert	Edward	Victoria	Magazine	Welcome	Empire
Statistic	Domain 1100	Domain 1201	Domain 1220	Domain 1302	Domain 1304	Domain 1305	Domain 1400
Samples	2765	88	718	253	231	823	1060
Minimum	0.005	0.01	0.005	0.025	0.005	0.005	0.005
Maximum	208.99	20.45	131.32	18.31	114.06	88.66	117.00
Mean	3.31	2.51	5.05	2.92	3.45	3.36	5.05
Standard deviation	7.63	4.27	10.11	3.05	9.35	5.52	9.53
CV	2.31	1.70	2.00	1.04	2.71	1.64	1.89
Variance	58.21	18.21	102.27	9.28	87.44	30.45	90.80
Skewness	11.18	2.41	6.00	1.76	9.74	6.66	4.98
Log samples	2765.00	88.00	718.00	253.00	231.00	823.00	1060.00
Log mean	-0.18	-0.82	0.30	0.42	-0.15	0.16	0.34
Log variance	3.60	4.88	3.50	1.81	3.94	3.00	3.69
Geometric mean	0.83	0.44	1.35	1.52	0.86	1.17	1.40
95%	13.24	13.52	21.31	9.00	11.73	12.19	19.32
97.50%	19.54	13.70	26.53	11.10	14.82	16.98	31.76
99%	30.69	18.54	38.18	13.48	24.11	22.22	44.82

In the construction of this model it was recognised that there is significant historic cross-cut data from the level development that could be utilised to aid in estimating grade particularly in the poorly drilled portions of the deposit. The legacy cross-cut data is of unknown quality, grade historically was recorded as an economic value and a gold equivalent value was back calculated for this dataset previously. The cross-cut data was reviewed spatially and only data that spanned the full width of the vein was selected for utilisation in the grade estimation process. This data was further limited to only the second pass grade estimation pass.

The channel and RC data are spatially distinct from each other and cover those portions of the deposit that have already been mined or are immediately adjacent to the mined portion of the deposit whereas the exploration drilling data covers the full extent of the area being modelled. Figure 14-2 below presents the comparative assessment of the grade by data type for the Martha Domain using full vein width composites for all data types. From the Figure, it is apparent that the legacy cross-cut data (XC) is representative of the high-grade subset of the domain. On this basis the cross-cut data is excluded from the grade estimate for Indicated and Inferred Resource.

Figure 14-2: Martha Domain comparative assessment of Grade distribution by data type



14.3.2 WKP

Statistical assessment is undertaken on independent domains for all Waihi deposits, the domains are defined by vein wireframes. All domains in Waihi / WKP District have hard boundaries. Summary statistics by domain are tabulated using the Snowden "Supervisor" package. Outputs from the analysis are presented in Table 14-3 to Figure 14-4.

Table 14-3: Summary Statistics of Major Domains for WKP

	T Stream	EG	EG FW1	Sth FW Splay
Statistic	Domain 400	Domain 410	Domain 420	Domain 425
Samples	184	230	197	104
Minimum	0.025	0.09	0.09	0.19
Maximum	57.9	239	39.207	151.086
Mean	2.06045	12.7132	2.86772	19.9816
Standard deviatior	5.51032	21.4893	5.64885	30.8568
CV	2.67432	1.69031	1.96981	1.54426
Variance	30.3636	461.791	31.9095	952.145
Skewness	6.79037	5.28429	4.09362	2.10757
Log samples	184	230	197	104
Log mean	-0.410525	1.5366	0.272306	1.69018
Log variance	1.75567	2.46686	1.17736	3.19996
Geometric mean	0.663302	4.64878	1.31299	5.42047
50%	0.479	5.66	1.09	4.574
95%	10.555	47.855	14.171	90.197
97.50%	13.99	58.85	21.97	108.747
99%	20.653	101.199	25.008	111

Figure 14-3: Log Probability Plot of the EG Vein, WKP

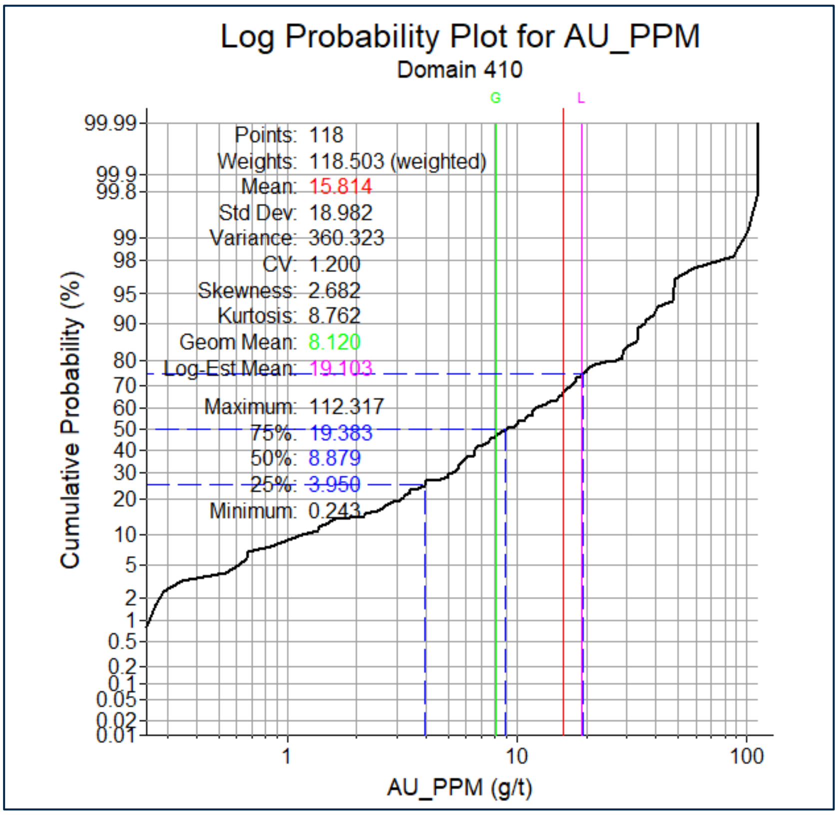
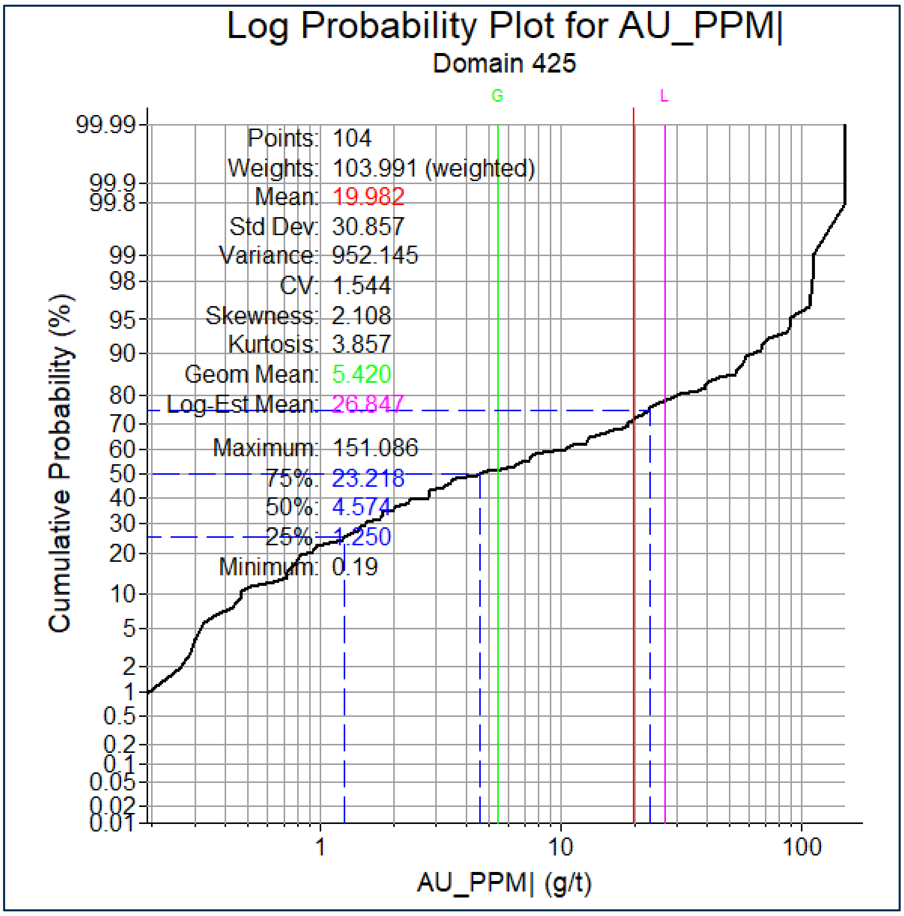


Figure 14-4: Log Probability Plot of the South FW Splay, WKP



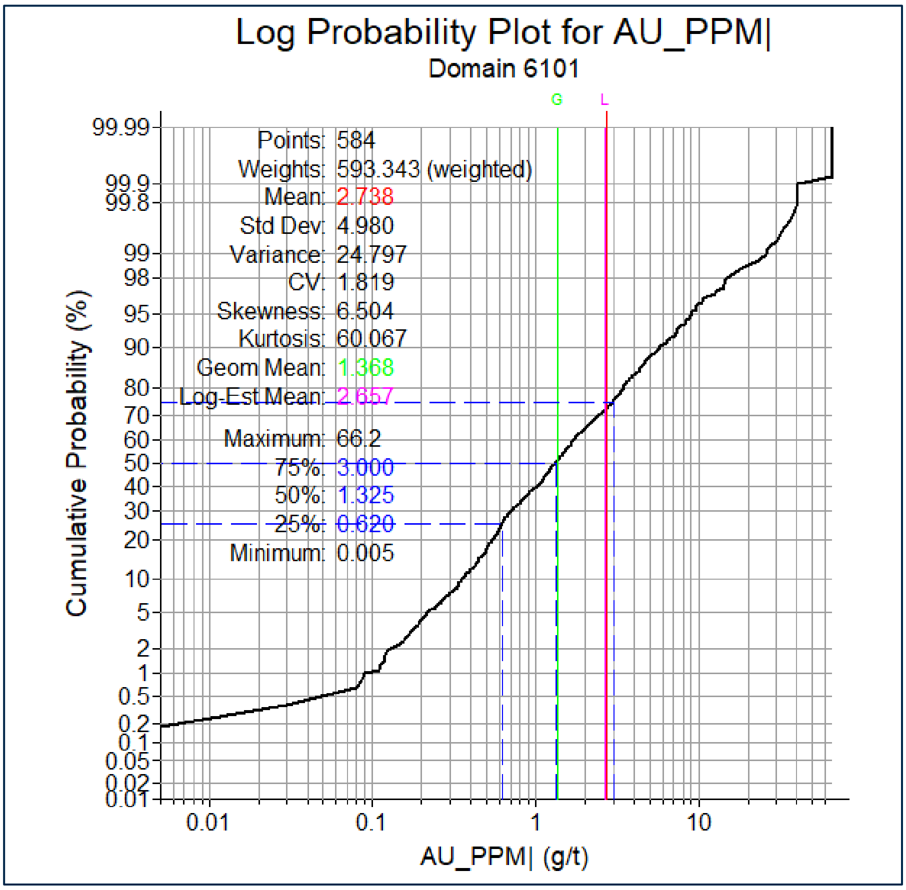
14.3.3 GOP

Summary statistics for the major GOP domains are presented in Table 14-4. As with all estimates at Waihi utilising an Inverse Distance based estimation scheme the top-cut is set to the 98th percentile of the cumulative distribution as illustrated in the cumulative probability plot for the primary GOP vein shown below in Figure 14-5.

Table 14-4: GOP Composite Statistics by Domain

Statistic	Domain 6101	Domain 6102	Domain 6103	Domain 6105	Domain 6109	Domain 6201	Domain 6204
Samples	1138	736	418	815	296	2441	26093
Minimum	0.03	0.01	0.03	0.01	0.01	0.01	0.01
Maximum	66.2	26.363	25.7	35.137	23.2	25.88	57.637
Mean	2.74	1.31	1.55	1.56	1.46	0.38	0.31
Standard deviation	5.43	1.91	2.60	3.27	2.22	0.78	0.93
CV	1.98	1.46	1.67	2.10	1.52	2.02	3.05
Variance	29.49	3.65	6.74	10.71	4.92	0.61	0.87
Skewness	6.65	5.64	5.84	6.04	5.31	16.80	25.57
Log samples	1138	736	418	815	296	2441	26093
Log mean	0.23	-0.41	-0.15	-0.52	-0.24	-1.67	-1.98
Log variance	1.44	1.73	1.09	2.07	1.30	1.47	1.41
Geometric mean	1.26	0.66	0.86	0.59	0.79	0.19	0.14
95%	9.23	3.84	4.24	5.22	4.75	1.27	0.94
97.50%	14.20	6.24	7.05	8.87	6.59	1.73	1.49
99%	25.60	9.83	13.53	17.30	10.86	2.92	2.67

Figure 14-5: Log probability Plot for the 6101 domain - GOP



14.4 MOP5

Summary statistics for the major MOP5 domains are presented in Table 14-5. As with all estimates at Waihi utilising an Inverse Distance based estimation scheme the top-cut is set to the 98th percentile of the cumulative distribution as illustrated in the cumulative probability plot for the primary Martha vein shown below in Figure 14-6.

The Open Pit channel and RC data has been utilised in the construction of the Martha model, these datasets are spatially distinct from each other and cover those portions of the deposit that have already been mined or are immediately adjacent to the mined portion of the deposit whereas the exploration drilling data covers the full extent of the area being modelled. Data analysis is completed for each domain and each data type as a routine process in the construction of the Martha grade estimates. Differing composite lengths are utilised for differing styles of mineralisation within the Martha deposit. To this end data analysis is also conducted on 1.5- and 3-metre composites for each data type and each domain.

Table 14-5: Vein Domains 1.5m Au Composite Statistics by Domain diamond drilling dataset

Lode	Martha	Edward	Victoria	Welcome	Empire	Royal
Statistic	Domain 1100	Domain 1220	Domain 1302	Domain 1305	Domain 1400	Domain 1500
Samples	1967	410	265	716	558	147
Minimum	0.005	0.005	0.02	0.01	0.005	0.005
Maximum	283.9	151.0	20.7	85.0	117.5	44.9
Mean	3.3	6.3	2.9	3.3	5.0	4.5
Standard deviation	9.5	14.7	3.5	6.0	9.3	7.3
CV	2.9	2.3	1.2	1.8	1.9	1.6
Variance	89.4	214.6	12.5	35.7	86.7	52.8
Skewness	17.1	5.6	2.1	6.2	5.7	2.8
Log samples	1967	410	265	716	558	147
Log mean	-0.4	0.1	0.2	0.0	0.5	0.0
Log variance	3.9	4.6	2.3	3.1	2.9	4.7
Geometric mean	0.7	1.1	1.2	1.0	1.6	1.0
95%	14.1	25.0	10.2	11.8	17.8	16.7
97.50%	19.9	39.7	12.4	17.5	28.0	26.8
99%	26.4	80.8	16.5	26.1	47.2	35.0

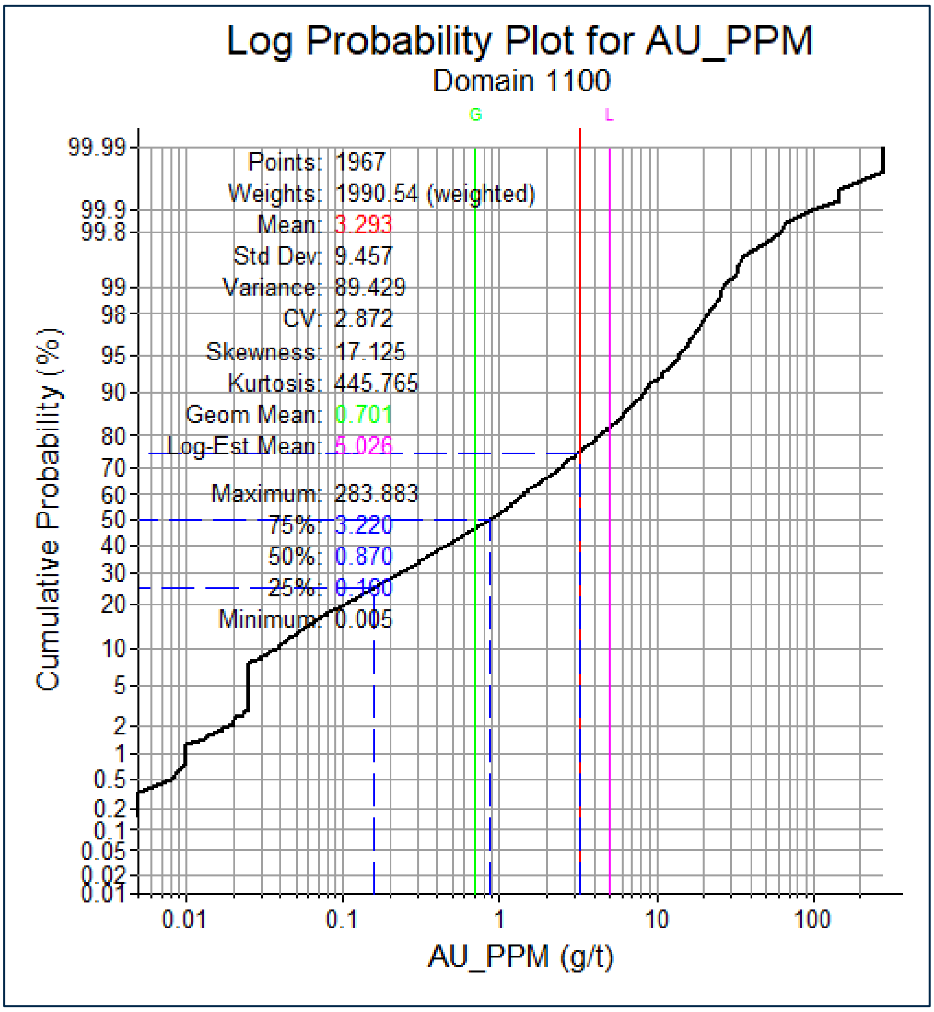
Table 14-6: Bulk Domains 3m Au Composite Statistics by Domain – diamond drilling

Statistic	Domain 1900	Domain 1901	Domain 1902	Domain 1903	Domain 1904	Domain 1905
Samples	1892	1797	398	672	3346	1783
Minimum	0.005	0.002	0.005	0.007	0.005	0.005
Maximum	88.38	77.94	14.07	33.97	58.01	35.20
Mean	0.69	0.70	0.60	1.34	0.35	0.95
Standard deviation	3.27	3.17	1.54	3.12	1.87	2.20
CV	4.76	4.56	2.57	2.33	5.29	2.32
Variance	10.70	10.07	2.36	9.73	3.50	4.85
Skewness	16.60	14.61	4.76	5.40	17.75	7.39
Log samples	1892	1797	398	672	3346	1783
Log mean	-2.75	-2.24	-2.46	-1.17	-2.83	-1.24
Log variance	4.25	2.88	3.86	3.10	2.50	2.43
Geometric mean	0.06	0.11	0.09	0.31	0.06	0.29
95%	2.99	3.03	3.26	6.70	1.39	4.08
97.50%	5.28	5.45	5.14	9.55	2.62	6.34
99%	10.63	9.24	7.28	13.53	4.74	9.78

Table 14-7: Bulk Domains 3m Au Composite Statistics by Domain – diamond drilling

Statistic	Domain 1906	Domain 1908	Domain 1909	Domain 1910	Domain 1911	Domain 1912
Samples	1840	783	305	940	3363	2221
Minimum	0.005	0.005	0.007	0.002	0.005	0.005
Maximum	15.16	18.50	26.47	4.21	38.14	61.90
Mean	0.18	0.64	1.56	0.06	0.33	0.31
andard deviati	0.81	1.57	2.82	0.23	1.74	1.10
CV	4.56	2.44	1.81	3.56	5.24	3.61
Variance	0.66	2.47	7.96	0.05	3.01	1.22
Skewness	10.23	5.59	5.10	13.65	12.55	18.63
Log samples	1840	783	305	940	3363	2221
Log mean	-3.53	-1.81	-0.41	-3.53	-3.40	-2.83
Log variance	2.12	2.51	1.87	0.98	2.98	2.40
eometric mea	0.03	0.16	0.66	0.03	0.03	0.06
95%	0.68	3.02	5.46	0.17	1.24	1.51
97.50%	1.68	4.82	6.99	0.35	2.76	2.63
99%	3.13	8.05	17.60	0.53	6.32	4.57

Figure 14-6: Log Probability plot Martha Vein 1.5m Au composites



14.5 Composites

Composite weighting by length was applied during estimation to avoid bias from very small, high-grade composites. There has been no change to the compositing method for any Waihi Projects used since May 2010.

The standard method used to define composites for all resource estimates was to flag the raw data in the local drilling database for the project against the geology solids. The Vulcan compositing program (run length) was run to generate a length composited database at the required sample length. Compositing was by fixed length, honouring the domain boundaries. 1m fixed length composites are routinely generated for the narrow veins across all deposits. There are five vein-based domains in the MUG Project that have a vein width of greater than 10 metres, these broader domains are composited to a 2-metre fixed length interval.

For narrow domains across all underground deposit the drilling data is composited to a 1m composite length using the distributed technique, this methodology is consistent with the techniques applied for the Waihi deposits. Composite weighting by length is applied during estimation to avoid bias from small, high-grade composites.

Open pit models are estimated using larger composites. Veins domains are composited to a 1.5 metre length and bulk domains to 3m, this being representative of the mining bench height and therefore the implied mining selectivity inherent in the model.

14.6 Grade Capping / Outlier Restrictions

14.6.1 MUG

- Reconciliation history for the Waihi Project has demonstrated that some level of high-grade restriction is necessary to limit the influence of outliers on grade estimates for the epithermal veins that have been mined during the operations history;
- Statistical assessment of the input data is undertaken by domain, typical top-cut selection is based on the assessment of the population distribution characteristics and for Inverse Distance estimates cutting at the 98th percentile on the log probability distribution has been a long-standing methodology that has produced acceptable results. Estimates using an OK estimation scheme utilise a 99th percentile threshold;
- The use of this method in determining top caps has resulted in good reconciliation historically. Typically, different data types are assessed independently in the capping analysis process; and
- MUG estimate is based on an OK estimation plan and based on comparative assessment of the OK outputs a top-cut % of 99 has been adopted for kriged estimates.
    - Number of samples above the cap
    - Percentage of samples above the cap
    - Minimum, maximum, mean and variance of samples above the cap
    - Mean and variance of uncapped data
    - Mean and variance of capped data
    - Capped % difference:

$$\frac{(\text{uncapped mean} - \text{capped mean})}{\text{uncapped mean}} \times 100\%$$

    - Contribution of the samples above the cap to the uncapped variance:

$$(\text{mean above the cap} - \text{uncapped mean})^2 \times \frac{\%\text{ of data above the cap}}{\text{uncapped variance}}$$

    - Contribution of the samples above the cap to the total metal:

$$(\%\ \text{of data above the cap}) \times \frac{\text{mean of data above cap}}{\text{uncapped mean}}$$

Statistical assessment was undertaken independently on the different data types as it is recognised that the data is spatially zoned.

Top-cut assessment was undertaken on each of the fixed length composited datasets generated in the compositing stage, top cuts were then assigned by domain to the individual datasets for the composite databases through the addition of an “Au_cut” field to the composites database.

14.6.2 WKP

Reconciliation history for the Waihi Project has demonstrated that some level of high-grade restriction is necessary to limit the influence of outliers on grade estimates for the epithermal veins that have been mined during the operations history. Statistical assessment of the input data is undertaken by domain, typical top-cut selection is based on the assessment of the population distribution characteristics and for Inverse Distance estimates cutting at the 98^{th} percentile on the log probability distribution has been a long-standing methodology that has produced acceptable results. For the WKP deposit, MOP5 and the GOP the approach of cutting to the 98^{th} percentile is considered appropriate.

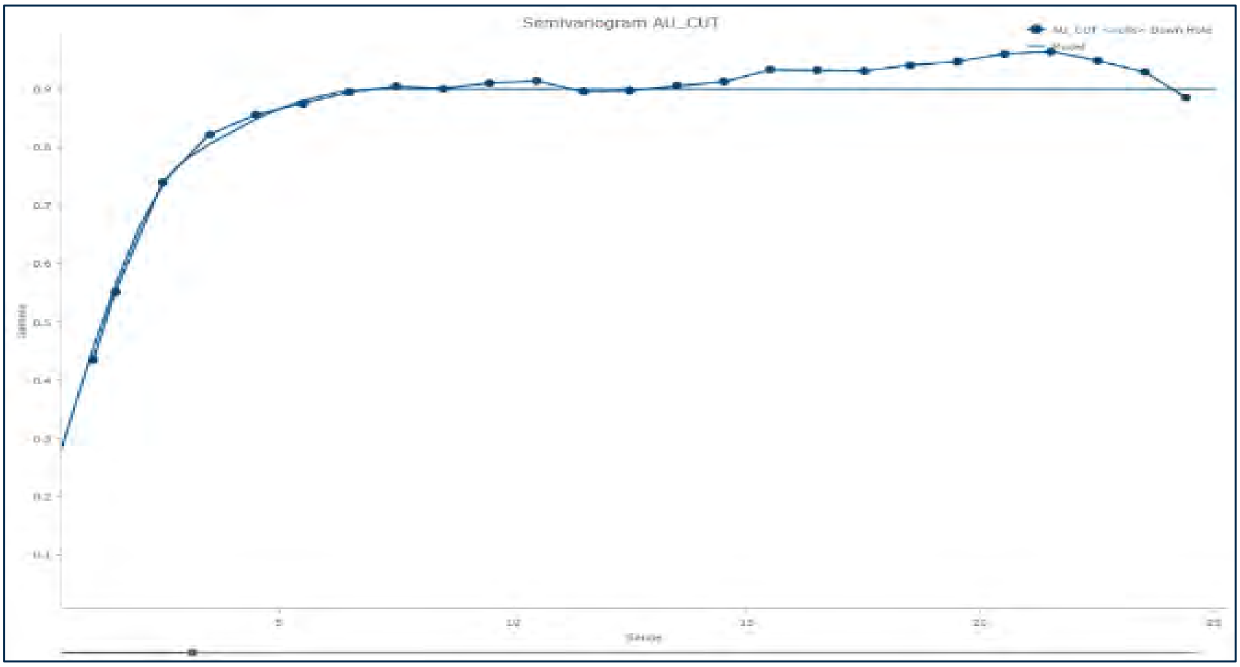
14.7 Variography

Down hole and directional variography are typically run using Snowden Supervisor v7 software. Variograms are run as a means to test spatial continuity within the selected geological domains. Due to the scarcity of data, variogram models often are not easily obtained so in this instance anisotropic ratios are based on geological observation rather than on fitting data to the variogram models. Dominant mineral continuity is set along the strike of the modelled veins.

14.7.1 MUG

Variograms were modelled using Vulcans data analysis tools. In Waihi the generation of variograms is only successful on un-domained data, as the domaining process removes the variance necessary to model a robust variogram. Orientations of the omni-direction variogram are defined by the orientation of the vein. The MUG omnidirectional semi-variogram model is presented in Figure 14-7 below.

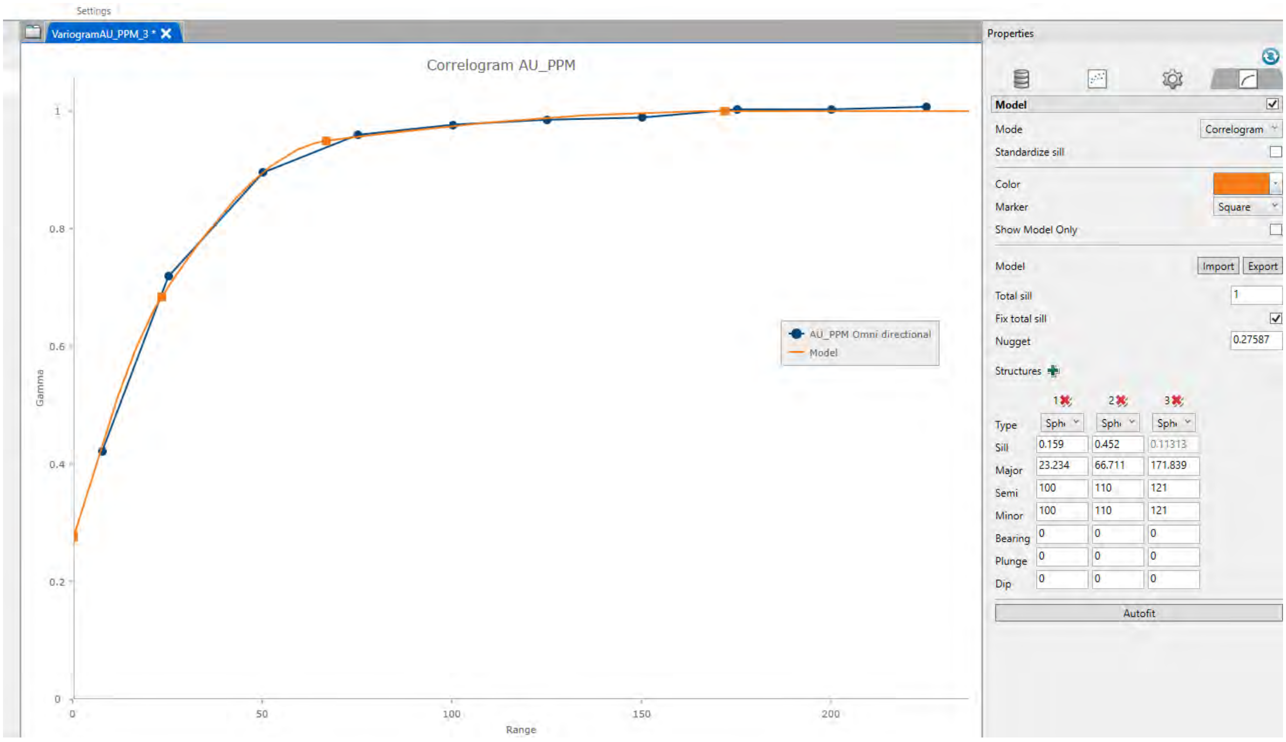
Figure 14-7: Omni directional Semi-variogram for the MUG diamond drilling data



14.7.2 WKP

The best model of the variability for this project is the vein interpretation. Given the variable drilling density across the WKP Project area not considered appropriate to develop any form of kriged estimate at this time. A robust omni-direction variogram has been modelled based upon the un-domained drilling data as shown in Figure 14-8. Given the challenges faced in modelling variograms of domained data in a narrow vein setting there has been no attempt to generate a kriged estimate of grade for this deposit. This is not regarded as a risk to this project as the site has significant experience reconciling Inverse Distance grade estimates to mill production and consequently has an established estimation methodology that can be demonstrated to be appropriate for the epithermal veins encountered at the site.

Figure 14-8: Omnidirectional variogram – WKP all data, Un-domained



14.7.3 GOP

GOP has been estimated utilising an Inverse Distance estimation method due to challenges faced in generating robust variograms for this deposit. This is again not regarded as a risk to this project as the site has significant experience reconciling Inverse Distance grade estimates to mill production.

14.8 Estimation / Interpolation Methods

The modelling process employed in the grade estimation for all the Waihi Projects is performed using numerous Vulcan and Leapfrog processes summarised in the steps outlined below:

1. Input data Validation;
2. Update lithological domains, geologic model construction;
3. Data selection, Drill hole data selection from the site AcQuire database;
4. Exclusion of unwanted drill holes by data type;
5. Flag data files by lithology;
6. Composite drill holes to fixed length composites within defined geological boundaries, typically 1m using length weighting;
7. Exploratory data analysis by domain, generation of domain and data type summary statistics;
8. Variography;

9. Assign top caps by domain and data type to input data files;
10. Block Model construction based upon lithological wireframes;
11. Run estimation for all domains for Au, Ag, As, Resource Classification;
12. Assign density, mining depletions, back fill grade, stripping of negative values from non-estimated blocks, assignment of grade to dilution domains; and
13. Classify model.

The model is estimated in Vulcan. Estimations were performed in individual lithological domains using length weighted down hole composites.

Vulcan software version 11.0 has been used to construct the MUG, MOP5, WKP and GOP estimation models. MineSight® software has historically been used to construct resource estimates for the MOP5 during past operations.

Sub-blocking with either OK or Inverse Distance weighting to the second power (ID2) is used for all underground models. Ordinary kriging in conjunction with tetra unfolding, has repeatedly produced outputs that are consistent with those achieved using ID2 and also produce acceptable reconciliation between resource and mill in the case of the underground projects that have been in production over the mine's recent history. The method of unfolding was adopted for the estimation of vein models as a way of dealing with the sinuous character of the veins.

The underground block models are rotated in bearing to align with the dominant strike of the veins and they are run using Vulcan software. Sub-blocking is used to define narrow veins and to maintain volume integrity with the geology solids. The grade estimation for all models is strictly controlled by the geology, with both sample selection and estimation of blocks limited to domains defined by the geology interpretation solids. Gold is estimated using one of the following methods; either - a single pass with a combined channel and drilling dataset; OR - two-pass estimation using a combined dataset with short search range first, then followed by a second pass using drillhole data only with longer search ranges to estimate blocks not estimated in the first pass.

14.8.1 MUG

The MUG block model dimensions, origin and cell size are provided in Table 14-8.

Table 14-8: Block Model Dimensions - MUG

Variable	X	Y	Z
Origin	395200	642200	500
Extents (m)	1600	1200	700
Block Size (Parent)	10	10	10
No. of Blocks (Parent)	340	190	140
Sub Block Size	1.0	1.0	1.0
Orientation	+65 degrees	X axis around Z	

For this model the vein domains were estimated using OK, tetra unfolding was employed for all domains to improve estimation locally in areas with complex vein geometries and to aid in resolution of the sample selection for the estimation.

Models are created using a standard block variable schema to enable capture of all relevant grade fields, Resource Classification evaluation data and geologic information. Parent block model variables captured are presented in Table 14-9. Mining evaluations are performed on a stripped-down version of the parent model, with all non-essential variables removed from the engineering model edition to assist in processing requirements.

Dilution domains where created based on a 5-metre halo around the veins and grades where assigned into these domains using mean grades for the dilutant domain.

An octant search was applied to all domains. Example estimation parameters used for the major domains are presented in Table 14-10.

Table 14-9: Listing of fields in the MUG Model

Model Field	Type	Default Value	Description
code	Short (Integer * 2)	-99.0	vein code
sg	Float (Real * 4)	2.5	density value =2.5
rescat	Byte (Integer * 1)	4	4=MI; 3=Inferred; 2=Indicated; 1=measured
rescat_nsamps	Short (Integer * 2)	0	Resource Classification # of samples
rescat_avedist	Float (Real * 4)	-99	Resource Classification average distance
rescat_nholes	Short (Integer * 2)	-99.0	Resource Classification # of holes
rescat_id	Float (Real * 4)	4	
mined	Byte (Integer * 1)	0	historic workings and subsidence
hdns	Byte (Integer * 1)	3	hardness code for pit
pit	Byte (Integer * 1)	99	pit phase
oxide	Byte (Integer * 1)	2	oxide surface
est_id	Integer (Integer * 4)	-99.0	estimation id
au_id_nsamps	Short (Integer * 2)	-99.0	number of samples used in id2 estimate
au_id_nholes	Short (Integer * 2)	-99.0	No of drillholes used to calculate block grade id2
au_id_avedist	Float (Real * 4)	-99.0	average distance to samples
au_id_ndist	Float (Real * 4)	-99.0	distance to nearest sample
au_nn_c1	Float (Real * 4)	-99.0	nearest neighbour estimate cut
au_nn_ndist	Short (Integer * 2)	-99.0	distance to nearest sample nearest neighbour
au_pref	Float (Real * 4)	-99.0	preferred au
au_ok_nholes	Short (Integer * 2)	-99.0	No of drillholes used to calculate block grade id2
au_ok_nsamps	Short (Integer * 2)	-99.0	No of samples
au_ok_avedist	Float (Real * 4)	-99.0	average distance to samples
au_ok_ndist	Float (Real * 4)	-99.0	distance to nearest sample
au_ok_k_var	Integer (Integer * 4)	-99.0	kriging variance

Model Field	Type	Default Value	Description
ag	Float (Real * 4)	-99.0	
as	Float (Real * 4)	-99.0	
geol	Name (Translation Table)	none	

Table 14-10: Estimation Parameters used in estimate – Major Veins

	1100	1201	1220	1221	1302	1305	1308	1400
Major Axis X	120	120	120	120	120	120	120	120
Semi-major Z	100	100	100	100	100	100	100	100
Minor - X (1)	1	1	1	1	1	1	1	1
Bearing	235	200	200	25	235	50	250	235
Plunge	0	0	0	0	0	0	0	0
Dip	-75	-75	82	50	-83	-88	-70	80
Discretisation XYZ	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3
min Samp	6	6	6	6	6	6	6	6
Max Samp	18	18	18	18	18	18	18	18
Samp per DH	3	3	3	3	3	3	3	3
Max samp/octant	9	9	9	9	9	9	9	9
High-Grade Restraining	na	na	na	na	na	na	na	na
Method	OK	OK	OK	OK	OK	OK	OK	OK
Tetra Model	1100.tetra	1201.tetra	1220.tetra	1221.tetra	1302.tetra	1305.tetra	1308.tetra	1400.tetra

(1) Tetra unfolding ranges for the across strike range are expressed as a relative proportion of the vein thickness

14.8.2 WKP

For the WKP deposit the grade was estimated into the sub celled blocks, future estimates will utilise parent cells of 10m x 10m x 10m, with minimum sub-block dimensions of 0.5m metres in each direction.

The raw assays are composited to one metre fixed lengths and “distributed” (1MD) across the vein width to eliminate very small remnant composites. The distributed method divides the vein interval into several equal length samples as close to the desired sample composite length as possible given the intercept width, this is an option available in the Vulcan® software.

The general approach to estimation for WKP is consistent with approaches used for other epithermal deposits in the Waihi Project area. Veins for the WKP Underground model were interpreted using Leapfrog software. Vein and geology wireframes were then utilised to construct a block model within Vulcan. Compositing of data for grade estimation is within distinct geological boundaries. For this model the vein domains were estimated using Inverse Distance estimation techniques. All domains are estimated using hard geologic boundaries, tera unfolding of the search ellipse and estimation parameters that have been calibrated based on the long operating history of the Waihi Project.

The WKP block model is rotated in bearing to align with the dominant strike of the veins. Sub-blocking is used to define narrow veins and to maintain volume integrity with the geology solids.

The grade estimation for all models is strictly controlled by the geology, with both sample selection and estimation of blocks limited to domains defined by the geological interpretation solids. Gold is estimated using a single estimation pass. The specific details for the WKP resource estimate such as block model dimensions, origin and cell size are provided in the tables below.

Table 14-11: Block Model dimensions - WKP

Variable	X	Y	Z
Origin	2759700	6429325	-345
Extents (m)	900	1000	620
Block Size (Parent)	10	10	10
No. of Blocks (Parent)	280	164	62
Sub Block Size	0.5	0.5	0.5
Orientation	+100 degrees	X axis around Z	

Table 14-12: Listing of fields in model

Model Field	Type	Default Value	Description
code	Integer (Integer * 4)	0	vein code
sg	Float (Real * 4)	2.5	density value = 2.5
au_id	Float (Real * 4)	-99.0	au ID2 estimated value cut
ag_id	Float (Real * 4)	-99.0	ag OK estimated value cut
au_id_u	Float (Real * 4)	-99.0	au ID2 estimated value uncut
res_cat	Byte (Integer * 1)	4	classification 2= Ind; 3 = Inf, 4=mineral inventory
au_samps_id	Integer (Integer * 4)	-99.0	number of samples used in estimate ID2
au_dist_id	Float (Real * 4)	-99.0	Weighted average distance of samples for ID2
rescat_id	Float (Real * 4)	-99.0	
rescat_avedist	Float (Real * 4)	-99.0	
rescat_nsamp	Float (Real * 4)	-99.0	
rescat_nholes	Float (Real * 4)	-99.0	
au_id_nn	Float (Real * 4)	-99.0	nearest neighbour Au

14.8.3 GOP

The GOP deposit is estimated in Vulcan, the model is constructed using a regularised block size of 2.5m in all dimensions. The grade is estimated into the regularised blocks with Inverse Distance interpolation. Estimations were performed in individual lithological domains using 1m length weighted down hole composites for all vein-based domains and 2-metre length weighted composites for the lithological domains, (Andesite and handing wall breccia).

The raw assays are composited to one metre fixed lengths and "distributed" (1MD) across the vein width to eliminate very small remnant composites, a separate compositing file is generated using a 2meter composite length for estimation of the lithological domains. Vein boundaries are treated as hard contacts in compositing, model construction and in grade estimation. The distributed method divides the vein interval into several equal length samples as close to the desired sample composite length as possible given the intercept width, this is an option available in the Vulcan® software.

14.8.4 MOP5

MOP5 deposit is estimated in Vulcan, the model is constructed using a sub-blocked model of 2.5m dimensions in all directions. The model is however, regularised into a 5-metre cell size prior to pit optimisation assessment. The grade is estimated using OK and parent cell estimation.

Estimations were performed in individual vein domains using 1.5 m length weighted down hole composites for all vein-based domains and 3-metre length weighted composites for the lithological (bulk) domains.

The raw assays are composited to 1.5 metre and 3-metre fixed lengths and "distributed" (1MD) across the vein width to eliminate very small remnant composites. Vein boundaries are treated as hard contacts in compositing, model construction and in grade estimation. The distributed method divides the vein interval into several equal length samples as close to the desired sample composite length as possible given the intercept width, this is an option available in the Vulcan® software.

Table 14-13: Block Model dimensions - MOP5

Variable	X	Y	Z
Origin	395150	642330	500
Extents (m)	1700	950	700
Block Size (Parent)	5	5	5
Sub Block Size	1.25	1.2	1.25
Orientation	+65 degrees	X axis around Z	

Table 14-14: Estimation Parameters used in estimate - Major Veins MOP5

	1100	1201	1220	1221	1302	1305	1308	1400
Major Axis X	120	120	120	120	120	120	120	120
Semi-major Z	100	100	100	100	100	100	100	100
Minor - X (1)	1	1	1	1	1	1	1	1
Bearing	56	18	25	28	55	55	70	57
Plunge	0	0	0	0	0	0	0	0
Dip	-75	-85	82	50	-83	-88	-70	80
Discretisation XYZ	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3	3,2,3

min Samp	4	4	4	4	4	4	4	4
Max Samp	16	16	16	16	16	16	16	16
Samp per DH	3	3	3	3	3	3	3	3
Max samp/octant	6	6	6	6	6	6	6	6
High-Grade Restraining	na	na	na	na	na	na	na	na
Method	OK	OK	OK	OK	OK	OK	OK	OK
Tetra Model	1100.tetra	1201.tetra	1220.tetra	1221.tetra	1302.tetra	1305.tetra	1308.tetra	1400.tetra

(1) Tetra unfolding ranges for the across strike range are expressed as a relative proportion of the vein thickness

14.9 Resources Classification

The Resource Classification is based on an assessment of average drilling density.

There is significant experience in mining and assessing the continuity of mineralisation in the Waihi District epithermal vein setting, this vein style mineralisation has a strong visual control and is well understood and has demonstrated continuity over significant ranges.

An estimation run is undertaken utilising the three closest drill holes intersecting the domain of interest, the average distance to the three closest drill holes used to estimate the block is then stored to form the basis for classification.

The Martha UG Project uses an average spacing to three drill holes of 60m for Inferred and 40m for Indicated Resources. Any mineralised backfill is not classified or inclusion within the Mineral Resource due to uncertainty in both the continuity and the distribution of grade within the back filled stopes.

The East Graben Vein zone of the WKP Project has been intersected in drilling over a strike length of ~1km, this structure is larger than those typically encountered in the Waihi Project area and on this basis the average drill hole spacing required for classification as an Inferred Resource on the EG vein structure has been increased to 70m average distance to the three closest drill holes. An average drill spacing of three holes within 50 metres was used as the basis for classification as Indicated Resource for the EG structure. All other WKP mineralisation has been classified using a distance threshold of 60m to the three closest drill holes for classification as Inferred.

For MOP 5 an average drill hole spacing of 60 meters to the three closest drillholes on the major mineralised veins for classification as Inferred and a spacing of 35 meters for classification as Indicated Resource. A tighter spacing of 22.5m has been implemented for classification as Indicated Resource for the non-vein-based domains, typically these are more complicated zones exhibiting strong brecciation and/or stockwork veining. As with MUG any mineralised backfill is not classified or inclusion within the Mineral Resource due to uncertainty.

The Gladstone deposit is classified using an average drill hole spacing of 60 meters to the three closest drillholes on the major mineralised veins for classification as Inferred Resource and a spacing of 35 meters for classification as Indicated Resource. A tighter spacing of 22.5m has been implemented for classification as Indicated Resource for the non-vein-based domains, typically these are more complicated zones exhibiting strong brecciation and/or stockwork veining.

The resource estimate outlined in this document appropriately reflects the Competent Person’s view of the deposit.

14.10 Block Model Validation

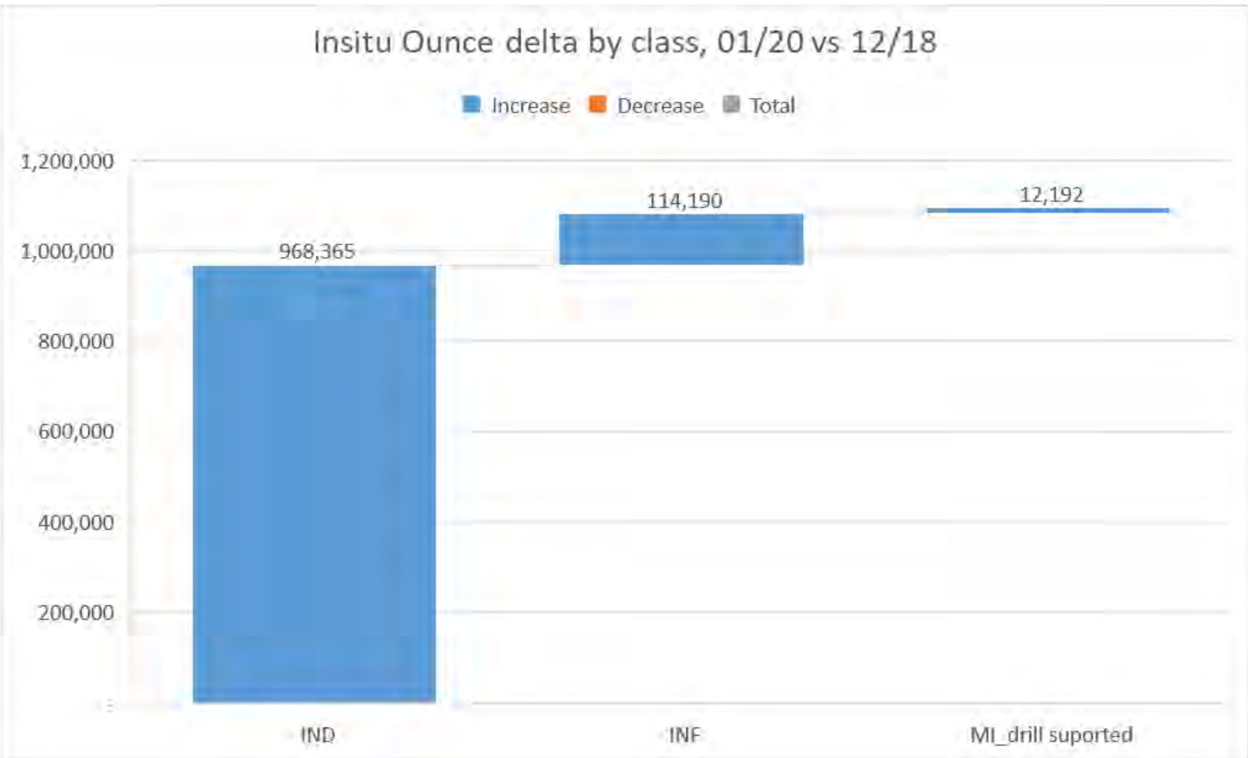
14.10.1 MUG

Numerous methods have been used to validate the r0120 MUG resource model, including the following:

- Validation of the new data;
- A review of the interpretation, including classification shapes;
- A review of the methodology;
- A review of the EDA work, including variography and search neighbourhoods;
- Global grade and tonnage comparisons with the previous model;
- A visual sectional validation of the block model with interpretation and drilling;
- A comparison of tonnes and grade of the LOM shapes and upcoming pit / stope designs will be provided upon completion of preliminary design work; and
- Swath plots are generated, blocks selected for comparative evaluation relative to the samples database are limited to blocks estimated in the first pass, blocks below the Phase 4 consent pit and exclude historic mined blocks. Axis values are relative to the model origin, 395150 x, 642330 y and 500 z. The variance in observed output for the drift analysis is a result of not estimating blocks within the depleted portion of the open pit and thereby restricting the block the model data.

Comparative assessment of the model relative to previous estimates indicates only modest changes between estimates in the total in-situ resource however, a closer assessment of the influence of the infill drilling undertaken in 2019 highlights the increase in resource confidence. The geologic model underpinning the estimate has not changed significantly, the number of veins forming the basis for the geological interpretation has increased slightly and the additional drilling has resulted in an increase in higher confidence resource, both Indicated and Inferred Resource having grown substantially since the previous estimate as shown in Figure 14-9 and Figure 14-10. The increase in drilling data has further reduced the relative influence of the lower quality historic cross cuts, particularly local to the drill positions. Note that Mineral Inventory (MI) is shown in both Figure 14-9 and Figure 14-10 for explanatory purposes only, MI is not a recognized resource category and is not included in resource tabulations or mining schedule for the PEA.

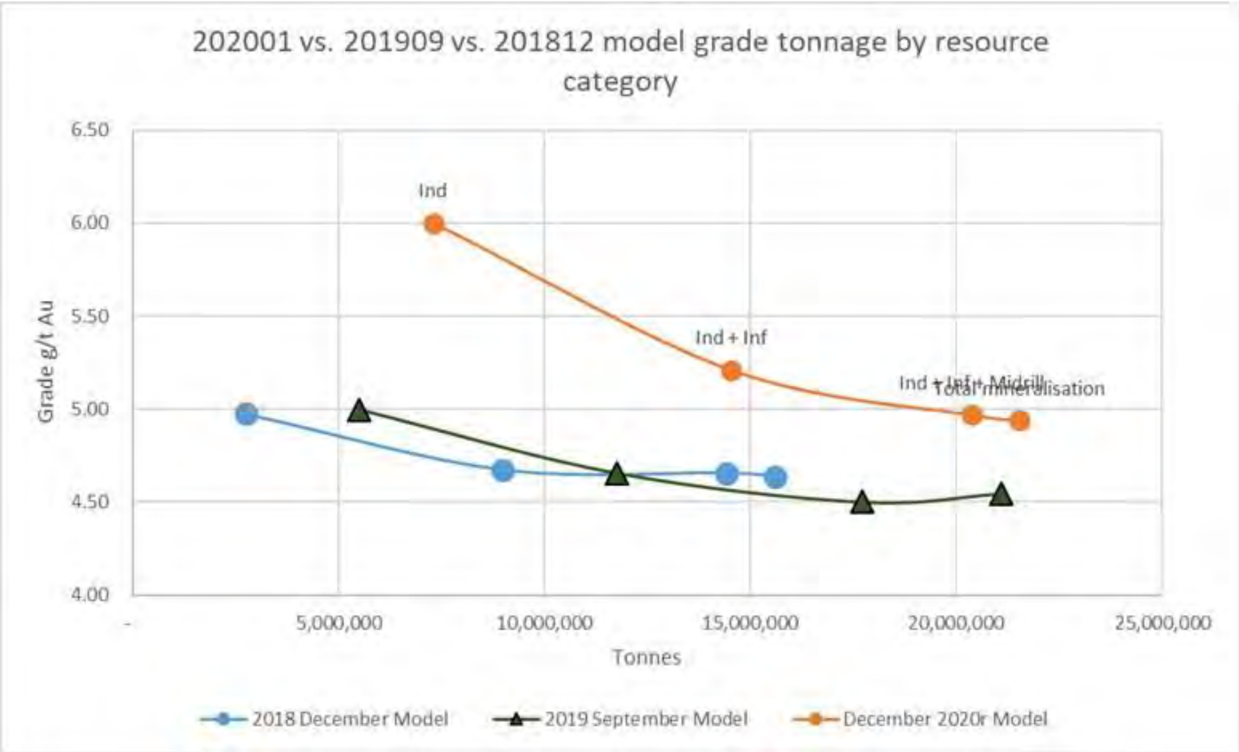
Figure 14-9: Mineralisation confidence increase by tonnage Jan 2020 relative to Dec 2018 by category



The model has been compared to previous *r1218_MUG_FNL.bmf* model. The grade tonnage curve,

Figure 14-10, provides a view of the increase in confidence of the in-situ mineralisation as a consequence of drilling completed into the project in 2019, this is prior to an assessment of the prospect of economic extraction and is therefore illustrative of the increase in confidence of the model only.

Figure 14-10: Relative confidence for in-situ mineralisation by model iteration 2019



A comparison between the current models and the end of 2018 estimate for Indicated and Inferred material coded to below the envisaged pit shape is presented in Figure 14-11. This comparison shows the increase in Indicated and Inferred material available because of drilling completed during 2019

Figure 14-11: MUG Grade Tonnage Curve Comparing r0120 to r1218

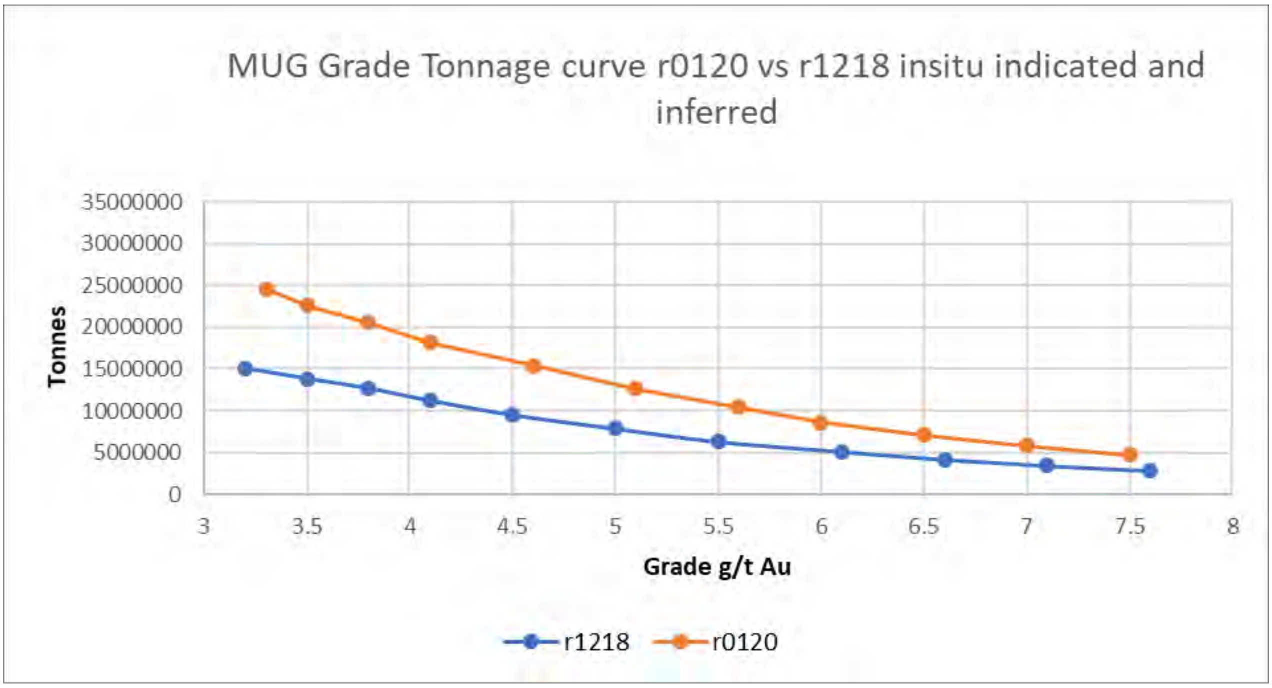
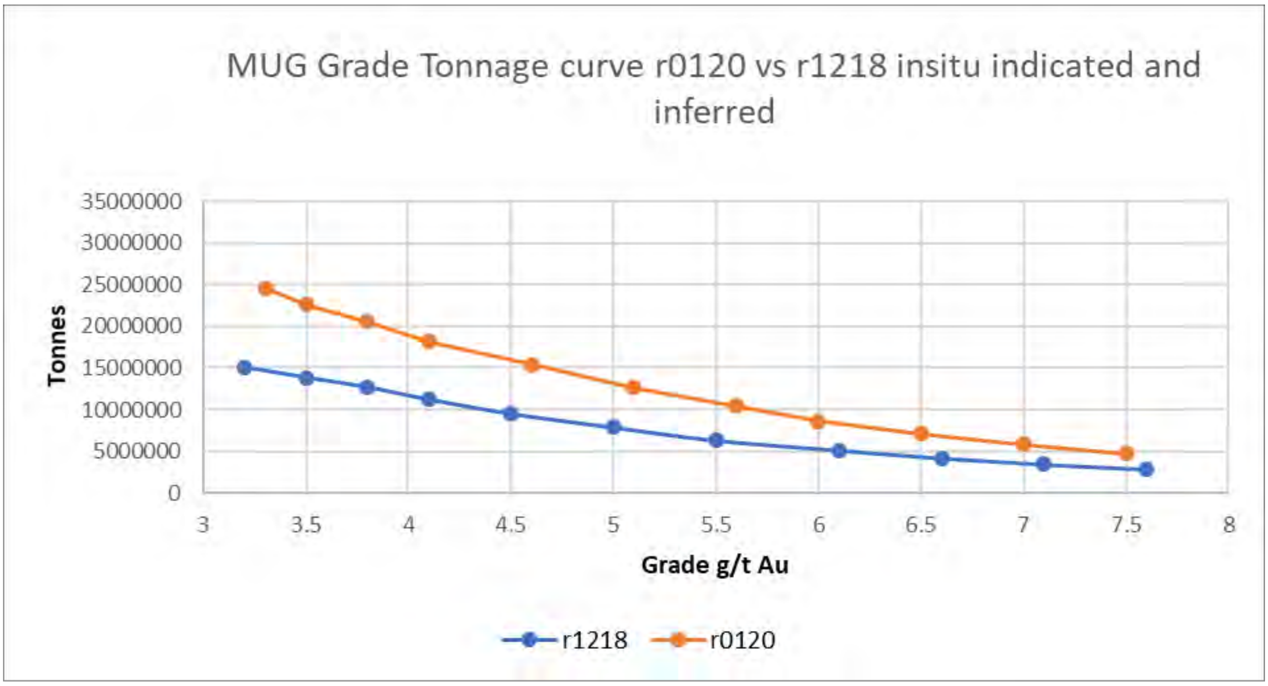


Figure 14-12: MUG Grade Tonnage Curve Comparing r0120 to r1218_MUG all material

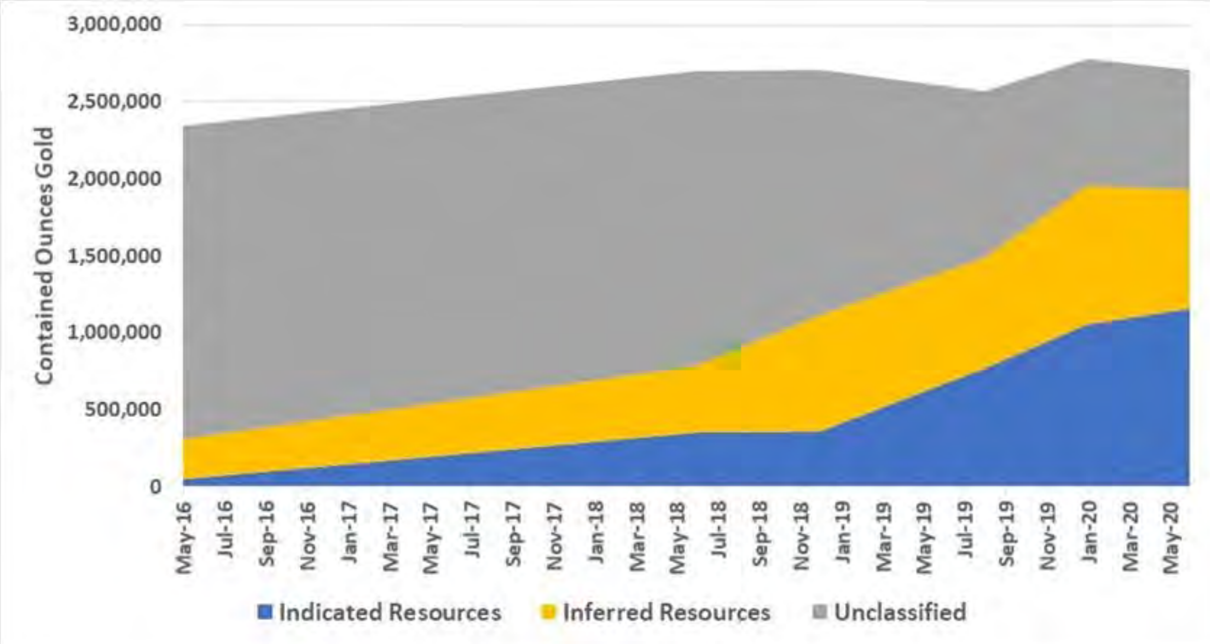


The resource development profile for MUG since 2016 is shown in Figure 14-13 and reveals a rapid progression from unclassified mineralisation[4] to Inferred Mineral Resources and subsequently to Indicated Mineral Resources.[5] This chart is significant in that it shows the veracity of the estimates, even prior to significant infill drilling. The high resource conversion rate reflects the extent to which MUG estimates are defined by the underlying geological interpretation. In the case of unclassified mineralisation, the geological models are commonly constructed on the basis of pre-1953 data with very limited subsequent diamond core drilling. As additional drilling is completed in these areas, improved local estimates result and the geological models are refined. At this stage they are converted to Inferred Mineral Resources with a large component of resource risk already reduced.

[4] For clarity, unclassified mineralisation is not a publicly recognised resource reporting category and was not used in the PEA. It is represented here graphically only to illustrate the importance of the underlying geological interpretation to support the resource estimates. A proportion of the unclassified mineralisation has previously been included in reported Exploration Targets after careful consideration. To-date infill drilling has confirmed the Exploration Target.

[5] Note that drilling specifically targeted to convert Inferred Resources to Indicated Resources only commenced in 2019 and is reflected in an upward inflection in conversion rate.

Figure 14-13: MUG resource Conversion History



The veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion mean that OceanaGold consider Inferred Mineral Resources at MUG to carry lower risk than might be the case for development projects elsewhere.

Additionally, the average drill hole spacing for MUG Inferred Resources is 48m which is 20% larger than the threshold of 40.5m required by OceanaGold for Indicated Resources. This does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme.

With all of the considerations above, OceanaGold believe that there are reasonable grounds to include MUG Inferred Resources for the purposes of mine scheduling.

14.10.2 WKP

Numerous methods have been used to validate the WKP0120 resource estimate, including the following:

- Validation of the new data;
- A review of the interpretation, including classification shapes;
- A review of the methodology;
- A review of the EDA work, including variography and search neighbourhoods;
- Global grade and tonnage comparisons with the previous models; and
- A visual sectional validation of the block model with interpretation and drilling.

Drilling during 2019 into the WKP Project focused on infill on the primary EG Vein structure. As seen in the global grade tonnage curve Figure 14-14, there has been relatively little change in the overall mineralisation defined for this project. When confidence in the resource is considered Figure 14-15, however, it is apparent that there has been a significant upgrade in resource confidence on the back of the work completed on this project in 2019.

Figure 14-14: In-situ Grade Tonnage curves all material Dec 2019 vs Feb 2019

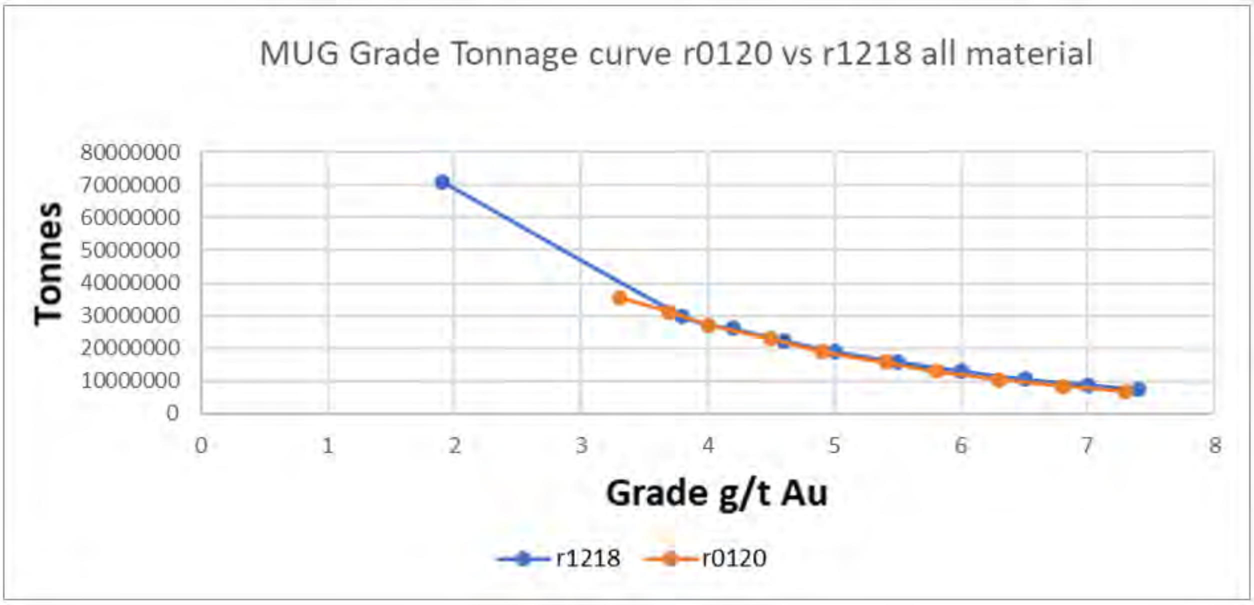
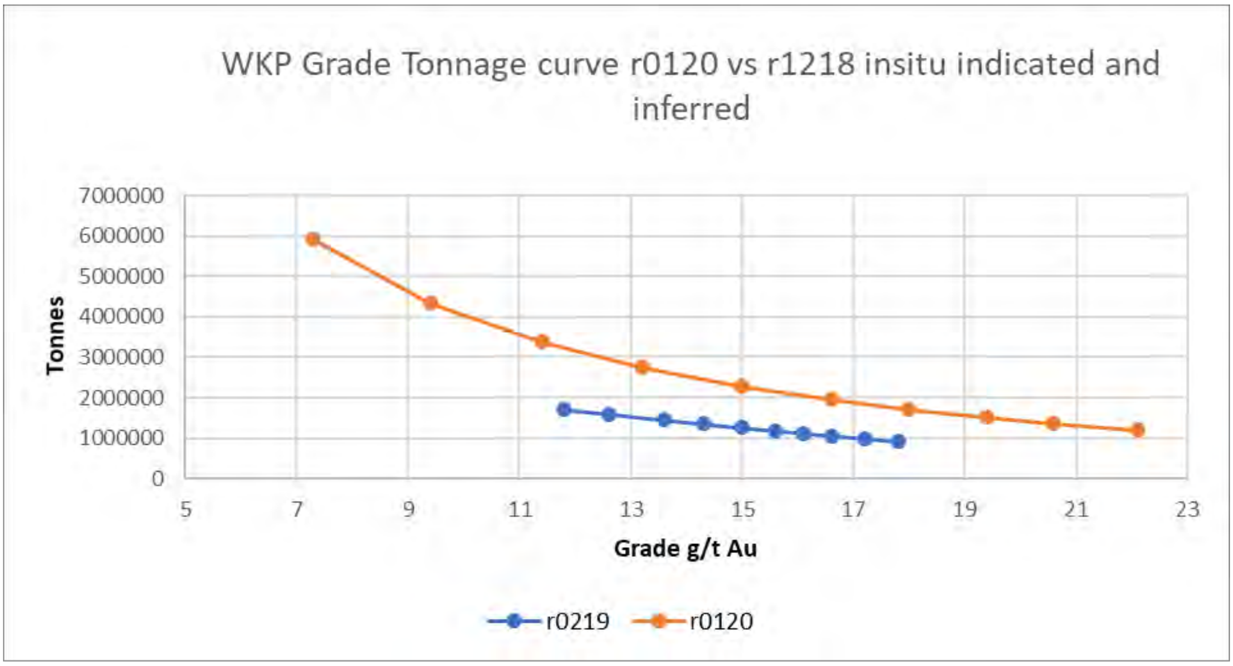


Figure 14-15: In-situ Grade Tonnage curves Indicated and Inferred combined Dec 2019 vs Feb 2019



14.10.3 Grade Control and Definition Strategies

Ongoing resource definition drilling is planned to be undertaken throughout 2020 and beyond for all projects on an as required and as appropriate basis.

Ongoing drilling is being undertaken into MUG. This drilling is planned as a combination on infill and extensional resource delineation. There is an integrated planning process that involves assessment of resource risk, economic considerations and mine development sequencing to ensure areas with elevated resource risk are identified and de-risked through drilling in a sustained an appropriate manner.

Grade Control strategies for MUG will be consistent with those used for previous underground mine developments in Waihi including

- Monitoring and identification of local high-risk geological area, infill diamond drilling of these risk areas as required; and
- In-cycle mine develop monitoring, mapping, sampling, geologic data capture and model development on individual lodes as they are developed to ensure appropriate risk management.

Planned WKP drilling has been impacted in 2020 however, there are planned extension and infill drilling activities for 2020 and beyond. Grade control activity will be undertaken via infill drilling upon attaining underground access to the project area. In-cycle grade control processes will continue to be similar to those used for other underground mine projects developed in Waihi.

Open pit grade control practices will be based on protocols used previously at Waihi with RC drill sampling of open pit deposits at appropriate drill spacing to guide ore selection at a mining scale

14.11 Resource Estimate

A summary the Mineral Resource Estimates is provided in Table 14-15.

Table 14-15: Summary of Mineral Resources as at January 1, 2020

	Indicated			Inferred		
	Inventory (Mt)	Grade (g/t Au)	Cont., Metal (Moz)	Inventory (Mt)	Grade (g/t Au)	Cont., Metal (Moz)
MUG	4.43	5.2	0.74	3.78	4.63	0.56
MOP5	3.98	2.0	0.25	4.85	1.87	0.29
GOP	2.77	1.6	0.14	0.59	1.06	0.02
WKP	0.98	13.	0.42	1.93	11.56	0.72
Total Resources	12.15	3.99	1.56	11.15	4.44	1.59

Note

- MUG Resources are reported below the MOP5 design and are constrained to within a conceptual underground designed based upon the incremental cut-off grade of 2.15 g/t which is defined at a gold price of NZD$2,083/oz (US$1,500/oz @ USD:NZD 0.72);
- WKP Resources are constrained to within a conceptual underground design based upon the cut-off grade of 2.5 g/t Au which is defined at a gold price of NZD2,083/oz (US$1,500/oz @ USD:NZD 0.72);
- The tabulated Resources are estimates of metal contained as troy ounces;
- No dilution is included in the reported figures and no allowances for processing or mining recoveries have been made;
- All figures are rounded to reflect the relative accuracy and confidence of the estimates and totals may not add correctly; and
- There is no certainty that Mineral Resources that are not Mineral Reserves will be converted to Mineral Reserves.

14.12 Risks

The Mineral Resource Estimates that form the basis of this report are based on a number of assumptions and are subject to a variety of risks and uncertainties which could cause actual results to differ from those reflected in this report. Potential geologic risks include unusual or unexpected geological complexities, variation in estimation and modelling of grade, tonnes; geologic continuity of mineral deposits, the possibility that future exploration, development or mining results will not be consistent with expectations and the potential for historic mine workings to be materially different to that assumed in these studies.

Indicated and Inferred Mineral Resources both have inherent risk, The term "Inferred Mineral Resource" refers to that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity.

The term "Indicated Mineral Resource" refers to that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The geological and grade continuity to be reasonably assumed.

The orebodies within the Waihi Project area are geologically complex and in some instances are difficult to fully drill test. WKP has limited consented drill platforms, deeper portions of the Martha system are at challenging drill intersection angles and the town infrastructure and pit highwalls overlying the MOP5 Project place limitations upon the ability to fully drill test the deposit, Notwithstanding this, Waihi has a strong operational history and the risks are considered to be in line with those dealt with throughout the operations past history, these risks are thought to be well understood and actively managed

The veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data and the experienced technical team at Waihi, mean that OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere. The reliability of Inferred Resources is reflected in the high resource conversion rates of Inferred Resources during development at Waihi.

The Martha deposit has been mined historically and there are extensive voids from both historic level development and stoping, both open and backfilled. There has been significant effort invested in de-risking the influence of the historic mining and the potential impact of this on both grade estimation of in-situ Mineral Resources and on planned future activity however, risks associated with the historic workings cannot be fully mitigated at this time. Ongoing efforts to define the nature of the voids and the potential impact on the proposed mine will be required throughout the course of the Martha Project.

15 MINERAL RESERVE ESTIMATES

Mineral Reserves are not being reported for the project as the PEA includes Inferred Mineral Resources.

16 MINING METHODS

16.1 Mineral Resources Considered in the Mining Plan

Mill feed refers to the Mineral Resources material in the LOM plan, are drawn from the four separate mining sources, the MOP5 and MUG, the GOP located close to the process plant and WKP Project. The four projects are in separate phases of development, the Martha Open Pit has been in production from 1988 through to 2015, development of MUG commenced in 2019 accessed from the existing underground mines, GOP is undeveloped and WKP is a green fields project.

The mill feed has been derived from 51% Indicated and 49% Inferred classified resource (no Measured resource currently exists). In addition, regulatory approvals to enable some of the proposed developments to take place are yet to be received. Inferred Mineral Resources are considered to be too geologically speculative to have mining and economic considerations applied to them to be categorised as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realised.

As discussed in Section 14.10, OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere. This is based upon the veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion. Additionally, in the case of MUG which provides over 90% of the PEA mill feed planned for the first 6 years, the average drill hole spacing for Inferred Resources is 48m which is only 20% larger than the threshold of 40m required by OceanaGold for Indicated Resources. This drill hole spacing does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme.

The modifying factors are well understood and are based on over 50 independent studies which have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 years comprising air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, Iwi, landscape, mine design, mine planning, noise, pit lake limnology, property values, pumphouse, social impact assessments, surface stability, tailings disposal, traffic, vibration, water management and, hydrogeology.

OceanaGold and its predecessors, have extended the original permitted Martha Pit Project with Mineral Reserves of 0.7Moz, (extracted from 1988 to 1997) to extract 2.1Moz. (from 1988 to 2015) through ongoing conversion of Resources focused on the same vein zones. In addition, nearby underground resources have been successfully converted to extract 1.1Moz. over the last fifteen years.

Taking these factors into account, OceanaGold believe that there are reasonable grounds to include Inferred Resources for the purposes of mine scheduling and determining the Mill Feed estimate.

Cautionary Statement

There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the PEA target itself will be realised Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

16.2 MOP5

16.2.1 Geotechnical Assessment

The open pit geotechnical conditions are impacted by the presence of extensive historic mine workings, particularly on the south and east walls of the pit. Caving initiated during historic mining has resulted in zones of poor-quality rock mass within and outside of the pit slope limits. There has been ongoing large-scale block movement over the last 70 years and this large-scale block movement is expected to continue into the caved zones in the future. Geotechnical consideration is given to concurrent mining of the MOP5 with MUG.

PSM reviewed the design inputs into the slope model for the optimisation in their desktop review, report PSM125 248R, “Phase 5 Scoping Study, Preliminary Geotechnical Appraisal”, 2016 and concluded:

- There are no "fatal flaws" in the planned mining;
- The slopes used to date are appropriate for the conditions at the level of study;
- The effect of historic workings on the slopes has been assessed and there are some areas where design modifications and or remediation will be required as part of future design works;
- However, overall Phase 5 will be the first pit excavated at Waihi where most of the slopes are outside historic underground cave and subsidence affected rock masses. This means there is probably significant upside potential in many of the deeper slope sections;
- Although geotechnical drill hole coverage is limited, this is not considered an issue because there is substantial cored exploration drill hole coverage in most areas of the Phase 5 pit;
- Notwithstanding the points above, there are information gaps in some upper walls; geological structure to the south; and general geological structure in some other walls that will need to be addressed in future studies.

The pit slope wall angles were generated for three separate sub-regions based on different rock units calibrated with existing pit slopes and comprise.

- An oxide/ weathered zone based on base of andesite and altered andesite observed in the south-east wall and northern walls;
- A weaker andesite zone on the southern and south-west walls of the pit, disturbed by historic underground mining (comprising caved and disturbed andesite’s); and
- A stronger quartz andesite undisturbed by historic mining generally confined to the north and north-western walls.

The design slopes for the MOP5 cutback are shown in Table 16-1.

Berm intervals are generally 20meters below 1090 mRL and 15m above 1090 mRL. In the past slopes to the south and south-west have been flatter due to effect of historic workings on the rock mass quality, the proximity of the town and presence of argillic andesite, Slopes to the east are the shallowest slopes due to presence of the post-mineral sediments comprising tuffs and alluvial layers as well as a weaker andesite unit.

Table 16-1: MOP5 Pit Slope Design Criteria

Bench (mRL)	Berm width	Face Height	South / West Walls	North-West Walls	North-East / South-East Walls	East Wall
1135 to 1150	5	15			35	
1120 to 1135	5	15	25		35	
1103.5 to 1120	5	16	30	35	35	30
1090 to 1103.5	7	14	45	55	60	35
1070 to 1090	7	20	45	65	60	30
1050 to 1070	7	20	50	65	55	45
1030 to 1050	7	20	55	65	55	55
1010 to 1030	7	20	55	70	55	45
990 to 1010	7	20	55	70	55	50
970 to 990	7	20	55	70	55	50
950 to 970	7	20	55	70	55	50
930 to 950	7	20	55	70	55	55
910 to 930	7	20	60	70	55	60

Bench (mRL)	Berm width	Face Height	South / West Walls	North-West Walls	North-East / South-East Walls	East Wall
Below 890	7	20	60	70	60	60

16.2.2 Hydrogeology Assessment

GWS Limited Consulting (GWS) have modelled the groundwater system in Waihi since the late 1980s. In terms of Martha Pit, GWS report that:

- The MOP5 is already dewatered by the Correnso workings and the MUG. No additional dewatering will be required for the open pit;
- Any pit wall run-off captured in the base of the pit that is not lost or diverted into the underground will be removed by diesel pumping units and pumped into the historic workings or delivered to the WTP for treatment prior to discharge to the Ohinemuri River under the existing treated water discharge consent; and
- The walls in the current pit have been depressurised using horizontal drain holes generally 20m long but up to 100-metres long. Drain holes in the existing east wall targeted bases of paleo-valleys and extracted up to 60 l/sec during drilling. The dewatering has been monitored with a network of piezometers around the pit perimeter. This practice should continue as required.

16.2.3 Mining Method

MOP5 operated between 1988 and April 2015 when a localised failure of the north wall occurred which undercut the main access ramp and operations were suspended. MOP5 pit cutback will follow the mining methods employed between 1988 and 2015.

The open pit mining process at MOP5 has been determined largely by the consents granted to the company for the previous pits. Mill feed and waste will be mined by conventional drill, blast, load and haul methods from the open pit. Mining is categorised into hard and soft material and waste further categorised into potentially acid forming or non-acid forming rock. RC grade control drilling to an approximate 10m x 5m pattern with 1.5m down hole sample lengths will be used to delineate the mill feed. Drill holes will be inclined to the north.

Mill feed will be blocked out based on this sampling and will account for the capacities of the equipment to selectively mine these blocks.

Soft material will be ripped by D9 dozer and harder material blasted. Strict controls on blast vibration will determine the blast hole spacing and the maximum allowable charge weight per delay. Material will generally be blasted in 5m vertical intervals (two flitches), but blast vibration limitations may require some blast holes to be drilled at 2.5m vertical intervals. Electronic detonators will be used in all holes to ensure detonation of charges occur as per the design sequence. The company will be required to monitor each blast vibration for conformance.

Initial mining operations will likely use small equipment until the pit perimeter is established and mining operations are below the crest. Small equipment will likely comprise 50t excavators and 50t articulated trucks.

Once the pit rim is established, all mined material will be loaded via 110 or 190t backhoe excavators into 85 tonne rear dump trucks and trucked via a 1 in 10 ramp and generally direct tipped to a jaw crusher or low profile MMD crusher via a bin and apron feeder. Small quantities of mill feed and waste rock may be temporarily stockpiled close to the crushers to accommodate the campaigning of the different types of material along the conveyor.

The presence of historic workings in the open pit will require probe drilling to identify voids or weak pillars which create both a safety hazard and an operating constraint. Underground voids will, be either bunded off or marked with hazard tape. Excavators and trucks will be required to operate around the void working in towards the void. This process can at times influence the bench extraction sequence.

Except for selected waste rock that is sent direct to MUG to backfill stopes and historical voids via the southern pit portal or fill pass all mill feed and waste rock will be crushed. Mill feed will be conveyed 1.5 km to the process plant and placed in a 40,000t stockpile. The PPS, up to 1 Mt capacity, is available for excess material and/ or underground backfill awaiting carting underground. Waste rock will be conveyed 2.0 km to the rock and tailings storage area (RTSA) loadout for construction of the Tailings Storage Facility 3 (TSF3) or the NRS or conveyed 1.5 km to ROM stockpile area and backhauled to the GOP portal stockpile.

The minimum mining width will be set at 3m wide, determined by the expected width of many of the small narrow veins to be mined. Equipment was sized to suit these design parameters.

It is anticipated that the working hours within the open pit, adjacent service facilities and conveyor corridor will be restricted to:

- Monday-Friday 0700-2100
- Saturday 0700-1200

The pit will not operate on public holidays or Sundays.

Blasting will generally be between 10am and 3pm on working days, but at the western end of the pit close to the Central School, blasting may be carried out between 4pm and 5pm such that it is outside of school hours.

16.2.4 Cut-off Grade and Modifying Factors

The cut-off grade is based on metal price of NZD 2,142 per ounce of gold. NZD 26 per ounce for silver is applied as a by-product credit to the operating costs. Inputs to the calculation of cut-off grades for MOP5 include mining costs, metallurgical recoveries, treatment and refining costs, general and administrative costs, royalties. A metallurgical recovery of 90% been used for the mill feed cut-off grade calculation.

The cut-off grade used to determine the mill feed for the open pit was 0.55 g/t Au (mill constrained) and 0.5 g/t Au (mine constrained).

No mining dilution or mining recovery factors have been applied to the geological model due to:

- The mineralised zones are broad on each mining bench, and the overall dilution edge effects are minimal, with the result that there is little difference between the overall in situ and diluted tonnes and grade;
- The Mineral Resource block model has a block dimension which is larger than the optimum selective mining unit (SMU), and
- Historical reconciliation between the mill, grade control and exploration data has shown good correlation over the last 30 years.

16.2.5 Mine Design

The MOP5 cutback was developed from a Whittle optimisation carried out in 2016 and further validated in 2017. Inputs comprised a maximum 7 Mt per annum operation and 1.5 Mt per annum processing throughput.

Open pit slopes were generated for separate rectangular sub-regions based on different rock units calibrated with existing pit slopes and with allowance for haul roads. Processing and administration costs were estimated from the existing Waihi Operation. Mining costs were based on actual mining costs from 2006 to 2007 when the Martha Pit was operating at moderate production rates escalated by the Consumer Price Index (CPI).

The Whittle optimisation and the optimum pit selected considered the proximity of the pit to the Waihi township, social and environmental constraints and the need for high geotechnical factors of safety and limits on encroachment.

MOP5 will be mined in a single top-down sequence as the new ramp is developed anti-clockwise around the pit. There are no requirements for temporary ramps or in-pit backfill. The pit does encroach towards the town centre, residential and low-density residential zones, and for this reason it is proposed to apply for a plan change to the Hauraki District Plan to provide for this component of the project.

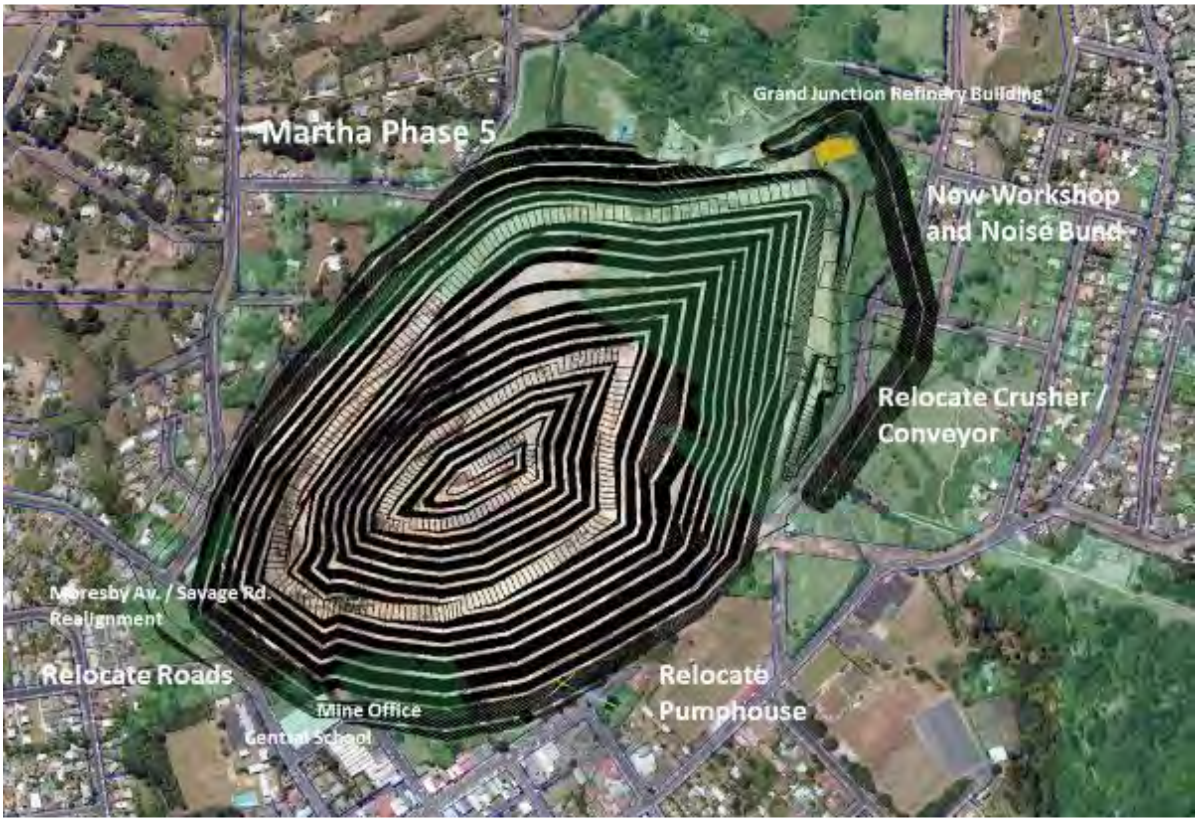
MOP5 will require the further relocation of the historical Cornish pumphouse.

Key points of note are:

- A constraint has been placed on the cutback of the western pit wall so as not to encroach into the Moresby Avenue reserve and the Central School grounds;
- Mining provides rock to backfill the underground mine and to construct TSF3, GOP TSF and the NRS;
- Operations require relocation of the existing crusher and belt conveyors from the existing crusher slot to a new crusher slot, 70m to the east and installation of a new MMD crushing facility;
- Relocation and enlargement of the noise bund beyond Grey Street into Slevin Park and construction of a noise bund along the remaining MOP5 pit rim is required;
- Partial realignment of the Eastern Stream is required; and
- Relocation and re-establishment of the open pit office block, fuel bowser, substation, workshop, wheel wash and magazine are required.

The pit configuration is shown in Figure 16-1.

Figure 16-1: Plan of Martha Phase 5 Pit



MOP5 waste includes non-acid forming (NAF) and potentially acid forming (PAF) rock.. All mill feed will be transported by conveyor to the Mill ROM stockpile. Waste rock will be mainly transported by conveyor to the rock and tailings storage site for use in the TSF3 embankment and the NRS. However, some rock will be transported either by fill pass or by truck to MUG for use as backfill.

The final dimensions of the open pit on completion of MOP5 are:

- Pit area - approximately 66 Ha;
- Pit depth - approximately 316 m;

- Pit floor level - approximately 840 mRL;
- Pit length x breadth - approximately 1,115 x 830 m; and
- Total volume - approximately 59 Mm^3.

Mining within the MOP5 pit commences in year 6 of the proposed LOM schedule, starting on the north wall, to provide backfill for the underground mine and construction material for the crest raise on TSF2.

16.2.6 Crusher ROM Activities

Other than crushing and conveying, ROM activities will also consist of:

- Sorting tramp steel and timbers from the historical workings and stockpiling for transport off-site;
- Temporary stockpiling of material close to the noise bund; and
- Operation of a front end loader to reclaim this stockpiled material and load into the crusher/conveyor system.

The top of the stockpile is maintained at a maximum level of 3m below the top of the noise screen and will involve stockpiling and reclaiming activities over the life of the project. It is designed for a maximum capacity of 200,000 tonnes.

16.2.7 Materials Handling

Since 1988, materials handling has used conventional belt conveyors between the open pit and process plant and the waste development/ TSF site. AECOM were commissioned in 2016 to conduct a Scoping Study for the MOP5 materials handling system with the scope of work including:

- High level review of the 1996 MAMIC study to establish if the conclusions reached are still valid for MOP5;
- Screen initial concepts using a weighted value analysis to +/-50% accuracy capital and operating costs and implementation schedules; and
- Screen the selected options further using +/-30% accuracy capital and operating costs.

In terms of the 1995 MAMIC study, AECOM concluded the reports are still valid, apart from:

- The use of a single sizer for crushing may be an option in lieu of using a Stamler feeder breaker and jaw crusher;
- Trucks could be used to direct transport uncrushed waste, thereby saving on crushing costs; and
- Railveyor© and Ropecon© are technologies developed since the 1996 study and should be evaluated.

To establish if the above technologies presented any opportunities for MOP5, several options and sub-options were investigated, including:

- Reuse of the existing conveyor system, different crusher configurations;
- Off-road and on-road trucks;
- Railveyor; and
- Ropecon.

The Railveyor© option had the lowest net present cost, however, AECOM concluded:

- The costs for the Railveyor© were yet to be verified by the supplier;
- The schedule implications were yet to be provided by the supplier;
- The options evaluation scores for the Railveyor© were lower;
- The technical viability of the solution needs further evaluation within the framework of the mine plan; and
- Possible damage may result from mining activities (slips, blasting, etc.).

AECOM recommended the preferred options in order of preference to be:

- Reuse the overland conveyor and construct a new crushing station with a single / dual sizer; and
- Railveyor uncrushed ROM material from the pit floor and construct a crushing station at the plant.

Further studies in 2019 concluded that a single MMD sizer within a new crushing station and reuse of the overland conveyor was the preferred option and this approach has been taken forward in this PEA.

16.3 GOP

16.3.1 Geotechnical Assessment

Geotechnical studies during 2017 on preliminary design concepts including geotechnical drilling, rock/ soil testing and detailed core logging showed that the slopes in the Winner Hill pit and the northern slopes in Gladstone Hill were generally satisfactory under fully saturated or partially drained conditions. However, the southern and eastern upper slopes were shown to be marginally stable under fully or partially saturated conditions particularly where there was a significant depth of the surficial deposits.

The geological model shows the north-western wall will comprise andesite, overlain by a thin band of hydrothermal breccia and a relatively thin sheet of rhyolitic tuff/ignimbrite thickening to the south. The south-eastern wall has a thicker band of rhyolitic tuff/ignimbrite and hydrothermal breccia overlying andesite; and the east wall has the greatest thicknesses of dacite and volcaniclastics.

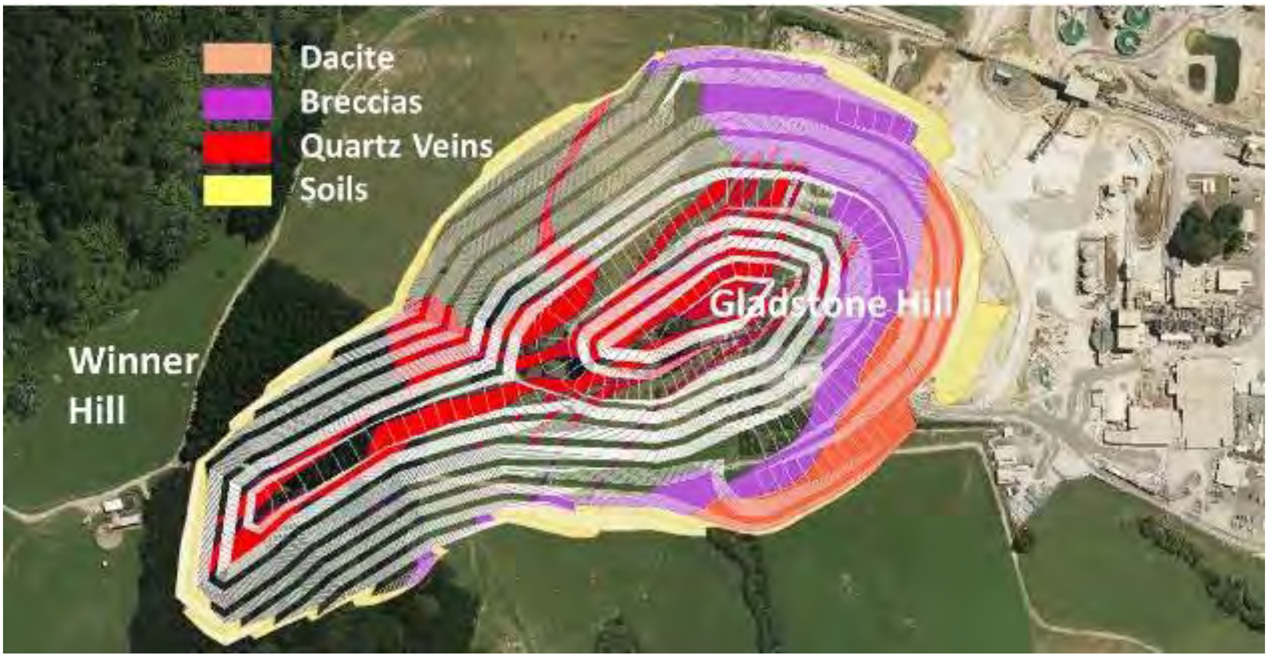
Design pit slopes were modified based on a geotechnical study completed by PSM in early 2018 including three additional geotechnical holes and geotechnical modelling to achieve satisfactory factors of safety. Geotechnical domains were re-defined based on drilling. The design criteria used to support calculation of Mill feeds are reported in Table 16-2. The geotechnical domains are presented in Figure 16-2.

Table 16-2: GOP Pit Slopes

Pit Design Parameter	Bench Height (m)	Face Slope (degrees)	Berm Width (m)
GOP Pit			
1040 to 1100 mRL	15	60	5
1100 to 1140 mRL	10	40	5
Breccias	10	40	5
Surface to 6m depth	35		
Haul Road Width	20m wide @1 in 10, surface to 1070, 12m wide @ 1 in 9 to 1040		
Goodbye Cut	5m deep		
Winner Pit			
1060 to 1085 mRL	15	60	5
1085 to 1100 mRL	15	55	5
1100 to 1130 mRL	10	55	5
Surface to 8m depth	30		
Haul Road Width	18m wide 1 in 10		

Goodbye Cut	None

Figure 16-2: GOP Pit Geotechnical Domains



16.3.2 Hydrogeology Assessment

The company commissioned GHD to assess the site in 2017/ 2018. Two aquifers are interpreted across the site, an upper aquifer within the surficial materials and young volcanics, and a lower aquifer within the andesite with the two aquifers partially separated by the lower permeability, weathered and hydrothermally altered cap at the top of the andesite sequence.

The hydrogeology model for the GOP comprises:

- An upper perched groundwater system within the surficial materials of moderate to low hydraulic conductivity, with pore pressures below hydrostatic and a standing water level at ~1096 mRL with seasonal fluctuation; and
- A lower groundwater system in the Andesite with a standing water level of approximately ~1075 mRL.

Groundwater inflows during the operational phase from the shallow groundwater system were estimated at 1.5m^3/day. As the Favona portal is considered to underdrain the shallow groundwater system, no significant inflows to the pit are predicted from the deep groundwater system.

GHD also note that on closure of the GOP and subsequent re-watering of the deeper groundwater system, the potential exists for interaction of groundwater with mineralised rock to influence the groundwater quality without proper management. The liner proposed in GOP pit will be sized to eliminate this risk, refer Section 18.11.

16.3.3 Mining Method

GOP will use similar equipment and mining methods as proposed for MOP5. Key difference aspects of the mining method are:

- There are no significant historic workings within the GOP;
- Waste rock will be hauled direct to the disposal areas, TSF3, NRS or within the existing embankments;
- Mill feed will be direct hauled to a new crusher at the process plant;

- Although blasting is further away from privately owned residences than MOP5, strict controls on blast vibration will determine the blast hole spacing and the maximum allowable charge weight per delay. It is expected all material will be blasted in 5m vertical intervals (two flitches). Electronic detonators will be used in all holes to ensure detonation of charges occur as per the design sequence. The company will be required to monitor each blast vibration for conformance;
- Initial mining operations will likely use small equipment until the pit perimeter is established and mining operations are below the crest. Small equipment will likely comprise 50t excavators and 50t articulated trucks;
- Once the pit rim is established, all mining resource and rock will be loaded via 110 or 190 tonne backhoe excavators into 85 tonne rear dump trucks;
- A surge (Polishing Pond) stockpile (up to 1.2 Mt) is available close to GOP for excess mill feed or temporary stockpiling of waste rock; and
- The minimum mining width will be set at 3m wide, determined by the expected width of many of the small narrow veins to be mined. Equipment was sized to suit these design parameters.

GOP is planned to operate between 7am and 10pm, 7 days but must comply with the District plan noise levels[6]. Operations will include excavation; trucking of mill feed from the pit to the ROM stockpile, and trucking waste rock to and from the PPS, to the NRS, TSF3 and within the pit.

16.3.4 Cut-off Grade and Modifying Factors

Cut-off grade is based on gold price of NZD 2,142 per ounce. A silver price of NZD 26 per ounce for silver is applied as a by-product credit to the operating costs. Inputs to the calculation of cut-off grades for Waihi Open Pit include mining costs, metallurgical recoveries, treatment and refining costs, royalties. A metallurgical recovery of 71% been used for the mill feed cut-off grade calculation.

The cut-off grade used to determine the mill feed for the GOP was 0.5 g/t Au based on an empty mill and a waste rock disposal credit (i.e. less cost to haul to process plant than place and compact in waste rock stacks). This is an adjustment over the 2019 Mineral Resource estimate.

No mining losses were applied. It is considered that the resource estimation technique applied to the broad Mineral Resource zones provides an adequate estimate of the mill feed tonnes and grades.

16.3.5 Mine Design

The GOP mill feed is reported within a pit shell optimised using a USD 1,500 gold price, this resource is largely Indicated. 18% of the tonnage and 13% of the contained metal within the pit shell is classified as Inferred Resource.

The method for estimating the mill feed involved a 2018 Whittle optimisation study. Operating costs were estimated based on rates for the MOP5 conventional drill, blast, load and haul with standard mid-sized mining equipment but excluding costs associated with crushing and conveying.

The GOP is situated in rolling farmland / pasture with a small exotic pine plantation to the south-west. The pit will be developed in three stages with the intention of validating the design slopes prior to committing to excavating the final walls. The initial, interim and final pits prior to backfilling are shown in Figure 16-3 to Figure 16-5.

Pit development comprises an initial cut adjacent to the conveyor corridor to provide a box cut for the replacement of the Favona portal to provide ongoing access to MUG. The cut comprises 0.2 Mm^3 and mines

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[6] Section 8.3.1.3(1)a of the operative Hauraki District Plan, September 2014, $L_{Aeq(15\ min)}$

down to 1110 mRL[7]. The Stage 1 pit is developed on the main Gladstone Hill veins and the cut comprises 3.8 Mm^3 developing the pit to 1055 mRL. The final pit extends westward and deepens the eastern end of the pit, removing a further 2.2 Mm^3 to reach target depth of 1025 mRL. The eastern end of the GOP is mined to a final depth of 143 m.

The pit is bounded by Union Hill to the north-west, Black Hill to the south and the overland conveyor and process plant to the east.

Figure 16-3: Plan of Initial GOP Box Cut

Figure 16-4: Plan of Stage 1 GOP Pit

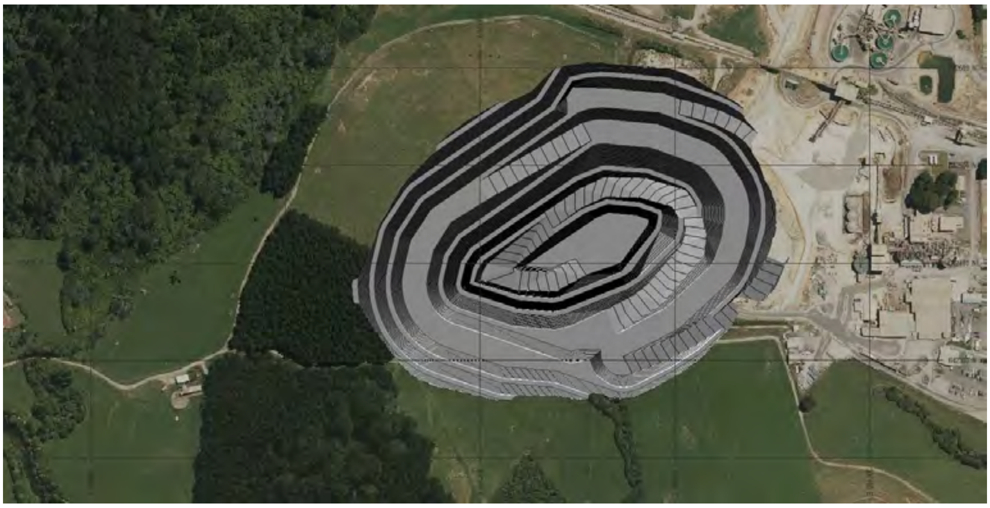
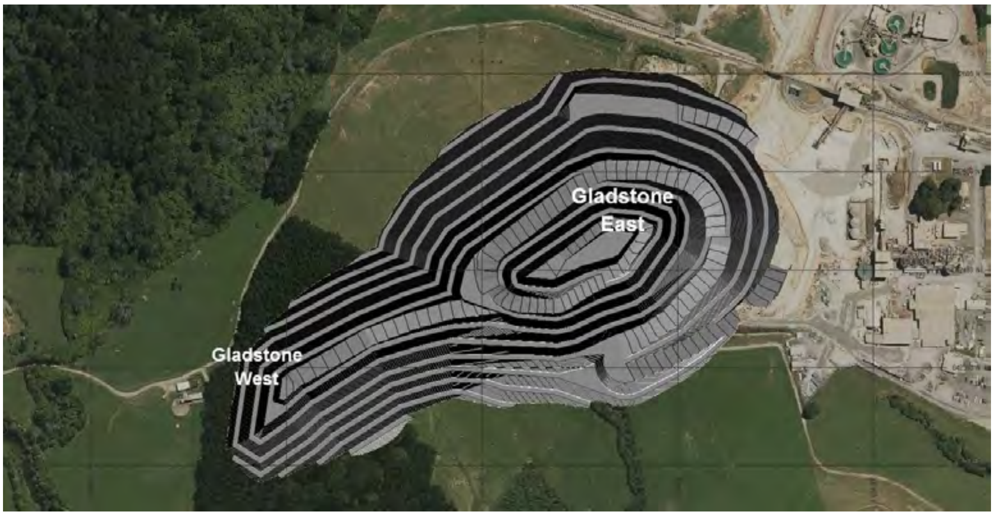


Figure 16-5: Plan of Stage 2 Final GOP Pit

[7] Note that the mine datum references mean sea level less 1000m. Works around the TSF/ NRS area reference the mean level above sea level. Hence there is a discrepancy between RL's referenced in the open pits and underground mines and the TSF/ NRS area.



The mine design comprises:

- An open pit that mines out parts of Gladstone Hill and Winner Hill. The eastern section of the pit on Gladstone Hill has a low strip ratio and accesses the relatively low-grade GOP resource whereas the western portion has a high strip ratio and higher-grade resource;
- The removal and re-establishing the Favona portal and portal infrastructure;
- A bridge crossing across the Ohinemuri River constructed adjacent to the existing bridge and suitable for 85t dump trucks;
- A new crusher at the Mill ROM stockpile;
- A topographical low point on the pit rim at the western end of 1106 mRL that may require a noise bund during operations to mitigate noise effects towards the west;
- Drilling horizontal dewatering holes at selected locations within the pit; and
- Topsoil and NAF material stockpiles.

The open pit comprises 3.4 Mt of mill feed and 10.1 Mt of waste rock and it is expected to take around four years to mine. Rock will be disposed of initially within the existing TSFs at the central and eastern stockpile areas and then within the NRS and Tailings Storage Facility 3 (TSF3). Selected NAF material will be stockpiled at the PPS for final rehabilitation of the pit.

The pit access is close to the process plant and mill feed will be hauled directly to the ROM stockpile.

The pit will require the existing explosives magazine used by the underground mining operations to be relocated from its current location on the north-eastern flank of Gladstone Hill to an underground location and/or to the east of the Gladstone Hill. A noise bund may be established at the south-west end of the pit during the extraction and backfilling of the western end of the pit to provide a barrier when mining moves westwards. Once excavation of the western end of the pit is completed, some rock material from the eastern end will be short-hauled and placed as backfill to suit the final end use. Noise bunds or screens will be constructed around the pit rim as it is developed.

In year 4 a bridge across the Ohinemuri River is constructed suitable for 85t haul trucks. In year 5 a box cut is excavated in the north of Gladstone Hill together with an access road to the mill. The Favona magazine is relocated into the underground mine and a second magazine is also established to the east of Gladstone Hill. The replacement decline is mined mainly from the underground mine and the GOP portal broken through into the already established box cut.

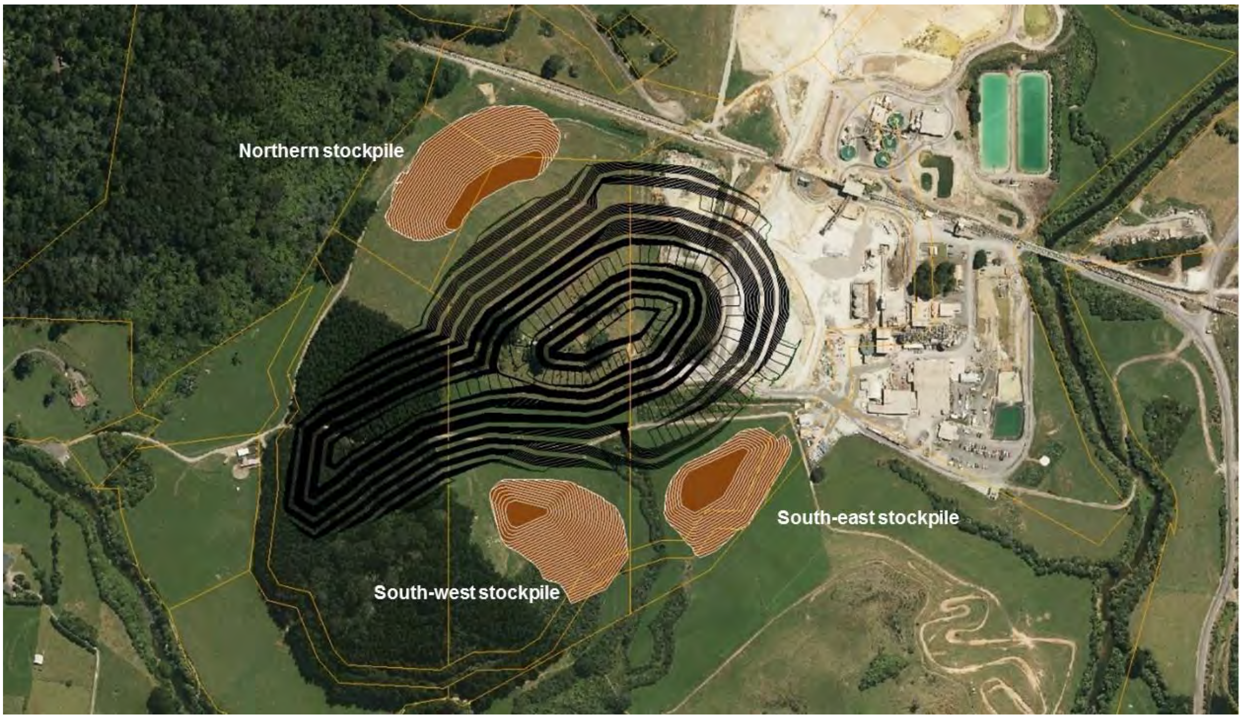
To minimise the excavation and footprint, the GOP portal is located within the open pit. A usable width of 20m is provided into the portal area for portal infrastructure such as tag board, truck load sensors, compressors etc. The replacement decline threads its way around the northern wall of GOP at a gradient of 1 in 7.

The GOP disturbs an area of around 14.2 Ha. and three stockpiles are planned as shown in Figure 16-6 which will contain both topsoil and NAF material.

On completion, the pit will either be partially backfilled with rock sourced from within the GOP or from MOP5 to allow for its conversion into a TSF or completely backfilled and sealed with a non-acid capping layer. It is planned that rock will be placed by paddock dumping and then compacted in place by dozing and use of mobile compactor. It is likely that limestone will be mixed with the rock in situ.

The GOP portal box cut will be preserved until it is no longer required and then the decline partially backfilled, the portal plugged with a concrete plug and the box cut backfilled and landscaped.

Figure 16-6: Plan of GOP Pit NAF Stockpiles



16.4 MUG

Permits and consents have been granted for MUG and all selected mining methods are in accordance with the licence, permit and consent conditions, principally related to placement of backfill, blast vibration limits, method of working and hydrogeological controls. Exploration drives were completed on 800 mRL and 920 mRL in 2018. Development of MUG commenced in mid-2019 and 2,169m of lateral development and a 120m ventilation raise were completed by the end of 2019 as shown in Figure 16-7.

Figure 16-7: Status of MUG Development at 31 December 2019

16.4.1 Geotechnical Assessment

Geotechnical studies related to the MUG were undertaken by SRK between 2011 and 2016 and by Entech, AMC and PSM during 2018 and 2019.

Entech report that ground conditions within MUG will be impacted due to proximity to historic mining voids. Mechanisms for mitigating the associated risks will be considered as part of further studies to be undertaken in the coming year.

PSM reported on the effect of MUG on the Martha Pit wall stability for the smaller MOP4 pit and concluded that the MUG will run in parallel with the Martha Pit and this will have several benefits:

- A proportion of the existing unfilled historical stopes will be stabilised by filling with rockfill and half of these lie in the upper levels immediately below the Martha Pit;
- A proportion of the total planned mining is re-mining of historical stopes, it will be mining from the top-down, a very large proportion of these lie immediately below the Martha Pit; and cemented aggregate fill will be used extensively in this mining; and
- These two factors will result in a significant improvement in overall rock mass conditions; firstly, by improving pit stability conditions both in the short and long-term, secondly by reducing any impacts of MUG mining and thirdly by reducing the longer-term creep of the rock mass around the historical underground.

AMC investigated the stability of the underground workings AMC reported that based on the current understanding of ground conditions, the planned ongoing investigation of conditions as suitable drilling positions become available, and the proposed cautious approach to development using close ground control techniques where required, AMC is confident that the proposed MUG mine can be developed and brought into production without any compromise to underground or surface stability.

AMC reported that the ground conditions influence the mining method, the means of access and the design of stopes and access tunnels. A critical aspect of MUG is to undertake investigations to understand those conditions so that a safe and efficient mining method and well-informed approach to developing the mine is used.

AMC concluded that stable stope strike spans of up to 30m can be mined. Caving and surface subsidence potential has been assessed for development and stoping with the risk being low if recommendations for ground support, allowable spans and management techniques are followed.

The following geotechnical parameters are proposed by AMC within the MUG mine design:

- Development ground support regimes with bolting and mesh required in all areas, fibrecreting as required in poorer ground areas and cable bolting of drive intersections and wider excavations;
- Minimum 1:1 pillar width separating development openings; and
- 15m to 18m vertical level spacing provides a good basis for stable stoping and manageable blast vibration.

A geotechnically significant zone, known as the Milking Cow zone, is a cave zone located below and to the east of the MOP5 pit. Historical mining of this zone commenced prior to 1907 and it was noted in historical documents that the surface subsidence crater was "constantly moving". Although production records are not available, anecdotal evidence suggest that +/- 1.5 Mt of ore was extracted over a 20-year period. No mill feed is extracted from this area by the underground mine.

It is not known how the cave was established. It was speculated that the cave originated as a result of a number of structural geology features in the area, and that when conventional stoping was affected, the mining operation took advantage of the situation and operated the area as a block cave. Historical documents tend to support this theory.

Entech considers that management of historic voids will be a key issue to be addressed for mining MUG. A void management plan has been produced for the Waihi Underground working areas to reflect the conditions expected within Martha.

16.4.2 Hydrogeology Assessment

GWS Limited Consulting (GWS) prepared a specific groundwater model for MUG and a Technical Report issued to support permitting of the project. GWS concluded that:

- The orebody to be mined comprises near-vertical quartz veining with relatively elevated permeability and storage within an andesite rock mass of lower permeability and storage. Vein and fault intersections provide interconnections between Martha, Trio and Correnso mines. These intersections have been enhanced by mine developments;
- Because of the interconnections, dewatering of one vein also dewaters the interconnected veins to a similar elevation, but the Andesite rock mass surrounding and between the veins is dewatered to a lesser degree such that steep hydraulic gradients develop between the veins and the rock mass;
- While the current dewatering level of the Martha, Trio and Correnso vein systems is at approximately 705 mRL, historical dewatering has been undertaken to approximately 540 mRL and with the proposed MUG Project to extend to 500 mRL only some 40m of previously non-dewatered ground would be dewatered;
- An estimate of the expected averaged daily pumping rates to dewater range from 14,000 m^3/day to 16,700 m^3/day; and
- Monitoring data collected over the period since dewatering began in the late 1980s has Indicated no adverse effects on shallow groundwater or baseflow to surface waters. This is, largely, a consequence of the perched nature of the surface water bodies in the shallow groundwater system. The proposed deepening will have no additional effect to surface waters than that already experienced.

16.4.3 Mining Method

Mining method selection work for MUG was undertaken by SRK in 2011, 2016 and 2017 and confirmed by Entech in 2018. This PEA has applied the same mining methods recommended by SRK and Entech.

Much of the mill feed can be extracted using the Modified Avoca mining method, refer Figure 16-13, similar to the methods employed at Favona and Correnso. Certain areas employing Modified Avoca, recovering skins adjacent to historic stopes will entail filling the historic stopes with a CRF and then mining adjacent to the CRF using Modified Avoca with RF.

A small proportion of the mill feed will involve the extraction of remnant skins in the footwall or hangingwall of previously mined stopes, or the extraction of both remnant skins. Historical backfill may also be mined and experience with open pit mining shows this material may be above the cut-off, however, it is not included as a mill feed.

The mining method for the extraction of remnant skins will use conventional remote drilling and loading methods, combined with remote LHD equipment. This method involves additional waste development adjacent to the remnant stopes, which increases overall development quantities and mining costs. SRK and Entech concluded that once established, the method is expected to achieve acceptable mining recovery with few safety issues anticipated. The proposed mining method is illustrated in Figure 16-8 and Figure 16-9.

Figure 16-8: Side Ring Mining Method

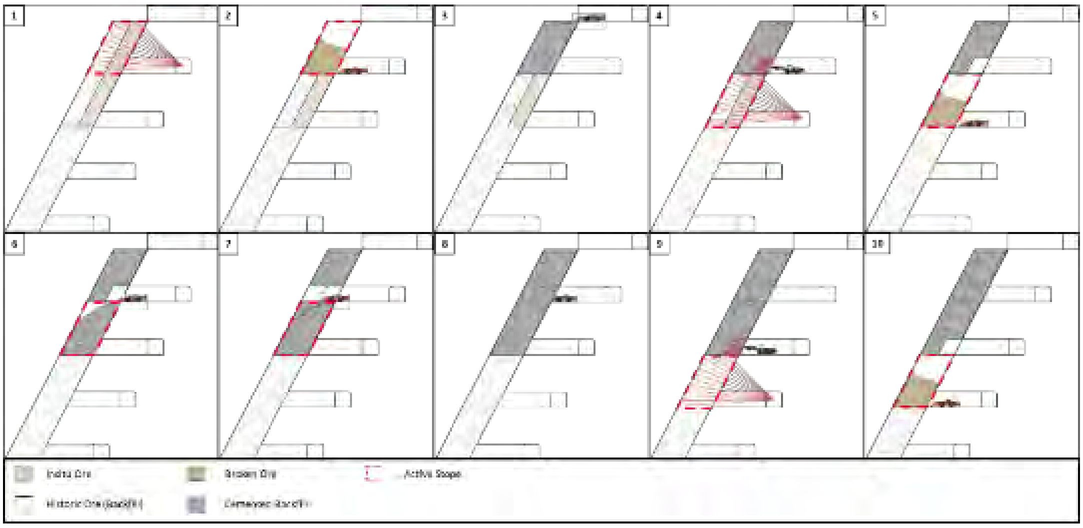
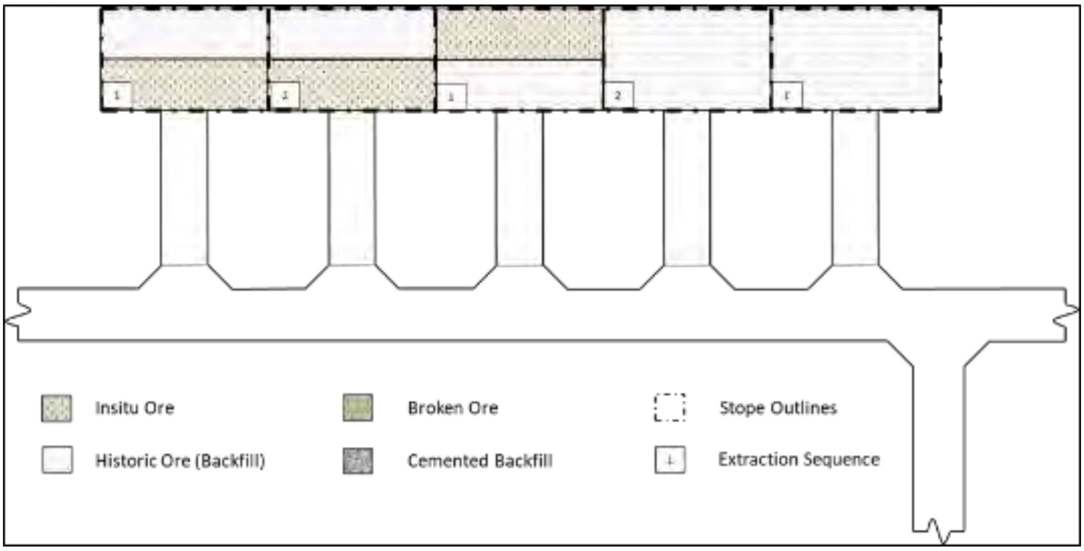


Figure 16-9: Side Ring Mining Method – Plan



16.4.4 Underground Mining Costs

Previous operating costs for the Favona, Trio and Correnso Underground mines have been reviewed from 2009 to 2019. Operating costs per tonne of mill feed mined vary depending on:

- The feed tonnage mined;
- The proportion of lateral development to stoping;
- Average width of stoping;
- Any floor benching or overhand cut and fill; and
- The operating development in waste (barren lateral development drives, expensed development).

Unit operating costs have shown a general trend of decreasing operating costs as the mill feed tonnage increases and a strong trend in decreasing costs over time due to improvements in efficiency, improvements in ground conditions and the transition to owner mining.

16.4.5 Cut-off Grade and Modifying Factors

MUG cut-off grades were reviewed in 2019 with the objective to provide cut-off grades for the various mining methods to be used. Three mining methods are proposed, viz:

- In areas where backfilled historic stopes are present the design stope would target recovery of the backfill and either a footwall or hangingwall skin where grade is present. A top-down, side ring method was proposed in these areas by SRK and endorsed by Entech.
- In areas where unfilled historic stopes are present, Entech proposed to backfill these stopes with a cemented fill and apply conventional Avoca mining adjacent to the cemented fill for new stoping to recover footwall or hanging wall skins or remnant pillars.
- In areas previously unmined by the historic workings, conventional Avoca with rock fill would be used.

Parameters used to calculate the cut-off grades were derived from the nearby Waihi Operation and the study work carried out by Entech and are summarised in Table 16-3. The cut-off grades determined for the various mining methods and used in the mine design are shown below in Table 16-4.

Table 16-3: MUG Cut-off Grade Parameters.

Area	Units	Cut-off Grade Input
Metal recovery	%	93%
Gold price	USD/oz	1,300
Mining cost Avoca	NZD/t	48
Mining cost remnants	NZD/t	87
Mining cost backfilled remnant	NZD/t	111
Processing	NZD/t	30
G & A	NZD/t	25

Table 16-4: MUG Cut-off Grade by Mining Method

Area	Cut-off Grade (g/t Au)
Avoca mining in areas not previously mined	2.4
Avoca mining in remnant areas with CRF	2.9
Backfill remnant areas, top-down, side ring mining method	3.3

16.4.6 Mine Design

Stope shapes were optimised using the Deswik stope optimiser (SO). Sublevel intervals range from 15m to 18m high and stopes were created at lengths of either 12 or 15m depending on the mining area. Stope widths vary, depending on the thickness of the mineralisation. A minimum stope width of 1.2m was used for both the side ring drilling method (for remnant mining) and for the Avoca mining method. 0.3m of dilution was applied to both the footwall and hangingwall resulting in a minimum stope width of 1.8m. A maximum stope width of 15m was used with a minimum pillar width between stopes of 5m. A maximum percentage of historical stoping of 10% was allowed within each stope shape.

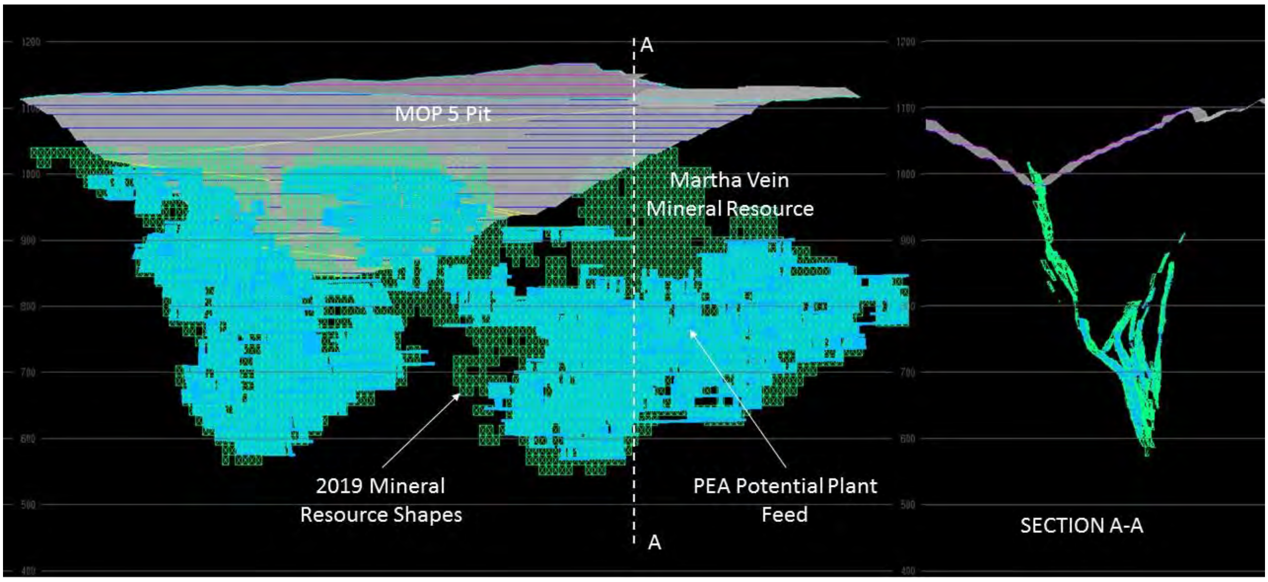
Stope control surfaces were generated in Deswik by combining and simplifying the geological wireframes into one file. This file was then used in the SO tool to guide the stope generation process. Stope shapes from the SO run were manually inspected for proximity and any isolated stopes removed. The following SO shapes were manually excluded from the mine plan:

- All stopes shapes falling or partially falling within the MOP5 pit shell.
- All stope shapes closer than 90m from the natural ground surface.
- Within a solid created as an exclusion solid around the historical “Milking Cow” zone by projecting the base of the cave zone outwards by 20m and projecting it upwards at an angle of 65° from horizontal.
- All stope shapes within the Martha lode within areas where intensive historic stoping had been undertaken[8].
- Isolated pillars mainly within the Royal lode.

Assessments were then made of the remaining areas to confirm sufficient mill feed existed to pay for the development of the block and areas that could not support the development were further excluded. As a comparison, the mill feed used in the PEA as a subset of the total Mineral Resource for MUG is shown in the long section and cross section in Figure 16-10.

[8] A significant Indicated and Inferred Resource has been reported within the Martha lode. The Martha lode was intensively mined historically with a mixture of cut and fill, square set stoping, shrinkage stoping and caving of pillars and recovery of floor pillars. This area was largely excluded from the PEA mine plan pending further work around defining the extent and condition of the historic workings, the intervening pillars, the historic backfill and confirmation of a suitable method of access, mining methods and sequencing. Further work will also be focused on deriving appropriate Modifying Factors to account for mineralization within intermediate pillars and on the footwall and hangingwall of the main veins.

Figure 16-10: Mineral Resource Used in the PEA



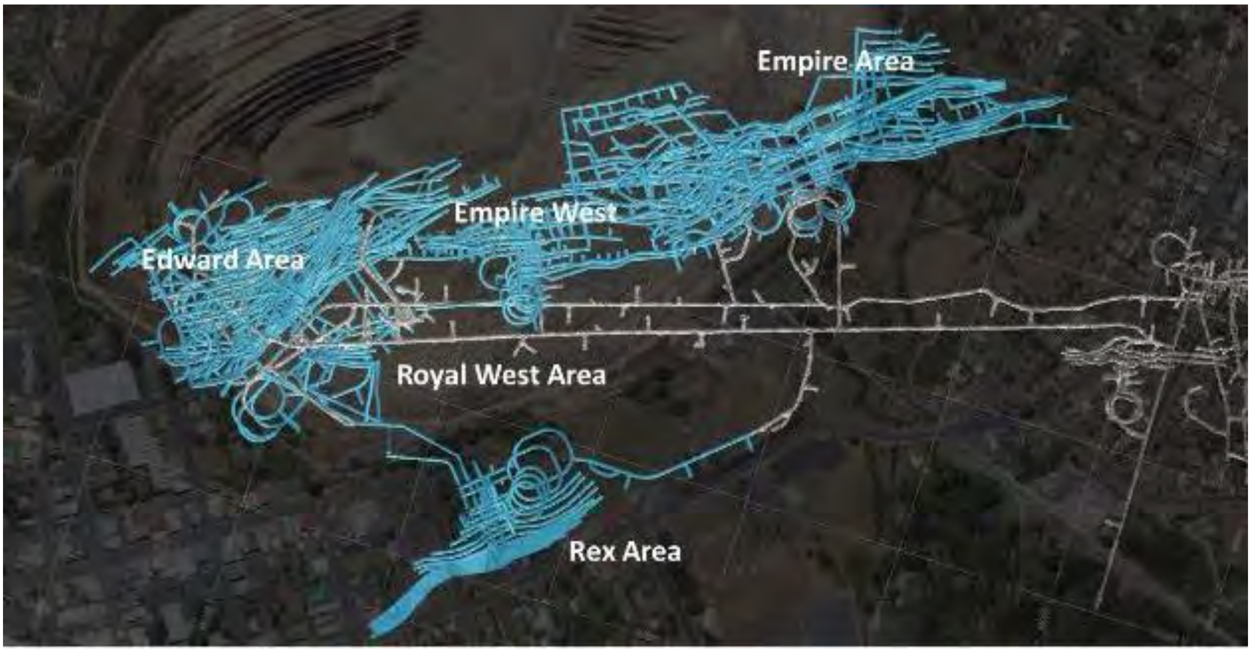
There are multiple orebodies within the MUG, and these have been grouped together into five mining areas being Rex, Empire, Empire West, Edward and Royal West. These mining areas are shown in Figure 16-11. In general mining areas are designed with either a 15m or 18m level spacing, floor to floor. This is primarily to limit blast vibration, but this also assists hanging wall and footwall stability. The upper parts of the Rex mining area have been designed as overhand cut and fill, again to limit blast vibration to the properties lying directly over the orebody. This is in line with previously mined areas and has proven to be successful and efficient. The mine layout for the current underground workings can be summarised as follows:

- Primary accesses via the existing development that was used for the Favona, and Trio mines;
- Exhaust ventilation from the development levels travels to a dedicated return air raise between 920 mRL and 800 mRL and exhaust drive breakthroughs into the open pit;
- Level development at level spacing discussed above;
- All material movements on and off levels are via stockpiles developed on the level access; and
- The permit and mining method require all stopes and selected development to be backfilled.

The development design strategy has planned to use the current workings as a backbone as much as practicable. The 920 and 800 drill drives act as main arterial branches for the early development as well as ventilation and haulage drives to cater for much of the mined material. These drill drives have acted as the starting point for the development of all mining areas. Individual declines and ventilation links are then developed to establish the infrastructure required for the separate mining areas. However, these drill drives are still important for the flow of air and equipment throughout the mine life.

The general mine layout is shown in Figure 16-11, current development is shown in grey. There are five separate working areas serviced by four independent ramps. The Rex and Royal West areas are previously unmined area.

Figure 16-11: General Mine Layout MUG



Tonnage recovery factors shown in Table 16-5 for stoping include in-situ resource plus dilution material. Metal recovery factors consider the difficulties associated with recovering all resource from a stope, particularly under remote control operations. Additionally, it allows for the potential loss of metal due to excess dilution burying resource and limiting recovery.

Table 16-5: MUG Mining Recovery Factors

Activity	Tonnage Recovered	Metal Recovered
Lateral Development In Mill Feed	100%	100%
Avoca Long hole Stope – Virgin Areas	100%	93%
Avoca Long hole and Side ring Stope – Remnant Areas	100%	93%

16.4.7 Materials Handling

Much of the mill feed and waste will be trucked to the Favona portal, adjacent to the Processing Plant. Some mill feed and waste may be transported through the MOP5 materials handling system once the haul road is established. Early development waste will be stockpiled close to the portal or at the Polishing Pond stockpile close to the Processing Plant and returned to the mine as backfill for the stopes as mining progresses.

Stoping and development resource will be bogged directly to 50t trucks on each level and trucked via the portal direct to the process plant or ROM stockpile. Similarly, waste rock from development will initially be bogged and loaded into trucks and taken to the surface. As rockfill stopes become available, development waste rock will be taken direct to the stopes as backfill.

16.4.8 Ventilation

Ventilation design has been undertaken by Entech and slightly modified in this latest iteration of the mine design.

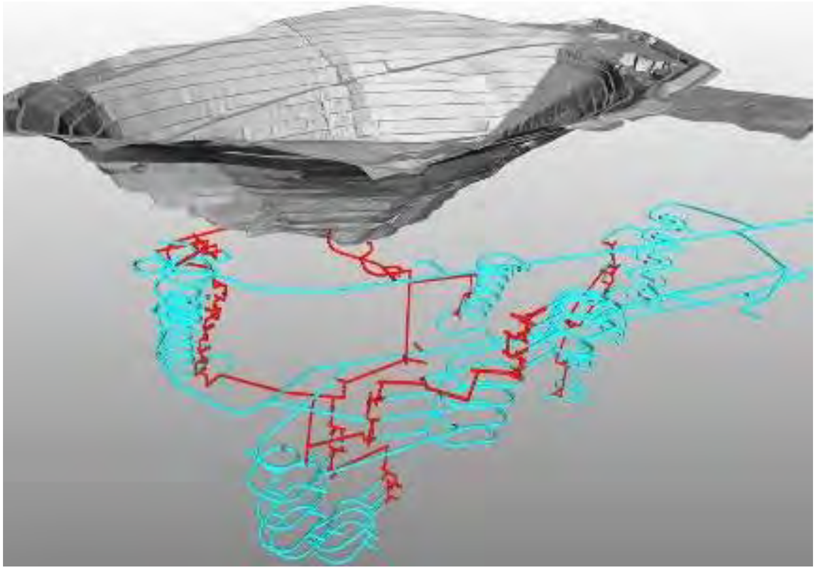
The access ramps have numerous raises installed as part of the construction process that will become fresh air raises for the production phase of the mine. The minimum airflow requirements for diesel dilution is shown in Table 16-6.

Table 16-6: Estimated ventilation quantities

Equipment	kW / unit	Units	Total kW	Total Airflow (m^3/s)
Loaders	280	6	1680	84
Trucks	485	4	1940	97
Grader	83	1	83	4
Charge units	110	2	220	11
Service truck	154	1	154	8
Integrated tool carriers	200	3	600	30
Spray units	90	1	90	5
Development drills	110	4	440	22
Production drills	75	2	150	8
Sub Total 268				
Leakage (30%) 80				
Total m^3/sec 348				

The primary ventilation circuits are presented in Figure 16-12 with fresh air circuit shown in blue and return air circuit in red.

Figure 16-12: Primary Ventilation Circuit



16.4.9 Backfill

Backfilling has been assumed for the MUG in the following circumstances:

- Rockfill (RF) for the Avoca bench mining method;
- CRF filling of the historical voids which are expected to be encountered and where a stope is planned in close proximity; and
- Both RF and CRF are required for remnant mining areas.

The use of CRF is important for the remnant mining areas, since in some cases backfill will be exposed adjacent to, or above, stopes being mined. In other cases, CRF will be required to fill portions of historical voids to allow mining through the CRF at a later stage for access, and to stabilise voids below the active mining horizon to reduce the risk of sudden and unexpected backfill subsidence into historical voids at depth. Stopes within 20m of the final MOP5 pit walls will also be filled with CRF to improve the stability of the pit walls.

It is assumed that CRF can be produced on-site in a surface batch plant and trucked underground. Rockfill will consist of MUG development waste, which can be stockpiled on surface and re-used as backfill or moved from the development face directly to a void which requires filling.

It is assumed that all fill material if on surface will be loaded onto trucks and hauled underground via the decline. The trucks will enter the level and dump the backfill material into designated stockpiles. From here, LHD equipment will load, tram and dump the backfill into the void.

Other backfill placement options could include the use of boreholes and/ or fill raises to reduce trucking requirements. However, the vast strike of the orebody and the timing of filling does not make it a simple decision and Entech recommended that backfill placement options be evaluated in more detail in future studies.

Introduction of paste fill into the mine plan was investigated by Outotec and AMC and was found to be technically feasible to manufacture. AMC concluded:

- Supply and production of paste fill prepared from Waihi tailings is technically feasible but the loss of paste into old workings was not addressed;
- Waihi tailings respond better to slag cement binders than GP grade cement, but slag binders are not available domestically in New Zealand;
- Paste fill has the lowest operating cost but the loss of excess paste fill into old workings could negate that benefit;
- Paste fill has a significantly higher capital cost being nearly double that of an engineered CAF system;
- All backfill operating costs are higher than usual due to the need to pre-fill old voids prior to access, drilling and extraction of new stopes followed by filling of those new stopes. The total backfill operating cost is spread over a lower tonnage than comparable green field mining operations; and
- Outotec have demonstrated that paste fill is technically feasible to produce but the risk of uncontrolled loss of paste fill during placement in remnant stopes represents a potential fatal flaw to the method.

Paste fill has been discounted as a method of backfill for MUG.

16.4.10 Other Design Considerations

Refuge chambers will be required in the working areas of the mine. These chambers would be located in the working areas and be sufficient for the number of workers within the area.

Various substations will be located within the mining areas associated with each decline. From these substations power will be distributed via cable holes or in the decline depending of the ability to drill cable holes in suitable locations.

A permanent pumping station capable of dewatering at 180l/sec at 400m head has been established at the 790mRL. Four dewatering boreholes equipped with submersible pumps are being installed on the 800 mRL for ground water lowering purposes. These boreholes have a combined capacity of 15 0l/sec and a target dewatering depth of 600 mRL. It is planned to either install additional boreholes from the 650 mRL to dewater to the base of the planned stopes at 550 mRL or directly pump from temporary sumps established in the decline.

Sumps located on each level will drain via drain holes to various minor pump stations and then pumped via the main pump station on 790 mRL to the portal. Where a drain hole is not possible, pipes will be run between levels in the decline.

Allowance within the design has been made for an underground crib-room, service bay and workshop.

16.4.11 Design Parameters

Table 16-7 presents a summary of the design parameters used in the design for the MUG deposit.

Table 16-7: MUG Design Parameters

Item	Units	Value
Sublevel Spacing	m	15 to 18
Stope Strike Length	m	12
Stope Width	m	1.8 -16
Lateral Development		
• Access Ramps and Declines	mH x mW	5.8 x 5.0
• Level Accesses, Stockpiles, Waste Drives, Pass Accesses	mH x mW	5.6x 5.0
• Strike Drives	mH x mW	5.0 x 4.5-5.0
• Ventilation Access	mH x mW	5.0 x 5.0
Vertical Development		
• Long Hole Winze	m	2 x 2
• Material Passes	m diameter	1.8
• Main Exhaust Ventilation raise	m diameter	4
• Intermediate Ventilation Raise	m diameter	4

16.5 WKP

16.5.1 Geotechnical Assessment

SRK assessed the geotechnical data from the exploration drill holes to establish the geotechnical characteristics and conceptual design elements for the underground mine. The assessment entailed:

- Understanding the geological setting of the gold deposit;
- Creation and population of an interpretable geotechnical property database based on the limited geotechnical core logging available;
- Collection and recording of suitable core samples for rock property testing in a laboratory, supported by field estimates (point loads) of rock strengths;
- Graphical representation, interpretation and reporting of recorded data, culminating that describes the geotechnical environment, and
- Transformation of data into Barton's Q' value.

Based on 1,112 measurements of structural data within 20m of the planned stopes, SRK determined that the structural sets strike parallel to the structural vein system (~20^0) with dip angles varying from 40^0 to 90^0 towards the northeast.

Q' values were determined by SRK from 422m of logged core within 20m of the planned stopes, the Q' values by lithology are shown in Table 16-8.

Table 16-8: Q' Values by Lithology for WKP

	Eastern Graben EG Rhyolite	Central Area Lapilli Tuff	Western T-stream Rhyolite
25^{th} percentile	3	4	5
50^{th} percentile	5	4	8
75^{th} percentile	14	8	25

Based on the estimated Q' values, SRK recommended that the hydraulic radius (HR) shown in Table 16-9 be used for stope sizing by area and depth.

Table 16-9: Preliminary Geotechnical Parameters for WKP Stope Sizing

	Eastern Graben EG Rhyolite		Central Area Lapilli Tuff		Western T-Stream Rhyolite	
	HR min	HR max	HR min	HR max	HR min	HR max
80-160m	5.5	5.5	5.1	5.1	6.8	6.8
160-240m	4.8	5.5	4.5	5.1	6.8	6.8
260-320m	4.2	5.5	4.0	5.1	6.7	6.8

16.5.2 Hydrogeological Assessment

To date, two sets of piezometers, each having a shallow and deep well setting, have been constructed at the site. These piezometers indicate a vertically downward hydraulic gradient in the range of 0.55 to 0.59 m/m.

GWS have provided a preliminary assessment of the hydrogeology for WKP. GWS report that the catchment area for the Wharekirauponga Stream is approximately 15 km^2 and with 2.17 m/year rainfall, the average daily rainfall volume reporting to the catchment is in the order of 89,178 m^3/d, with most rainfall in winter although sub-tropical storms can produce heavy events in summer.

GWS state that there are insufficient piezometers constructed within the WKP area to enable the development of a potentiometric surface and given the difficulties with site access may remain the case going forward. The potentiometric surface is, however, expected to mimic that of the surrounding topography.

GWS preliminary assessment based on limited data suggest that:

- Surface soils in the locality are highly clay altered and are unlikely to drain abnormally as a result of mine dewatering;
- The host rocks are generally low permeability and are expected not to dewater. Some amount of dewatering may occur in the silicified rock mass;
- The EG Vein is expected to be dewatered via the Stream exposures, resulting in discharge and gains in surface water flows; and
- Understanding the changes to the catchment water balance as a consequence of dewatering is still deemed the critical element of the hydrogeologic assessment.

Further work is still required to understand how groundwater interacts with surface waters around WKP and with the stream channels.

16.5.3 Mining Method

SRK reviewed an earlier block model for the shape, size and continuity at different cut-off grades to determine the most appropriate mining methods that could be applied to the WKP deposit. SRK noted that the orebody is dipping between 65 and 70 degrees and is between 2m and 7m in width. and considers that the orebody geometry is not suitable for block or sub level caving because of the vein nature of the deposit, as well as the surface disturbance caused by caving is not suitable for the conservation status of the land.

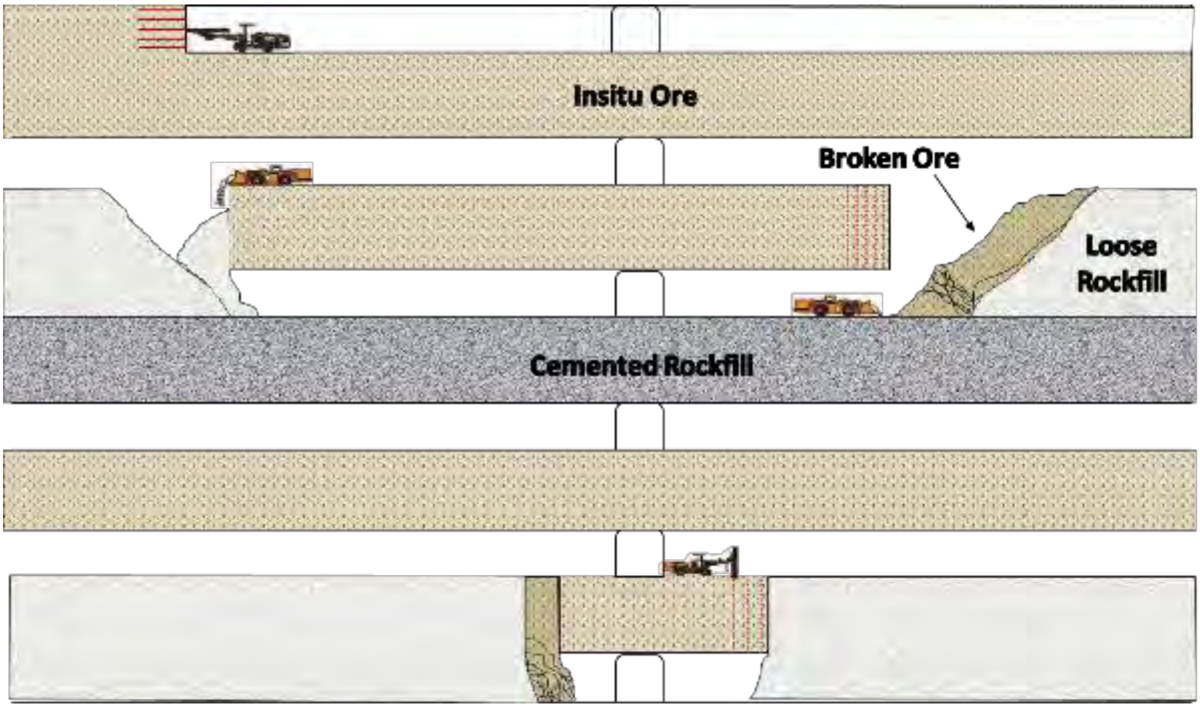
SRK consider both pillar and artificially supported methods are suitable for the WKP deposit. The deposit will not be able to be supplied an engineered fill such as paste or cemented hydraulic fill because the location of the Processing Plant is 10 km distance from the mine. Backfill for the mine could be either CRF or rock fill. The use of in-situ pillars was not considered in this study because leaving pillars due to the high-grade nature of the Mineral Resource, as such if pillars are required these could be cemented fill rather than in-situ pillars.

The OceanaGold Correnso operation uses the Avoca mining method and SRK considers that Avoca mining method is suitable for the WKP deposit.

The Modified Avoca method is a semi-selective and productive underground mining method, and well suited for moderately deposits of varying thickness. It is typically one of the most productive and lower-cost mining methods applied across many different styles of mineralisation.

Access is required centrally within stope panel to allow for mining to progress longitudinally as shown in Figure 16-13. Down holes are drilled and loaded with explosives and the stope is blasted, with broken material falling to the bottom drive for extraction. Remote controlled LHD are required to remove the blasted material from the stope once blasting commences.

Figure 16-13: Modified Avoca Mining Method



Stope structural support is provided through a combination of cable bolting and un-CRF. Due to the high-grade of the deposit, it is not planned to leave rib pillars unless there is limited access to the sublevel or recommended to maintain overall mine stability.

16.5.4 Cut-off Grade and Modifying Factors

The Cut-off grade is based on a metal price of NZD 2,142 per ounce. A silver price of NZD 26 per ounce for silver is applied as a by-product credit to the operating costs. Inputs to the calculation of cut-off grades include mining costs, metallurgical recoveries, treatment and refining costs, general and administrative costs, royalties. The cut-off grade used to determine the mill feed for the WKP was 2.5 g/t Au based on these assumptions. A metallurgical recovery of 90% been used for the cut-off grade calculation.

16.5.5 Mine Design

SRK undertook an assessment of the stope design parameters using a Mine2-4D shape optimiser to determine which design parameters based on high level economic and design assumptions gave the best outcome. The options assessed were:

- Sub level height 15m and stope strike length 10m;
- Sub level height 20m and stope strike length 10m;
- Sub level height 15m and stope strike length 15m;
- Sub level height 20m and stope strike length 15m; and
- Sub level height 25m and stope strike length 15m.

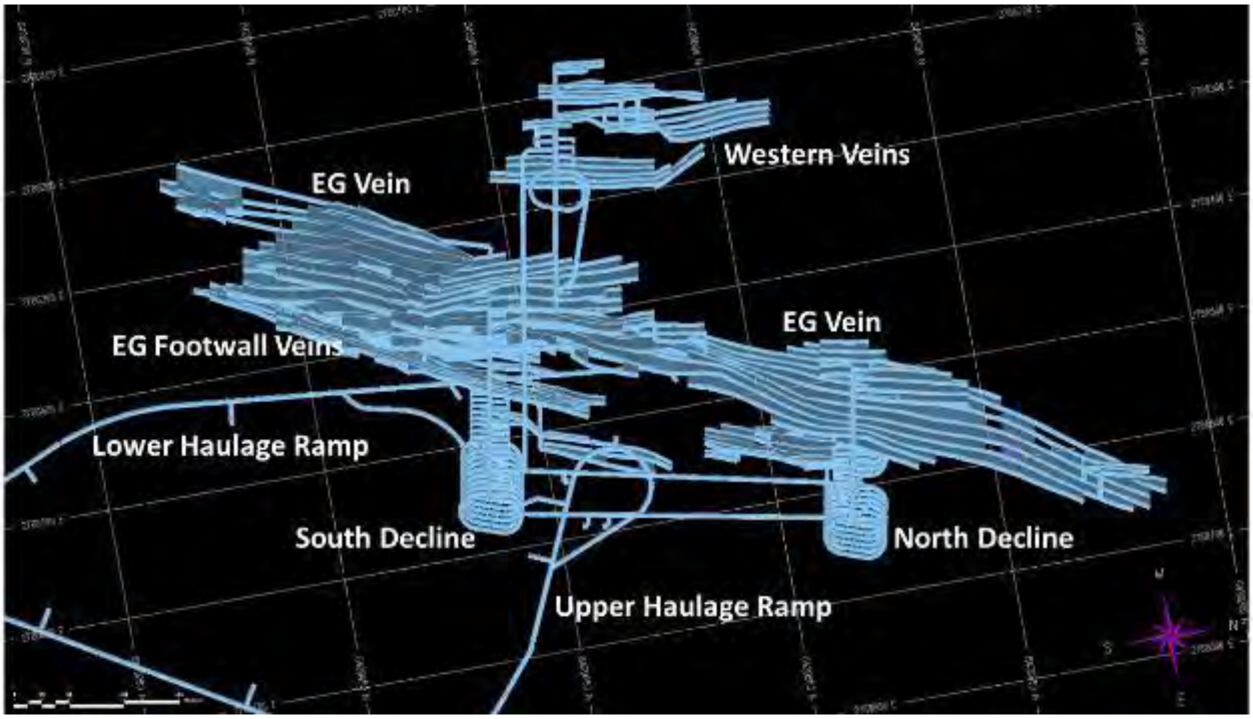
The assessment calculated the development requirements with factors and assumes that the access ramp and raisebore sizes are the same for all options and therefore these costs are not included in the assessment.

The assessment Indicated that the “sub level height 20m and stope strike length 10m" was the optimum option. The small strike length of the stope meant that there is limited flexibility in the stoping cycle between bogging and filling. SRK considered that the longer strike length of 15m would provide more schedule flexibility.

A sub level spacing of 20m and a strike length of 15m has been applied to the mine design for this PEA because this is the next best option and is within the preliminary geotechnical parameters with a HR of 4.3 for the stope hangingwall.

SRK concluded that these parameters are based on the current geotechnical and geological understanding and will need to be reviewed as the Mineral Resource changes and the geotechnical knowledge increased. A plan view of the mine design is shown in Figure 16-14.

Figure 16-14: WKP Mine Design Plan View



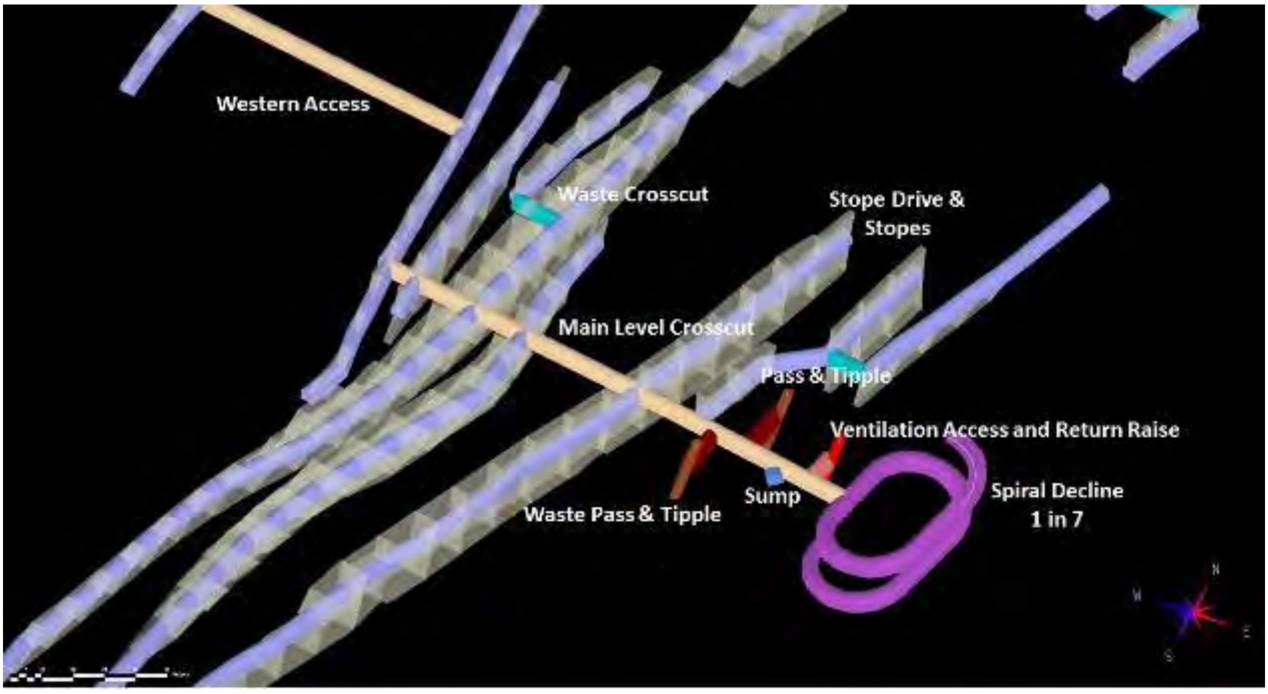
There are two distinct mining areas of the mine, EG Vein and the western veins. The mine plan has the EG Vein broken up into north and south areas which allows more flexibility in the mining sequence and schedule.

The mine access ramp has been designed at 1:15 to the haulage levels for the EG Vein. Stockpiles have been located every 150m along the access ramp and ventilation raises every 1,500m for the construction. The ventilation fans will be located at the bottom of the raise to exhaust the mine during construction. The mine services will also be installed in the access ramp for the project.

The EG Vein is accessed by two declines, designed at 1:7 located at the north and south of the orebody. The western veins are accessed from the southern end of the EG Vein with a small ramp to access the upper levels.

The levels have been designed with a sump, ventilation access waste and pass access and tipple in Figure 16-15.

Figure 16-15: Typical Level Arrangement



Tonnage recovery factors shown in Table 16-10 for stoping include in-situ resource plus dilution material. Metal recovery factors consider the difficulties associated with recovering all resource from a stope, particularly under remote control operations.

Table 16-10: WKP Mining Recovery Factors

Activity	Tonnage Recovered	Metal Recovered
Lateral Development In Mill Feed	100%	100%
Avoca Long hole Stope	100%	93%

The mill feed and waste will be trucked to the WKP portal. The mill feed will be transported to the existing Processing Plant located east of the Waihi township and approximately 10 km southeast of the WKP orebody. Development waste will be stockpiled close to the portal or at the Polishing Pond stockpile close to the Processing Plant and returned to the mine as backfill for the stopes as mining progresses.

Stoping and development resource will be bogged to a dedicated tipple on each level where it will be loaded into trucks via a pass chute and trucked to the portal where it will be transported to the process plant. Similarly, waste rock from development will be bogged to a dedicated tipple on each level where it will be loaded into trucks via a pass chute. Trucking loops have been included within the design for both lower level and upper level accesses.

16.5.7.1 Development

The WKP deposit will require a long access ramp into the orebody from a suitable portal site that is located outside the DOC area. OceanaGold have been investigating suitable sites for the portal location and have identified several portal locations that will require an access ramp of approximately 6.5 km length. The access ramp will have approximately 5.9 km located under the DoC land area which means that the ventilation requirements needs to minimise or eliminate the ventilation raises required in this area.

Ventilation requirements for access ramp development include the following considerations:

- Adequate ventilation for the operation of the major diesel equipment units (loaders and trucks);
- Sufficient ventilation to dilute and clear blasting fumes (in a reasonable amount of time) for re-entry;
- Adequate ventilation for the application of shotcrete and other ground support activities; and
- Satisfy the minimum regulatory requirements for ventilation flow.

Bamser consulting were commissioned to investigate different tunnelling options for the access ramps including road-headers, tunnel boring machines and conventional drill and blast. The level of geotechnical investigation was insufficient to identify a preferred method, although Bamser recommended that tunnel boring machine and drill and blast be taken forward for further study. Drill and blast with dedicated ventilation raises has been used for this PEA mine plan and schedule.

The construction of the main access ramp will be straight and relatively flat which is suitable for off-highway trucks or conventional highway trucks.

SRK concludes that all the equipment combinations are possible from a ventilation consideration, but there are opportunities to consider alternatives in using existing technologies such as:

- Using tele-remote to bog (muck) faces; and
- Consider the use of electric trucks and loader for the development and mining of the deposit to mitigate the ventilation requirements for the diesel particulate matter and the requirements under the Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2016.

In addition to the ventilation requirements for the access ramp construction, it is necessary to consider the time required to clear the blast fumes from the firing of the development headings. Table 16-11 presents the blasting clearance times for each of the different equipment combinations. SRK notes that the off-highway equipment combinations require the longest clearance times because the drive excavations are larger, so a low air velocity increases the clearance time. There is potential to mitigate this re-entry time with the use of tele-remote loaders while the fumes are clearing.

Fans will be initially located at the portal, twin 90 kW fans with 1,400 mm ducting. As mining progresses and the ventilation raises are established the fans can be moved 50m on the portal side of the ventilation access drive and an exhaust fan station established for the vent raise. This continues until the main surface connection has been established.

Table 16-11: Blasting fumes clearance times.

	Volume (m^3/s)	Area (m^2)	Air Velocity (m/s)	Distance (m)	Time (mins)	Time (hours)
CAT982M / CAT773G	45	42.00	1.07	1,500	23.3	0.39
CAT982M / Volvo 60H	41	37.80	1.08	1,500	23.0	0.38
R2900 / AD60	45	31.35	1.44	1,500	17.4	0.29
ST14 / MT54	41	29.70	1.38	1,500	18.1	0.30
ST18 / MT65	46	29.70	1.55	1,500	16.1	0.27
LH517 / TH663i	44	31.35	1.40	1,500	17.8	0.30

16.5.7.2 Production

Conceptual ventilation design has been undertaken by SRK and modified in this latest iteration of the mine design.

The access ramp has a small number of raises installed as part of the construction process that will become fresh air raises for the production phase of the mine. The minimum airflow requirements for diesel dilution are presented in Table 16-12.

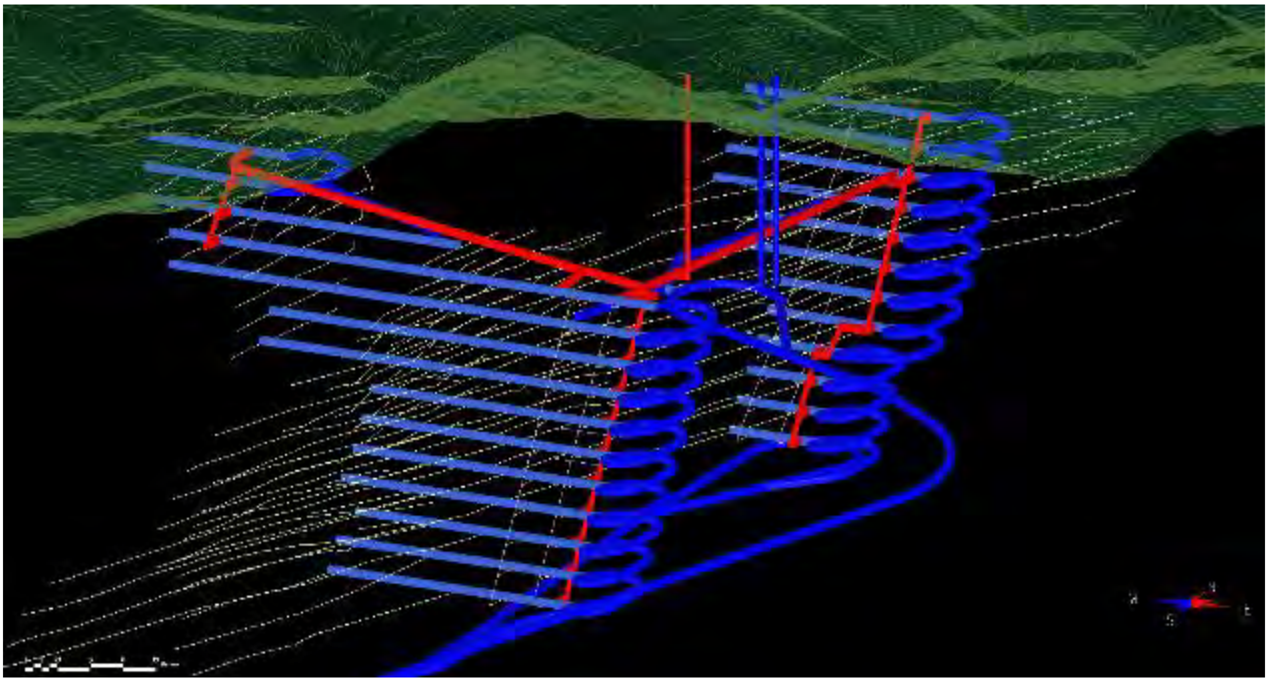
Table 16-12: Estimated ventilation quantities

Equipment	kW / unit	Units	Total (kW)	Total Airflow (m^3/s)
Loaders	305	2	610	30.5
Development Trucks	439	2	878	43.9
Production Trucks	495	3	1,485	74.3
Service Truck	242	1	242	12.1
Light Vehicles	200	6	1,200	60.0
Grader	114	1	114	5.7
Leakage				22.6
Total			4,529	249.1

Based on this airflow the exhaust raise to the surface is estimated to be 5m in diameter. A fan station will be installed underground at the base of the ventilation raise.

The primary ventilation circuits are presented in Figure 16-16 with the fresh air circuit shown in blue and return air circuit in red.

Figure 16-16: Primary Ventilation Circuit



16.5.6 Other Design Considerations

Refuge chambers will be required in the working areas of the mine and would be sufficient to accommodate the number of workers within the area.

There will need to be substations located in the mining areas associated with each decline. From these substations power will be distributed via cable holes or in the decline depending of the ability to drill cable holes in suitable locations.

Sumps located on each level will drain via drain holes to the haulage level and then pumped to the portal. Where a drain hole is not possible, pipes will be run between levels in the decline.

16.5.7 Design Parameters

Table 16-13 presents a summary of the design parameters used in the design for the WKP deposit.

Table 16-13: WKP Mine Design Parameters

Item	Units	Value
Sublevel Spacing	m	20
Stope Strike Length	m	15
Stope Width	m	4.5 -16
Lateral Development		
• Access Ramp	mH x mW	6.5 x 6.0
• Decline, Stockpiles	mH x mW	5.5 x 5.0
• Haulage Drive	mH x mW	6.3 x 6.0
• Stope Drive, Waste Drive, Footwall Drive, Pass Access, Sump	mH x mW	5.0 x 4.5
• Chute Drive	mH x mW	7.0 x 6.0
• Vent Access	mH x mW	4.5 x 4.5
Vertical Development		
• Long Hole Winze	m	2 x 2
• Material Passes	m diameter	1.8
• Main Exhaust Ventilation raise	m diameter	5
• Access Ramp Ventilation Raise	m diameter	2.4

16.6 Mining Equipment

16.6.1 Open Pit Mining

The MOP5 cutback is relatively narrow and extends to the full circumference of the current Martha Pit. The current plan is for MOP5 to be accessed using a single ramp. As the operating area will be relatively narrow, it will not be efficient to operate two excavator’s side-by-side in a single working area.

Tight working areas are more suited to backhoe excavators than shovels as the dig unit does not occupy floor space, leaving more room for trucks. Blasting at Martha is also limited to 5m benches, which is more suited to backhoes.

The schedule configuration is two excavators, with each operating in a different direction away from the ramp access point on each bench. An access past the excavators will be required for drill and blast and it should be possible to accommodate another excavator in separate working area further around the cutback in each direction.

MOP5 pit design is based on Cat 777 86t capacity haul trucks. The size range for excavators to match these trucks is in the 100t to 180t operating range. Analysis shows that assuming an operational efficiency of 83%, availability 90% and utilisation of 90%, the annual production rates shown in Table 16-14 can be achieved.

Table 16-14: Open Pit Digger Productivities

Activity	PC1250	PC2000	PC1250	PC2000
Operating weight (t)	110	180	110	180
Bucket size (m^3)	6.7	12	6.7	12
Truck	777	777	777	777
Days / yr	250	250	250	250
Hours / day	12	12	10	10
Mt per year	2.7	4.0	2.2	3.3

The fleet size has been estimated from the mining schedule and the waste rock disposal schedule

Support equipment includes graders, water trucks, fuel trucks, explosives trucks, maintenance and lube vehicles and roller compactors.

16.6.2 Underground Mining

The MUG mining equipment fleet is in place and comprises:

- Lateral Development face drilling and bolt installation with two boom jumbos (Axera and Sandvik);
- Loading using Cat 1700 or 2900 underground loaders, fitted with remote mucking capability;
- Trucking using Atlas 50t underground trucks;
- Solo 5V long hole drill rigs capable of drilling in the diameter range of 51 mm to 76 mm and up to 25m hole length; and
- Ancillary equipment (explosive charge vehicles, shotcrete equipment, integrated tool carries, grader).

It is planned to transition the MUG fleet to a largely Sandvik manufactured fleet replacing the existing fleet once it reaches its economic life.

16.6.3 Maintenance

Comprehensive maintenance tracking and reporting systems, in addition to preventive maintenance (PM) programs are already established on-site. Site maintenance facilities are considered adequate to support the current and forecast LOM fleet and exist in centralised facilities on surface and a service bay underground. PMs are routinely performed as per the manufacturer's recommendations.

16.7 Production Scheduling

16.7.1 Open Pit Mining

MOP5 and GOP pits were scheduled using OPMS software. There were several limitations imposed on the mining rate at MOP5, these are:

- Dayshift only operation;
- Crushing/ conveying system capacity;
- Vertical advance rate;
- Operating space; and
- Working around historic workings and probe drilling.

Scheduling assumed that the same equipment would be used for GOP and MOP5 and production rates from both pits were capped at a total output of 8 Mtpa.

The commonly accepted vertical advance rate for open pit studies is 90m to 120m per year. Given that MOP5 is a single-shift operation that will be blasting/mining on 5m high benches, this is likely to be beyond the capacity for mining at MOP5. Further analysis will be required, however, a maximum vertical advance rate of approximately 50-60m per year (10 to 12 number 5m high benches) is assumed for this PEA. This accords well with previous mining rates achieved in the pit over the last 30 years. The MOP5 mining schedule is targeted to:

- make up the shortfall in feed to the process plant,
- provide a constant source of backfill to the underground,
- provide construction material for the engineered embankments for TSF3 and GOP TSF, and
- in the event GOP is not used as a TSF, backfill for the GOP and construction material for the engineered embankments for TSF1A.

16.7.2 Underground Mining

MUG and WKP mine production criteria were calculated from benchmarked rates. Table 16-15 lists the productivity rates and activity durations used in the mine development and production schedule.

Table 16-15: Underground Mining Rates

Activity	MUG Rate	WKP Rate
Critical access and ventilation development	24m / week max	20m / week max
General rate level waste development	15m / week	15m / week
High priority mining resource drive development	18m / week	15m / week
General rate mining resource drive development	9m / week	9m / week
Stope production –peak individual stope	800 t / day	850 t / day
Stope production – total mine peak	2,000 t / day	1,350 t / day
Standard backfilling rate	850 t / day	850 t / day
Long hole drilling rate per rig	160m / day	160m / day

Production scheduling was undertaken in Deswik. Checks were made to ensure development and stopes were sequenced correctly with bottom up development or top-down development where appropriate, development completed on the level prior to stoping commencing and adequate separation between the stoping fronts on the various levels. Checks were also made to ensure stoping, drilling and backfilling activities on a single level could be carried out independently of each other.

The MUG schedule allows for a dewatering rate of 40 vertical metres per year. Crown pillars were located at strategic horizons to enable production targets to be met. All crown pillars allowed for cemented backfill and recovery. The mining sequence is shown in Figure 16-18 viewed from the southwest.

The MUG schedule targets four main independent working areas, Edward, Empire, Royal and Rex and employs recoverable crown pillars to allow for dewatering rates. Although a focus was placed on extracting higher confidence Indicated Resources early in the schedule, the mining method of extracting thin horizontal slices and a predominant bottom up sequence in four working areas meant that some Inferred Resources were always mined sequentially with Indicated Resources.

Figure **16-17** shows the planned mill feed design as dark blue wireframes overlying the Indicated Resource shown in light blue.

Past experience at the Waihi underground mines have shown that ~ 20% Inferred material is normally included within the mining plan but removed for determining Mineral Reserves.

Figure 16-17: MUG Long Section Overlying Indicated Resources

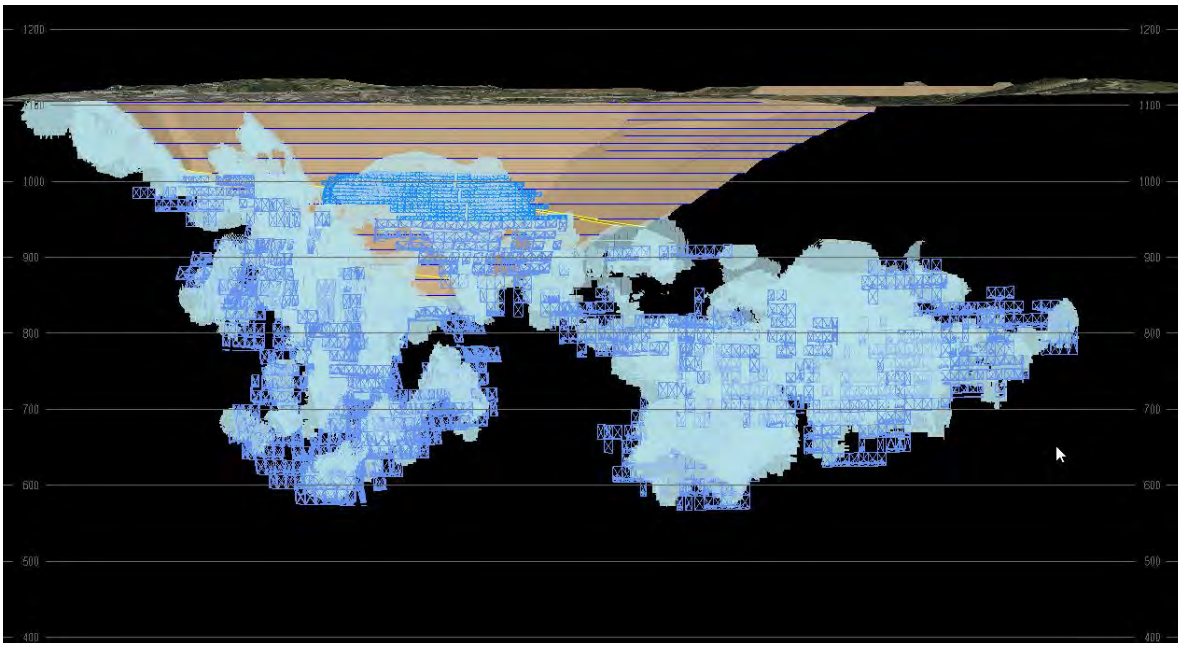
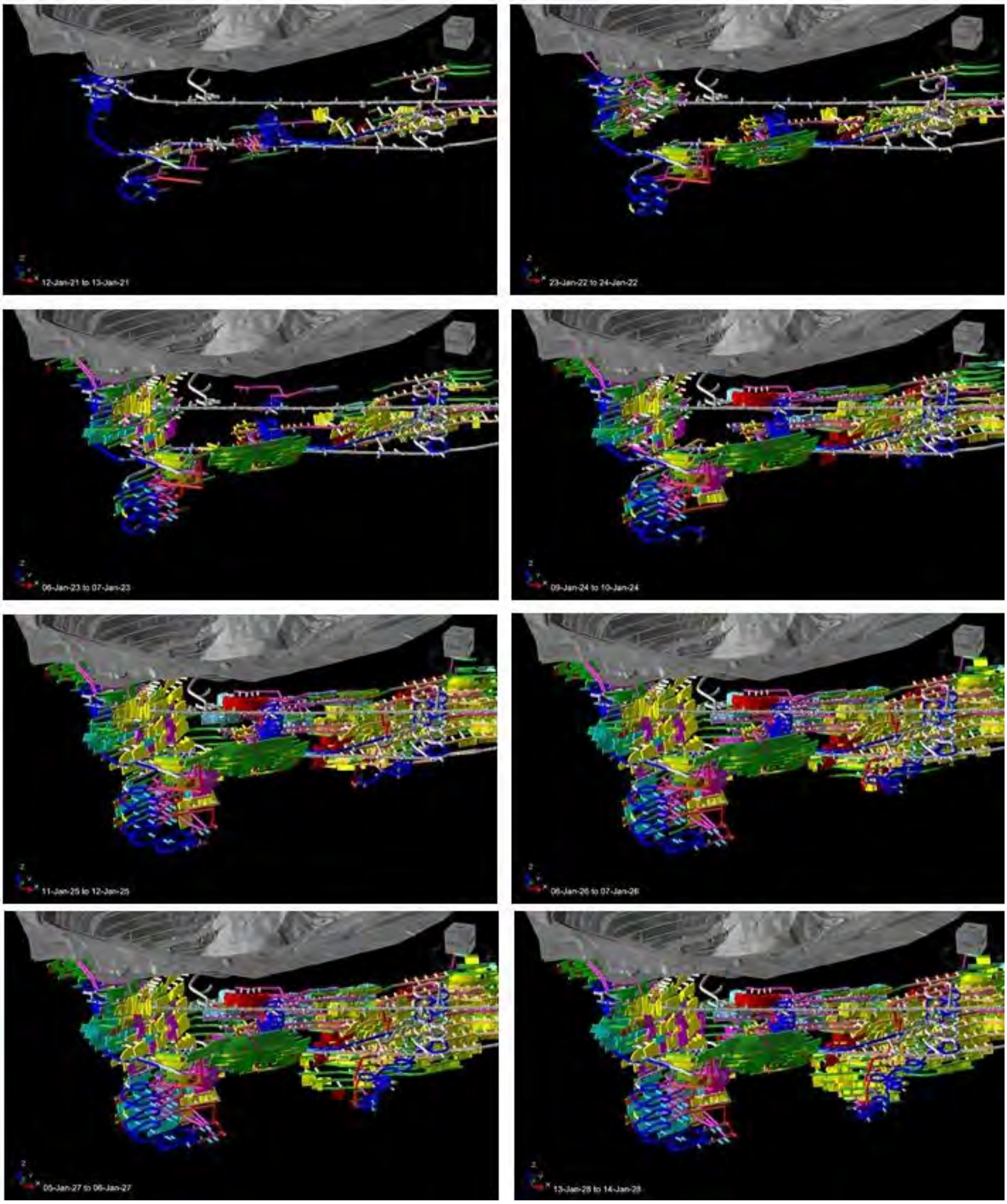
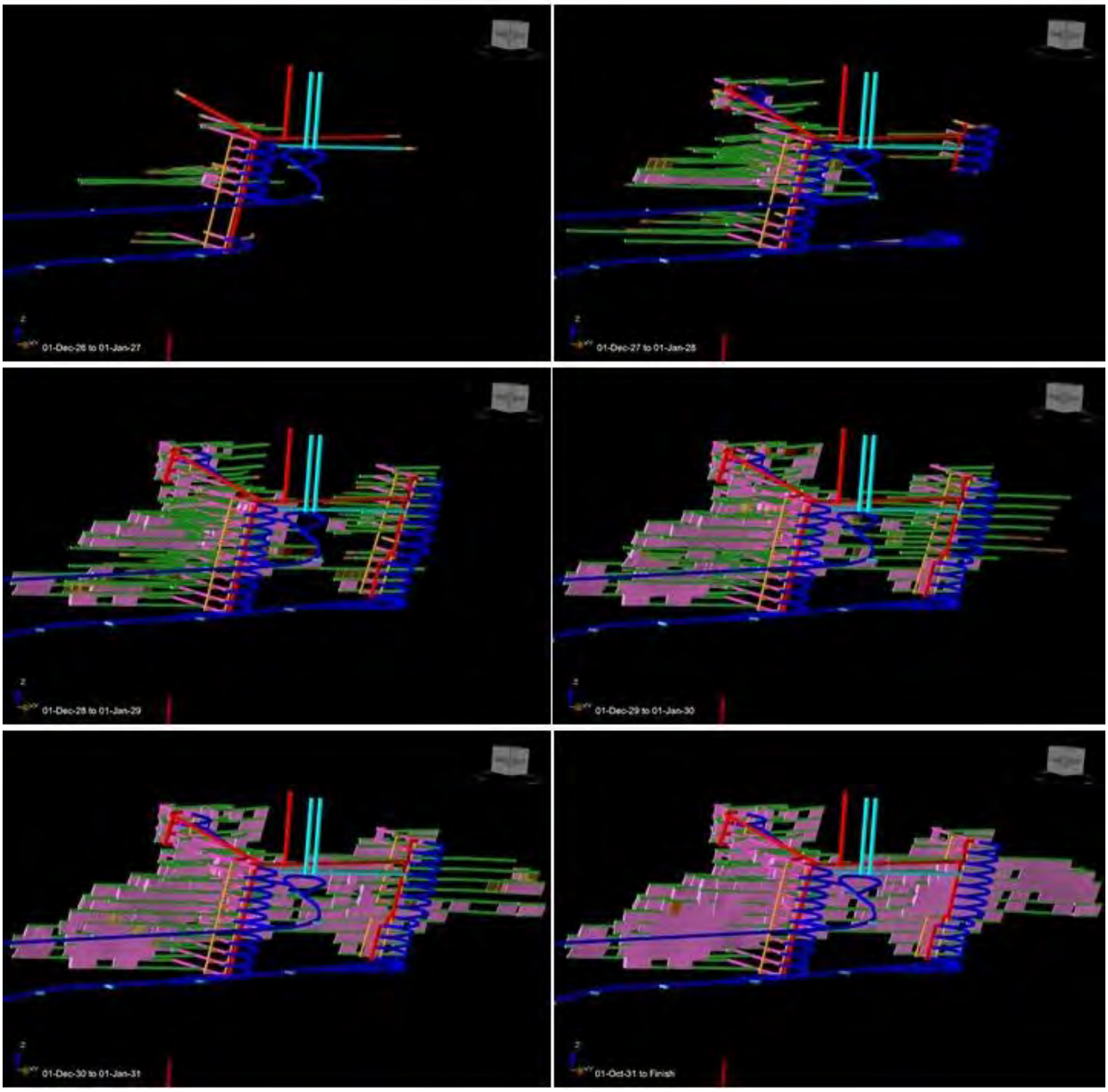


Figure 16-18: MUG Mining Sequence



The mine development by year of the WKP is shown in Figure 16-19 viewed from the south-east, highlighting the use of the central crown pillar to provide multiple mining fronts and early access to the high-grade mineralisation.

Figure 16-19: WKP Mining Sequence



16.8 Mill Feed Schedule

The mining inventories are referred to as mill feed as they have been derived from 51% Indicated and 49% Inferred classified resource (no Measured resource currently exists). In addition, regulatory approvals to enable some of the proposed developments to take place are yet to be received.

There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the production or economic forecast will be realised.

As discussed in Section 14.10, OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere. This is based upon the veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion. Additionally, in the case of MUG which provides over 90% of the PEA mill feed planned for the first 6 years, the average drill hole spacing for Inferred Resources is 48m which is only 20%

larger than the threshold of 40.5m required by OceanaGold for Indicated Resources. This drill hole spacing does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme.

The modifying factors are well understood and are based on over 50 independent studies which have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 years comprising air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, Iwi, landscape, mine design, mine planning, noise, pit lake limnology, property values, pumphouse, social impact assessments, surface stability, tailings disposal, traffic, vibration, water management and, hydrogeology.

OceanaGold and its predecessors, have extended the original permitted Martha Pit Project with Mineral Reserves of 0.7Moz, (extracted from 1988 to 1997) to extract 2.1Moz. (from 1988 to 2015) through ongoing conversion of Resources focused on the same vein zones. In addition, nearby underground Resources have been successfully converted to extract 1.1Moz. over the last fifteen years.

Taking these factors into account, OceanaGold believe that there are reasonable grounds to include Inferred Resources for the purposes of mine scheduling and determining the Mill Feed estimate.

The schedule has an approximate equal split of Indicated and Inferred Resource. In relation to the PEA mine schedule, OceanaGold has prioritised the resources with higher proportions of Indicated Resources ahead of the other Resources, i.e. MUG and GOP ahead of WKP and MOP5.

Cautionary Statement

"There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the PEA target itself will be realised". Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

16.9 Manpower

Mining manning distribution excludes EMPC, construction staff and labour and casual employees.

16.9.1 Open Pit

Open pit mine staff are shared between MOP5 and GOP pits and the TSF / NRS site staffing comprises mine manager and administrator, 12 technical services staff including samplers, five maintenance supervisors and 19 mine maintenance and electrical staff, 3 mine foreman and supervisors and mining personnel ranging from 35 to 74 dependent on level of activity. It does not include specialist construction staff for the NRS or TSF for installing piezometers, underdrainage, subsoil drainage, liners and dam monitoring or the workforce for construction activities around the pit perimeter.

16.9.2 Underground

Staff at the MUG mine comprises mine manager and administrator, 13 technical services staff, 25 mine maintenance staff six electrical staff, 6 mine foreman and supervisors, four mine control operators and mining personnel ranging from 88 to 112 dependent on activity.

WKP will have a separate workforce and comprises a similar number of mine administration, maintenance, electrical and technical services staff. Mining personnel range from 68 to 92 dependent on activity.

16.10 Risks and Opportunities

The PEA is preliminary in nature in that it includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the PEA will be realised. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Factors which may affect the preliminary stope and pit designs used to constrain the Mineral Resources, and therefore the mill feed estimates include:

- geological confidence of the Mineral Resources;
- commodity price assumptions and exchange rates;
- metallurgical recovery assumptions;
- geotechnical assumptions;
- imposed blast vibration and noise limits;
- working time constraints associated with MOP5 and GOP;
- suitable weather conditions during construction periods;
- hydrogeology assumptions;
- mining recovery and dilution assumptions; and
- MOP5 and MUG interactions, (geotechnical, blasting etc.).

Mining opportunities based on the current Mineral Resource lie in:

- improving the geological confidence of the Mineral Resources;
- expanding the amount of Mineral Resource used in this PEA for mill feed from MUG around the Martha and Royal veins;
- reoptimising the Martha Mine plan with respect to lower / variable cut-off grades;
- earlier access to WKP though use of tunnel boring machines; and
- lower-cost materials handling methods at WKP.

17 RECOVERY METHODS

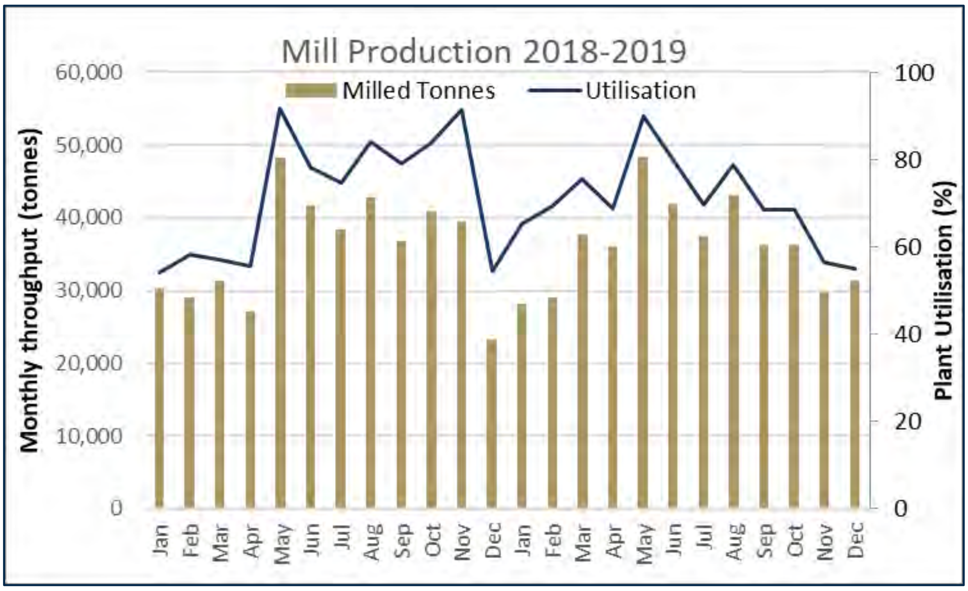
The metallurgical process at Waihi is well-tested and proven technology, having been in operation for 30 continuous years.

17.1 Actual Plant Performance

The current mill facility has a proven capacity to treat approximately 1.3 Mtpa of open pit feed from MOP5, or up to 900 ktpa of underground sourced ore historically from the Favona, Trio and Correnso areas. Mill feed is treated in a conventional SABC grinding circuit followed by cyanide leaching of gold and silver in a hybrid CIL/CIP circuit.

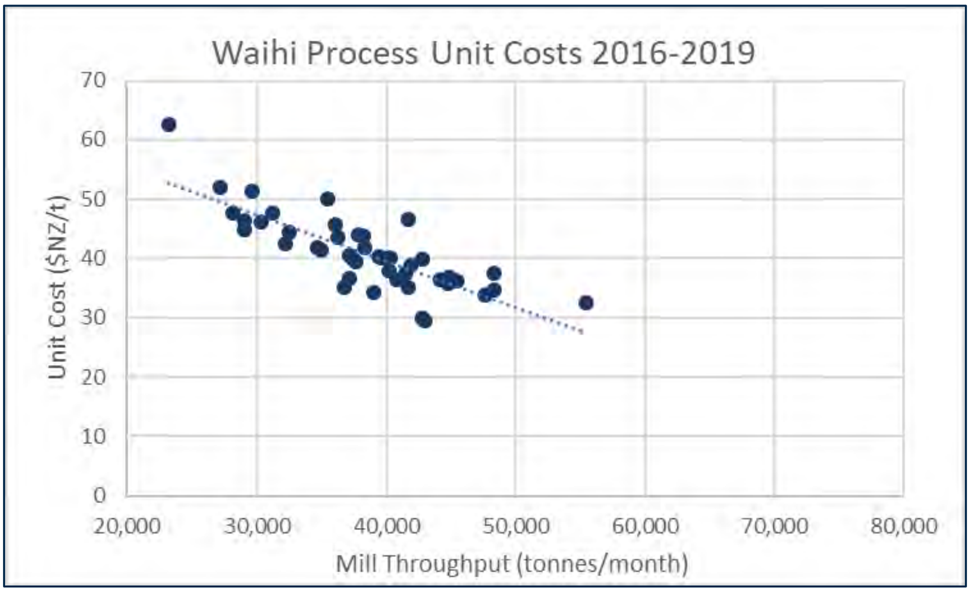
Mill production tonnes processed and plant utilisation for 2018-2019 years are shown in Figure 17-1. Mill throughput has been limited with a single ore source from the Correnso mine at reduced milling rates and plant utilisation.

Figure 17-1: Underground mill feed tonnes and utilisation actual 2018-2019



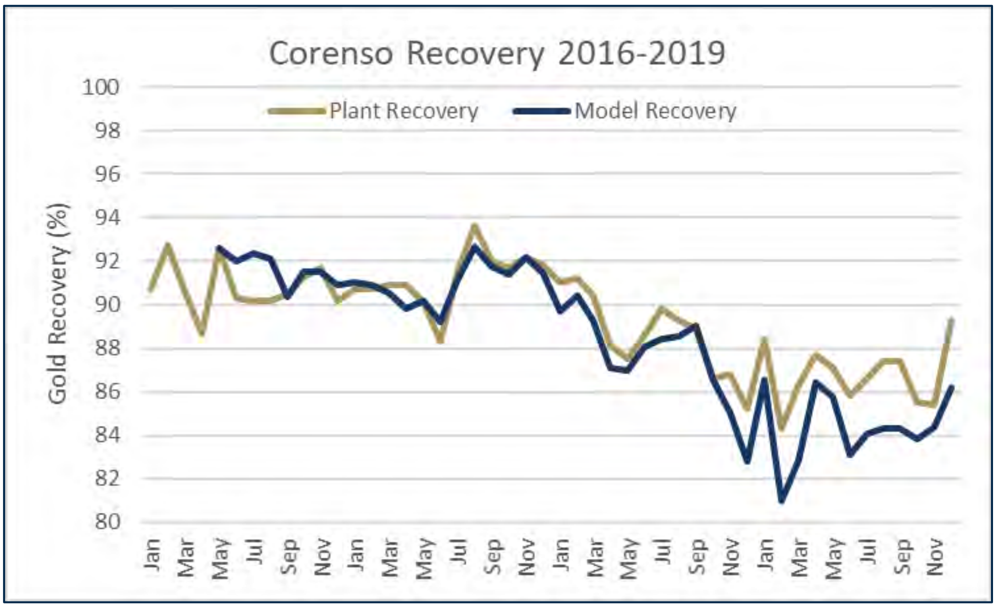
Process unit costs are dependent to a large degree on ore availability with initiatives implemented since 2015 to reduce costs in the mill given the limited supply of ore. Processing costs have ranged from NZD30-40/tonne milled when more than 40,000 tonnes per month was available and trends down at higher throughput rates as the fixed cost component is allocated over a larger tonnage. Forecast unit costs on MUG mill feed have been estimated at NZD34/tonne at 800 Ktpa throughput rate and as throughput increases are modelled to reduce to NZD26.4/tonne at 1.6 Mtpa. Unit cost history for the Waihi mill is shown in Figure 17-2 below.

Figure 17-2: Process unit cost 2016-2019



Gold losses to tailings in both the Correnso orebody and testwork on the Martha and WKP deposits indicate the majority of losses are related to sulphide locked gold. Modelling of gold recovery based on testing of samples from the Correnso deposit provided a strong relationship between recovery and the gold and arsenic head grades, with the arsenic a marker for increased arsenopyrite locked gold. Actual plant recovery compared to the modelled recovery from test work from 2016 is shown in Figure 17-3 with the plant in general able to meet or improve on the laboratory based recovery prediction.

Figure 17-3: Modelled vs Actual Gold Recovery



Treatment of Correnso ore was completed in March 2020 and the plant was then placed into a care and maintenance program. Continuous milling operations are expected to recommence in Q2 2021 as development and production becomes available from the MUG mine at an initial throughput rate of 150Ktpa increasing to 800 Ktpa over 3 years.

17.2 Metallurgical Accounting

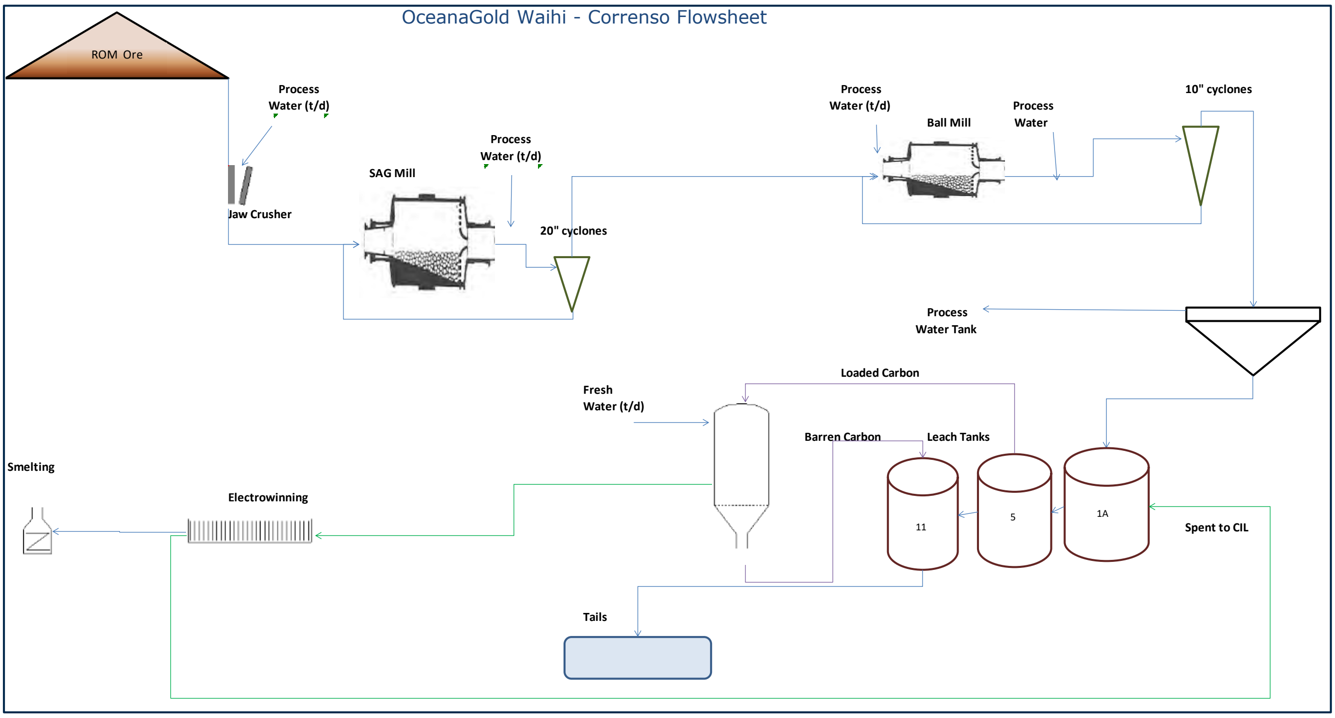
Metallurgical accounting at Waihi is primarily based on the tonnage of wet ore processed through the comminution circuit, as totalised on a conveyor weightometer and gold receipts from the Mint. Wet tonnes are converted to dry tonnes by using a moisture factor, the moisture factor is derived from samples taken from the conveyor. Gold production is based on gold receipts from the Mint and the changes to the gold stocks in circuit. Gold stock takes are taken monthly.

Samples are taken at strategic points in the processing stream to measure gold concentrations in those streams to determine plant efficiencies on a day to day basis. All information is entered into a data base which then performs the metallurgical accounting.

17.3 Ore Processing

Ore processing consists of five stages: comminution, leaching/adsorption, elution, electrowinning and smelting as shown in Figure 17-4.

Figure 17-4: Process Flow Sheet



17.4 Comminution

Underground stockpile material is reclaimed at 80 tonnes per hour by front end loader and fed onto a static grizzly with an aperture of 150 mm. The final conveyor from the ore handling circuit transports the ore into the grinding circuit.

Prior to entry into the feed chute of the semi autogenous (SAG) mill, the ore is further reduced in feed size via a jaw crusher to a P_{80} of 110 – 130 mm. The SAG mill ball size is 125 mm and the mill will operate typically with a 10% ball load. The SAG mill draws between 2.0 and 2.2 MW of power.

The SAG mill discharge is classified via a trommel attached to the SAG. The +12mm oversize material is conveyed to a 30 kW cone crusher and is recycled back to the SAG mill. The undersize slurry from the SAG trommel is pumped to two 0.5 m diameter inclined Weir Warman Cavex cyclones. The cyclone underflow reports to the SAG mill feed chute. The cyclone overflow gravitates to the ball mill discharge hopper, whereby the slurry is pumped to a cyclone distributor, which consists of 14 250 mm diameter Weir Warman Cavex cyclones. The cyclone underflow reports back to the ball mill for further grinding and the cyclone overflow reports to the pre-leach thickener.

Historically open pit ore from the MOP5 was crushed at the pit to <250mm before being conveyed overland on the ore/waste conveying system with the ore being diverted via a stacker conveyor to form a stockpile on the ROM pad. Open pit ore is reclaimed at 160 tonnes per hour by front end loader and fed to a storage bin, feeder and onto the SAG mill feed conveyor.

Normally, the comminution process is set-up as a closed circuit, but the plant has an ability to operate to an open circuit system if required. On underground ore sources the primary grind size target Is 53 microns and on open pit ores the cyclone configuration is changed to target 90 microns. The finer grind size target on underground ore is based on the higher head grade and proportion of losses that are sulphide locked which economically justify the finer grind size to increase recovery.

17.5 Leaching and Adsorption

The pre-leach thickener increases slurry density from approximately 15% solids to approximately 37% to 40% solids prior to the leach/adsorption circuit, which comprises six leach and six CIP adsorption tanks. The leaching tanks capacity are 700 m^3 and the adsorption tanks have 300 m^3, providing a total residence leach/adsorption time of 24 hours for MOP5 feed and 48 hours for underground sourced feed. Wedge wire cylindrical inter-stage screens with mechanical wipers are installed in each adsorption tank. The inter-stage screens retain carbon in the tank but let the slurry pass through to the next stage. A bleed stream is pumped from an adsorption tank to the previous tank in the circuit, the carbon contained in the bleed stream is retained in the previous adsorption tank in the circuit, this provides counter current flow whereby the slurry flows from adsorption tank 1 to 6 while the carbon flows from adsorption tank 6 to 1. This allows for maximum carbon loading in adsorption tank 1 and maximum scavenging of gold solution in adsorption tank 6. From adsorption tank 6 the slurry passes over a carbon safety screen to collect any carbon that may have leaked from the adsorption circuit, the barren tailings slurry is then pumped to the TSF.

Cyanide is delivered and mixed on-site, via a sparging system to a concentration of 21 % wt./vol. The cyanide is dosed into the first leach tank and the concentration is maintained at 280 ppm for Martha and 240 ppm for Correnso. Oxygen is added to the first leach tank by a shear reactor to enhance the leach kinetics and reduce cyanide consumption.

17.6 Elution, Electrowinning and Smelting

Loaded carbon from the adsorption circuit is fed into a 12 tonne capacity elution column where the carbon is washed at high temperature and pressure to remove the gold and silver from the carbon and into a pregnant eluate. The pregnant eluant is then passed through electrowinning cells where gold and silver are electroplated onto stainless steel cathodes. Following elution, the barren carbon is reactivated and recycled to the adsorption tanks.

The cathodes are periodically harvested and rinsed to yield a gold and silver bearing sludge which is dried, mixed with fluxes and put into a furnace at 1200^{O}C. Once the sludge is molten it is poured as bars of doré (alloy of gold and silver) ready for shipment to the Mint.

17.7 Other

The Processing Plant has a SCADA control system. Equipment protection and P&ID control loops to optimise the control of the major streams/processing parameters within each process circuit are actively in use within the process plant.

17.8 Progressive Capacity Increase

The Processing Plant will see a staged increase in throughput from four feed sources over the planned LOM. There are two underground sources namely MUG and WKP at up to 800 Ktpa each, and the GOP and MOP5 at up to 1,900 Ktpa each but sequentially. Processing rates are expected to commence at 400 Ktpa ramping up to 1.6 Mtpa by 2026 and maintain this rate for a number of years. Figure 17-5 shows proposed flowsheet for the expanded Processing Plant.

Based on testwork and studies completed each section of the plant has been reviewed to identify modifications required to increase capacity to the planned 1.6 Mtpa of underground mill feed and 1.6 Mtpa of combined underground and open pit mill feed. A progressive upgrade plan is expected to achieve the mine plan requirements.

Ultimately feed will be campaign treated from either underground mine at 190 tph for nominally 48% of the year, with the remaining operational time dedicated to treating open pit feed at 200 tph.

17.9 Primary Crusher Installation

During the care and maintenance phase it is planned to relocate the modular primary jaw crushing plant from the now decommissioned Reefton mine to Waihi and install at the plant ROM pad with a new discharge conveyor to the current SAG mill feed conveyor. This will provide sufficient primary crushing capacity with the Kobelco 48x36 crusher to achieve the required plant throughput in the same established direct feed arrangement utilised at the Waihi and Reefton plants.

17.10 SAG Mill Upgrade

The current Waihi SAG mill has insufficient capacity for the throughput available in the mine plan once the GOP comes online. The SAG mill from the decommissioned Reefton plant will be relocated to the Waihi site and installed upstream of the current SAG mill with the existing conveying system removed after the installation of the modular primary crushing plant.

The Reefton mill is a 5.2m diameter by 6.8m long (EGL) grate discharge mill with a 3.6MW motor originally installed at the Hedges project in Australia and refurbished prior to installation at the Reefton Project in 2007. The Reefton mill will be installed with a discharge pumpbox to feed the primary 20” cyclones to run in closed circuit to control the transfer size of the circuit. In this configuration power modelling has shown the mill will be capable of achieving the 190 tph milling rates required on the more competent underground feed and 200 tph on the open pit sources to meet the mine schedule.

The existing SAG mill will be reconfigured to operate as an overflow ball mill capable of drawing 2.0MW and will operate in closed circuit with the 10” secondary cyclones and the existing 1.2MW ball mill.

This primary SAG circuit will accommodate milling the MUG / WKP feed as well as the open pit feed from GOP / MOP5 in the plan at combined rates of 1.6 Mtpa or straight open pit mill feed at 1.6 Mtpa. Upside potential throughput will be available with the installed motor power of the Reefton mill not being fully utilised.

17.11 Ball Mill Upgrade

With the introduction of the additional open pit mill feed from 2024 and the increase in throughput rates on underground feed to 190 tph an increase in ball mill capacity to maintain target grind sizes will be required. By the end of 2024 an additional new 4.7m diameter by 7.92m long (EGL) 3.0 MW ball mill will be installed to operate in parallel with the converted current SAG mill to accommodate the grinding power requirements for the larger proportion of open pit feed. The current 1.2MW ball mill will be decommissioned and removed from site.

A new combined discharge pumpbox, cyclone feed pumps and cyclone distributor will be installed to treat combined ball mill discharge and distribute the underflow to the two ball mills. When treating open pit feed from the GOP or MOP5 the coarser grind size target will allow the existing reconfigured Waihi mill to be turned off.

17.12 Leach and Adsorption Circuit Upgrade

The increased throughput from the increased throughput feed rate from 160 tph to 200 tph will require changes to the leach circuit to accommodate the increased slurry flow and maintain the target 24 hours of leach residence time to meet recovery targets.

The primary cyclone overflow trash screen will be replaced with a larger capacity linear screen to remove trash and tramp material from the leach circuit feed.

A new pre-leach 22m diameter pre-leach thickener will be installed to replace the current unit to increase solids density to 45-50% solids and return process water to the grinding circuit.

A new leach tank of a nominal capacity of 1500 m^3 will be constructed at the head of the current leach train to maintain the required 24 hours of leach residence time before passing through the existing adsorption tanks with contact times in each adsorption stage being maintained above 40 minutes.

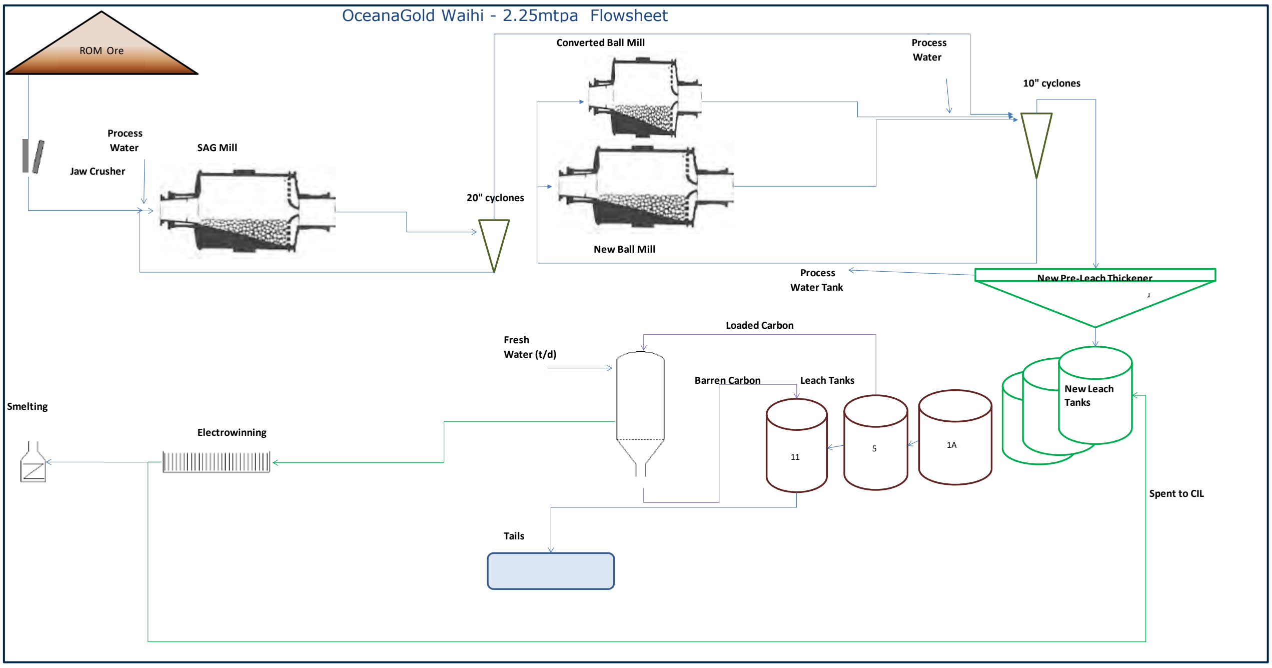
The existing screens in the adsorption tanks will be replaced with higher capacity pump screens to handle the increased flowrate through the tanks. The existing 12t elution column is planned to be replaced with an identical size stainless steel unit in 2021 before operations recommence. To meet the production rates of combined gold and silver an average of five strips per week will be required and the rest of the gold room and elution circuit will be unchanged. Metal production rates are within the capacity of the existing stripping and electrowinning circuit.

17.13 Tailings Pumping

Tailings disposal will be to the existing TSF 1A and two dams until 2027 and then be pumped to the GOP which will be converted to an in-pit tailings storage when mining is completed. A new storage facility (TSF3) will be required after the pit has been filled. The existing tailings pumping system of 2 stage Warman 6/4 pumps will be upgraded to 8/6 pumps and a larger diameter tailings pipeline to accommodate the increased flow with the installation of the second ball mill.

The existing decant return pumps have additional capacity to feed the WTP, the process water pumps in the plant will be upgraded to provide the increased flow duty. Further study work will be conducted in 2020 to confirm sizing of tailings pumps and motor.

Figure 17-5: Process Flowsheet Upgraded for 1.6 Mtpa



17.14 Risks

Metallurgical test work on proposed mill feed sources has been carried out in multiple campaigns to provide throughput and recovery data for design and to develop variability testing campaigns that reflect the expected mine plan. Prior production history in the Martha deposit provides a higher level of confidence in recovery assumptions compared to other greenfield projects.

Higher feed hardness presents a risk to achieving expected throughput rates at target grind sizes. Ongoing infill drilling work is planned in 2020 to generate additional variability composites for both grinding and recovery test work to improve confidence in the plant design criteria.

Installed mill power is based on modelling to the 75 percentile of test work to date and an allowance of reserve installed power has been made. Direct leach test work is planned in 2020 at sizes above and below the selected optimum to allow increased understanding of mill feed characterisation and trade-off between grind size (throughput) and leach recovery.

18 PROJECT INFRASTRUCTURE

18.1 Site Access Infrastructure and Logistics

The project is an active mining project with the majority of the infrastructure required for its ongoing operation already in place. Site access from major ports, international and domestic airports and roads are well established at the Waihi site, refer Section 5.1.

Supplies, equipment and materials are trucked to the sites via the paved roads. As this is a gold project there are no concentrate shipping constraints. There are no material logistic limitations impact the project.

The WKP Project is located on land owned by the Crown and administered by the DOC as a conservation/forest park. Current access for exploration activities is by helicopter or foot.

For the purposes of this Technical Report it is assumed that a new sealed access road will be established to the proposed WKP portal area, outside DOC land, which may include upgrades to the existing roads.

18.2 Mine Site Surface Infrastructure

MUG, MOP5, GOP and WKP will use the following facilities in place established at Waihi Operations in 1988 and upgraded in the late 1990s:

- tailings storage facilities,
- silt and collection ponds,
- stockpile facilities,
- mine access roads,
- water treatment facilities,
- Favona Underground administration and change house,
- conveying and loadout facilities,
- Favona Underground workshop,
- surface explosives magazines,
- other site infrastructure and,
- existing components of the process plant.

A new core shed will be required and is expected to be constructed in company owned property on the outskirts of the Waihi township. It is also likely that the geology team currently based in the Waihi administration area will relocate to this building. The location of the existing infrastructure is shown in Figure 18-1.

Figure 18-1: Waihi Existing Infrastructure

18.2.1 MUG

MUG facilities will use the existing Favona facilities, with minor upgrades to the surface infrastructure as required.

The Favona portal, used to access MUG and the existing stockpile area will be relocated as part of the proposed GOP development. This will necessitate relocation of the laydown area, security fencing and explosives magazine.

A fill pass from the MOP5 close to the crushing facility is proposed to link into the 920 drive, approximately 200m deep. A cement batch plant is proposed to be constructed close to the Polishing Pond stockpile entry.

18.2.2 GOP

GOP will require the following infrastructure

- a new crusher at the Mill ROM;
- a 15m to 20m wide haul road from the GOP pit to the NRS and PPS including a bridge constructed across the Ohinemuri River and use of the existing underpass below the overland conveyor;
- a new laydown to the north of the conveyor and cut to the 1120 mRL contour is proposed of 1.7 Ha which provides a services area for the MUG;
- clean water diversion drains as required; and
- a realigned gravel road from the end of Clark Street for public access the BMX / mountain bike track.

18.2.3 MOP5 Cutback

MOP5 will require the following infrastructure.

- partial relocation or demolition of the existing workshop, wheel wash and other mobile plant facilities and provision of new duplicated facilities;

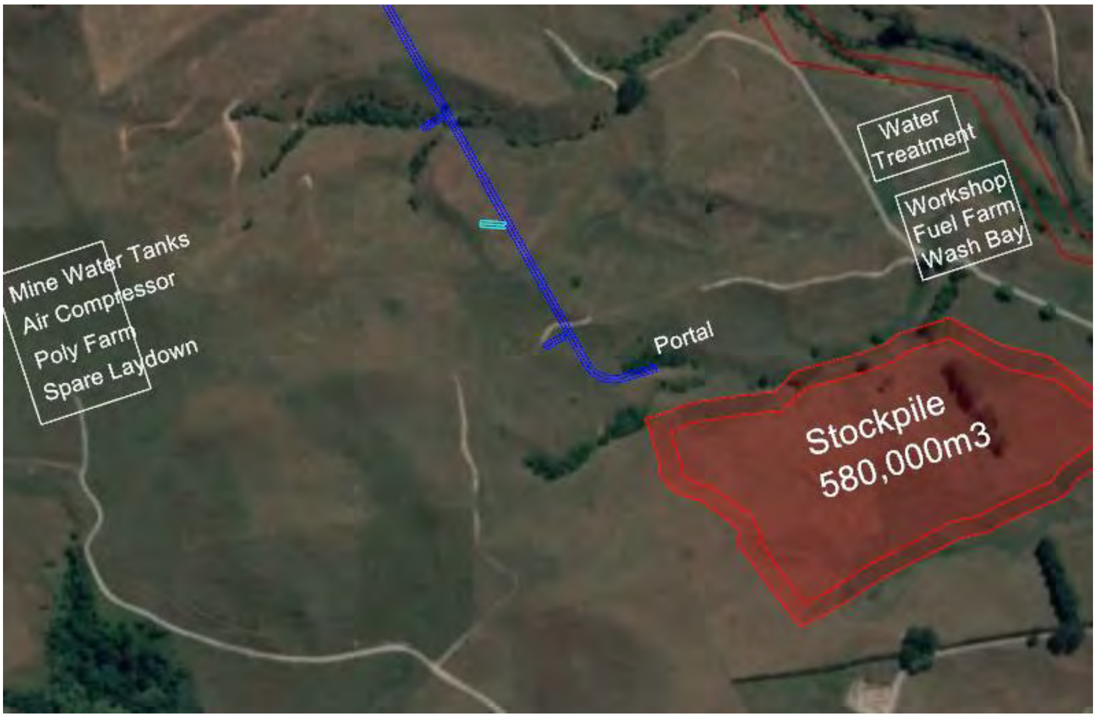
- site preparation works described in section 18.5.1
- relocation of the open pit administration and ablution facilities/ offices and fuel bowser; and
- relocation and upgrade of the crushing and conveying facility.

18.2.4 WKP

The PEA assumptions for the WKP portal area are that the general mine surface facilities will include a mine truck shop, a plant maintenance workshop, an explosives storage magazine, water ponds, a small general warehouse and a WTP. In total approximately 3,000 m^2 of general buildings have been accounted for in the capital cost estimate. A stockpile facility has been designed to accommodate development waste rock all of which will be returned underground as backfill. A concept level plan is shown below in Figure 18-2.

A sealed haul road from the process plant area to the WKP portal will be required to minimise dust nuisance. Studies are in progress assessing the suitability of public roads for materials handling, however, for the PEA, allowance has been made for construction of a dedicated haul road, bridges across minor streams and an underpass beneath the State Highway.

Figure 18-2: Concept Plan of WKP Surface Infrastructure



18.3 Engineering and Design of Site Infrastructure

Design drawings and reports have been prepared by engineering consultants for TSF3, NRS and the lifts on the existing TSF1A and TSF2. The site preparation and earthworks for the TSF and NRS are discussed in Sections 18.10 and 18.11.

The engineering and designs for the remainder of the site infrastructure is at a concept level.

18.4 Project Schedule and Infrastructure Staging

The project schedule allows three and half years for staged detailed design and consenting.

18.5 Site Preparation, Civils and Earthworks

18.5.1 MOP5

Site earthworks and civils for the MOP5 development include the following:

- Relocate / realign public roads, west of the pit and establish a new noise screen adjacent to the realigned roads.
- Realign public roads to the north of the pit.
- Relocate the OceanaGold Education Centre to the south of the pit or other nearby location and relocate other tourist attractions as close to the pit as practicable and as required to align with the proposed closure plan.
- Silt control, topsoil removal and stockpiling, removal of the significant trees, natives and exotics.
- Excavate new crusher slot and relocate crusher conveyor approximately 70m further east. Construct a new noise bund fencing and access road along Grey Street. Diversion of part of Eastern Stream and tributaries will precede the noise bund relocation.
- Construct minor noise bunding and screening around remainder of pit rim.
- Relocate explosives magazine, offices, existing workshops and wheel wash.
- Relocate housing.
- Construct causeway and relocate historical Cornish pumphouse to an area south of the replica poppet head.
- Remove and relocate historic Grand Junction powerhouse foundations to an area within Slevin Park.
- Relocate security fencing.
- Relocate the pit rim walkway, statues, signage and enhancement plantings.

18.5.2 GOP

Site earthworks for GOP comprise the following:

- Pine tree removal and disposal.
- Topsoil removal and stockpiling.
- The Favona magazine is relocated to the east of Gladstone Hill. The replacement decline is mined mainly from the underground mine and the GOP portal broken through into the already established box cut.
- A bridge across the Ohinemuri River is constructed suitable for 85t haul trucks.

18.5.3 MUG

The site preparation or earthworks required for MUG is the establishment of a new portal which is included in the GOP works and a suitable pad and foundations for the cemented back fill batch plant.

18.5.4 WKP

WKP is a “greenfields” site and for this PEA it is assumed the following is required, establishment of:

- a portal;
- service and haul road to the portal;
- earthworks and civils for the proposed mine surface facilities;
- diversion drains, minor settling and collection ponds;

- construction of a pad for temporarily stockpiling waste rock from the mine development;
- laydown area for mining infrastructure;
- consumables, security fencing and screening;
- silt dam and silt pond;
- WTP;
- noise bunding;
- car parks;
- ablution block, mine administration and mine rescue station;
- security gate and station; and
- surface magazine.

18.6 Site Services Infrastructure

18.6.1 Fuel Supply and Storage

Fuel is supplied directly to the mine, by local venders who contract supply from Tauranga, 60 km south of Waihi.

18.6.2 Water

Process water will be sourced from the TSF, via a pump on a pontoon collecting clear water, which is conveyed to the mill via a pipeline. Water to supply the buildings, as well as for the fire suppression distribution system will be provided by the town water supply.

Mine water is supplied from the WTP. Used water and sewage are handled by a septic tank system.

18.6.3 Security

The current security office and guardhouse are provided at the public entrance to the Martha site and Processing Plant / TSF site will be staffed continuously. Perimeter fencing will be provided around the WKP portal area and haul road as required and a security office at the main point of entry.

18.6.4 Power and Electrical

Power is supplied through the local utility. The power supply is provided from the national grid and supplied to the company substation at the mill location and mine locations. The company has backup generation available to support the main lines if needed. The mine is currently allocated 12 MW but during peak holiday seasons, the mine is currently restricted in its power draw to 9 MW and some areas of the operations are shut down during these times.

The Waihi Mine Site power is supplied from the Waihi Substation via dual 11kV Powerlines. Normally the maximum site load is limited to 12MW but during public holidays the site is restricted to 5MW and the process plant is usually shutdown during these times. The current load for surface and underground is between 7.6MW and 7.9MW but the process plant is not fully loaded due to low feed tonnages from the Underground. With MUG coming online, the expected upgrades to the process plant and the new WKP mine, the site maximum demand has been estimated to increase in stages to approximately 29MW.

As the existing infrastructure at the Waihi Town Substation is not capable of handling this additional load, PowerCo was requested to investigate what is required in the way of new infrastructure to cater for the expected load increases. PowerCo issued a preliminary high level options report based on the installation of a new 33kV Powerline from the Waikino Substation (11 km's north of Waihi township) to the Waihi Town Substation and from there to a proposed new 33kV/11KV Substation at the Processing Plant. Edison Consulting Group were chosen by PowerCo to carry out Concept Design Report (CDR). Various options were tabled with and without connection to the Waihi Substation and within road reserve or private land. Cost estimates ranged from NZD10M to NZD13M. Project power demands average and peak are shown in Table 18-1.

Table 18-1: Waihi Power Demands

Activity	Peak Power (MW)	Average Power (MW)
Ball and SAG mill	10.0	8.0
Other processing and water treatment	5.1	4.1
MUG	4.5	4.0
WKP	4.5	4.0
Open pit crushing and conveying	5.5	5.0
Total Power Draw	29.6	25.1

18.6.5 Communications

The Waihi site has an established telecommunications system including radio and telephone installations, these will be extended to cater for the project.

Technologies installed at MUG and WKP is expected to include:

- Mine control employing Fewzion technology.
- Person to person communications consists of handheld and vehicle mounted radios transmitting via leaky feeder cable reticulated through the mine.
- Proximity detection (equipment to equipment and equipment to person).
- Electronic tagging and tracking and proximity detection using proprietary cap lamps.

18.7 Administration Area Infrastructure

The existing Favona administration facilities will continue to be used for the MUG.

New facilities will be required to replace the existing administration offices at Waihi and the PEA assumption is that existing buildings within the Waihi town will be used.

18.8 Processing Area Infrastructure

The key process pant infrastructure requirements are covered in Section 17.

18.9 Existing Tailings Storage Facilities

Waihi has two tailings storage facilities known as Storage 2 and 1A. Both are located south-east of the Processing Plant and Martha Pit as shown in Figure 18-3. The TSFs are formed by downstream constructed embankments that abut elevated ground to the east of Storage 2 and north of Storage 1A.

Storage 2 has a planned finished crest elevation of 161 mRL and the planned crest of Storage 1A is 177.25 mRL. The embankments have both been constructed from overburden material obtained from mining Martha Pit. Storage 2 was constructed first and provided tailings storage from 1989 to May 2000. Storage 1A has since provided tailings storage. Storage 1A and 2 are permitted by the Mining Licence, Storage 1A has a Building Consent allowing it to be constructed to 177.25 mRL. Storage 2 has a Building Consent allowing it to be raised to 161 mRL. A further lift on TSF 1A to 181 mRL is planned through a combination of downstream and centerline construction techniques.

Figure 18-3: Location of tailings storage facilities

18.10 Planned Tailings Storage Facilities

The project will require constructing a new Tailings Storage Facility, TSF3. The design of the TSF3 will take into consideration:

- TSF3 will be constructed using only downstream construction techniques.
- The scheduling and delivery of rock and the availability of different rock types to meet the low permeability fill zones, non-acid sealing layers and long-term stability and closure requirements.
- The TSF3 embankment and the NRS will require building consents, and therefore need to comply with the Building Act. In addition, the TSF3 design will need to comply with the NZSOLD Dam Safety Guidelines.
- Geotechnical conditions that include the presence of weak materials.
- The need to restrict seepage from the tailings, and to collect any seepage that does form for pumping to treatment.
- Surface water diversion works to divert clean run-off from above and within work areas and to direct it to Collection Ponds.

Figure 18-5 shows TSF3 completed with the final crest at 170 mRL and is constructed immediately east of the existing TSF1A. TSF3 is formed by an embankment that abuts against the downstream shoulder of the eastern side of TSF1A and the land that rises to the north.

A geotechnical investigation covering part of the proposed TSF3 footprint was undertaken in 1995 and has continued through 2017 and 2018. The depth to bedrock is greater than that encountered at TSF2 and1A. The overlying soils are variable in depth, and some are compressible, the result of which is that settlements beneath the embankment and tailings impoundment are potentially greater than experienced with the existing TSFs.

To accommodate these different site conditions and provide for a structure of similar geotechnical integrity as the existing embankment, will involve excavation of areas of compressible soils and backfilling with a structural fill. Additionally, a geomembrane is proposed within the tailing impoundment and up to the initial starter embankment height to provide secure containment of tailings seepage. Above the starter embankment, a low permeability layer of compacted clay is proposed.

18.10.1 Preparatory Works

The footprint of the TSF3 will require approximately 60 Ha of topsoil and subsoil to be progressively stripped from the area including several unnamed stream beds. The location and footprint of the topsoil stripping and stockpile location is shown in Figure 18-4.

Figure 18-4: Preparatory Works for TSF3

Compressible soils will also need to be removed from the footprint of both the TSF3 impoundment area and the embankment footprint. This material will be replaced with suitable structural fill material sourced from GOP and MOP5. It is expected that some infilling and re-shaping within the impoundment area will be necessary to provide a suitable surface for placement of the geomembrane.

A new water collection pond is to be constructed for TSF3, in the lowest area of the site. The collection pond is to be lined with a geomembrane full height and will likely have an overflow spillway into the Ruahorehore Stream.

TSF3 will also include an uphill diversion drain to divert clean run-off from higher ground, a perimeter drain to collect surface run-off from the embankment and to direct it to a collection pond, and a perimeter road to provide access for operation and maintenance. Run-off collected in the collection pond will be pumped to the existing WTP. The clean water diversion/ stream diversion drain is shown in blue and a tentative location for the collection pond / silt pond in yellow in Figure 18-5.

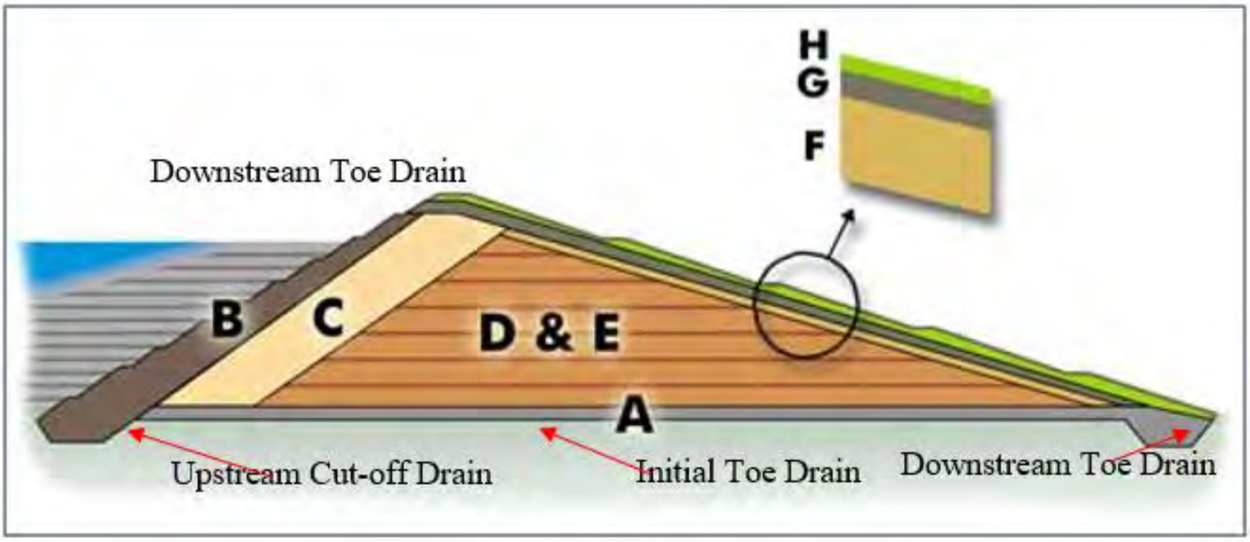
During the initial foundation preparation works, appropriate silt control will be provided to avoid discharge of excessive suspended solids to the Ruahorehore Stream. Pumping to the WTP remains a contingency, that could be adopted if required.

18.10.2 TSF3 Construction

The embankment would be raised in stages as required to provide the required storage. It is likely it will be raised to 135 mRL, 147.5 mRL and then in lifts to the final crest at 170 mRL. A typical plan view of the conceptual embankment design is shown in Figure 18-5. A typical embankment cross section is shown in Figure 18-6. The TSF3 design and construction will be similar to that employed for TSF2 and TSF1A except for the provision of synthetic geomembranes.

Figure 18-5: Conceptual Plan View of TSF3 to 170 mRL

Figure 18-6: Conceptual Cross Section of TSF3



The final position of the toe of the TSF3 embankment will be subject to geotechnical investigation to determine extent and depth of low strength soils.

The deposition of tailings into the TSF will be via a HDPE pipeline located around the perimeter of embankment crest. Deposition will occur from multiple spigots inserted along the tailing's distribution line. The deposition locations will be moved progressively along the distribution line, as required, to maintain slightly graded deposition of tailings towards the decant pond that is located in the southeast corner of the facility. Water from the decant pond will be recycled back to the mill for make up water and will be reclaimed by utilising either vertical turbine pumps mounted on a floating barge above the decant pond or skid mounted pumps to be located on the ramp within the southern end of the decant pond.

The TSF will be designed as a zero-discharge facility. In addition to the anticipated tailing storage and operating pool requirements, the facility will be designed to contain the Probable Maximum Precipitation (PMP) storm event and an additional one metre of freeboard at all times.

The project requires the TSF3 embankment to be constructed to 170 mRL, but the surplus materials available means that the embankment will be constructed well ahead of the tailings level and will be largely completed by year 13.

18.11 Planned Tailings Storage Facilities - Other

Studies are being conducted into additional facilities for storing tailings at a concept level, options include a further downstream lift on TSF1A to 192 mRL and conversion of the GOP pit into a TSF with partial embankments and various types of liners. The studies indicated the capacities shown in Table 18-2 could be achieved and the materials required for construction.

Table 18-2: Concept Tailings Storage Plan – Other Facilities

Area	Tails Storage Mm^3	Earth fill volume Mm3
GOP - Earth Fill Liner	3.70	1.63
GOP - Geomembrane Liner	4.1	1.24
TSF1A – raise RL182 to RL186	1.52	1.14
TSF1A – raise RL186 to RL192	2.41	2.12

Schedules have been run for both the GOP TSF and downstream lifting of TSF1A and both schedules meet the site criteria for waste rock disposal and tailings disposal. Costs for the concepts are similar and selection of the preferred method will largely rely on the various studies undertaken to support the assessment of environmental effects as well as consultation with various stakeholders. The concept plans for GOP TSF embankment and the TSF1A raise is shown in Figure 18-7.

Figure 18-7: Concept TSF Plans

For the purposes of this PEA the GOP pit converted to a TSF with earth fill liner has been included in the overall project schedule. The GOP TSF concept requires partial backfilling of the floor of the open pit, trimming of selected walls and placement of a NAF liner against these walls. An embankment around the pit perimeter is constructed to similar specifications and zoning as employed for TSF1A and proposed for TSF3. Other concept design aspects include:

- The GOP embankment will require building consents, and therefore need to comply with the Building Act. In addition, the design will need to comply with the NZSOLD Dam Safety Guidelines.
- The west end of the pit is partially backfilled to limit the embankment footprint extending down the slope towards the Ohinemuri River.
- Selected pit slopes flattened to a slope of 1.5H:1V to allow construction of the earth fill liner.
- A drainage layer comprising a geo-composite drainage blanket is installed to intercept groundwater seepage and to collect any leakage through the liner. The seepage is collected in a sump and pumped out by a pump installed in a 1m diameter PE pipe laid on the pit wall.
- A tailings underdrainage blanket comprising a geo-composite drainage blanket is placed on the floor of the liner and extends as strips up the sides of the TSF to promote consolidation of the tailings.

18.12 Planned Tailings Storage Schedule

The project requires facilities for the disposal of 17.24 Mm^3 of tailings and will use the tailings disposal facilities shown in Table 18-3. For this PEA an *in-situ* tailings dry density of 1.2 t/m^3 is assumed.

Table 18-3: Concept Tailings Storage Plan

Area	Storage Mm^3	Cumulative storage Mm3	Cumulative storage M tonnes
Remaining capacity TSF1A to 177.25 mRL	1.7	1.7	2.0
TSF2 5m raise to 161 mRL	1.6	3.3	4.0
TSF1A 5m raise to 181 mRL	2.1	5.4	6.4
TSF3 to 170 mRL	12.5	17.9	21.4
GOP TSF	4.1	22.0	26.3

Construction of the tailings facilities has been scheduled to ensure the TSF's meet the minimum freeboard conditions and provide adequate tailings capacity throughout the LOM plan

Availability of a surplus of suitable rock means that the TSF3 can be constructed well in advance of the minimum freeboard requirement.

Additional capacity is provided to future proof the project in the event that additional Mineral Resources are found, reducing cut-off grades or increased freeboard is required. The design and construction of TSF3 will not preclude additional lifts to cater for further new projects.

18.13 Waste Rock Stacks

The project requires the disposal of 26.2 Mm^3 of various types of rock. Areas for disposal are:

- MUG and WKP requires 4.9 Mm^3 for stope backfill.
- TSF3 requires 7.5 Mm^3 for its construction to 170 mRL.
- The central stockpiles can accommodate up to 0.9 Mm^3.
- GOP TSF requires 1.6 Mm^3 for its construction.

A facility to contain the remaining 10.4 Mm^3 will be required to accommodate the LOM waste rock. The proposed NRS is designed to a nominal elevation of 190 mRL and to accommodate up to 11 Mm^3 of rock.

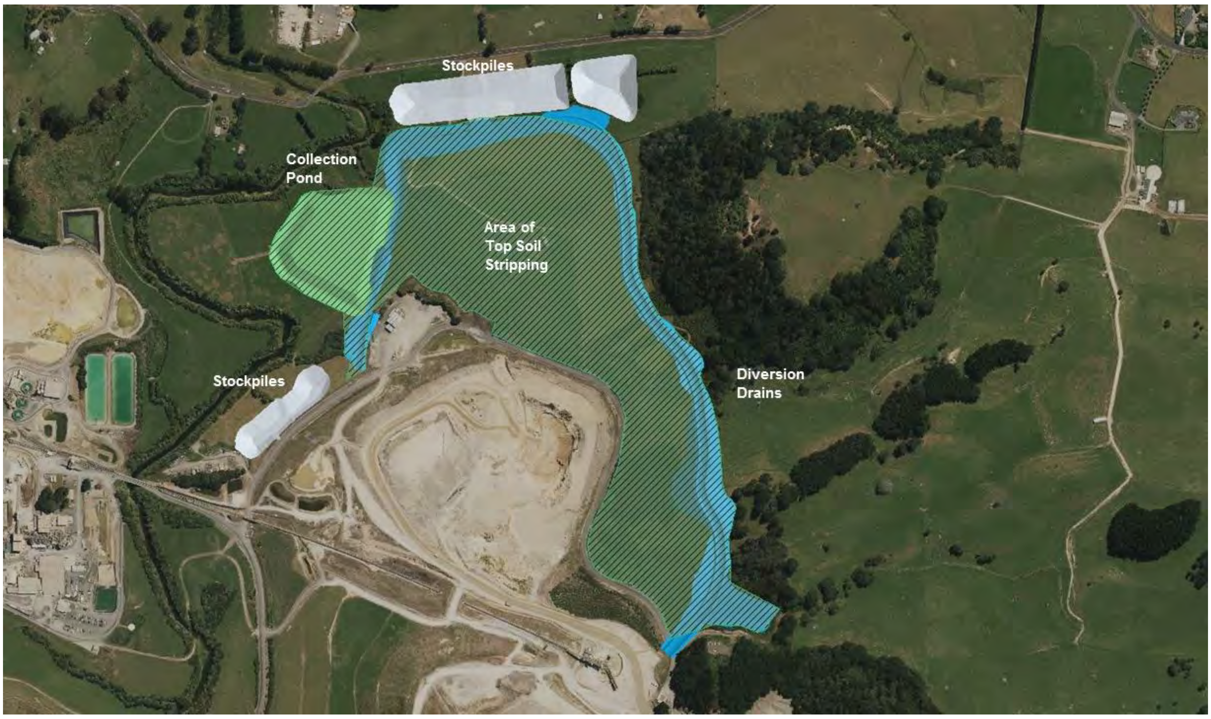
18.13.1 Preparatory Works

The footprint of the NRS will require approximately 18.2 Ha of topsoil to be progressively stripped from the area. A topsoil stockpile will be constructed at the northern extent. The stockpile can contain up to 100,000 m^3 of material and is constructed to a nominal height of 10m above natural topography. The northern toe of the stockpile is defined by the current alignment of the overhead power lines.

A company owned, single story dwelling is impacted by the stockpile footprint and will need to be relocated. The existing workshop structure, fuel bowser and grease storage facilities will need to be relocated approximately 160m to the south-west. The location of the structure allows for construction of the GOP haul road and retaining existing spillways.

An indicative uphill clean water diversion/ stream diversion and NRS collection drain will be required. The diversion drains contain a clean water drain which reports direct to the Ohinemuri River and collects run-off and stream flows upstream of the NRS and a dirty water drain which collects run-off from the NRS and reports to a collection pond. The drains are separated by a 6m wide perimeter road and shown in Figure 18-8.

Figure 18-8: NRS Preparatory Works



18.13.2 Rock Stack Design and Construction

The NRS is designed in three sequential phases.

- Design to 170 mRL leaving the conveyor corridor and loadout station in place.
- Design to 170 mRL infilling the conveyor corridor abutting TSF2, requiring relocation of the conveyor truck loadout to close to wheel wash station.
- Final Design to 190 mRL, refer Figure 18-9

The final position of the northern toe of the rock stack will be subject to geotechnical investigation to determine extent and depth of low strength soils.

The material generated from the development of the pits will be classified as either PAF or non-acid forming overburden material (NAF).

The NRS would incorporate similar design features as the existing TSFs to restrict the potential for generation of acid leachate and for leachate to enter surface groundwater. This base of the rock stack will be lined with a composite lining system utilising a low permeability soil layer overlain by a geomembrane. The geomembrane will be covered with a 600-mm drainage layer. A pipe network will be installed within the drainage layer to collect and transmit infiltration through the PAF material and direct it into the contact water collection pond. The PAF material will be compacted the within centre of the rock stack with lime addition to meet both strength and permeability criteria and the NAF material will be placed on the outer parts of the rock stack to meet both strength and permeability criteria and provide a growth medium for pasture.

Figure 18-9: NRS to Final Height 190 mRL

18.13.3 Rock Storage Schedule

Rock disposal by area and time have been considered. Key constraints in the schedule are providing available backfill for the Martha and WKP undergrounds and providing suitable material to construct TSF3,

18.14 Mining Area Infrastructure

The batching of open pit mined material through the crusher conveyor system will require this material to be hauled to stockpiles. This will occur when an excavator is excavating materials not being conveyed at the time or when maintenance or modification works are being undertaken on the conveyor crusher system. The maximum stockpile capacity at the Martha Pit is 200,000 t.

A 1.2 Mt stockpile facility has been constructed adjacent to the process plant.

Some stockpiling of material will be required to enable waste production to be scheduled in accordance with backfill requirements and maintain consistent feed through the process facility. The stockpile areas near the Favona portal will be used for the temporary storage of waste rock.

A shortage of backfill material exists for the MUG and WKP Underground mines and this will be sourced from the GOP and MOP5 pit developments.

It is expected that mill feed from the underground mine will be processed relatively quickly with the ROM material stockpiled in the ROM stockpile located near the conveyor in the processing area.

18.15 Manning

General administration staff include management, administration, human resources, safety, community support and environmental technicians and number 38 over the project life.

In addition to the full time employees (FTE's) a number of contractors are used around the site for security, drilling, cleaning, tree planting and gardening, electrical and fabrication works and property maintenance. These are included at the equivalent to 40 FTE's.

19 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

The mine has been operational continuously for the last 30 years and has current contracts in place for doré refining and other goods and services required to operate an underground mine and open pit mine.

19.2 Commodity Price Projections

Metal price assumptions are provided by OceanaGold Corporation. Prices used for the PEA estimates:

- Gold: NZD 2,308/oz, (USD1500/oz.)
- Silver: NZD 26/oz, (USD 17/oz.) treated as a by-product credit.
- Exchange Rate NZD: USD 0.65.

19.3 Contracts

OceanaGold has agreements at typical industry benchmark terms for metal payables and refining charges for doré produced from the Waihi Operations. Gold and silver bearing doré is shipped to an Australian refinery for further processing under a toll refining agreement.

Contracts are in place covering underground mining, transportation and refining of bullion, and the purchase and delivery of fuel, electricity supply, explosives and other commodities. These agreements conform to industry norms.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL IMPACT

20.1 Statutory Requirements for Environmental Consents

The projects require various regulatory approvals for the projects to proceed. In New Zealand the primary piece of legislation governing this process is the Resource Management Act 1991 (RMA). Resource consents will be sought from the Hauraki District Council (HDC) and Waikato Regional Council (WRC).

The projects within the Favona Mining Permit requiring resource consent and district plan change approval include:

- GOP and supporting infrastructure
- MOP5 cutback and supporting infrastructure
- Additional lift on TSF1A
- TSF 3
- NRS
- Process plant upgrade

Development of WKP within the Hauraki Exploration Permit, requires resource consent approvals and requires an access arrangement from the DOC for any surface disturbance of conservation land.

20.1.1 The Resource Management Act 1991 and Regulatory Authorities

The RMA sets out a series of considerations and restrictions on the use of land, the use of beds of lakes and rivers, the use of water and also the discharge of contaminants into the environment. Generally, unless a rule in a relevant plan permits an activity, or an appropriate resource consent is held, the activity is not allowed.

Where consents are required, an application must be made to the appropriate consent authority. With respect to applications for the use of land the consent authority is the HDC. For matters relating to water, the use of beds of rivers and lakes, and the discharge of contaminants to land, air or water the relevant consent authority is WRC. It should be noted that WRC also has limited control of land use with respect to soil conservation and maintenance and enhancement of the quality and quantity of water.

Once the application is lodged the regulators decide how the matter will be considered and approved. For mining applications, it is common for regulators to hold a public consent hearing often heard by independent hearing commissioners.

Where possible a joint hearing (District and Reginal Councils) is held. During this hearing the applicant and submitters, both in support and opposition, are able to present information in support of their position to the commissioners prior to a decision being released.

Once a decision is made this can be appealed to the Environment Court by any party who participated in the Council Hearing process. These appeals lead to an Environment Court hearing unless resolved through mediation. This hearing is conducted by an Environment Court Judge and Commissioners who test the application through the provision of evidence and cross examination. The court then delivers its decision on the project.

20.2 Favona Mining Permit - Resource Consent Applications

It is proposed that approvals under the RMA for the interrelated components will be sought via concurrent plan change and resource consent applications.

Resource consent applications to the HDC will be sought for:

- The establishment and operation of GOP; and
- Ancillary activities and infrastructure (e.g. a tailings storage and rock disposal areas).

These resource consent applications will seek to authorise the land use activities associated with surface mining, mining operations, the establishment of noise bunds, vegetation clearance, earthworks, subdivision, road construction and realignment, movement / removal of heritage / archaeological features, and rehabilitation activities etc. The overall activity classification for these activities in the Hauraki District Plan is currently considered to be discretionary.

In addition, resource consent applications to the HDC will be sought for ancillary activities associated with the expansion/ cutback of MOP5.

The ancillary activities that will be authorised via resource consent include the destruction / relocation of heritage features, subdivision and road construction and realignment. The overall activity classification for these activities in the Hauraki District Plan is currently considered to be discretionary.

A resource consent application for the expansion and operation of MOP5 will also be sought from the HDC post the approval of the plan change to the Hauraki District Plan. Based on the proposed structure of the plan change, this resource consent application will be for a controlled activity and will be limited in scope in light of the mining activities at MOP5 having been considered in detail within a public forum via the plan change process.

Resource consent applications to the WRC will also be sought for the following:

- The expansion and operation of the MOP5;
- The establishment and operation of the GOP; and
- Ancillary activities and infrastructure (e.g. tailings storage and rock disposal areas).

These resource consent applications will seek to authorise the discharge of contaminants to air, pit dewatering, clean water diversions, the abstraction of water, the discharge of water and contaminants, instream works, stream diversion and the impoundment of water etc. The overall activity classification for these activities in the Waikato Regional Plan is currently considered to be discretionary.

It is noted that some of the existing regional consents held by OceanaGold may overlap with the resource consent requirements under the Waikato Regional Plan.

The resource consent applications to the HDC and the WRC will be supported by an integrated assessment of environmental effects (along with a number of technical assessment). An integrated environmental assessment report is proposed given the overlap between the activities requiring resource consent from the two regulators, and in order to enable manawhenua and the community to review the effects of overall proposed project in a single document.

20.2.1 Hauraki District Plan Change

In addition to securing resource consents from the HDC for the various land use components of the projects, OceanaGold will also seek a plan change to the Hauraki District Plan. The proposed plan change will seek to amend the Hauraki District Plan as follows:

- Rezone all properties supporting the expansion / operation of the Martha Mine from Residential, Low-Density Residential and Town Centre Zones to Martha Mineral Zone;
- Rezone all properties supporting the establishment / operation of the GOP from Rural Zone to Martha Mineral Zone;
- Rezone all properties supporting the expansion / development of the TSF and rock disposal area from Rural Zone to Marth Mineral Zone;
- Update the introductory text and policies for the Martha Mineral Zone in Chapter 5.17 of the Hauraki District Plan;
- Introduce a new controlled activity rule for surface mining, mining operations, rehabilitation and landscaping works at the Martha Mine, where the works are undertaken in accordance with a mine structure plan, mine slope profile plan and various performance standards;

- Introduce a new controlled activity rule for surface mining, mining operations, rehabilitation and landscaping works at the other surface facilities for the projects, where the works are undertaken in accordance with a mine structure plan (or similar), mine slope profile plan and various performance standards;
- Remove several trees contained within the footprint of the expansion of the MOP5 from the schedule of significant trees in Chapter 6.4 of the Hauraki District Plan; and
- Update the hazardous substances rules in Chapter 7.7 of the Hauraki District Plan so they recognise the need to use and store hazardous substances in the Martha Mineral Zone.

20.3 WKP Resource Consents

Separate applications for the WKP exploration drive and mine are currently being considered by OceanaGold. Each application will require the following permissions if applicable to the proposed activity.

20.3.1 Resource Consent Applications

Resource consent applications to the HDC will be sought for the following components of WKP:

- The establishment of new access roads to mine portals;
- The establishment of new haul roads to the Processing Plant;
- The establishment and use of a portal;
- The stacking and storage of mill feed and mine waste material;
- Sill drive development;
- Drilling, blasting, earthworks and the removal of rock material and mill feed;
- Backfilling of stopes with rock and CAF;
- The use of machinery and vehicles on haul roads;
- Use of the concrete batching plant;
- Clearance of indigenous vegetation to establish ventilation shafts; and
- The use and storage of hazardous substances in the underground mine.

Resource consent applications to the WRC will be sought for the following components of WKP:

- To discharge contaminants to air from the ventilation shafts and fresh air portals associated with WKP;
- To take groundwater to dewater WKP;
- To discharge treated mine water from the WTP;
- To discharge mill feed and mine waste material in separate stockpiles;
- To place rock and CAF into land in WKP and use as backfill to allow groundwater to discharge from the flooded workings in WKP into the surrounding ground post closure; and
- To discharge stormwater to land or water from stockpile areas and haul roads.

20.3.2 Access Arrangement Application

Access to WKP is proposed to occur under DOC land. If there is any surface expression on DOC land, an access arrangement with the Department will be required. This process would potentially run concurrently with the resource consent process.

The following is an excerpt for the New Zealand DOC website and sets out information regarding obtaining an access arrangement to undertake mining on Crown land administered by DOC.

Once consents have bene obtained, access from the landowner is required. Where this is public conservation land as is the case with WKP, and the application is not for minimum impact activities, the application is processed by the DOC as an access arrangement. If the access arrangement is approved, then a work program must also be submitted by the applicant prior to their being permitted to commence their activity.

This allows for details to be determined and ensures bonds, insurances, compensation plans and consents are in place. Once this is approved an Authority to Enter and Operate will be granted.

20.3.3 Timeframes

All applications should be processed by the Department in a timely manner. Target processing timeframes differ depending on which processing level the application fits (low, medium or high impact). The following factors will be considered when determining the processing level of an application:

- Values present at the site;
- Potential impacts on the values;
- The scale of the operation;
- Whether Conservation Board consultation is likely to be required.

These impact levels and timeframes apply to applications for prospecting, exploration and mining. Note that applications for prospecting and exploration will generally fit the low or medium impact category. Department staff will determine the processing level of the application.

The timeframes relate to the time from receipt by the DoC of a complete application through to the making of a decision on the application. Any changes made to an application by the applicant will generally extend the overall time needed for processing.

When an application is granted, the time that may elapse before the granting of the Authority to Enter and Operate is largely driven by the applicant and will depend on a number of factors such as the work program, ensuring the lodgement of the bond and insurances, and the payment of any compensation and cost recovery for the processing of the application.

Target processing timeframes for access arrangement applications:

- Low Impact 2 months/44 working days
- Medium Impact 4 months/88 working days
- High Impact 8 months/176 working days

Note that target processing timeframes will be extended for applications that are publicly notified. This extension is due to the timeframes associated with notifying applications, receiving submissions and holding hearings.

20.4 Social Impacts

Waihi is a town in Hauraki District, located at the base of the Coromandel Peninsula. Approximately 4,500 people make up the community of Waihi. Gold mining has been a feature of the region for three centuries with modern mining practices being present since 1987.

The Waihi community has experienced a history of mining operations both open pit and underground and new projects during this time. With the close proximity of a community to these operations, the need to understand and manage how mining affects the community and society at large is integral to successfully operate within a town. This has led to mining becoming part of the social fabric and identity of Waihi today, creating strong community connections built through trust by sharing information.

To identify and analyse how mining affects the Waihi community, reliable information is gathered through various monitoring methods across a broad section of disciplines. Part of this suite of monitoring information has been the extensive use of community surveys and polls, alongside multiple Social Impact Assessment conducted by credible third-party experts. Since 2014 the company has been required by consent condition to conduct an annual Social Impact Monitoring Plan report. This report monitors and reviews community perception and social impacts. It provides the opportunity for the local regulatory authority (HDC) to make comment or suggest modifications to activities and requires the company to suggest mitigating actions to address any negative issues or trends that are identified.

These monitoring methods help to inform strategies to alleviate any concerns raised by the community. In order to build trust and relationships unconstrained communication with the company is important as this ensures the best possible opportunity for community members to provide feedback, an example is the Complaints Hotline and procedure. It provides the community an opportunity to provide continual and unfettered feedback whenever they feel appropriate, meaning the community has access to communicate with the company whenever they need. Another example of providing access, is the appointment of a Community Liaison Officer, someone to act as the main point of contact between the community and the company.

Mitigation strategies have been implemented through innovation and use of policy. With technology continuing to evolve new and innovative ideas become more viable and effective. The Amenity Effects Program (AEP) arose from mediation with residents during a consent application and is a condition of consent. The program allows for a scientific method to be applied in identifying homes that are affected by vibration. An objective formula calculates the amount of mitigation the company needs to pay to the affected resident. Another example of innovation can be seen through the Blast Notification Program, where an alert device notifies residents' (who participate in the scheme) before a blast is initiated. By utilising innovative technology, proprietary hardware and public information sessions a process was developed to provide predictability and a sense of control around blasting. These issues were identified as needing solutions through the various monitoring and work done with the community.

Not all innovative ideas require technology but instead rely on a new perspective and understanding. Maori have a close spiritual connection with the earth and waterways. The physical and spiritual survival of all things dependent on the maintenance of the life force (Mauri), spirit, power and sacredness of Papatuanuku (Earth Mother). Maori regard land, soil and water as taonga (treasures) and they consider themselves to be the kaitiaki (guardians) of these taonga. Pukewa is the Maori name for the hill that once stood at the centre of Waihi town. Pukewa was mined. The mining of Pukewa had significant negative impact on the spiritual connection of local Iwi with the land. To assist in mitigating this impact, solutions are sought through collaborative means and robust engagement practices with an Iwi liaison group. A group that invites all interested Iwi groups to be involved in discussions on how to address the cultural significance of the area and provide up to date information about the operations as well as the progress of projects. The development of a cultural balance plan in partnership with local Iwi is in progress. The aim of the plan is to identify the Mauri of the whenua (land) and to work collaboratively to ensure the life force is restored at the conclusion of mining. Iwi are one example of how the company strives to build mutual trust through shared values, multiple opportunities are continually sought with key stakeholder groups that are identified through various methodologies of understanding the context.

Stakeholder identification is used to assist with effective engagement practices. Extensive work to map stakeholders using the technical studies, social risk assessment and local knowledge allows for a targeted approach to ensure relevant information is provided to the appropriate groups.

The way we communicate is an important aspect of how we listen to the various perspectives and expectations that can lead to conflicting interests within the project and decision-making processes. Due to the diverse range of perspectives and experiences a participatory approach is required.

20.4.1 Approach to Community Engagement & Participation Management Approach

To achieve this an adaptive approach to managing stakeholder engagement will be adopted. This approach will allow the projects to better understand how the business impacts people by listening to community and societal expectations and then utilising these learnings to inform the project's planning and risk management processes to drive decision-making. This approach is characterised by:

- In depth exchange of views and information between the project team and its stakeholders;
- Disclosure of relevant company information that helps affected stakeholders to understand the impacts, risks and opportunities of the business;
- Organised and iterative engagement between the project team and stakeholders on matters that impact them;

- Participation of and partnerships with stakeholders to identify impacts and develop mitigation or enhancement solutions;
- Participation of a broad spectrum of community voices, including informal and traditional leaders, formally elected and appointed leaders, families, women and vulnerable groups; and
- Formalised commitments and agreements for how the project team will work with stakeholders.

To continue to build upon the foundation of baseline data, a SIA is planned for the projects so effective and fit-for-purpose strategies can be implemented to enhance potential benefits and mitigate potential negative impacts. These management measures are to be monitored, reviewed and adapted through an effective SIMP framework to ensure ongoing effectiveness. The SIA will identify and define the potential social impacts, including the identification of potentially impacted communities. This will build a knowledge base to inform integrated and adaptive impact and risk assessment using local knowledge and participatory processes. Overall, the desired outcome is to uphold strong practices of social performance to ensure the company is a good neighbour and provides a positive legacy.

20.5 Cultural Values

OceanaGold (and its predecessors) have engaged with Iwi who have a special interest in Waihi in relation to various mining proposals over the last 30 years, and engagement is currently occurring in relation to proposed projects.

The nature of the engagement between OceanaGold and Iwi has been wide-ranging. It has included the establishment of Memorandums of Understanding, which have sought to recognise the relationship of Iwi with some of the areas that are subject to mining activities and their role as kaitiaki (and for Iwi to recognise the perspectives and interests of the company). It has also included engagement in relation to the potential cultural effects of resource consent applications for new mining proposals (e.g. through the preparation of cultural impact assessments), acknowledging that at times there has been a need for Iwi to submit on resource consent applications by the company. OceanaGold has also worked with Iwi to implement ongoing cultural awareness training of its staff.

In light of the above, OceanaGold recognises that its mining activities are located within the rohe of Hauraki Iwi. The rohe of Hauraki Iwi is described as *“Mai Matakana ki Matakana”* and covers the area from Matakana Estuary (near Mahurangi) in the north to Te Kauri Point (overlooking Matakana Island) in the south.

The Martha Open Pit has involved the mining of the ore body in Pukewa – a prominent hill in Waihi that had a pa nestled at its base. Ngati Hako have previously advised that Pukewa is the source of great energy and power and is the resting place of its ancestors.

It is understood that the Mauri of Pukewa has been affected by the mining activities that have been undertaken historically and in modern times, but that Iwi continue to have a significant relationship with Pukewa. In this regard, the Hauraki Iwi Environment Plan acknowledges the loss of waahi tapu associated with the mining activities at Pukewa.

It is also recognised that the Ohinemuri River is a taonga (treasured possession) to Iwi and they have previously advised that in pre-European times the river was home to thriving populations of whitebait, tuna (eel), and other native fish and the surrounding forest teemed with birds. Various Iwi have also noted that historic mining activities in Waihi damaged and polluted the Ohinemuri River and that the Ohinemuri / Waihou Rivers are of spiritual, cultural and historic significance.

The Waikato Regional Policy Statement (“***RPS***”) does not identify any scheduled sites of significance to Iwi within the vicinity of the projects. It does, however, include a method that specifies that the WRC will encourage tangata whenua to identify those areas, places, landscapes and resources of significance - including those with significant spiritual or cultural historic heritage values.

The Hauraki District Plan also does not identify any scheduled sites of significance to Iwi within the vicinity of the projects. It does acknowledge the relationship of Maori with their ancestral lands, water, waahi tapu and other taonga has the potential to be destroyed or compromised through inappropriate land use and development. Further, it notes that ancestral land is an important source of spiritual strength.

20.5.1 Multi-Disciplinary Management Approach

The project has adopted an early, multidisciplinary approach to identifying, assessing and managing impacts and risks for all project aspects. Early identification of impacts allows for identification of opportunities to avoid, minimise, restore, rehabilitate and or offset environmental impacts.

The process identifies environmental risks early in options analysis to enable the technical teams to consider the potential impacts and their treatment as part of the analysis process. These processes include:

- Initiation of a risk assessment specific to political, consenting, social and environmental at the start of a technical study phase.
- Use of a comparative political, consenting, social and environmental risk exposure matrix to inform and support the assessment of multiple technical solutions.
- Initiation of independent risk experts to facilitate key risk workshops to ensure critical risk management requirements are clearly defined and communicated.
- Inclusion of non-technical project members into technical options analysis processes to ensure key political, consenting, social and environmental risks are identified during scoping of work, and
- Engagement of third-party experts to undertake environmental assessments.

To inform the risk assessments, the project team leverages existing knowledge of the environmental and social context, in addition to implementing baseline studies. Current studies underway cover legal and planning, climatic conditions, water quality and flow, aquatic and terrestrial ecology, archaeology and noise and vibration, among others. In addition, a SIA has commenced with a focus on MOP5 along with a recreation study to assess use of the WKP area and a regional economic study.

20.6 Environmental Studies – Technical Assessments

Modern mining has operated in Waihi since 1987 to today. During this time, occurred only within the MOP5 and most recently at Correnso and Favona Underground with mining currently occurring in the MUG mine that is located largely under the Martha Pit.

Over this period OceanaGold has undertaken technical assessment and monitoring of relevant amenity aspects to where required implement mitigation strategies. This approach will continue for the assessment and ongoing management of the proposed projects. The amenity aspects include, but are not limited to, the following; Blasting, Vibration, Terrestrial ecology, Aquatic ecology, Water management, ground settlement, air quality, property, heritage and socioeconomic impacts.

Further detail on the Technical Assessment provided in Appendix C.

20.7 Environmental Bonds

Under the regulatory approvals granted for the Martha Mine Extended Project in 1999 and subsequent mining projects, OceanaGold must maintain two bonds in favour of the WRC and HDC (the Councils):

- a rehabilitation bond; and
- a capitalisation bond.

20.7.1 Rehabilitation Concept

OceanaGold is required to rehabilitate the exiting mining operations in accordance with an approved Rehabilitation and Closure Plan. The plan envisages the following rehabilitation occurring:

- The Martha Pit is to be transformed into a pit lake and surrounding parkland facility for recreation use;

- If, at or after the end of mining operations the Processing Plant or WTP is dismantled, the area formerly occupied by and surrounding the dismantled plant is to be contoured, and as far as is reasonably practicable restored in a manner that will protect water quality and avoid soil erosion;
- The conveyor route is to be restored to its former condition unless the HDC requires that it be left for use as a public walkway or other useful amenity provided the cost of doing so does not exceed the cost of restoration to the former condition; and
- The TSF's are to be rehabilitated using a range of vegetative covers (e.g. grass, native plants and vegetation and wetlands) as appropriate.

It is anticipated that MOP5 within the Favona Mining Permit will be included in this process and WKPs closure controlled in a similar manner.

20.7.2 Rehabilitation Bond

The purpose of the Rehabilitation Bond is to provide the Councils with unencumbered access to a source of funds sufficient to close and rehabilitate the current mine site in the very unlikely event that OceanaGold fails to meet the closure obligations required under other conditions of the consent.

The scope of works from which the closure cost is derived includes:

- Demolition and removal of plant and buildings;
- Rehabilitation areas of mine disturbance by completing capping, re-contouring areas of disturbance, spreading sub-soils and topsoil and planting;
- A period of site aftercare that typically includes care and maintenance of newly vegetated areas, weed management, water treatment and environmental and geotechnical monitoring and continues until all of the closure criteria are met (the site achieves "Closure"); and
- Management and administration costs throughout the rehabilitation and aftercare periods.

The method of estimating the closure costs to complete the rehabilitation is well established and straightforward. It involves:

- Establishing a list of the tasks and activities required to rehabilitate the site from its current state to one that meets the closure obligations;

- Estimating the quantity (volume, area, hours etc.) of work involved in completing each task or activity;
- Assigning a unit rate to each measurement of quantity (dollars per unit measure of volume, area, time etc.).

The total closure cost estimate is calculated from the resulting schedule of quantities by multiplying the component quantities and unit rates to derive a cost for each activity then summing the activity costs.

20.7.3 Capitalisation Bond

When Closure is achieved, ownership of the areas of land disturbed by mining will pass to a charitable trust called the Martha Trust. The Martha Trust exists but is not yet active.

The areas of land that pass to the trust are defined in the Extended Project consents and include:

- Land to the north and east of the Martha Pit centred around the existing surface facilities area where the lakeside park was proposed;
- The WTP; and
- The tailings storage area.

The trust's responsibility will be to monitor and maintain that land in a safe and stable condition in perpetuity.

- Once the mine site is fully rehabilitated, OceanaGold will settle funds on (capitalise) the trust to a level sufficient for it to fulfil its responsibilities. The fund is called the Capitalisation Sum.

Until the Capitalisation Sum is settled on the trust, the conditions of consent require that OceanaGold maintains a capitalisation bond, the quantum of which equals the Capitalisation Sum. The bond would provide the trust with the necessary funding in the unlikely event that OceanaGold defaults on its obligation to do so.

The scope of works from which the Capitalisation Sum is derived includes:

- The cost of maintaining and managing the land;
- Monitoring;
- Trust operating expenses; and
- A contingent liability fund (risk cost) to cover the occurrence of possible risk events that could occur and that, if left unattended, would result in ongoing environmental impairment.

The method of estimating the first three component is the same as that used to derive the rehabilitation bond quantum. The risk cost is derived from the outcomes of a quantitative risk assessment that identifies and quantifies (in terms of likelihood and costs to remediate).

20.7.4 The Martha Trust

After mining stops at the Martha Mine, stages known as 'Closure' and 'Post Closure' begin.

Closure is the period of final rehabilitation and finishes when the regulatory authorities consider the site has reached a 'safe, stable, self-sustaining, rehabilitated state'.

The Martha Trust will own, manage, monitor and maintain the land and facilities at the wetlands, WTP and the parklands adjacent to the lake. It will also be responsible for maintenance and monitoring of the lake. The company will hand over a sum of money to the trust. This money and the interest it earns will be used to carry out the responsibilities of the trust in perpetuity.

The trust membership includes regulatory bodies and Iwi.

20.7.5 Bond Review

The quantum of each bond is reviewed annually.

The rehabilitation bond quantum is adjusted at each review to take account of new areas of disturbance, areas of completed rehabilitation, and corrections to unit rates (e.g. for inflation) over the following 12-month period.

The capitalisation bond is also similarly reviewed and amended for changes in scope and unit rates. The risk assessment is reviewed and updated as required to ensure that changes that occur on-site and that might affect the post closure residual risk are accounted for.

As part of the 2016 bond review, following an informal agreement between the Councils and OceanaGold, the risk cost component of the capitalisation bond was extended to cover the closure and aftercare period. That increased period to which the risk cost applies is now included in the rehabilitation bond quantum.

The latest rehabilitation bond quantum, which covers the closure costs for the 2018-2019 period, is NZD44.09 million. The latest capitalisation bond quantum was assessed at NZD10.4 million.

Both bonds will need to be reviewed should consents be granted to provide for the full closure costs and the post closure site management costs that include the new project components. That review would need to be completed after the grant of consent so that the revised bond quanta can take account of the closure obligations in the new conditions, and before works starts on the new projects.

21 CAPITAL AND OPERATING COSTS

21.1 Introduction

For the PEA, the project's technical team prepared estimates of both capital and operating costs associated with the LOM production schedule used to determine the mill feed. This section of the report presents the basis of the Capital and Operating costs estimates. All estimates are based on annual inputs of physicals and all financial data is first quarter CY 2020, all currency is in NZ dollars (NZD), unless otherwise stated.

With cash generated from the Waihi District Study Projects starting with MUG, as well as cash generated from the company's other operating mines throughout much of the Waihi District Study Project life, and given the progressive nature of the development, OceanaGold expects to generate sufficient funds to finance the project from the group cashflow once MUG goes into production. In the alternative, and dependent on corporate preference for gearing at that time, OGC may finance development by increasing debt relative to current low gearing levels.

21.2 Capital Costs

21.2.1 Basis of Estimate

The capital cost estimate for the PEA has an expected accuracy of ±30%.

The estimate includes direct and indirect costs (such as engineering, procurement, construction and start-up of facilities) as well as owner's costs and contingency associated with mine and process facilities and on-site infrastructure.

The following areas are included in the estimate:

- Mine (underground mine development, pre-strip, equipment fleet, backfill plant and supporting infrastructure and services).
- Process plant upgrade to 1.6 Mtpa with and supporting infrastructure and services.
- Additional TSF, TSF3, GOP TSF, raises to TSF1A and 2.
- Northern Rock Stack.
- On-site infrastructure (water treatment and distribution, electrical substation and distribution and other general facilities).
- Pit rim works including relocation of public roads, relocation or demolition of buildings and monuments and fencing.
- Off-site infrastructure (water and power supply, and new external access) for WKP.
- Land acquisition and property divestment.
- Mine site rehabilitation.

A small amount of engineering work, being in the range of 5–10% of total engineering for the project, was carried out to support the estimate. The estimate was based on the following project-specific information:

- Preliminary conceptual mine, process plant and TSF design criteria
- Preliminary conceptual process flowsheet
- Preliminary major mechanical equipment list for process plant and mining
- Equipment fleet and infrastructure
- Preliminary general site layout
- Conceptual electrical supply trade-off study
- Preliminary conceptual mine plan and TSF designs
- Preliminary process plant general mechanical arrangement

- Earthworks quantities derived from preliminary sketches (sections).

Where possible costs were estimated from similar constructions at Waihi, sourced from OEM or otherwise factored, end-product units and physical dimensions methods were used to estimate costs.

The following assumptions were considered:

- The Reefton mill will be dismantled and reassembled at Waihi.
- All equipment and materials will be new.
- The main equipment will be purchased and manufactured in appropriate sizes to be transported by the existing main roads from Tauranga to the project site.
- The execution work will be continuous without interruptions or stoppages.
- Concrete will be produced at the construction site.
- Contractors will be contracted under unit price contracts.
- All mining surface and underground mobile equipment is costed as an operating lease.

The project will be executed by OceanaGold.

The following are excluded from the capital cost estimate:

- Finance costs and interests during construction, except for mobile plant leases.
- Costs due to fluctuations in exchange rates.
- Cost of working capital.
- Changes in the design criteria.
- Changes in scope or accelerated schedule.
- Changes in New Zealand legislation.
- Provisions for force majeure.
- Wrap-up insurance.
- Lack of geotechnical and environmental definitions.

21.2.2 Labour Assumptions

The construction labour and equipment costs were included in the factors that were used in the estimation to account for installation costs or in the unit costs when applied.

21.2.3 Material Costs

All materials required for facilities construction are included in the capital cost estimate. Material costs include freight to the site. Material costs related to the Processing Plant such as concrete, structural steel, piping and fittings and electrical cable were included within the installation factors applied to the mechanical equipment costs.

Material cost related to the Processing Plant platform, TSF, road relocations, building relocation and demolition and planned access roads were determined by material-take off quantities from sketches/drawings and installation unit costs.

All earthworks quantities were assumed to be in-situ volumes, with allowance for swell, waste or compaction of materials. Industry-standard allowances for swell and compaction were incorporated into the unit rate.

21.2.4 Mine Capital Costs - Underground

This item accounts for the capital costs associated with the underground mine development, mining equipment fleet leases, mine backfill plant, haul roads and support mine infrastructure and services.

The WKP site preparation and haul roads costs were mainly based on earthworks quantities estimated from the preliminary general site layout and sketched sections and unit costs sourced from OceanaGold's internal database.

The underground mine development costs were estimated based on the development quantities obtained from a preliminary conceptual mine design and schedule and unit costs estimated by OceanaGold based on prior underground mining adjusted for the specific site conditions.

Mine equipment costs were estimated based on previous budgetary quotations sourced from OceanaGold's internal database and converted to an operating lease. For estimating purposes, it was assumed that the mine will be run by the owner.

The underground mine ventilation capital cost was estimated based on a preliminary sizing of the ventilation system composed of drifts, raises and ventilation fans and costs obtained from OEM quotes.

The underground mine electrical distribution capital cost was estimated based on a conceptual outline of the electrical distribution system to the mine and costs sourced from the OceanaGold's internal database.

The cost associated with the mine backfill (paste) plant were estimated based on OEM quotes.

Resource drilling to convert Inferred Resources to Indicated Resources has been estimated at NZD30/oz. for MUG and NZD 32/oz. for WKP surface drilling based on past performance. WKP resource conversion drilling from underground has been estimated at NZD16/oz.

21.2.5 Mine Capital Costs – Open Pit

This item accounts for the capital costs associated with the surface mine development, pre-stripping, mining equipment fleet, haul roads and support mine infrastructure and services. It also includes surface preparation which includes rerouting public roads, building relocation or demolition, relocation of monuments and fencing.

The site preparation and haul roads costs were mainly based on earthworks quantities estimated from the preliminary general site layout and sketched sections and unit costs sourced from OceanaGold's internal database.

The crusher relocation costs were estimated based on bulk earthwork quantities, civils and services, Original Equipment Manufacturer (OEMP pricing for supply and commissioning, steelwork weights and pricing for installations from similar works in 2010).

Building relocations and demolitions were estimated separately for the individual structures including engineering, civils, bulk earthworks and electrical works. The Cornish pumphouse estimate included reference to the methodology and costs from the previous relocation in 2006.

The open pit pre-stripping costs were estimated based on the pre-strip quantities obtained from a preliminary conceptual mine design and schedule and costs estimated by OceanaGold based on prior surface mining.

Mine mobile plant costs were estimated based on previous budgetary quotations sourced from OceanaGold's internal database and converted to an operating lease. For estimating purposes, it was assumed that the mine will be run by the owner.

Resource conversion costs are estimated from drill hole designs and drilling unit costs to convert the Inferred to Indicated Resource.

21.2.6 Process Capital Costs

This item accounts for the capital costs associated with the process plant, including the site preparation in this area and the support process plant infrastructure and services. The site preparation and surface water management cost accounts for the costs associated with earthworks in the process plant area estimated from the preliminary general site layout and sketched sections and unit costs sourced from OceanaGold's internal database.

Capital costs for processing have been estimated to a Scoping Study level. The process plant and associated infrastructure direct costs were primarily based on the major mechanical equipment list that was prepared as part of the study, and budgetary quotations obtained for equipment at similar projects. These were updated and scaled to the required capacity as necessary. The mechanical equipment cost accounts for approximately 50% of the total process plant direct cost. Capital costs includes also refurbishment, relocation and installation of a SAG mill and primary crusher from the decommissioned Reefton Processing Plant.

A 30% contingency has been applied to the original estimate.Infrastructure Costs

Infrastructure areas include:

- TSF embankment and water management system.
- Northern Rock Stack.
- Site electrical substation and distribution.
- Internal access roads.
- On-site general facilities.
- Power supply (including the relocation of a section of the two existing power lines on-site).
- External access road.
- Land acquisitions.

The TSF costs were estimated based on quantities obtained from a conceptual design and drawings of the TSF, collection ponds and diversion channel and unit costs obtained from OceanaGold's internal database. An HDPE liner was assumed for the TSF3 and an earth fill liner for GOP TSF.

The cost associated with the site electrical substation and on-site distribution was estimated based on a conceptual system design and benchmarked costs for the major components.

The costs for upgrading the total power supply to site was obtained from the regional power supplier, Power Co. The power supply cost includes costs associated with a new transmission line from the Waikino Substation to the existing on-site electrical substation, as well as the costs associated with the relocation of a section of the existing transmission lines on-site. These costs were estimated based on sketched routes and benchmark costs sourced from PowerCo's internal database.

The costs associated with the internal access roads were based on earthworks quantities estimated from the preliminary general site layout and sketched sections and unit costs sourced from OceanaGold's internal database.

The other general facilities cost accounts for the costs associated with items such as the general office building, and warehouses.

The cost associated with the external access road was based on earthworks quantities estimated from the preliminary general site layout and sketched sections and unit costs sourced from the internal database.

Costs for raising the existing TSF1A and TSF2 is included under sustaining capital.

21.2.7 General and Administrative Capital Costs

The sustaining capital costs for general and administrative functions have been estimated based on previous years expenditures.

21.2.8 Sustaining Capital

OceanaGold developed the sustaining capital cost estimate to account for underground mine development, mine equipment and TSF construction capital costs through the LOM, by applying the same estimating methodology.

21.2.9 Property Divestment and Rehabilitation

The company currently has NZD35M of commercial and residential property that it plans to divest over the next 15 years in a careful manner that does not adversely disrupt the local property market. There is also approximately NZD1.5M of annual rental income from these properties and payment of rates of NZD0.28M which will decrease over this time. In addition, the project requires the purchase of property with subsequent divestment at the end of the project valued at NZD7M.

Rehabilitation and closure costs for the current site has been estimated. An additional allowance has been made for rehabilitation to WKP, NRS, GOP pit and TSF3.. Rehabilitation and closure commence at the end of the project except for progressive rehabilitation of the TSF's.

21.2.10 Capital Cost Summary

Capital costs include the direct costs for project execution, as well as the indirect costs associated with design, construction and commissioning.

Indirect project capital costs include third-party consultants, construction facilities and services, equipment freight, vendor support, first fill and spares (for the first year of operation). Percentage factors based on OceanaGold's experience with similar projects were used to determine indirect project costs, based on the project direct cost.

The range of accuracy for the capital cost estimate is $\pm$ 30%.

21.3 Operating Costs

21.3.1 Basis of Estimate

The operating cost estimate has an expected accuracy range of ±30% and is expressed in Quarter 1 CY 2020 NZD. The estimate includes the underground mining, open pit mining, processing and G&A operating costs. It excludes costs associated with escalation beyond Quarter 1 CY 2020, currency fluctuations, off-site costs, interest charges and taxes. No contingency has been included in the operating costs.

21.3.2 Mine Operating Costs

Separate cost models were developed for open pit mining and underground mining which build up costs from first principles using physical inputs as drivers and unit rates sourced from the Waihi site and suppliers.

21.3.2.1 Underground Mining

The underground mine operating costs were developed by OceanaGold, based on assumptions of Avoca mining at WKP and for a combination of remnant pillar recovery methods and Avoca mining at MUG. Costs were benchmarked from the previous projects at Waihi for the planned 2,000 t/d production rate. All costs assume owner mining.

The underground mine operating cost estimate includes the costs associated with stope preparation, drilling, blasting, ground support, backfill, underground loading and hauling and material transport to the primary crusher on surface, as well as support and ancillary equipment operations and maintenance, power, direct labour and mine operations supervision staff.

Mine operating costs include the sustaining mobile equipment operating leases and the interest payments on the leases.

Mine staff wages and salaries were included as part of benchmark costs based on the current operation at Waihi. A diesel cost of NZD 0.94/l and power cost of NZD 0.11/kWh was assumed.

Operating costs associated with the backfill plant are included in the mine operating cost estimate.

21.3.2.2 Surface Mining

The open pit mine operating costs were developed by OceanaGold, benchmarked against past operations at Waihi and assumptions of mining 2.5metre high benches, use of electronic detonators, compliance with strict blast vibration limits and restricted work hours to comply with night-time noise limits. Open pit mining costs include crushing and conveying of all MOP5 material and compaction of waste rock within the waste rock stacks and the TSF's.

Mine operating costs include the sustaining mobile equipment operating leases and interest payments on the leases.

The overall average open pit mine operating cost was estimated excluding pre-development costs (capitalised pre-strip costs during the pre-operational period).

21.3.3 Process Operating Costs

The process operating cost estimate accounts for the operating and maintenance costs associated with the 1.6 Mtpa process plant operation, water treatment, supporting services infrastructure and tailings disposal to the various TSF's.

Process plant operating costs were estimated using the following cost categories: power, labour, reagents and consumables, maintenance supplies and services. In general, the process operating cost estimate is based on the following preliminary documentation: conceptual process flowsheet, conceptual mass balance, mechanical equipment list, list of reagents and consumables, and a referential staffing plan.

Power consumption was estimated based on the power requirements by the major and secondary Processing Plant equipment (excluding stand-by equipment) and adjusted using benchmark factors to account for auxiliary and minor equipment power demand. Assumptions included 95% annual availability and a unit power cost of NZD0.11/kWh.

Reagent consumptions and crushing / grinding consumables were estimated based on the results of metallurgical testwork and previous experience at the Waihi plant.

General consumables for the process plant (personnel protective equipment, metallurgical laboratory, chemical laboratories, maintenance, office supplies and others) were estimated from the total consumable and reagent costs.

Labour costs were estimated based on a preliminary staffing plan estimate for the operation and maintenance of the process plant based on OceanaGold's experience at the site. The estimate accounts for management personnel, plant operators and supervisors, as well as WTP operators and maintenance personnel.

Services costs include the following areas: chemical assays, maintenance services by contractors, personnel mobilisation, as well as water and compressed air supply and distribution and other general services.

The chemical assay costs were estimated based on a preliminary testwork program for control of the process plant and unit costs for laboratory tests.

The maintenance services costs associated with the replacement of mill liners and grinding media were estimated based on previous experience at the process plant. The costs associated with the personnel mobilisation, scheduled maintenance services for plant shutdowns (carried out by contractor companies) and other general services were assumed as the 2% of the total direct capital process plant cost, while the water and compressed air supply and distribution costs were assumed as the 4% of the direct capital cost of these systems. The range of accuracy for the unit operating cost estimate is ± 30%.

21.3.4 Infrastructure Operating Costs

General on-site infrastructure operating costs are included in the G&A operating costs

21.3.5 General and Administrative Operating Costs

The G&A operating cost was estimated based on previous costs at the Waihi Operation.

21.3.6 Operating Cost Summary

The cost estimate is ±30%. This level of accuracy is attributed to the site operating history over a range of conditions.

21.3.7 Comments

Appropriate contingency was applied to capital cost items.

22 ECONOMIC ANALYSIS

22.1 Economic Assumptions

22.1.1 Revenue

The revenue assumptions are based on the assumptions in Chapter 19 and further summarised below.

- Processing plant production rate of 1.6 Mtpa has been scheduled.
- Gold Price – NZD 1,500/oz.
- Exchange Rate - NZD: USD: 0.65.
- Metallurgical recovery assumptions of 94% for MUG, 90% for MOP5, 71% for GOP and 90% for WKP.
- Royalty payments include higher of 1% of net sale revenue or 5% accounting profit to the Crown.
- For WKP a 2% third-party royalty is also applied.
- Revenue is recognised at the time of production.

22.1.2 Cost

The basis of the capital and operating cost assumptions are described in Chapter 21 and further summarised below.

Capital and operating costs are well known from the 30 years of operations and have been appropriately applied to develop cut-off grades and inputs into economic analysis.

- The operating cost estimate has an expected accuracy range of ±30% and is expressed in Quarter 1 CY 2020 NZD.
- The estimate includes the underground mining, open pit mining, processing and G&A operating costs derived from historical data and forward cost estimates.
- The capital cost estimates have an expected accuracy of ±30% that includes direct and indirect costs and, owner's costs associated with the mine and process facilities and on-site infrastructure.

Engineering work, in the range of 5–10% of total engineering for the project, was carried out to support the estimate. Where possible costs were estimated from similar constructions at Waihi, sourced from OEM or otherwise factored, end-product units and physical dimensions methods were used to estimate costs. The main items in included in the capital cost estimate are listed below:

- Underground mine development, pre-strip, equipment fleet leases, infrastructure and services.
- Process plant upgrade to 1.6 Mtpa with and supporting infrastructure and services.
- TSF, TSF3, GOP TSF, raises to TSF1A and 2. Northern Rock Stack.
- On-site infrastructure (water treatment and distribution, electrical substation and distribution and other general facilities).
- Pit rim works - relocation of public roads, relocation or demolition of buildings and monuments.
- Off-site infrastructure (water and power supply, and new external access).
- Land acquisition and property divestment.
- Mine site rehabilitation.

The following have been excluded from the economic analysis

- Finance costs and interests during construction.
- Costs due to fluctuations in exchange rates.
- Cost of working capital.

- Changes in the design criteria.
- Changes in scope or accelerated schedule.
- Changes in New Zealand legislation.
- Provisions for force majeure.
- Wrap-up insurance.
- Lack of geotechnical and environmental definitions.

22.2 Taxation and Royalties

OceanaGold hold a 100% interest on the Favona Mining Permit, MP41808 that includes MOP5, MUG and GOP.

Royalties payable include the higher of a 1.0% royalty on net sales revenue from gold and silver or 5% accounting profits is payable to the Crown.

OceanaGold holds 100% of the WKP permit interest. Third-party rights to receive a royalty from the project are confined to a crown royalty of 1% of the turnover or 5% of the accounting profits whichever is higher. The area under an application to extend MP41808 is subject to an additional 2% royalty payable to Osisko (acquired from Geoinformatics and BCKP).

The corporate taxation rate included in the analysis is 28%.

22.3 Cash Flow Analysis

Base case assumptions for economic projections include gold price USD1500/oz and NZD/USD 0.65. Upside projections, approximating current spot price, have been run at USD1750/oz and NZD/USD 0.65.

The study results are positive for a number of scenarios including the exclusion of all Inferred Resources from the mine schedule. Historically for Inferred Resources at Waihi, conversion rates approaching 100% are typical. The results justify OceanaGold continuing to fund the project development and proceeding to PFS and FS level studies.

Cautionary Statement

The project economics are based upon mining inventories comprised of Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case.

23 ADJACENT PROPERTIES

There are no adjacent properties that are relevant to this report.

24 OTHER RELEVANT DATA AND INFORMATION

New Zealand has an established framework that is well regulated and monitored by a range of regulatory bodies. OceanaGold has dedicated programs and personnel involved in monitoring consent compliance and works closely with authorities to promptly address additional requests for information. Risks associated with review and renewal of operating consents is, upon that basis, regarded as manageable within the ordinary course of business.

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 INTERPRETATION AND CONCLUSIONS

Following review of the data available on the Waihi District Study, the QPs have reached the following interpretations and conclusions.

25.1 Mineral Tenure, Surface Rights, Royalties, Environment, Social and Permits

No fatal flaws have been identified through the investigations to date that would prevent the required permissions being obtained for the activities described in this assessment.

Mining and exploration tenure held by OceanaGold in the areas for which Mineral Resources are estimated is valid. WKP will require conversion of the exploration permit to a mining permit.

Except for MUG all other aspects of the project will require resource consents and potentially a district plan change under the Resource Management Act in order for the projects to advance.

Except for WKP and minor surface areas of MOP5 and GOP, OceanaGold holds sufficient surface rights to support the PEA operations over the planned LOM.

Sufficient tailings and waste rock storage facilities have been planned for.

Closure provisions and allowances for additional activities have been appropriately considered. Monitoring programs are in place.

The existing infrastructure, availability of staff, the existing power, water and communications facilities, the methods whereby goods are transported to the mine, and any planned modifications or supporting studies are sufficiently well established, or the requirements to establish such, are well understood by OceanaGold, and can support the PEA mine plan.

OceanaGold has developed a communities relations plan to identify and ensure an understanding of the needs of the surrounding communities and to determine appropriate programs for filling those needs. The company monitors socioeconomic trends, community perceptions and mining impacts.

25.2 Mineral Resource and Mineral Reserve Estimates

There are no Mineral Reserves reported, due to the inclusion of Inferred Mineral Resources.

The Mineral Resources for the project, which have been estimated using core drill data, have been performed to industry best practices, and conform to the requirements of CIM (2014).

Factors which may affect the estimates include:

- commodity price assumptions;
- metallurgical recovery assumptions;
- changes to the geotechnical and hydrogeological parameters used for stope and open pit mine design;
- dilution assumptions; and
- changes to capital and operating cost estimates.

25.3 LOM Plan

The PEA is preliminary in nature in that it includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that the PEA will be realised. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability

Underground and open pit mine plans are appropriately developed to maximise mining efficiencies, based on the current knowledge of geotechnical, hydrological, mining and processing information on the project.

OceanaGold considers that:

- The production forecasts are achievable with the equipment and plant;
- The current process facilities are appropriate to the mineralisation styles in the underground and open pit operations but require significant upgrading to support the current LOM plan; and
- Additional infrastructure has been identified to support the LOM plan; this includes additional rock stacks, fixed and mobile plant, additional tailings storage facilities, power upgrades and other minor infrastructure.

25.4 Conclusions

In the opinion of the QPs, this PEA has been appropriately estimated for the Waihi District Study.

The following conclusion have been drawn from this Technical Report:

- The Mineral Resources have been estimated in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standard Definitions for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions);
- The economic evaluations are to a PEA level of study. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability and there is no certainty that the results described in the PEA will be realised;
- The mine design, mine dewatering designs, mining plans, surface infrastructure and processing assumptions are based upon preliminary conceptual designs and evaluations; and
- The areas requiring further study and design are:
    - Increasing geological resource confidence and reducing resource risk;
    - Mine design, scheduling and cost modelling;
    - Environmental and social studies to support permitting;
    - Community and stakeholder engagement;
    - Hydrogeological conditions around WKP;
    - Methods of extraction of remnant resources around the Martha, Empire, Edward and Royal lodes;
    - Re-evaluation of MUG cut-off grades;
    - TSF constructions and liners;
    - Geotechnical interactions between MUG and MOP5;
    - Metallurgical recoveries; and
    - All surface infrastructure works.

26 RECOMMENDATIONS

Based on the conclusions of the Technical Report and PEA, the following actions are recommended:

- Continue drilling to expand resources to support future Mineral Reserves.
- Completion of a Feasibility Study for MUG, to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Completion of a Prefeasibility Study for WKP, to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Completion of a Feasibility Study for GOP, MOP5, GOP TSF and TSF3 to support publishing a Mineral Reserve, at an estimated cost of USD1-2M.
- Progress work to consent the projects, prioritising the development of WKP, in line with target dates assumed in the PEA.

27 REFERENCES

Refer Appendix A

APPENDIX A - REFERENCES

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APPENDIX B - TECHNICAL GLOSSARY AND ABBREVIATIONS

Abbreviation	Definition
AAS	Atomic absorption spectroscopy.
AECOM	AECOM Pty Ltd.
AEP	Amenity Effects Program.
AEPEP	Annual Environmental Protection and Enhancement Programmes.
Ag	silver.
AMC	AMC Consultants.
Analabs	Analabs Propriety Limited.
ANCOLD	Means the Australian National Committee on Large Dams Inc., which is an Australian based non-governments, non-profit association of professional practitioners and corporations with a profession interest in dams. ANCOLD is a member of the International Commission on Large Dams (ICOLD) and publishes international recognised guidelines for the sustainable development and management of dams and water resources.
ASX	Australian Securities Exchange.
ATV	Acoustic Televiewer.
Au	gold.
AuEq	gold equivalent.
bcm	bank cubic metre(s).
BFA	bench face angles.
Block model	is a computer based representation of a deposit in which geological zones are defined and filled with block which are assigned estimated values of grade and other attributes. The purpose of the block model is to associate grades with the volume model.
Bulk density	is the dry in situ tonnage factor used to convert volumes to tonnage.
CIL	carbon in leach.
CIM	the Canadian Institute of Mining, Metallurgy and Petroleum.
CIM Standards	are the CIM Definitions Standards for Mineral Resources and Mineral Reserves adopted by the CIM Council on 27th December 2010, for the reporting of Mineral Resource, Mineral Reserve and Mining Studies used in Canada. The Mineral Resource, Mineral Reserve and Mining Study definitions are incorporated, by reference, into the NI 43-101, and from the basis for the reporting of reserves and resources in the Technical Report. With triple listing on the TSX, ASX and NZX. OceanaGold also reports in accordance with the JORC Code and where necessary reconciles its reporting to ensure compliance with both the CIM Standards and the JORC Code.
CIP	carbon in pulp.
CMA	Crown Minerals Act 1991.

cm	centimetre(s).
CRM	Certified Reference Material.
CSR	corporate social responsibility.
Cu	copper.
cut-off grade	is the lowest grade value that is included in a Mineral Resource Statement, being the lowest grade, or quality of mineralised material that has reasonable prospect for eventual economic extraction.
CVZ	Coromandel Volcanic Zone
DH	drill hole.
diamond drilling or DD	is a rotary drilling technique using diamond set or impregnated bits, to cut a solid, continuous core sample of the rock.
DOC	Department of Conservation.
E	East.
EG	East Graben.
EIS	Environmental Impact Assessment.
EISS	Means the Environmental Impact Statement System, established under the Mining Act, for classifying projects in terms of their potential impact on the environment. A project that is classified as environmentally critical or located in an environmentally area requires an ECC from the DENR, certifying that the operator will not cause a significant negative environmental impact and has compiled with all the requirements of the EISS.
ELB	Eastern Layback
Entech	Entech Consultants.
EOM	end of month.
EOY	end of year.
EPCM	Engineering, Procurement and Construction Management.
EPRMP	Environmental Performance Report and Management Plan.
ERA	the Environmental Risk Assessment conducted under the conditions of the ECC.
ESE	East South East.
ESIA	Environmental and Social Impact Assessment.
ETF	the Environmental Trust Find established for the Didipio operation under the conditions of the ECC.
FAR	fresh air rise.
Fe	iron.
FTD	flow through drain.

FTE	full time employee(s)
FUFG	flotation & ultra-fine grind
g	gram(s).
G&A	general and administration.
GHD	GHD Limited.
GOP	Gladstone Open Pit
g/t	grams per metric tonne.
GTA	graphite tube atomisation.
GWS	GWS Limited Consulting
H&SC	Hellman and Schofield Pty Ltd.
ha	hectare(s)
HDC	Hauraki District Council
HDPE	high density polyethylene.
Hg	mercury.
HQ	is a reference to the ~ 96mm diameter of drill rods used to recover diamond drill core.
HR	hydraulic radii
ID2	Inverse Distance weighting to the second power method.
ID3	Inverse Distance weighting to the third power method.
Indicated Mineral Resource	as defined under the CIM Standards, is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence, sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information, gathered trough appropriate techniques from locations such as outcrops, tranches, pits, workings and drill holes that are spaced close enough for geotechnical and grade continuity to be reasonably assumed.
Inferred Mineral Resource	as defined under the CIM Standards is that part of a Mineral Resource for which a quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.
IRA	inter-ramp angles.
JK	JKTech Pty Ltd.
JORC Code	the Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves which become effective 20th December 2012 and mandatory from 1st December 2013. The JORC Code is the accepted reporting standard for the ASX and the NZX.

kg	kilogram(s).
km	kilometre(s).
km^2	square kilometres(s).
koz	thousand troy ounces.
kt	thousand metric tonnes.
kV	kilovolts.
kWh	kilowatt hour(s).
kWh/t	kilowatt-hours per tonne.
lb	pound(s).
LG	Lerch Grossman.
LHD	load haul dump machines.
LHOS	long hole open stoping.
LINZ	Land Information New Zealand.
LoM	Life-of-mine.
µm	micron or micrometre.
m	metre(s).
M	million(s).
m^3	cubic metre(s).
$m^{3/}h$	cubic metres per hour.
m/s	metres per second.
Ma	million years.
Measured Mineral Resources	as defined under the CIM Standards
MEO	Mt Eden Old Cadastral grid
Metso	Metso Technology PTSI Pty Ltd.
Mineral Reserve	as defined under the CIM Standards is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justifie4d. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined. The term “Mineral Reserve”, when used in the Technical Report, is consistent with “Ore Reserve” as defined by the JORC Code.

Mineral Resource	as defined under the CIM Standards is a concentration of occurrence of diamonds, natural solid inorganic material or natural solid fossilised organic material including base and precious metals, coal and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted form specific geological evidence and knowledge. Mineral Resources are subdivided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.
mineralisation	the concentration of minerals in a body of rock.
MLR	Multiple Linear Regression
mm	millimetre(s).
MMT	Multipartite Monitoring Team.
MOP	Martha Open Pit
MOP4	Martha Phase 4.
MOP5	Martha Phase 5.
Moz	million troy ounces.
MP	Mining Permit.
MRF	Mine Rehabilitation Fund.
mRL	Reduced Level from mien datum.
MSO	Mineable Stope Optimiser software.
Mt	million metric tonnes
Mtpa	million tonnes per annum.
MUG	Martha Underground.
multiple indicator kriging	is a grade estimation technique.
MW	megawatt(s).
N	North.
NAF	non-acid forming rock
NAPP	negative acid producing potential.
NATA	National Association of Testing Authorities, the body which accredits laboratories and inspection bodies within Australia.
NE	Northeast.
NI 43-101	National Instrument 43-101 – Standards of Disclosure for Mineral Projects of the Canadian Securities Administrators.
NNE	North East.

NPV	net present value.
NQ	is a reference to the ~ 76mm diameter drill rods used to recover diamond drill core.
NRS	Northern Rock Stack.
NMV	Net Metal Value.
NSR	net smelter return.
NW	Northwest.
NZMG	New Zealand Map Grid.
NZPAM	New Zealand Petroleum and Minerals.
NZD	New Zealand Dollar.
NZDM	New Zealand Dollar Millions
NZTM	New Zealand Transverse Mercator
OceanaGold	means OceanaGold Corporation and/or any of its subsidiaries.
OCEANAGOLD or OGC	means OceanaGold Corporation.
OEM	Original Equipment Manufacturer.
OHPL	Overhead Power Line.
ordinary kriging or OK	is a grade estimation technique.
Outotec	Outotec Pty Ltd.
oz	troy ounce (31.103477 grams).
PAF	potentially acid forming rock
Pb	lead.
PEA	Preliminary Economic Assessment.
PIMA	Portable Infrared Mineral Analyser.
PMP	Probable Maximum Precipitation storm event
polygonal method	is a grade estimation technique.
ppb	parts per billion.
ppm	parts per million.
PPS	Polishing Ponds Stockpile.
PQ	is a diamond tube size equivalent to 85mm inside diameter.
Preliminary Feasibility Study	as defined under the CIM Standards is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit

	configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on mining, processing, metallurgical, economic, marketing, legal, environmental, social and governmental considerations and the evaluation of any other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve. The CIM Standards require the completion of a Preliminary Feasibility Study as the minimum prerequisite for the conversion of Mineral Resources to Mineral Reserves.
Probable Mineral Reserve	as defined under the CIM Standards is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified. The term “Proven Mineral Reserve”, when used in this Technical Report, is consistent with “Probable Ore Reserve” as defined by the JORC Code.
Proven Mineral Reserve	as defined under the CIM Standards is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified. The term “Proven Mineral Reserve”, when used in this Technical Report, is consistent with “Proved Ore Reserve” as defined by the JORC Code.
PSE	Pollution Source Equipment.
PSM	PSM Consultants Pty Ltd.
pXRF	portable X-ray fluorescence.
Q1	Quarter beginning 1 January and ending 31 March.
Q2	Quarter beginning 1 April and ending 30 June.
Q3	Quarter beginning 1 July and ending 30 September.
Q4	Quarter beginning 1 October and ending 31 December.
QA/QC	quality assurance / quality control.
Qualified Person or QP	as defined under the CIM Standards means and individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation, or mineral project assessment, or any combination of these; has experience relevant to the subject matter of the mineral project and the Technical Report; and is a member or licensee in good standing of a professional association.
PLI	Point Load Index.
RAB	rotary air blast.
RAR	return air rise.
RC	Reverse Circulation drilling.
RCF	Rehabilitation Cash Fund.
RMA	Resource Management Act 1991.
RMI	Rick Management Intercontinental Pty Ltd.
ROM	Run-of-mine.

RPS	Waikato Regional Policy Statement
RQD	Rock Quality Designation index of rock quality.
S	South.
SABC	SAG mill / Ball mill / pebble crusher.
SAG	semi autogenous mill.
SCSR	self-contained self-rescuer.
SE	Southeast.
SEDAR	System for Electronic Document Analysis And Retrieval (www.sedar.com)
SG	specific gravity.
SGS	SGS Laboratory Waihi.
SIA	Social Impact Assessment.
SIMP	Social Impact Management Plan.
SMU	selective mining unit.
SRK	SRK Consulting Pty Ltd.
SSC	Southern Stability Cut
SSM	small scale mining or miners.
STDEV	standard deviation.
SW	Southwest.
t	metric tonne (1,000 kilograms).
TCDC	Thames Coromandel District Council.
TEM	technical economic model.
the District	Waihi District.
t/m^3	tonnes per cubic metre.
tpa	tonnes per annum.
tpd	tonnes per day.
tpm	tonnes per month.
TSF	Tailings Storage Facility.
TSP	total suspended particulate.
TSS	total suspended solids.

TSX	Toronto Stock Exchange.
TVZ	Taupo Volcanic Zone
UCS	Uniaxial Compressive Strength.
USD	United States dollars.
UTM	Universal Transverse Mercator.
UTS	Uniaxial Tensile Strength.
W	West.
WKP	Wharekirauponga.
WRC	Waikato Regional Council.
WRD	waste rock dump.
wt	weight.
WTP	water treatment plant.
XRF	x-ray fluorescence.
Zn	zinc.
3D	three-dimensional.
@	at.
%	percent.
º	degrees.
ºC	degrees Celsius.

SUMMARY OF TABLE 1 - 2012 JORC: Waihi Gold Mine

The Waihi operation is located 142 km Southeast of Auckland in the Township of Waihi in the Hauraki district of New Zealand. The Waihi township is known as a gold mining town and has a notable history of gold production. Open pit mining commenced at the site in 1988 with the first ore processed in that year and underground mining commenced in 2004 with the extraction of ore commencing in late 2006. The Waihi operation holds the necessary permits, consents, certificates, licences and agreements required to operate the Martha open pit, the Martha underground and Correnso underground mine.

Resources

The Waihi resource estimates, as at 31 May 2020, are presented in Table 1, Table 2 and Table 3, and are classified in accordance with CIM and JORC 2012.

The resource estimate is sub-divided into an open-cut and underground resource for reporting purposes. The open-cut resource includes material within the limits of the Martha Phase 5 pit and the Gladstone pit. The underground resources include the Wharekirauponga (WKP) project and the Martha Underground project. The Mineral Resources are depleted for historic mining as at May 2020.

Table 1: Open Cut Resource Estimate

Class	Tonnes (Mt)	Au (g/t)	Ag (g/t)	Au (Moz)	Ag (Moz)
Measured	0	0	0	0	0
Indicated	6.75	1.82	13.34	0.40	2.89
Measured & Indicated	**6.75**	**1.82**	**13.34**	**0.40**	**2.89**
Inferred	5.4	1.8	16.9	0.3	3.0

Table 2: Underground Resource Estimate

Class	Tonnes (Mt)	Au (g/t)	Ag (g/t)	Au (Moz)	Ag (Moz)
Measured	0	0	0	0	0
Indicated	5.41	6.70	19.15	1.16	3.33
Measured & Indicated	**5.41**	**6.70**	**19.15**	**1.16**	**3.33**
Inferred	5.7	7.0	17.5	1.3	3.2

Table 3: Combined Resource Estimate

Class	Tonnes (Mt)	Au (g/t)	Ag (g/t)	Au (Moz)	Ag (Moz)
Measured	0	0	0	0	0
Indicated	12.15	3.99	15.93	1.56	6.22
Measured & Indicated	**12.15**	**3.99**	**15.93**	**1.56**	**6.22**
Inferred	11.2	4.4	17.2	1.6	6.2

Notes to Accompany Mineral Resource Table:

1. There are no Ore Reserves associated with the Martha underground project or the WKP project.
2. Mineral Resources are reported on a 100% basis;
3. Mineral Resources are reported to a gold price of NZD$2,083/oz;
4. Martha Underground Mineral Resource is now reported below the Martha Phase 5 open pit cutback design. This Resource is constrained within a conceptual underground design based upon the incremental cut-off grade.

5. The WKP Resource is constrained within a conceptual underground design - based upon the incremental cut-off grade;
6. The Open pit resources are reported at a 0.5 g/t cut-off grade on the basis of the company's current cost model whilst the underground resources are reported at 2.15 g/t and 2.5 g/t cut-off grades for MUG and WKP respectively
7. No dilution is included in the reported figures and no allowances have been made to allow for mining recoveries. Tonnages include no allowances for losses resulting from mining methods. Tonnages are rounded to the nearest 1,000 tonnes;
8. Ounces are estimates of metal contained in the Mineral Resource and do not include allowances for processing losses. Ounces are rounded to the nearest thousand ounces;
9. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
10. Tonnage and grade measurements are in metric units. Gold ounces are reported as troy ounces.

The Waihi Projects comprise several areas of mineralization, which are at different stages of development. The major components are the Martha Underground Project and the Wharekirauponga (WKP) Underground project, the Gladstone Open Pit and the Martha phase 5 cutback.

The Martha underground was consented in February 2019 and relates directly to the mineralisation contained within the Martha vein system centred beneath the open pit mine within the Waihi Township.

WKP is located 10 km north of the township of Waihi. It is a high grade, low sulphidation epithermal vein gold-silver deposit hosted within a Miocene rhyolite dome complex.

The Gladstone pit is based on a conceptual open pit centred around the Gladstone hill and Winner hill area. The resource model describes the mineralisation within Gladstone and Winner Hills and includes part of the Moonlight orebody, depleted for underground mining

The Martha phase 5 cutback is a full cutback of the existing pit targeting resource at depth and re-establishing pit access.

Approximately 566 km of diamond drilling has been done on the Waihi projects since 1980. Approximately 42 km of diamond drilling within 104 drillholes has been undertaken on the WKP project. All drill core, since 1990, was routinely oriented below the base of the post-mineral stratigraphy, either by plasticine imprint or using the Ezimark or Reflex core orientation tool.

Over the course of the next few years, OceanaGold will continue to drill beneath the Martha open pit for resource conversion with 60km of additional drilling likely to be required to test the full extent of the mineralised system. The resource is associated with numerous veins that form part of the Martha Vein system, the largest of which include the Martha, Edward, Empire, Royal and Rex veins. Exploration is also planned to continue throughout the coming year on the WKP project with a further 5 km of diamond drilling planned for the remainder of 2020.

The major gold - silver deposits of the Waihi District are classical low sulphidation adularia-sericite epithermal quartz vein systems associated with north to northeast trending faults. Larger veins have characteristically developed in dilational sites in the steepened upper profile of extensional faults with narrower splay veins developed in the hanging wall of major vein structures. Figure 1 shows a plan of the Waihi area illustrating the major vein locations and recent drill hole collars. The Waihi epithermal gold-silver mineralised veins are hosted in Miocene andesitic units beneath the Waihi township area.

Low sulphidation epithermal quartz veins at WKP are hosted in a rhyolite flow dome complex with overlying and interfingering lithic lapilli tuffs which are in turn partially overlain by post-mineral andesites (Figure 2). The rhyolites have undergone pervasive hydrothermal alteration, often with complete replacement of primary mineralogy by quartz and adularia with minor illite and/or smectite clay alteration. The vein system lies within a NNE trend with a low magnetic response and likely represents a combination of weakly magnetic primary lithology and magnetite-depleted hydrothermally altered lithologies. This magnetic low trend contains well-defined edges suggesting a NE trending district-scale graben boundary.

Gold mostly occurs as electrum and has a particle size less than 10µm. At Waihi the veining contains variable, though usually minor pyrite, sphalerite, galena and chalcopyrite in a gangue consisting of varying amounts of quartz, calcite, chlorite, rhodochrosite and adularia. Concentrations of base metal sulphides generally increases with depth. Geopetal indicators within vein textures logged in drill core from Favona suggest south eastward tilting by approximately 15 degrees since vein formation.

In general, there are very few sulphides other than pyrite in the WKP veins. Major structures strike NNE and dip steeply to the west with extensional linking vein sets striking in a more northerly direction.

Domaining is performed based on geological observation from logging of diamond drill core and mapping of exposure in both the open pit and underground. Mineralised geologic domains are typically narrow, subvertical epithermal veins within which gold is modelled via ordinary kriging or inverse distance methods dependent on data density. Dry bulk densities ranging between 1.8 and 2.5 t/m^3 are assigned by rock type.

Estimation is completed using either ordinary kriging (OK) or inverse distance weighting to the second or third power (ID2/ID3), as deemed suitable by the density of data in each domain.

The quantity and quality of the lithological, geotechnical, collar and down hole survey data collected in the exploration, delineation, underground, and grade control drill programs are sufficient enough to support the Mineral Resource estimation.

To classify the mineral resource, appropriate account was taken of geology, drill hole spacing, search criteria, location and geometry of historic mining voids, reliability of input data, and the Competent Person's confidence in the continuity of geology and metal values.

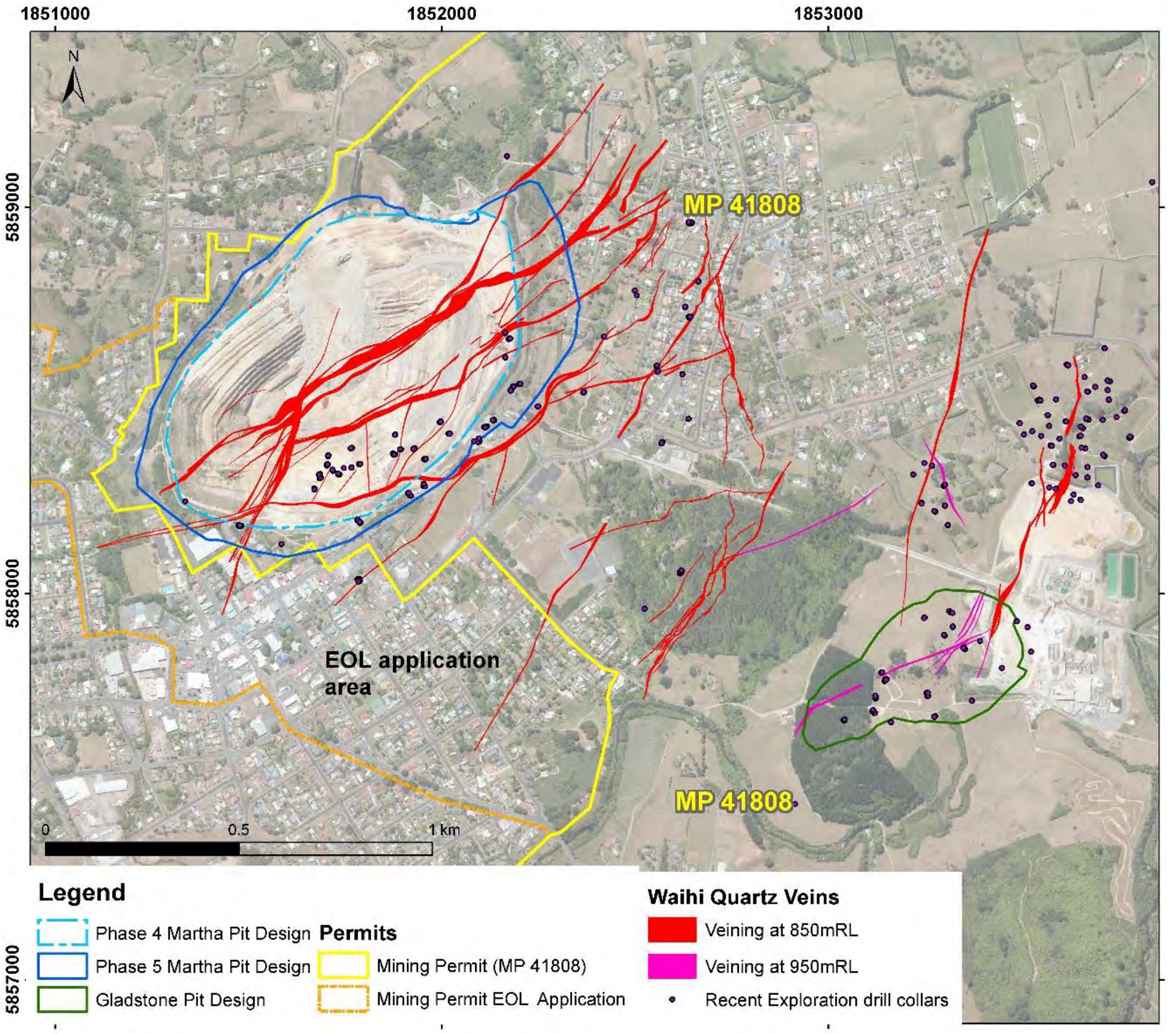


Figure 1: **Map of Waihi showing the project areas, permit boundaries, underground and surface drill collars 2017 to May 2020)**

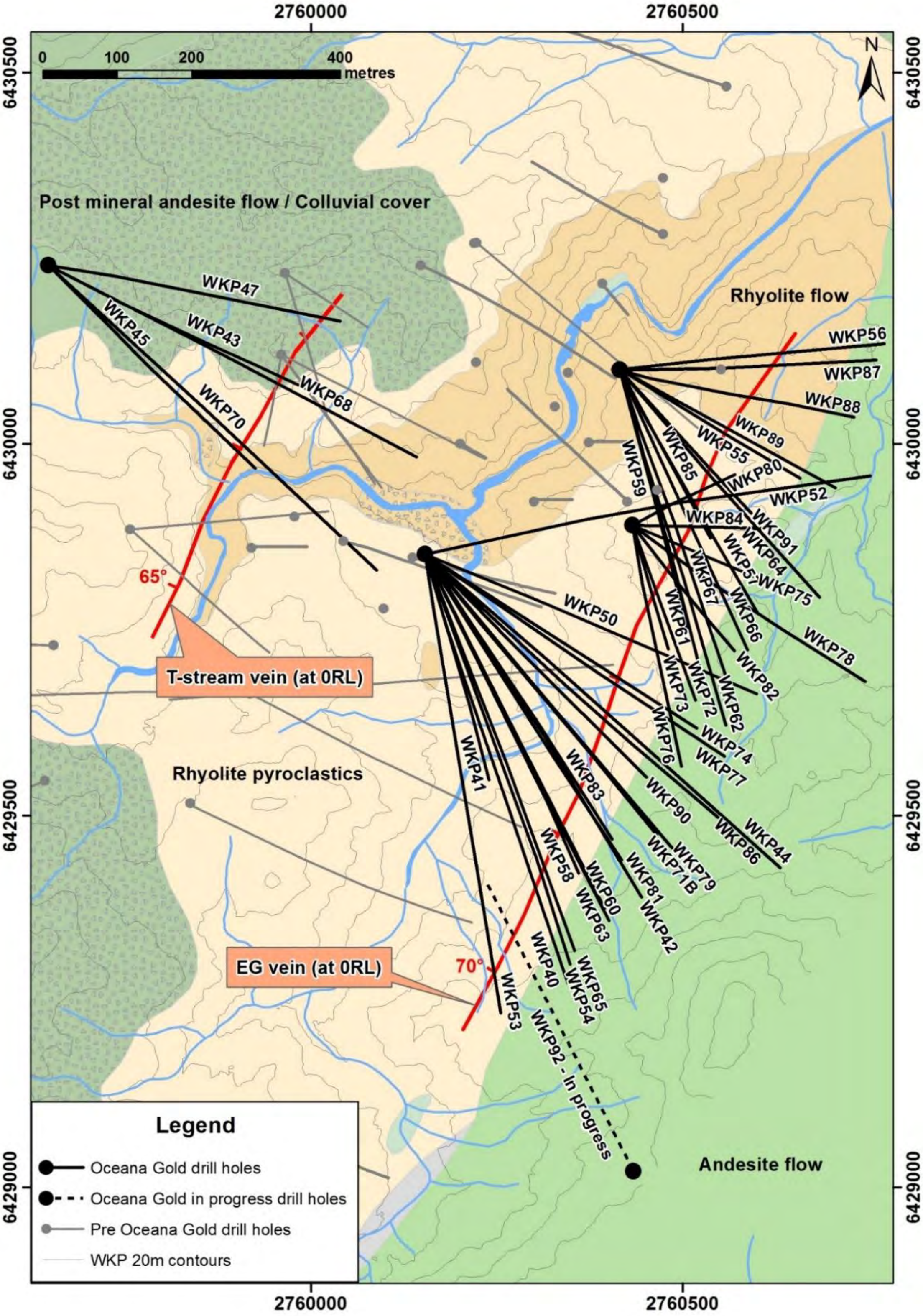


Figure 2: Map showing WKP Location and Drilling

Scoping Study

There are no Ore Reserve estimates for the Waihi operation as at 31 May 2020. However, a scoping-level study has been undertaken. This Study was prepared as a PEA Canadian National Instrument 43-101 (NI 43-101) Technical Report (Technical Report) for the OceanaGold Waihi District.

The projects included in the Waihi District comprise the following:

- Martha Underground Mine (MUG);
- Martha Open Pit Phase 5 Project (MOP5), the final cutback of the Martha Pit;
- Gladstone Open Pit Project (GOP);
- Wharekirauponga Underground Project (WKP); and
- Processing Plant.

Other key elements of the project include:

- Upgrade and expansion of the Processing Plant;
- Two additional lifts on Tailings Storage Facility (TSF) 1A, and one additional lift on TSF2;
- TSF3, a new Tailings Storage Facility;
- Further TSF capacity, which may include GOP as a new Tailings Storage Facility post mining, or additional raising of TSF1A;
- A new rock stack, the Northern Rock Stack (NRS); and Upgrade of the power supply to the operation

Mill Feed Estimates

The mining inventories are referred to as "mill feed" as they have been derived from 51% Indicated Mineral Resources and 49% Inferred Mineral Resources (no Measured resource currently exists). In addition, regulatory approvals to enable some of the proposed developments to take place are yet to be received.

Inferred Mineral Resources are considered to be too geologically speculative to have mining and economic considerations applied to them to be categorised as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realised.

OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere. This is based upon the veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion. Additionally, in the case of MUG which is initially the sole source of mill feed in the PEA mining scenario, the average drill hole spacing for Inferred Resources is 48m which is only 20% larger than the threshold of 40m required by OceanaGold for Indicated Resources. This drill hole spacing does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme.

The modifying factors are well understood and are based on over 50 independent studies which have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 years comprising air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, Iwi, landscape, mine design, mine planning, noise, pit lake limnology, property values, pumphouse, social impact assessments, surface stability, tailings disposal, traffic, vibration, water management and, hydrogeology.

OceanaGold and its predecessors, have extended the original permitted Martha Pit Project with Mineral Reserves of 0.7Moz, (extracted from 1988 to 1997) to extract 2.1Moz. (from 1988 to 2015) through ongoing conversion of Resources focused on the same vein zones. In addition, nearby underground Resources have been successfully converted to extract 1.1Moz. over the last fifteen years.

Taking these factors into account, OceanaGold believe that there are reasonable grounds to include Inferred Resources for the purposes of mine scheduling and determining the Mill Feed. Estimate. Note that the study results are positive even with the exclusion of all Inferred Resources from the mine schedule,

Mine Schedule

In relation to the PEA mine schedule, OceanaGold has prioritised those resources with higher proportions of Indicated Resources ahead of the other Resources, i.e. MUG and GOP ahead of WKP and MOP5. This mine development sequencing will allow OceanaGold to continue to convert and de-risk Inferred Mineral Resources in advance of the mining front. Notwithstanding the inclusion of Inferred Resources, they are high confidence Inferred Resources.

In the case of MUG, OceanaGold has adopted a conservative case by including only about half of the stated Mineral Resources pending further geotechnical study, specifically regarding extraction close to historic workings. Given the mining methods employed at Waihi, where extraction is in a series of small horizontal slices from bottom up, some Inferred material would always be extracted with Indicated material. Previous experience at the Waihi underground mines have shown that mine planning would normally include around 20% of Inferred Resource but this is removed for determining Mineral Reserves. For the PEA this included Inferred Resource ranges from 30% in the early years to 50% in the later years.

Economic Analysis

The study results are positive for a number of scenarios including the exclusion of all Inferred Resources from the mine schedule. Historically for Inferred Resources at Waihi, conversion rates approaching 100% are typical. The results justify OceanaGold continuing to fund the project development and proceeding to PFS and FS level studies.

Cautionary Statement

The project is based upon mining inventories (mill feed) comprised of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case.

Competent Persons

Information relating to Exploration Results and Mineral Resources in this document was prepared by or under the supervision of Mr Peter Church. Trevor Maton supervised the mining study work and the compilation of the economic model. David Carr supervised the metallurgy and process design study work.

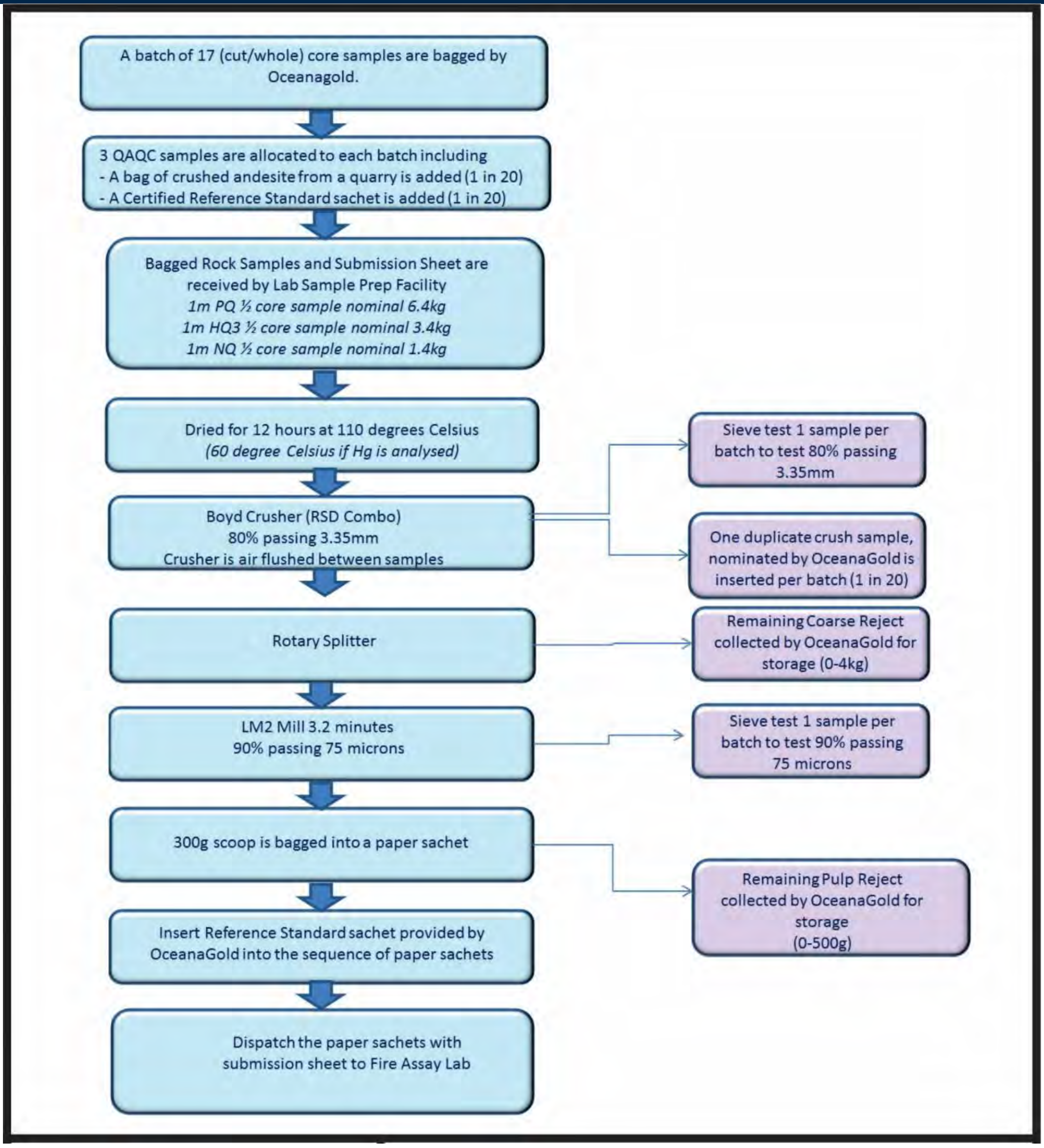
Messrs Church, Maton and Carr are members and Chartered Professionals of the Australasian Institute of Mining and Metallurgy. Messrs Church and Maton are full-time employees of OceanaGold (New Zealand) Limited. Mr Carr is a full time employee of OceanaGold Management Pty Ltd. Messrs Church, Maton and Carr have sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Messrs Church, Maton and Carr consent to the inclusion in the report of the matters based on the information in the form and context in which it appears.

Section 1 Sampling Techniques and Data

Criteria	Commentary
Sampling techniques	• The Mineral Resource estimates of individual projects in Waihi use a combination of sampling techniques including: o Martha Underground (MUG): Diamond Drilling (DD) core, Reverse Circulation (RC) chips from exploration drilling, RC chips from open pit grade control drilling, and grade control channel samples, o Martha Open Pit (MOP): Diamond Drilling (DD) core, Reverse Circulation (RC) chips from exploration drilling, RC chips from open pit grade control drilling, and grade control channel samples, o Gladstone Project: DD core, RC chips from exploration drilling, o WKP Project: DD core. • DD and RC drilling sampling techniques are discussed further in 'drilling techniques' criteria. • Pit channel sampling: Channel sampling was undertaken on a regular basis prior to 2006 and occasionally since then as a method of grade control sampling in the Martha open pit. The sample material was chipped from scraped channels on the bench floor using a pneumatic hammer along 1m sample intervals and collected in a pre-labelled calico bag. Three QAQC samples were assigned per channel including a blank sample, a crush duplicate and a standard. Prior to 2006, this was common practice, however after 2006 RC drilling was used as the preferred method of pit grade control until mining ceased in 2016. • All exploration at WKP is by diamond core drilling from surface. Drilling conditions are well understood. Triple tube coring is routinely used to ensure that core recovery is acceptable. • Diamond drilling sample intervals are guided by logged geological boundaries and vary in length between 0.3 and 1.3m in length. Where possible, a discrete vein will have a sample start point along the up-hole contact and sample end point along the downhole contact of the structure. • Core samples are processed using industry standard practices of drying, crushing, splitting and pulverisation at the SGS Waihi or SGS Westport Laboratory. SGS are an internationally accredited global analytical services provider with strong internal governance standards and a reputation to uphold.
Drilling techniques	**Diamond Drilling:** • All the projects in the Waihi District study are explored using diamond drilling techniques exclusively. Given the extensive operational history at Waihi there are some legacy Reverse circulation drillholes within the drilling database. This RC data is excluded from the dataset for modelling and grade estimation. • All diamond drilling is triple tube wireline diamond core drilling from surface or underground. • All drill core is routinely oriented either by plasticine imprint or using Ezimark, Reflex or TruCore core orientation tools. • DD core diameter is PQ (85mm diameter), HQ3 (61mm diameter), NQ3 (45mm diameter) or BQ (36.4 mm diameter). Surface holes are collared using large-diameter PQ core, both as a means of improving core recovery and to provide greater opportunity to case off and reduce diameter when drilling through broken ground and historic stopes. Underground holes are collared using HQ3 core diameter. PQ, HQ, NQ and BQ core diameters are used in the Mineral Resource estimate with HQ3 being the dominant core diameter used in the resource estimations. **RC Drilling:** • RC drill chips were collected predominantly as part of the grade control process during the Martha Open Pit operation but also on a minor scale for exploration purposes (approximately

Criteria	Commentary
	4309m used in MUG estimate). 88,000m have been drilled in 4,445 reverse circulation (RC) grade control holes in the open pit between May 2007 and May 2015, using a 114mm hole diameter and rig-mounted cyclone sampler. This grade control RC drilling is used to inform the estimate for the Martha Underground project in proximity to the open pit. • Grade control RC collars were designed on a 10x5m horizontal grid, with exception of areas in proximity to highwalls or known historical voids and the holes angled at a -50° dip. • Samples were collected in a bag attached to the cyclone at 1.5m intervals from which a nominal 3.6kg sample was split using a cone splitter.
Drill sample recovery	• In diamond drill core recovery is estimated by measuring the recovered core length against the drilled length which is uploaded to an AcQuire Database as a percentage. • Recovery data has been captured for all sample intervals for all diamond drill holes • Core from the Martha project is monitored for recovery daily to rationalize actual core loss against the intersection of historic mining voids with re-drilling actioned if necessary. • There is no observed relationship between core recovery and grade. • Core recovery within veined material (>40% vein in sample interval) varies between projects and is summarized as follows: o 92.5% within the Martha Underground project, o +95% for the Martha phase 5 pit project, o 89-90% for the Gladstone pit project, 96.2% for the WKP project. • RC drill sample recoveries were assessed by weight for representivity by the sampling technician and dispatching geologist. Samples were discarded where the recovered sample weight did not correlate well with the drilled interval.
Logging	• DD core and RC chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation. Logging includes geotechnical parameters, lithology, weathering, alteration, structure and veining. • Geological logging is based on both qualitative identification of geological characteristics, and semi-quantitative estimates of mineral abundance. Geotechnical logging uses standard semi-quantitative definitions for estimating rock strength and fracture density. • Logging intervals are based on geological boundaries or assigned a nominal length of one metre. • Some logging processes have varied over time. Since June 2015 core has been logged using an excel spreadsheet and uploaded to an AcQuire database. Between 2009 and 2015 logging was entered using Newmont proprietary Visual Logger software and uploaded onto a web-based database. • Logging of recent drilling (2009 onwards) has been validated using inbuilt validation tables and checked for consistency. • A complete digital photographic record is maintained for all drill core. • Unsampled drill core forming part of a resource is stored in a core shed for a minimum of 2 years, but usually until the area has been mined. Core in storage is divested after a review process after which it is either thrown away or retained in government core storage facilities. • All geological logging data is stored in an acQuire database.
	• Once the core is logged, photographed and sample intervals allocated, it is cut in half length ways. If a vein is present, the cut line is preferentially aligned to intercept the downhole apex of the structure. Within each sample interval, one half of the core is bagged for sampling and the other is kept in storage. Whole core has been sampled on occasion where there was

Criteria	Commentary
Sub-sampling techniques and sample preparation	significant core loss coupled with visible electrum and for all BQ core due to reduced sample volumes. • Labelled calico bags containing the core samples were either transported to the local Waihi SGS Laboratory or the Westport SGS laboratory for crushing and sample preparation. • Sample size for resource DD holes drilled from surface is optimised through initial collection of large-diameter diamond drill core samples, generally PQ3 or HQ3. Current drilling from underground utilises an HQ3 or NQ3 diameter core size for advanced exploration and resource conversion drilling. The core is then split using a core saw to produce an initial sample size of 3.5-4kg (HQ3) or 1.7-2kg (NQ3). Drilling for the purposes of grade control utilises an HQ3 or NQ3 diameter core size which is whole core sampled to produce an initial sample size of 7-8kg or 3.5-4kg respectively. • Sample preparation (drying, crushing, splitting and pulverising) is carried out by SGS using industry standard protocols. The sample preparation flow sheet is illustrated in Figure 1.1. • Since mid-2006, sample preparation has been carried out at the SGS laboratory in Waihi. Current standardised sample preparation procedures are summarised in the flow sheet below. Prior to mid-2006, the sample preparation facility was located at the Martha mine site and operated by Waihi Gold personnel. SGS has continued to use the same methods and protocols that were established by the Martha Mine geologists. • Standardised sample preparation procedures are based on nomograms that were developed using Gy's Estimation of the Fundamental Sampling Error. Gold particle liberation size for the Waihi gold deposits is based on petrographic studies, which indicate that gold mostly occurs as electrum in the Waihi epithermal vein deposits and has a particle size between <5 to 10µm. • Representivity of samples is checked by duplication at the crush stage, one in every 17-20 samples.

Criteria	Commentary
	 **Figure 1.1 Sample Preparation Flow Sheet, SGS, Waihi**
Quality of assay data & laboratory tests	• All exploration samples are assayed for gold by 30g Fire Assay with AAS finish • Multi-element ICP data is obtained routinely from the Waihi SGS Laboratory for all exploration assay samples for the elements silver, copper, arsenic, lead, zinc and antimony, which are potential pathfinders for epithermal mineralisation. For samples with over-range silver and lead, these elements are found to be extracted more efficiently by using a more dilute Aqua Regia digest (1-gram sample weight rather than the standard 10-gram per 50 ml). • Quality of exploration assay results has been monitored in the following areas: o Sample preparation at the SGS Waihi and Westport labs through sieving of jaw crush and pulp products, o Monitoring of assay precision through routine generation of duplicate samples from a second split of the jaw crush and calculation of the fundamental error. o Monitoring of accuracy of the primary SGS assay and ALS results through insertion

Criteria	Commentary
	Certified Reference Materials (CRM's) and blanks into sample batches. • Analyses of drill sample pulps from WKP were undertaken at the ALS laboratory in Brisbane, the ALS laboratory in Townsville and SGS laboratory in Waihi. • Blank, duplicate and CRM results are reviewed prior to uploading results in the AcQuire database and again on a weekly basis. The Waihi protocol requires CRMs to be reported to within 2 standard deviations of the certified value. The criterion for preparation duplicates is that they have a relative difference (R-R1/mean RR1) of no greater than 10%. Blanks should not exceed more than 4 times the lower detection method of the assay method. Failure in any of these thresholds triggers an investigation and re-assay.
Verification of sampling and assaying	• CRMs performance is regularly scrutinised and the database QAQC function thresholds are reviewed bi-annually. CRMs are currently assigned to batches on a rotational roster in a "pigeon pair" system. • Monthly QAQC reporting and review is undertaken on all assay results from SGS. • Multi-element data is obtained routinely from the Waihi SGS Laboratory for all exploration assay samples for the elements silver, copper, arsenic, lead, zinc and antimony, which are potential pathfinders for epithermal mineralisation. A comparison between non-routine multi-element data from Ultratrace in Perth with routine multi-element data produced by SGS Laboratory in Waihi showed good correlation between the parent (SGS) and umpire (Ultratrace) data sets for silver, lead, zinc and arsenic, which gives confidence in the accuracy of SGS data for these elements. For samples with over-range silver and lead, these elements are found to be extracted more efficiently by using a more dilute Aqua Regia digest (1-gram sample weight rather than the standard 10 grams per 50 ml). Antimony is not efficiently extracted by the current Aqua Digest method at SGS and consideration should be given to using the Peroxide Fusion extraction if more accurate antimony results are required. • For every batch of results received, SGS release its internal QAQC data to OceanaGold for review. The performance of SGS internal standards appears satisfactory. • No data from geophysical tools, spectrometers or handheld XRF instruments have been used for the estimation of Mineral Resources. • Open pit RC samples contained one blank, one crush duplicate and one standard every 20 samples. Results were required to pass QAQC validation prior to being imported to an AcQuire database. • All laboratory results are uploaded directly into an AcQuire database. Below level detection limit assay results are stored in the database as (negative) half the detection limit. No other modification of the assay results is undertaken. • All intercepts are reviewed during the construction of the geological wire frames prior to grade estimation, this review involves visual comparison of core photography, assay and logging data and spatial relationships to adjacent data. Significant intercepts are reported internally on a weekly basis for peer review purposes. • Check assay programs have been undertaken for some projects in Waihi in the past as a part of advancing milestones such as feasibility level studies. • At WKP there are some visual indicators for high grade mineralisation observed in drill core. Therefore, significant grade intersections are visually validated against drill core. Some holes have been subject to umpire analysis by an alternate laboratory. To date no WKP drill holes have been twinned.
Location of data points	• All historic underground mine data in Waihi was recorded in terms of Mt Eden Old Cadastral grid (MEO). This is the grid utilised for all underground and exploration activity within 3km of the Waihi Mine beyond which New Zealand Map Grid is utilised.

Criteria	Commentary
	• The MEO grid is offset from New Zealand Transverse Mercator (NZTM Grid) by 5215389.166 (shift mN) and 1456198.997 (shift mE). • Relative level (RL) is calculated as Sea Level + 1000m. • Drill collars are surveyed using a total station or differential GPS by a registered professional land surveyor. At the start of the hole the drillers line up the mast in the correct azimuth using a Gyrocompass Azimuth Aligner. • The positions of Open Pit channel samples were surveyed using a total station by a registered professional land surveyor. • For the underground mine, a transformation is used to convert all data to NZGD2000 as per the regulations for the purpose of all statutory underground plans. Checks show that all underground coordinates are within the allowed 1:5000. • Down hole surveys are recorded at 30m intervals by using a Reflex digital downhole survey camera tool. • New Zealand Map Grid (NZMG) is used at WKP, which is in the NZGD1949 projection. False northing 6,023,150m north; False easting 2,510,000m east. • All the drill collars from WKP40 onwards and all OGL drill sites to date have been by accurately located by survey methods. The initial survey control for each site has been established using a Leica GNSS GPS (hired from Global Survey) using Fast Static method and post processed by Global Survey. Each drill site has then been surveyed using a Leica TCRA1205 Total Station. The Total Station has been setup/ orientated using resection method utilising 3 of the 4 previously established Static GPS survey control marks with the 4th one used as a check. The drill collars have then been identified and surveyed. The Total Station has then been moved and setup again using the same resection method and a second round of observations observed on each of the new survey control points. • WKP topographic control is from high resolution aerial photography and LiDAR providing 0.5m contour data
Data spacing and distribution	• The Gladstone deposit has a nominal drill hole spacing of 30m on the major mineralised veins. A tighter spacing of 22.5m has been implemented in the more complicated zones exhibiting strong brecciation and/or stockwork veining. • The Martha UG project uses an average spacing to three drill holes of 60m for inferred and 40m for indicated. The extensive mining history of Martha (>135 years+) has developed significant experience in assessing the continuity of mineralisation and mining the Martha vein system and the adjacent deposits. The vein style mineralisation has a strong visual control, is well understood and has demonstrated continuity over significant ranges. An estimation run utilizing a maximum of three drill holes with a single sample per drill hole was undertaken storing the average distance to the three drill holes used to estimate the block. This formed the basis for the resource classification. • For Martha Phase 5 pit, the sample composite length was based on the nominal sample interval of 1.5m for DD in vein domains and 3 meters in bulk domains. Compositing was by fixed-length, honouring the domain boundaries. • The East Graben Vein zone of the WKP project has been intersected in drilling over a strike length of ~1km, this structure is larger than those typically encountered in the Waihi project area and on this basis the average drill hole spacing required for classification as an inferred resource has been increased by 15% to 80m average distance to the three closest drill holes. All other mineralisation has been classified using a distance threshold of 70m to the three closest drill holes for classification as inferred. • Diamond Drill samples are not composited prior to being sent to the laboratory.

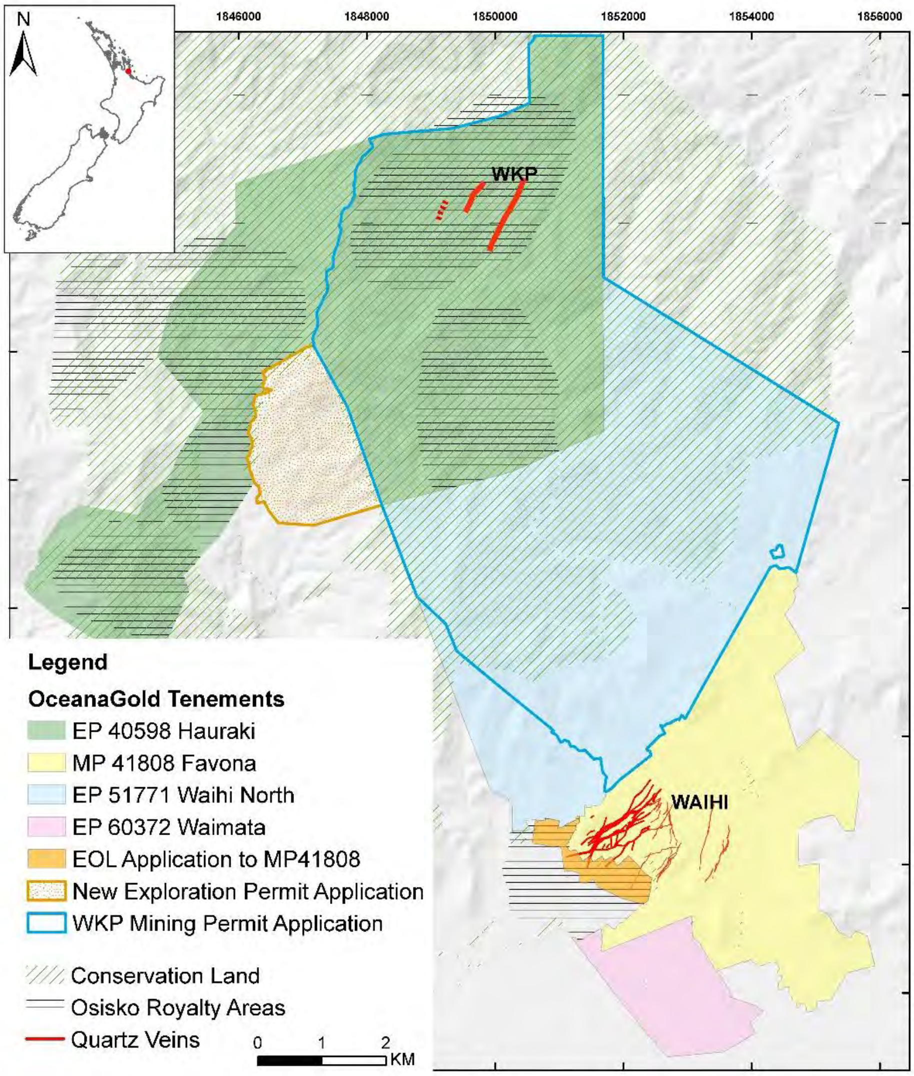
Criteria	Commentary
Orientation of data in relation to geological structure	• Drill holes are designed to intersect known mineralised features in a nominally perpendicular orientation as much as practicable given the availability of drilling platforms. Sample intervals are selected based upon observed geological features. • All drill core is oriented downhole. Structural orientation measurements recorded during logging are used to inform vein modelling for resource estimation and true width interpretation for reporting of significant intercepts. • Sample intervals are selected based upon observed geological features. • Photogrammetry captured during underground grade control sampling is used to update the vein model for the reserve estimation.
Sample security	• Drill core is stored within secure facilities where access is controlled. Site employees transport samples to the analytical lab. The laboratory compound is secured.
Audits or reviews	• The SGS laboratory in Waihi has been audited on a quarterly basis by OceanaGold geologists and the Competent Person when possible. No sampling risks have been recorded during these visits. • Sampling techniques and data handling processes are reviewed annually during internal OceanaGold technical service reviews. External reviews of sampling techniques and data have been undertaken during third-party technical assessments

Section 2 Reporting of Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	• Rights to prospect, explore or mine for minerals owned by the Crown are granted by permits issued under the Crown Minerals Act 1991 (CMA). Crown-owned minerals include all naturally occurring gold and silver. A map showing the location of the permits held by OceanaGold near Waihi is shown in Figure 2.1. Mining permit MP41808 in Waihi was granted in March 2004 for a duration of 25 years, under the provisions of the Crown Minerals Act 1991. The current mining permit covers an area of 1485.38 hectares and encompasses Martha Phase 5 project, the majority of the Martha Underground Project and the Gladstone Project. • The majority of mineralisation within the Martha Underground resource occurs within the granted mining permit (MP41808). The southwestern extent of the resource, however remains open and lies within an area that is currently under an application for an extension to the current Mining Permit (MP41808), formally EP40767. • Royalties of the higher of a 1.0% royalty on net sales revenue from gold and silver or 5% accounting profits is payable to the Crown for MP41808. The area under an application to extend MP41808 is subject to an additional 2% royalty payable to Osisko (acquired from Geoinformatics and BCKP). • A Land Use Consent (202.2018.00000857) was granted by Hauraki District Council (HDC) on the 1st of February 2019 and commenced on the 27th July 2019. This Land Use Consent allows for mining of the Martha Underground resource and the remainder of the Phase 4 Martha Pit. In addition to the authorisations required by HDC, a suite of consents were obtained from Waikato Regional Council (WRC) covering matters such as vegetation removal, water takes, diversions and discharges of water, discharges to air, and construction of the tailing's storage facilities. Both HDC and WRC have conditions in place relating to mine closure, bonds and a post closure trust. Consent has not been sought for mining the Martha Phase 5 Pit, the Gladstone Pit or the WKP underground project. • The Gladstone and the Martha Projects are situated on/below land owned by various landowners including government agencies, private landowners and OceanaGold. Office blocks, the processing plant, the underground portal and the tailings facilities are on land owned by OceanaGold. A significant portion of the area covered by the current Martha open pit is owned by the Crown and administered by Land Information New Zealand (LINZ). OceanaGold holds a current access agreement for work in this area. The WKP project is located within exploration permit EP40598, covering an area of 3762.94 hectares (Figure 2.1). The current term of the permit expires in May 2021. On the 6th May 2019 OceanaGold lodged a Mining Permit Application (MPA) 60541 over an area of 5124.77 ha that covers the extent of mineralisation at WKP and a corridor down to and connecting with the Company's Favona Mining Permit 41808. The application is being processed by New Zealand Petroleum and Minerals and is currently still pending. Once a mining permit is obtained, OceanaGold will be authorised to commercially extract the gold resource, subject to the conditions attending to the mining permit, gaining any surface rights required by agreement with the landowners and gaining the requisite resource consents under the Resource Management Act. • OceanaGold holds 100% of the WKP permit interest. Third party rights to receive an interest in the project are confined to a Crown royalty of 1% of the turnover or 5% of the accounting profits whichever is higher and a 2% royalty payable to Osisko (acquired from Geoinformatics and BCKP) with respect to certain "target" areas. In both cases the royalties are fixed and quantifiable for the purposes of inclusion in the business plan. • The WKP prospect is situated on state-owned land administered by the NZ government through the Department of Conservation and generally open to public use for amenity purposes. OceanaGold has received an Access Arrangement (AA) granted under the CMA, for the term of EP40598, giving surface rights to conduct exploration drilling within a defined footprint of 428.44 hectares and under conditions that protect the conservation (biodiversity

Criteria	Commentary
	and amenity) values of the land. The Company has applied for a variation to the AA to provide for the continuation of exploration drilling upon granting of the Mining Permit. • The company has received resource consents for surface exploration drilling at the WKP project granted by local authorities under the Resource Management Act 1991 (RMA). The environmental effects of exploration drilling are authorized and managed within the framework of that Act in keeping with the high environmental values of the permit location. • Any development of the WKP prospect for the purposes of advancing beyond exploration would require applications at that time under the RMA and (for surface impacts only) the CMA. The RMA applies land use designations (zoning) that allow underground mining on a discretionary basis and surface impacts in limited circumstances dependent on meeting a range of objectives and policies including protecting and enhancing the biological diversity and outstanding landscape character values of the permit area and minimising ground surface disturbance. Consent has not been sought for mining the WKP Project. • Changes to NZ government policy restricting access to mine on conservation land have been proposed, subject to a statutory consultation process that has not yet commenced. The precise nature of any proposal is not currently known.
Exploration by other parties	• Waihi Gold Company held exploration and mining licences and permits over the open pit portion of the Martha deposit and the current underground mine since the early 1980's. The Waihi East area covering the Correnso deposit and easterly extensions of the Martha system was historically held and explored by Amoco Minerals, Cyprus Minerals and a Coeur Gold-Viking Mining joint venture from whom Waihi Gold Company purchased the tenement area, EP40428, in 1998. These companies drilled approximately 18km in 60 holes in the Waihi East area and identified some remnant resources on the eastern end of the Martha vein system on which they undertook scoping studies. OceanaGold purchased the Waihi Gold Company in 2015. • Previous exploration by Amoco and BP Minerals at WKP in the 1980s and 1990s was focused on sheeted stockwork veins exposed in stream channels through the prospect. Newmont as the operator of a WKP joint venture with Glass Earth in 2009-2013 identified and drilled several larger structures, encountering significant results in some holes. The Newmont/Glass Earth interest was subsequently purchased by OceanaGold.
Geology	• The Au-Ag deposits of the Waihi District are classical low-sulphidation adularia-sericite epithermal quartz vein systems associated with north to northeast trending faults. Larger veins have characteristically developed in dilational sites in the steepened upper profile of extensional faults often with narrower splay veins developed in the hanging wall of, or between more than one major vein structure. Gold occurs exclusively within quartz vein structures, usually as electrum. Free gold is only rarely observed. **<u>Martha Underground and Martha phase 5 cutback</u>** • These two projects are focused on the large Martha Vein System, a complex vein network largely comprising a dominant southeast-dipping Martha vein (up to 30m thick in places) and several NW-dipping hanging wall splays including the Empire, Welcome, Royal and Rex veins. • Two additional steeply dipping, NNE-trending and well mineralised vein structures known as the Edward and Albert veins also form an important part of the overall Martha Vein System. • The host rocks are andesitic flows, intrusives and volcaniclastics which have undergone pervasive hydrothermal alteration. Much of the Waihi area, including the Martha open pit is overlain by post-mineral volcanics (Figure 2.2).

Criteria	Commentary
	Gladstone • The Gladstone project is located along the southwestern extent of the mined Favona deposit. It includes the upper part of the Moonlight veins in the northeast and Gladstone-Cowshed veins in the southwest. • Mineralisation at Gladstone is characterized by shallow-level, hydrothermal breccias and associated banded quartz veins between 1000mRL and 1150mRL. The breccias are rooted in the tops of mineralised quartz veins, flaring upwards into hydrothermal explosion breccias. The dominant veining at Gladstone trends ENE to NNE between 035° and 080° and dips steeply to the SE. **WKP** • Low sulphidation epithermal quartz veins at WKP are hosted in a rhyolite flow dome complex with overlying and interfingering lithic lapilli tuffs which are in turn partially overlain by post-mineral andesites. The rhyolites have undergone pervasive hydrothermal alteration, often with complete replacement of primary mineralogy by quartz and adularia with minor illite and/or smectite clay alteration. • Gold mineralization occurs in quartz veining developed along two types of structurally-controlled vein arrays. The principal veins occupy laterally continuous, NE trending (025-047°), moderately dipping (60-65°) district-scale graben step faults, reaching up to 10m in width. Subsidiary, extensional veins (1-100cm wide) are developed between or adjacent to the principle fault hosted veins. These veins often form significant arrays and are moderate to steeply dipping with a more northerly to NNE strike and appear to lack lateral and vertical continuity compared to the fault hosted veins. The primary structure targeted by much of drilling at WKP is the Eastern Graben Vein (EG-Vein), compared to the more westerly T-Stream and Western Veins (Figure 2.3). In general, there are very few sulphides other than pyrite in the WKP veins.
Drill hole Information	• This Table 1 update relates to resource updates based upon previously reported drilling data. • The declaration of a mineral resource for the Martha phase 5 cutback relates to update modelling and economic assessment of historic data acquired over the course of the company's 32-year operating history mining the Martha Deposit. • Charges in the reported resource for the Gladstone deposit are entirely attributable to changes in cut-off grade assumptions. Changes to the reported mineral resource for the Martha Underground project are due removal of mineralised material that is now being reported within the newly reported Marth phase 5 cutback project.
Data aggregation methods	• Compositing of data for grade estimation is within distinct geological boundaries, typically within modelled veins. • The grades are compiled using length weighting. • Grades are not cut in the database; however appropriate statistically derived top-cuts are assigned by domain in the estimation process.
Relationship between mineralisation widths and intercept lengths	• Drill intercepts are typically reported in true width where reliable orientation data is available or able to be inferred from angle to core axis, alternately down hole lengths are reported when orientation data is not available. Holes are designed to intersect veins at more than 60 degrees to the vein as much as practicable.

Diagrams	 **Figure 2.1 Waihi-WKP Map showing permit status, areas of Conservation Land and Osisko Royalties**

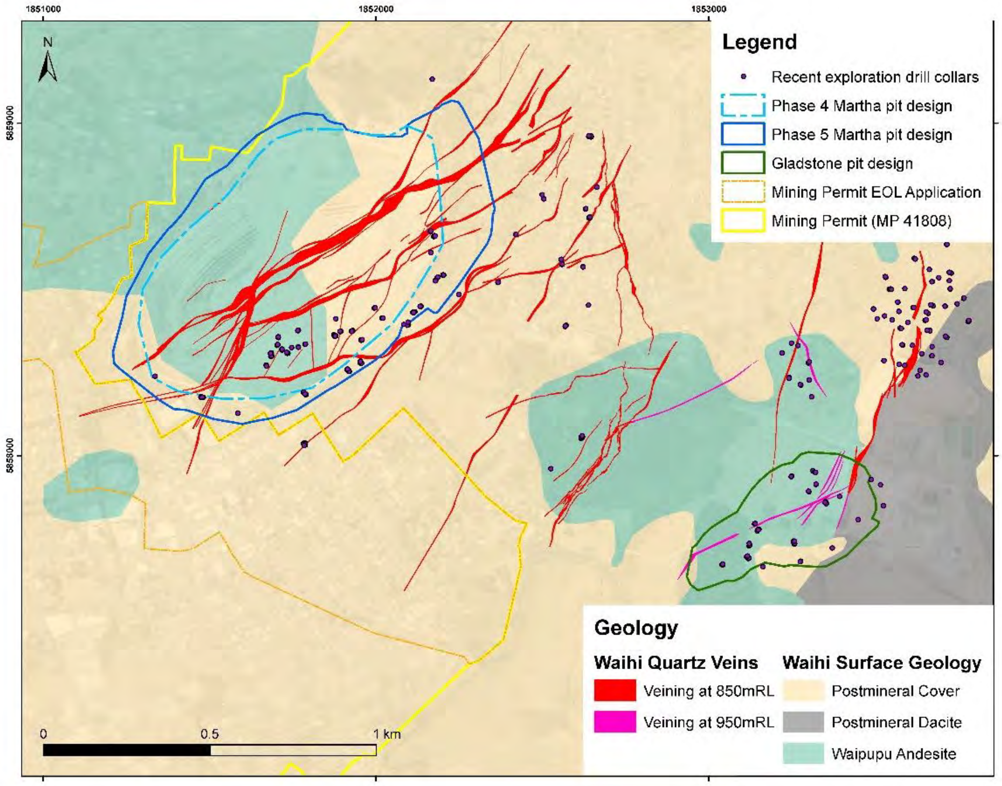


Figure 2.2: Simplified Geology of the Waihi Area showing drill collars drilled between 2017 and December 2019, quartz veins projected onto the surface and the project areas.

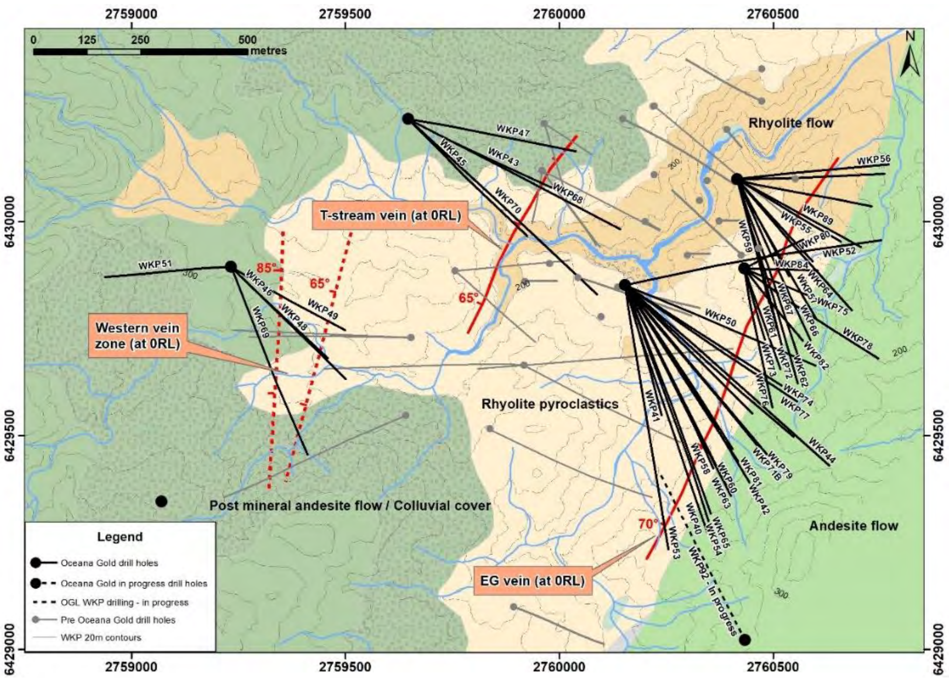


Figure 2.3: Simplified map showing surface geology, drilling and main vein zones at the WKP project (NZMG grid).

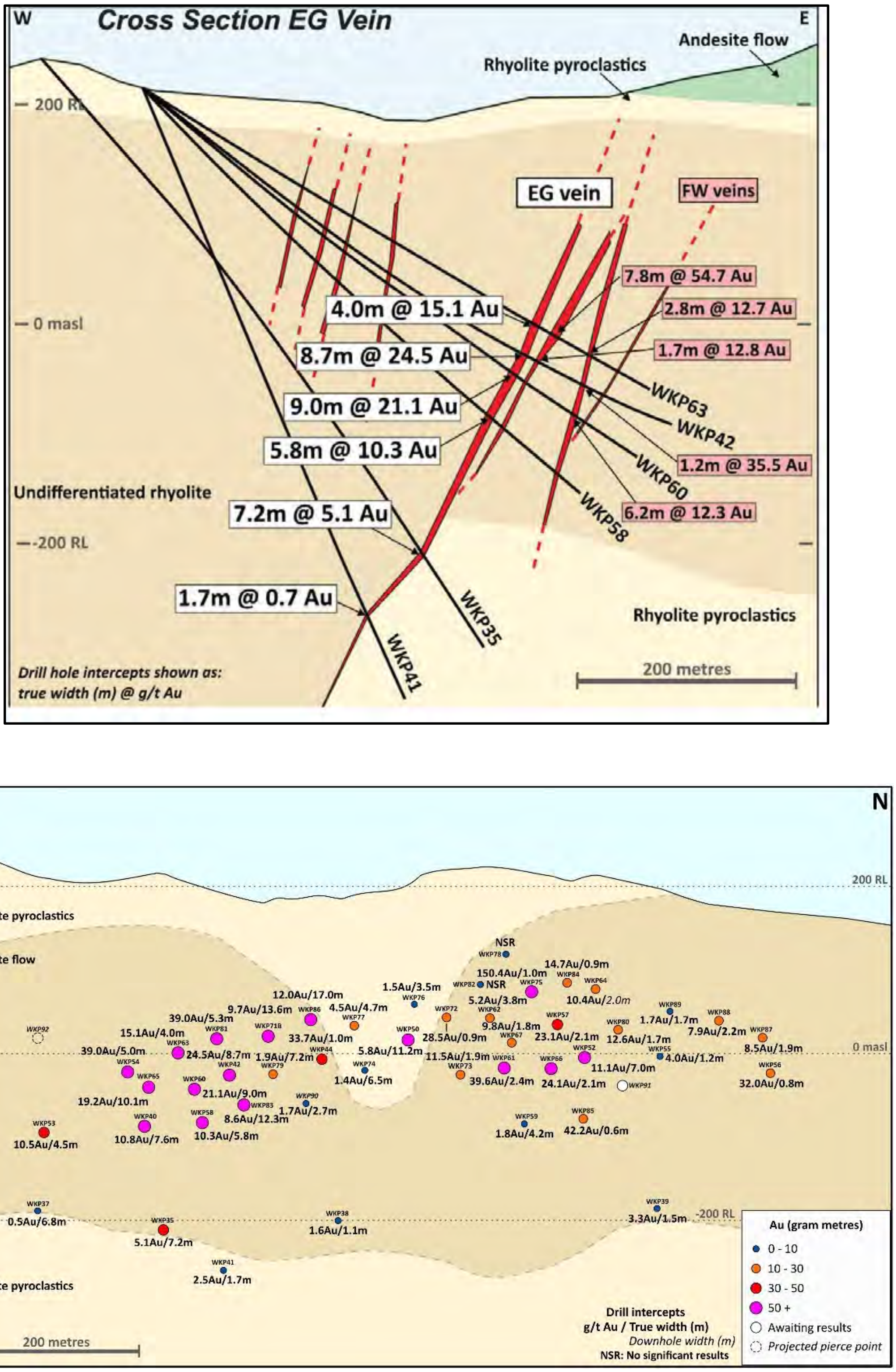


Figure 2.4: Simplified Cross and Long Sections of the EG vein at WKP

Balanced reporting	• Recent Waihi drill hole information is available from [www.oceanagold.com.](http://www.oceanagold.com)
Other substantive	• OceanaGold is continuing with exploration programs within the district on permits EP 51771, EP40598, EP40813, EP51041, EP51630, EP52804, EP60148 and EP60149.

exploration data	• Exploration drilling is continuing to test the resource potential at WKP. Two drill rigs have completed 11,216m in 31 drill holes during the 2019 exploration period. • Metallurgical test work has been completed on WKP samples in three rounds of test work. Test work has been carried out at ALS Laboratories in Perth. Crush material derived from drill core samples have been composited with each sample composite containing approximately 30kg of sample material. • The first round of test work was conducted on two sample composites from the 'East Graben vein' with the composite samples sent away for Gravity Leach and Direct Leach test work. • The second round of test work was conducted in two parts. Part one included sample composites from the 'East Graben' vein and other geologically distinct domains, including the 'East Graben Hanging Wall' veins and the 'East Graben Footwall' veins. One sample composite was tested from each geological 'domain'. These samples were tested for Batch Flotation, Gravity Leach and Direct Leach test work. Part two of the second round tested five composite samples from the 'East Graben vein' over a wider spatial spread and tested more variable types with regards to Au grade and distribution of other elements. These samples were tested for Batch Flotation, Flotation Concentrate Leach, Flotation Tails Leach, Gravity Leach and Direct Leach test work. • The third round of test work was conducted on four composite samples from the 'East Graben' Vein and two composites samples from the 'East Graben Footwall' veins. The samples were tested for Batch Flotation, Flotation Concentrate Leach and Flotation Tails Leach. These tests were conducted at a variety of grind sizes, including at 106um, 90um and 75um respectively. Direct Leach test work was also carried out at a grind size of 53um and 38um. • A programme of Comminution Testwork has also been completed by JKTech on six selected WKP vein sample composites. The samples were subject to the following comminution tests: SMC Test; JK Bond Ball, Bond Abrasion Index; and a Bond Rod Mill Work Index. The samples were determined to be moderately hard to hard in terms of resistance to impact breakage and hard to very hard in terms of resistance to grinding.
Further work	• OceanaGold continues to drill in the Waihi area, with a further 2km of drilling planned for resource infill and 14km planned for reserve conversion for the Martha Underground project and an additional 5km planned to advance the WKP project for the remainder of 2020.

OCEANAGOLD

Section 3. Estimation and Reporting of Mineral Resources

Criteria	Commentary
Database integrity	• Drill hole data is initially captured in an Access Database used for drill hole planning and management. That data is validated by several inbuilt data-entry checks. • The data is imported from Access into the main AcQuire database interface which includes validation protocols. • Personnel are well trained and routinely check source versus input data during the entry process. • The Martha underground model r0120_mug_subblocked_fnl.bmf incorporates all available data, exploration diamond drilling, in-pit channel grade control data and in-pit RC grade control data have all been utilised in both the building of the geologic model and in the grade estimate. • In the construction of the MUG model it was recognised that there is significant historic cross cut data from the historic level development (circa 1880 to 1930) that could be utilised to aid in estimating grade particularly in the poorly drilled portions of the deposit. This legacy cross cut data is of unknown quality, grade historically was recorded as an economic value and a gold equivalent value was back calculated for this data set previously. The legacy cross cut data is utilised in the construction of vein wireframes. This data is excluded from the grade estimation for material reported under this report. • The cross-cut data was reviewed spatially and only data that spanned the full width of the vein was selected for utilisation in the vein wireframe construction. This data was further limited to only the second pass grade estimation pass which is utilised on an on-site basis purely as an aid to drill planning. • Each dataset was extracted independently from the parent Waihi AcQuire database for EDA purposes. Local Vulcan isis databases are created with the extracted data. These local databases are then flagged with domain codes and utilised for all subsequent processes
Site visits	• Peter Church has been employed at the operating mine since 2011. He is employed in the role of Principal Resource Geologist with responsibility for resource estimation. • The wider resource development team is site-based and familiar with mine geology and exploration protocol. Validation of interpretation is regularly performed during mine development. • In the preparation of the Martha Underground model, OceanaGold Group Geologist Tim O'Sullivan was consulted with regards to some technical considerations in the construction of the models for the Martha and WKP deposits. Past Group Geologist Mike Stewart has also been widely consulted in the construction of various other models that contribute to the combined Martha, Gladstone and Wharekirauponga (WKP) Resource. • Martha Underground resource estimation protocols were independently reviewed and deemed fit for purpose in 2018 by Entech Pty Ltd during project study work
Geological interpretation	**Martha and Gladstone Resources** • Open pit and underground mining since 1988 have provided a large database of mapping and grade control sampling, which has confirmed the geological interpretation to date. • The geologic interpretation processes utilised in construction of all Waihi Models utilizes log data, assay data, underground face and backs mapping – where available, digital core photos and oriented core measurements, all of which are systematically collected and validated. The dip and dip direction of significant veins, faults, bedding and geological contacts are estimated from oriented core measurements. • Gold mineralisation is confined to quartz veins and is not disseminated in wall rock; therefore, the main vein boundaries are usually coincident with assay intervals, which attempt to honour the geology. There are a small number of instances where high grade

Criteria	Commentary
	assay results located immediately outside the main vein boundary have been included within the vein wireframe; such as where the grade is interpreted as belonging to small-scale, localized, parallel or sub-parallel veins / stringers rather than being attributed to contamination or a cross-cutting structure. • Geological modelling of the Martha Underground project was performed in Leapfrog Geo 5.0.1 using the interval selection and vein systems tools. The project was linked directly to the ADMWAIHIEXP AcQuire database using the AcQuire API. • Key geological features are interpreted from a combination of spatially referenced logging, assay and mapping data. Domain-specific grade and geological continuity characteristics were created to create representative wireframes of vein structures. The following data sources contribute to final wireframe shapes: o Exploration drilling data – Diamond and rare RC o Open Pit Grade Control channel samples and RC samples o Historic Quartz Vein Mapping o Historic mining triangulations o Surface mapping o Full width historic x-cuts o Core Photography and Logs • Diamond drilling intersects were assigned to structures from a merged assay and geology table. Discrete colourmaps were used to ensure that only distinguishing features were selectable. Criteria commonly used to determine inclusion within a vein include; o Au and Ag values o Vein quartz percentage o Composition of the interval, commonly quartz or quartz-calcite o Lithology type, including void intercepts (for example stope fill, open stope, cavity) o Brecciation type and intensity • Filters were commonly applied to identify primary structures within dense data. These were modified on a vein-by-vein basis and compared to core photography to establish geological consistency between veins. • A structural database was constructed using the structural modelling functions in Leapfrog Geo. Oriented discs were used to inform intercept relationships, with structure type, thickness and measurement confidence commonly used as filters. • The digital core photographic record is used extensively during the modelling process. Identifiable characteristics of veins can be recognised, such as mineralogical and textural characteristics, the nature of contacts, and the existence and relative timing of mineral phases within the vein zones. The mineralized veins have a distinctive appearance, and common textures and mineralogy - consisting of chlorite-smectite clays and base-metal sulphides, along with quartz, and which are commonly complex due to internal multi-phase syn- and post-mineralisation deformation, quite different to barren veins such as the 5995 (calcite-quartz lode). Another reference used to guide the geological interpretation is the mapped geometry of veins that have been mined previously. Waihi veins are characterised by sinuous deflections that tend to be continuous over a considerable vertical extent. Where the orientation data varies along the length of a given vein, or down dip, it is considered in context of the overall geometry of the deflections. • Geological models are integrated with regional geology and with detailed surface topographic models, which are routinely updated by mine surveyors. Geological models and geological concepts have been routinely reviewed by internal and external reviewers.

Criteria	Commentary

	Wharekirauponga (WKP)
	• The geologic interpretation processes utilised in construction of the WKP model utilizes log data, assay data, underground face and backs mapping – where available, digital core photos and oriented core measurements, all of which are systematically collected and validated. The dip and dip direction of significant veins, faults, bedding and geological contacts are estimated from oriented core measurements.
	• Gold mineralisation is confined to quartz veins and is not disseminated in wall rock; therefore, the main vein boundaries are usually coincident with assay intervals, which attempt to honour the geology.
	• Geological modelling is performed in Leapfrog Geo 4.2.1 using the interval selection and vein systems tools. The project was linked directly to the ADMWAIHIEXP AcQuire database using the AcQuire API.
	• Key geological features are interpreted from a combination of spatially referenced logging, assay and mapping data. Domain-specific grade and geological continuity characteristics were created to create representative wireframes of vein structures. The following data sources contribute to final wireframe shapes:
	  o Exploration drilling data – Diamond and rare RC
	  o Surface mapping
	  o Core Photography and Logs
	• Diamond drilling intersects were assigned to structures from a merged assay and geology table. Discrete colourmaps were used to ensure that only distinguishing features were selectable. Criteria commonly used to determine inclusion within a vein include;
	  o Au and Ag values
	  o Vein quartz percentage
	  o Composition of the interval, commonly quartz or quartz-calcite
	  o Lithology type, including void intercepts (for example stope fill, open stope, cavity)
	  o Brecciation type and intensity
	• Filters were commonly applied to identify primary structures within dense data. These were modified on a vein-by-vein basis and compared to core photography to establish geological consistency between veins.
	• A structural database was constructed using the structural modelling functions in Leapfrog Geo. Oriented discs were used to inform intercept relationships, with structure type, thickness and measurement confidence commonly used as filters.
	• The digital core photographic record is used extensively during the modelling process. Identifiable characteristics of veins can be recognised, such as mineralogical and textural characteristics, the nature of contacts, and the existence and relative timing of mineral phases within the vein zones.
	• Geological models are integrated with regional geology and with detailed surface topographic models, which are routinely updated by mine surveyors. Geological models and geological concepts have been routinely reviewed by internal and external reviewers.

Dimensions	**Martha underground Resources** **Martha Underground –** r0120_MUG_subblocked_ fnl.bdf block model was constructed in Mt Eden old grid. <table><tr><th>Variable</th><th>X</th><th>Y</th><th>Z</th></tr><tr><td>Origin</td><td>395200</td><td>642200</td><td>500</td></tr></table>

Criteria	Commentary

Extents (m)	1600	1200	700
Block Size (Parent)	10	10	10
No. of Blocks (Parent)	340	190	140
Sub Block Size	1.0	1.0	1.0
Orientation	+65 degrees	X axis around Z	

Martha Phase 5 Pit – r1119_MOP_ph5

Variable	X	Y	Z
Origin	395150	642330	500
Extents (m)	1700	950	700
Block Size (Parent)	5	5	5
Sub Block Size	1.25	1.2	1.25
Orientation	+65 degrees	X axis around Z	

Gladstone Project - Block definition for the Gladstone deposit

- r0218_GLOP_small_reg.bdf
- Regularised block model – cell size. 2.5 m
- Offset in X direction 400m
- Offset in Y direction 800m
- Offset in Z direction 300m
- Origin: X 396600: Y 642200: Z 900.0
- Rotation: Bearing 135; Plunge 0; Dip 0

WKP

- Block Model Dimensions – WKP0120.bmf

Variable	X	Y	Z
Origin	2759700	6429325	-345
Extents (m)	900	1000	620
Block Size (Parent)	10	10	10
No. of Blocks (Parent)	280	164	62
Sub Block Size	0.5	0.5	0.5
Orientation	+100 degrees	X axis around Z	

-

Estimation and modelling techniques

Martha Resources

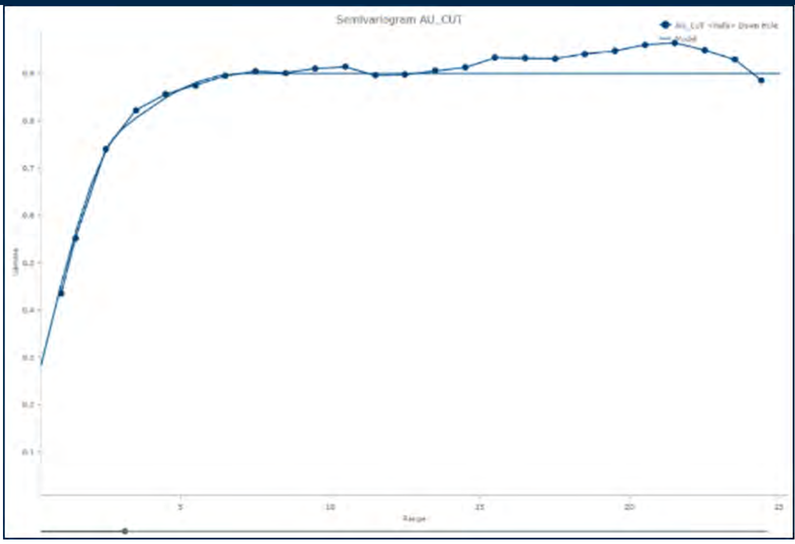
The modelling process employed in the grade estimation for all the Waihi projects is performed using numerous Vulcan and Leapfrog processes summarized in the steps outlined below:

1. Input data Validation
2. Update lithological domains, geologic model construction,
3. Data selection, Drill hole data selection from the site AcQuire database
4. Exclusion of unwanted drill holes by data type
5. Flag data files by lithology,

Criteria	Commentary
	6. Composite drill holes to fixed length composites within defined geological boundaries, typically 1m using length weighting, 7. Exploratory data analysis by domain, generation of domain and data type summary statistics 8. Variography 9. Assign top cuts by domain and data type to input data files 10. Block Model construction based upon lithological wireframes, 11. Run estimation for all domains for Au, Ag, As, Resource Classification, 12. Assign density, mining depletions, back fill grade, stripping of negative values from non-estimated blocks, assignment of grade to dilution domains 13. Classify model, The model is estimated in Vulcan. Estimations were performed in individual lithological domains using length weighted down hole composites. Vulcan software version 12.0 has been used to construct the Martha underground, Martha open pit, Wharekirauponga and Gladstone estimation models. Sub-blocking with either ordinary kriging (OK) or inverse distance weighting to the second power (ID2) is used for all underground models. ordinary kriging in conjunction with tetra-unfolding –has repeatedly demonstrated to produce outputs that are consistent with those achieved using ID2 and also produce acceptable reconciliation between resource and mill in the case of the underground projects that have been in production over the mines recent history. The method of unfolding was adopted for the estimation of vein models as a way of dealing with the sinuous character of the veins. The underground block models are rotated in bearing to align with the dominant strike of the veins and they are run using Vulcan software. Sub-blocking is used to define narrow veins and to maintain volume integrity with the geology solids. The grade estimation for all models is strictly controlled by the geology, with both sample selection and estimation of blocks limited to domains defined by the geology interpretation solids. Gold is estimated using one of the following methods; either - a single pass with a combined channel and drilling dataset; OR - two-pass estimation using a combined dataset with short search range first, then followed by a second pass using drillhole data only with longer search ranges to estimate blocks not estimated in the first pass. <u>Compositing</u> Composite weighting by length was applied during estimation to avoid bias from very small, high grade composites. There has been no change to the compositing method for any Waihi projects used since May 2010. The standard method used to define composites for all resource was to flag the raw data in the database local drilling database for the project against the geology solids. The Vulcan compositing program (run length) was run to generate a length composited database at the required sample length. Compositing was by fixed length, honoring the domain boundaries. 1m fixed length composites are routinely generated for the narrow veins across all deposits. There are 5 vein-based domains in the Martha underground project that have a vein width of greater than 10 meters, these broader domains are composited to a 2-metre fixed length interval. For narrow domains across all underground deposit the drilling data is composited to a 1m composite length using the distributed technique, this methodology is consistent with the techniques applied for the Waihi deposits. Composite weighting by length is applied during estimation to avoid bias from small, high grade composites. Open pit models are estimated using larger composites. Veins domains are composited to a 1.5m length and bulk domains to 3m, this being representative of the mining bench height and therefore the implied mining selectivity inherent in the model.

Criteria	Commentary
	Grade Capping • Reconciliation history for the Waihi project has demonstrated that some level of high-grade restriction is necessary to limit the influence of outliers on grade estimates for the epithermal veins that have been mined during the operations history. • Statistical assessment of the input data is undertaken by domain, typical top-cut selection is based on the assessment of the population distribution characteristics and for inverse distance estimates cutting at the 98th percentile on the log probability distribution has been a long-standing methodology that has produced acceptable results. Estimates using an ordinary kriged estimation scheme utilise a 99th percentile threshold. • The use of this method in determining top cuts has resulted in good reconciliation historically. Typically, different data types are assessed independently in the capping analysis process. • The Martha Underground estimate is based on an Ordinary Kriged Estimation plan and based on comparative assessment of the Ordinary Kriged outputs a top-cut % of 99 has been adopted for kriged estimates. • The metal removed analysis includes tabulation of the following: o Number of samples above the cap o Percentage of samples above the cap o Minimum, maximum, mean, and variance of samples above the cap o Mean and variance of uncapped data o Mean and variance of capped data o Capped % difference: $\frac{(\text{uncapped mean} - \text{capped mean})}{\text{uncapped mean}} \times 100\%$ o Contribution of the samples above the cap to the uncapped variance: $(\text{mean above the cap} - \text{uncapped mean})^2 \times \frac{\%\text{ of data above the cap}}{\text{uncapped variance}}$ o Contribution of the samples above the cap to the total metal: $(\%\text{ of data above the cap}) \times \frac{\text{mean of data above cap}}{\text{uncapped mean}}$ Variography • Down hole and directional variography are typically run using Snowden Supervisor v7 software or Vulcan Version 11.0. Variograms are run to test spatial continuity within the selected geological domains. • The process of domaining in the Waihi deposits removes the majority of the variance and consequently compromises the variogram modelling process. The best variography is therefore obtained for the Martha deposit when un-domained data is utilised. Variogram orientation is defined for each domain based on the strike and dip of the veins as modelled. Both downhole and omni-direction variograms have been defined that fitting of a variogram model. The variogram structure is defined using a standardised spherical single structure model with parameters as follows: **Figure 3.1: Omnidirectional variogram – Martha all data,**

Criteria	Commentary



Estimation / Interpolation Methods

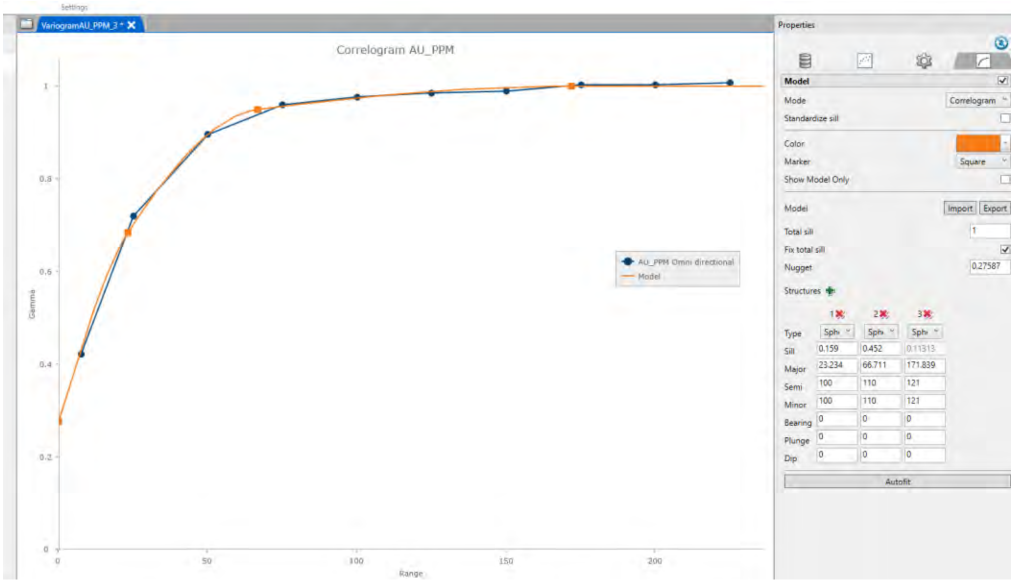
- Veins for the Martha underground model were interpreted using Leapfrog software. Vein and geology wireframes were then utilised to construct a block model within Vulcan. Compositing of data for grade estimation is within distinct geological boundaries. For this model the vein domains were estimated using Ordinary kriging and tetra unfolding was employed to deal with complex vein geometries and to aid in resolution of the grade distribution and sample selection for the estimation.
- The Martha Underground block model is rotated in bearing to align with the dominant strike of the veins and they are run using Vulcan® software. Sub-blocking is used to define narrow veins and to maintain volume integrity with the geology solids. The grade estimation for all models is strictly controlled by the geology, with both sample selection and estimation of blocks limited to domains defined by the geological interpretation solids. Gold is estimated using one of the following methods; either - a single pass with a combined channel and drilling dataset; OR - two-pass estimation using a combined dataset with short search range first, then followed by a second pass using drill hole data only with longer search ranges to estimate blocks not estimated in the first pass.

WKP

Grade Capping

- Reconciliation history for the Waihi project has demonstrated that some level of high-grade restriction is necessary to limit the influence of outliers on grade estimates for the epithermal veins that have been mined during the operations history.
- Statistical assessment of the input data is undertaken by domain, typical top-cut selection is based on the assessment of the population distribution characteristics and for inverse distance estimates cutting at the 98th percentile on the log probability distribution has been a long-standing methodology that has produced acceptable results. Estimates using an ordinary kriged estimation scheme utilise a 99th percentile threshold.
- The use of this method in determining top cuts has resulted in good reconciliation historically. Typically, different data types are assessed independently in the capping analysis process.

Variography

Criteria	Commentary
	• The process of domaining in the WKP deposits removes the majority of the variance and consequently compromises the variogram modelling process. The best variography is therefore obtained for the deposit when un-domained data is utilised. Variogram orientation is defined for each domain based on the strike and dip of the veins as modelled. Both downhole and omni-direction variograms have been defined that fitting of a variogram model. The variogram structure is defined using a standardised spherical single structure model. **Figure 3.2: Omnidirectional variogram – WKP all data,**  • Estimation / Interpolation Methods • Veins for the WKP underground model were interpreted using Leapfrog software. Vein and geology wireframes were then utilised to construct a block model within Vulcan. Compositing of data for grade estimation is within distinct geological boundaries. For this model the vein domains were estimated using Inverse distance estimation techniques. • The WKP block model is rotated in bearing to align with the dominant strike of the veins. Sub-blocking is used to define narrow veins and to maintain volume integrity with the geology solids. • The grade estimation for all models is strictly controlled by the geology, with both sample selection and estimation of blocks limited to domains defined by the geological interpretation solids. Gold is estimated using a single estimation pass.
Moisture	• Estimates of tonnage are prepared on a dry basis.
Cut-off parameters	All Mineral Resource cut-off grades are based on gold price of USD 1500/oz, silver price of USD20/oz and 0.72 NZD / USD exchange rate. Martha Underground • A cut-off grade of 2.15g/t has been estimated for the Martha underground Mineral Resource. Cut off grades based on processing costs of NZD 30/tonne, general and administration costs of NZD 20/tonne and underground mining costs of NZD85/tonne. Martha Open Pit • A cut-off of 0.5 g/t has been estimated for Martha open pit. Gladstone Open Pit

Criteria	Commentary
	• A cut-off of 0.5 g/t has been estimated for Gladstone open pit. <u>WKP Project</u> • A cut-off grade of 2.5g/t has been used to estimate the WKP Mineral Resource. Cut off grades are based on processing costs of NZD 30/tonne, general and administration costs of NZD 20/tonne and underground mining costs of NZD100/tonne.
Mining factors or assumptions	**<u>Martha Underground Project</u>** <u>Hydrogeology</u> • GWS Limited Consulting (GWS) have modelled the groundwater system in Waihi since the late 1980’s. • GWS report that a shallow groundwater system associated with volcanic ash, alluvium and completely weathered rhyolite tephra is present at shallow depth. Monitoring data shows that it is unaffected by mine dewatering except immediately adjacent to the Martha Pit. Shallow groundwater levels are controlled principally by rainfall infiltration, low surface soil permeability and natural and assisted drainage to surface water systems. • GWS report that the higher volumes of water in the deeper aquifer are contained primarily in the quartz vein, the historic underground workings and infiltrated through the open pit which is more permeable than the surrounding andesite country rock. Water levels are maintained at the lowest underground mine level (705mRL) by the current underground pumping system. • Further drawdown of the water table is required to extract the Martha Underground resource. Permits are in place for the drawdown of the water table to 500mRL. Boreholes are being installed for further dewatering as part of the Martha underground. A slurry pump system has been installed on 790mRL capable of handling the high level of entrained solids for the permanent pump stations. • GWS estimate the average daily pumping rates to dewater to 500mRL range from 14,000m^3/day to 16,700m^3/day. <u>Historic Stope Modelling</u> ***Stope Fill*** • Accurate definition and appropriate treatment of risk associated with historic stopes is important for the Martha underground project. • Wireframes of the historic workings contain development levels, open stopes and filled stopes, shafts, passes and the Milking Cow caved zone. Adjustments to development levels and stopes have been made based on interaction with current underground mining activity, additional historic plans made available through the Auckland War Memorial Museum and the current Martha diamond drilling campaign. • Current mining interactions have provided a source of more accurate information to base adjustments to the immediate area intersected. In some areas sufficient evidence has been determined to enable further adjustment to surrounding and wider areas. These are achieved either through directly mining into/ through old workings, targeted probe holes and scanning of the old voids. • Logging of diamond drill holes identified voids and stope fill within the drill core and provided an interpretation of voids as open stopes or levels, filled stopes or collapsed stope zones. ***Methodology***

Criteria	Commentary
	• As the latest information either physical or on paper becomes available the current data for the old level/s are reviewed and updated accordingly. • Stope shapes are digitised using stope widths annotated on the historic long-section plans, and stope orientation was determined by wireframes and/or drill hole intercepts. • The individual stope files that are situated entirely within the open pit shell and the Milking cow collapsed zone are archived and not included in the stope model.

Modelling of voids

- Historical stope voids and backfill is captured in the model via the *mined* variable. No back filled material is included in the reported Mineral Resource, this material is regarded as an exploration target and will be de-risked through further exploration work.

Table 3-1 **Historical Stoping Modelling Variables**

Mined Variable value	Material Type	Modifying factors
0	In-situ	As estimated
1	Back filled stopes	Density modified and grade removed
2	Subsidence	Density modified and grade removed
5	Open stope	Density set to zero, grade removed
6	Open development	Density set to zero, grade removed

Geotechnical

- Ground conditions within the Martha underground project will be impacted due to proximity to historic mining voids. Mechanisms for mitigating the associated risks will be considered as part of the project feasibility study to be commenced.
- AMC, engineering consultants, investigated the stability of the underground workings and reported that based on the current understanding of ground conditions, the planned ongoing investigation of conditions as suitable drilling positions become available, and the proposed cautious approach to development using close ground control techniques where required. AMC is confident that the proposed Martha underground mine can be developed and brought into production without any compromise to underground or surface stability.
- AMC reported that the ground conditions influence the mining method, the means of access, and the design of stopes and access tunnels. A critical aspect of the Martha Underground Project is to undertake investigations to understand those conditions so that a safe and efficient mining method and well-informed approach to developing the mine is used.

Mining Method

- Mining method selection work for the Martha underground project was undertaken by SRK in 2011, 2016 and 2017 and confirmed by Entech Pty Ltd in 2018. The Mineral Resource estimate has applied the same mining methods recommended by SRK and Entech.
- Much of the deposit will be extracted using Avoca which has been the predominant mining method at Waihi since 2004. Certain areas employing Modified Avoca, recovering skins adjacent to historic stopes will entail filling the historic stopes with a CRF and then mining adjacent to the CRF using modified Avoca.
- A small proportion of the Mineral Resource inventory will involve the extraction of remnant skins in the footwall or hanging wall of previously mined stopes, or the extraction of both remnant skins and historical backfill. The proposed mining method is illustrated in

Criteria	Commentary

Figure 3.3, this mining method will utilise remote drilling and loading methods combined with remote LHD equipment.

- SRK and Entech conclude that once established, the mining method is expected to achieve acceptable resource recovery, productivity with few safety issues anticipated.

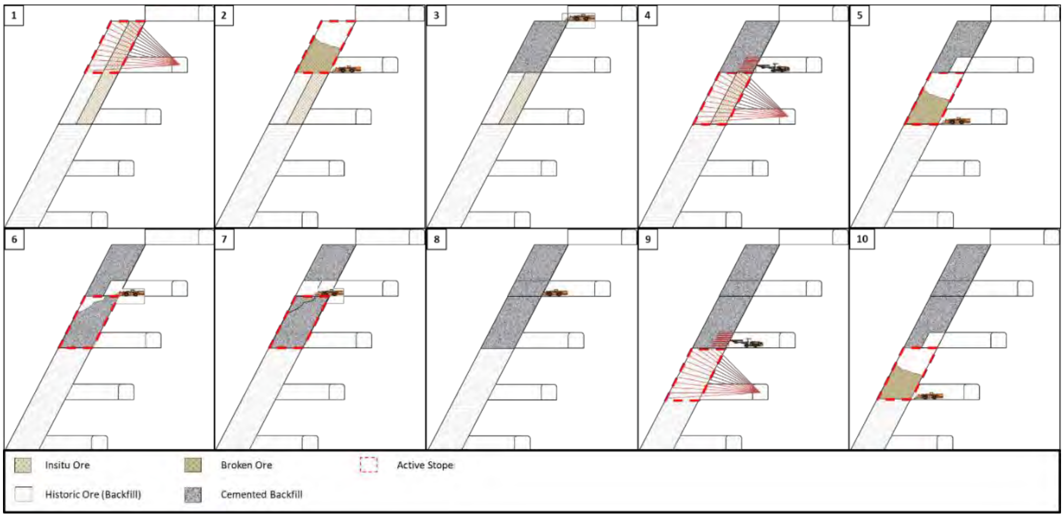


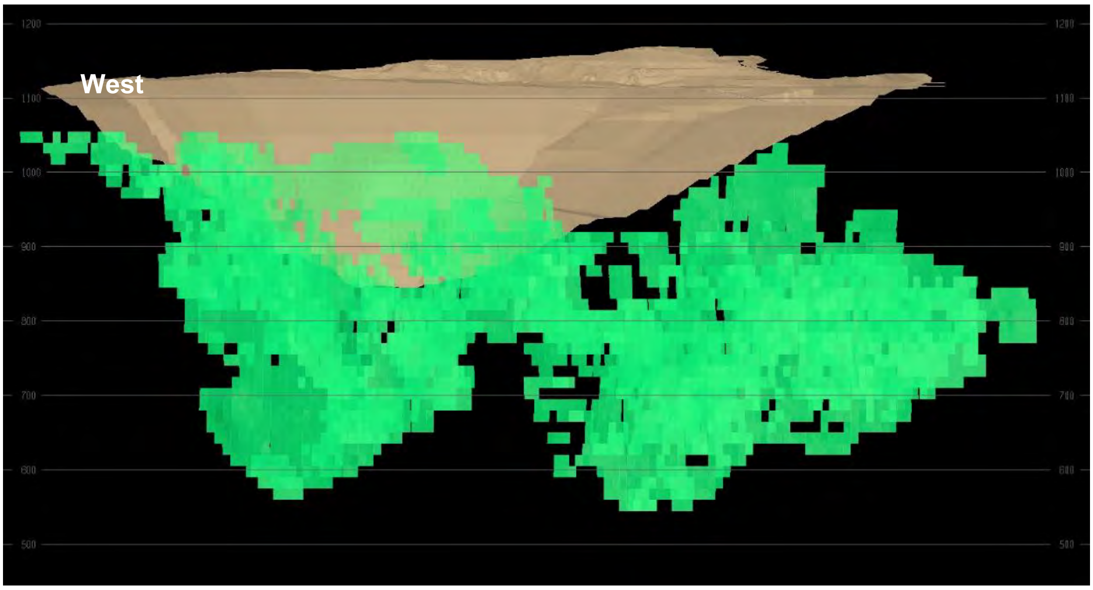
Figure 3.3: Side Ring Mining Method

<u>Mining Recovery and Dilution</u>

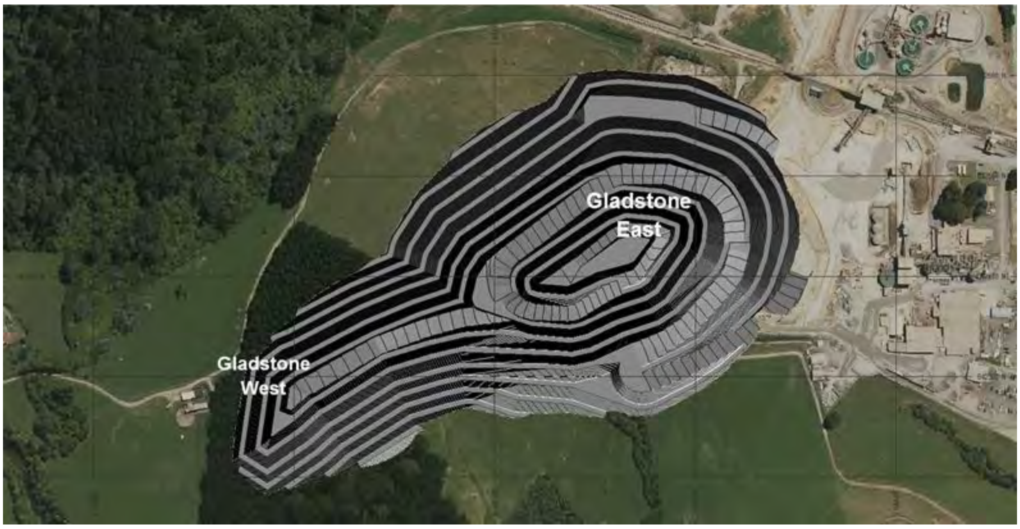
- No mining recovery or dilution were applied to the Mineral Resource estimate.

<u>Mineral Resource Estimate</u>

- OceanaGold has estimated the Mineral Resource using the Deswik Stope Optimiser (SO).
- The Mineral Resource is reported within the SO shapes above the 2.15 g/t cut-off grade. No unclassified material contained within the SO shapes is reported.
- Nominal stope dimensions of 15m high by 10m in length were selected for the design.
- Stope widths vary, depending on the thickness of the mineralisation. A minimum stope width of 0.5 m was used and 0.5m of dilution was applied to both the footwall and hanging wall resulting in a minimum stope width of 1.5m.
- A maximum stope width of 15m was used with a minimum pillar width between stopes of 8m. A maximum percentage of historical stoping of 10% was allowed in each SO shape.
- The method of specifying the strike and dip angles for the initial stope-seed-shapes in SO was to apply a stope control surface wireframe over the full extent of the orebody where stope shapes are to be generated.
- The following stope shapes were manually excluded from the Mineral Resource estimate:
    - Stope shapes within the Martha open pit (phase5)
    - Isolated stope shapes either showing lack of continuity or distant from the main concentrations of shapes.
    - Stopes closer than 50m from the surface.
    - Within a solid created as an exclusion solid around the historical "Milking Cow" zone by projecting the cave zone outwards by 20 m.
    - All stopes intersecting the base of the Martha Reserve pit.

Criteria	Commentary
	• Figure 3.4 presents the SO shapes after exclusion based on geotechnical and economic assessment.  ***Figure 3.4: Martha Underground Mineral Resource Long Section*** **<u>Martha Open Pit</u>** • The Martha Resource is reported within a conceptual pit shell defined using a USD 1500 gold price, this resource is 47% indicated and 53% inferred of the contained metal within the Resource reporting pit shell. • The method for estimating the Mineral Resource involved a 2018 pit optimisation study using the “Whittle” Lerch-Grossman algorithm to determine the economic limits. These limits were adjusted to meet both environmental and social constraints. • Operating costs were estimated based on past contract rates for the Martha open pit conventional drill, blast, load and haul with standard mid-sized mining equipment. • Allowances in the cost estimates were made for separating waste into hard and soft material and further categorised into potentially acid forming or non-acid forming rock and placing in engineered structures. • The conceptual pit design in shown in Figure 3.5. • Materials handling methods are considered to be similar to those employed over the last 30 years for the Martha pit. ***Figure 3.5: Martha Open Pit Conceptual Design***

Criteria	Commentary
	 <u>Hydrogeology</u> • The Martha open pit is already dewatered by the Correnso workings and the Martha underground. No additional dewatering will be required for the open pit resource. • Any pit wall run-off captured in the base of the pit that is not lost or diverted into the underground will be removed by diesel pumping units and pumped into the historic workings or delivered to the WTP for treatment prior to discharge to the Ohinemuri River under the existing treated water discharge consent. • The walls in the current pit have been depressurized using horizontal drain holes generally 20m long but up to 100-metres long. Drain holes in the existing east wall targeted bases of paleo-valleys and extracted up to 60 l/sec during drilling. The dewatering has been monitored with a network of piezometers around the pit perimeter. This practice should continue as required. <u>Geotechnical</u> PSM has reviewed the design inputs into the slope model for the optimization in their desk-top review, report PSM125 248R, “Phase 5 Scoping Study, Preliminary Geotechnical Appraisal”, and concluded: • There are no "fatal flaws" in the planned mining. • The slopes used to date are appropriate for the conditions at the level of study. • The planned slopes in the northeast only entail a minimal cutback of the current slopes. Because of the movement and impending failure in this area a larger cutback is probably required. • The effect of historic workings on the slopes has been assessed and there are some areas where design modifications and or remediation will be required as part of future design works. • However overall Phase 5 will be the first pit excavated at Waihi where most of the slopes are outside historic underground cave and subsidence affected rock masses. This means there is probably significant upside potential in many of the deeper slope sections. • Although geotechnical drill-hole coverage is limited, this is not considered an issue because there is substantial cored exploration drill-hole coverage in most areas of the Phase 5 pit. • Notwithstanding the points above, there are information gaps in some upper walls; geological structure to the south; and general geological structure in some other walls that will need to be addressed in future studies.

Criteria	Commentary
	Mining Recovery and Dilution • The minimum mining width has been set at 2.5 metres wide. The selective mining unit developed for the geological block model is a bench height of 2.5metres, and east west dimension of 2.5 metres and north south dimension of 2.5 metres with orientation reflecting the main trend of the mineralised veins in an east westerly direction. • The Mineral Resource zones are broad on each mining bench, and the overall dilution edge effects are minimal, with the result that there is expected to be little difference between the overall in situ and diluted tonnes and grade. The Mineral Resource block model has a block dimension which is larger than the optimum selective mining unit (SMU) for the equipment currently operating at Waihi. • No mining losses were applied. It is considered that the resource estimation technique applied to the broad mineral resource zones provides an adequate estimate of the Mineral Resource tonnes and grades. Reconciliation data from mining the Martha open pit also supports this approach. **Gladstone Open Pit** • The Gladstone Resource is reported within a conceptual pit shell defined using a USD 1500 gold price, this resource is largely indicated however approximately 10% of the contained metal within the Resource reporting pit shell is classified as inferred. • The method for estimating the Mineral Resource involved a 2018 pit optimisation study using the "Whittle" Lerch-Grossman algorithm to determine the economic limits. • Operating costs were estimated based on contract rates for the Martha open pit conventional drill, blast, load and haul with standard mid-sized mining equipment. The selected mining method and design is appropriate for the Gladstone open pit. • Allowances in the cost estimates were made for separating waste into hard and soft material and further categorised into potentially acid forming or non-acid forming rock and placing in engineered structures. • Capital costs allowed for relocating the underground portal and installation of a crushing facility. • The conceptual pit design in shown in Figure 3.6. ***Figure 3.6: Gladstone Open Pit Conceptual Design***  • Mill feed is planned to be trucked 0.25 km to the process plant and placed in a 40,000t stockpile. A surge (Polishing Pond) stockpile (up to 1.2MT) is available close to the water

Criteria	Commentary

	treatment plant for excess mill feed. Waste is planned to be trucked direct to the Waste Development site and used for construction of the Tailings Dams or placed in an engineered rock stack or sourced for underground back fill.
	
	<u>Hydrogeology</u>
	• Two aquifers are interpreted across the site, an upper aquifer within the surficial materials and young volcanics, and a lower aquifer within the andesite with the two aquifers partially separated by the lower permeability, weathered and hydrothermally altered cap at the top of the andesite sequence.
	• The model at Gladstone comprises:
	  o An upper perched groundwater system within the surficial materials of moderate to low hydraulic conductivity, with pore pressures below hydrostatic and a standing water level at ~1096mRL with seasonal fluctuation;
	  o A lower groundwater system in the Andesite with a standing water level of approximately ~1075mRL.
	
	<u>Geotechnical</u>
	• Geotechnical studies during 2017 on preliminary design concepts including geotechnical drilling, rock / soil testing and detailed core logging showed that the slopes in the Winner Hill pit and the northern slopes in Gladstone Hill were generally satisfactory under fully saturated or partially drained conditions. However, the southern and eastern upper slopes were shown to be marginally stable under fully or partially saturated conditions particularly where there was a significant depth of the surficial deposits.
	• The geological model shows the north-western wall will comprise andesite, overlain by a thin band of hydrothermal breccia and a relatively thin sheet of rhyolitic tuff/ignimbrite thickening to the south. The south-eastern wall has a thicker band of rhyolitic tuff/ignimbrite and hydrothermal breccia overlying andesite; and the east wall has the greatest thicknesses of dacite and volcaniclastics.
	• Design pit slopes were modified based on a detailed geotechnical study completed by PSM in early 2018 including three additional geotechnical holes and geotechnical modelling. Geotechnical domains were re-defined based on the recent analysis. The design criteria used to support calculation of Mineral Resources are reported in Table 3-2 below.

Table 3-2: Gladstone Pit Slopes

Pit Design Parameter	Bench Height m	Face Slope degrees	Berm Width m
Gladstone Pit			
• 1040 to 1100	15	60	5
• 1100 to 1140	10	40	5
• Breccias / Dacites	10	40	5
• Surface to 6m depth	35		
Haul Road Width	• 20m wide @1 in 10, surface to 1070, • 12m wide @ 1 in 9 to 1040		
Winner Pit			
• 1060 to 1085	15	60	5
• 1085 to 1100	15	55	5
• 1100 to 1130	10	55	5
• Surface to 8m depth	30		
Haul Road Width	18m wide 1 in 10		

Criteria	Commentary

	Mining Recovery and Dilution
	• The minimum mining width has been set at 2.5 metres wide. The selective mining unit developed for the geological block model is a bench height of 2.5metres, and east west dimension of 2.5 metres and north south dimension of 2.5 metres with orientation reflecting the main trend of the mineralised veins in an east westerly direction.
	• The Mineral Resource zones are broad on each mining bench, and the overall dilution edge effects are minimal, with the result that there is expected to be little difference between the overall in situ and diluted tonnes and grade. The Mineral Resource block model has a block dimension which is larger than the optimum selective mining unit (SMU) for the equipment currently operating at Waihi.
	• No mining losses were applied. It is considered that the resource estimation technique applied to the broad mineral resource zones provides an adequate estimate of the Mineral Resource tonnes and grades. Reconciliation data from mining the Martha open pit also supports this approach.
	WKP
	Hydrogeology
	• GWS report that the catchment area for the Wharekirauponga Stream is approximately 15 km^2 and with 2.17 m/year rainfall, the average daily rainfall volume reporting to the catchment is in the order of 89,178 m^3/d, with most rainfall in winter although sub-tropical storms can produce heavy events in summer.
	• GWS preliminary assessment based on limited data suggest that:
	  o Surface soils in the locality are highly clay altered and are unlikely to drain abnormally as a result of mine dewatering.
	  o The host rocks are generally low permeability and are expected not to dewater. Some amount of dewatering may occur in the silicified rock mass.
	  o The EG Vein is expected to be dewatered via the Stream exposures, resulting in discharge and gains in surface water flows.
	  o Understanding the changes to the catchment water balance as a consequence of dewatering is still deemed the critical element of the hydrogeologic assessment.
	• Further work is still required to understand how groundwater interacts with surface waters around Wharekirauponga and with the stream channels.
	Geotechnical
	• SRK have assessed the geotechnical data to establish the geotechnical characteristics and conceptual design elements for the underground mine. The assessment entailed:
	  o Understanding the geological setting of the gold deposit;
	  o Creation and population of an interpretable geotechnical property database based on the limited geotechnical core logging available;
	  o Collection and recording of suitable core samples for rock property testing in a laboratory, supported by field estimates (point loads) of rock strengths;
	  o Graphical representation, interpretation and reporting of recorded data, culminating that describes the geotechnical environment, and
	  o Transformation of data into Barton's Q' value.

Criteria	Commentary
	• SRK recommended that the hydraulic radii shown in Table 3-3 be used for initial stope sizing by area and depth.

Table 3-3: Preliminary Geotechnical Parameters for WKP Stope Sizing

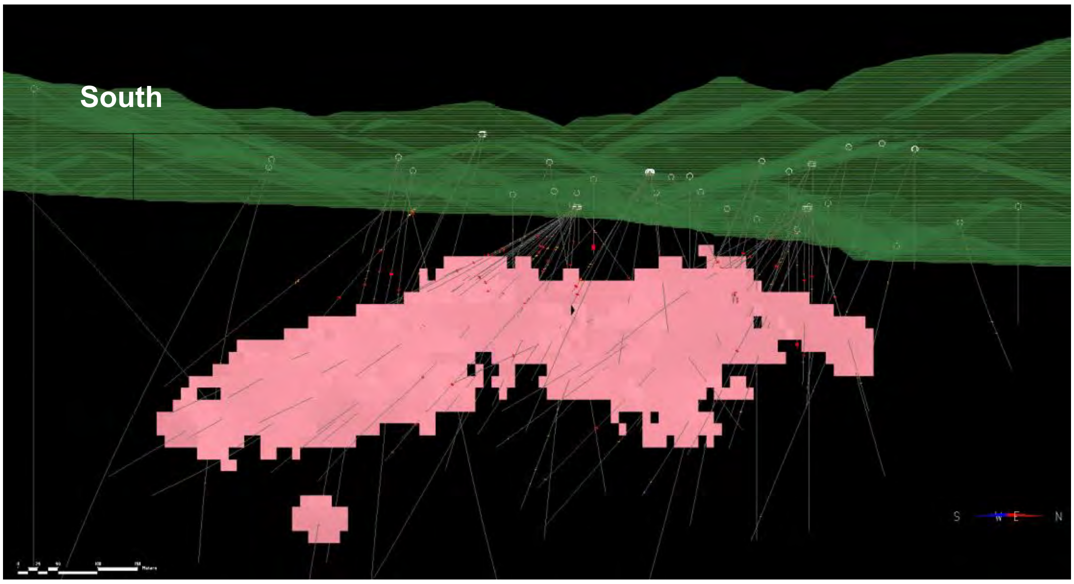
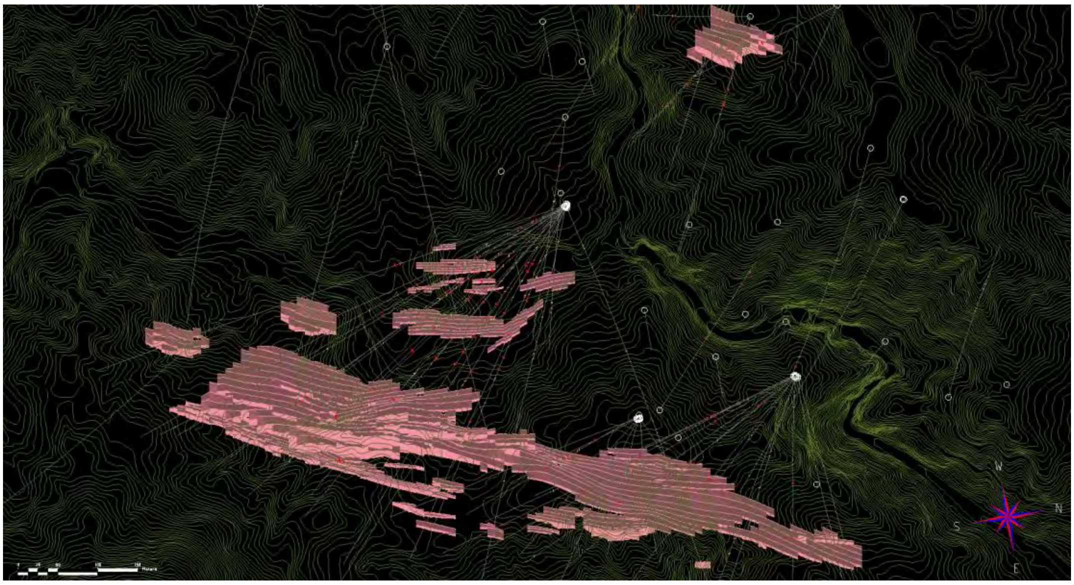
	Eastern Graben EG Rhyolite		Central Area Lapilli Tuff		Western T stream Rhyolite	
	HR min	HR max	HR min	HR max	HR min	HR max
80-160m	5.5	5.5	5.1	5.1	6.8	6.8
160-240m	4.8	5.5	4.5	5.1	6.8	6.8
260-320m	4.2	5.5	4.0	5.1	6.7	6.8

<u>Mining Method</u>

- Mining method selection work for the WKP Project was undertaken by SRK in 2019,
- SRK state both pillar and artificially supported methods are suitable for the WKP deposit. The deposit will not be able to be supplied an engineered fill such as paste or cemented hydraulic fill because the location of the processing plant is 10 km distance from the mine. Backfill for the mine could be either cemented rock fill or rock fill.
- The use of in-situ pillars was not considered by SRK due to the high grade of the Mineral Resource, as such if pillars are required these could be cemented fill rather than in-situ pillars.
- The existing OceanaGold operation Waihi use the Avoca mining method and SRK considers that Avoca mining method is also suitable for WKP.
- SRK recommended a sub-level height of 20m and stope strike length of 15m be adopted for stope optimisation which is within the preliminary geotechnical parameters with a HR of 4.3.

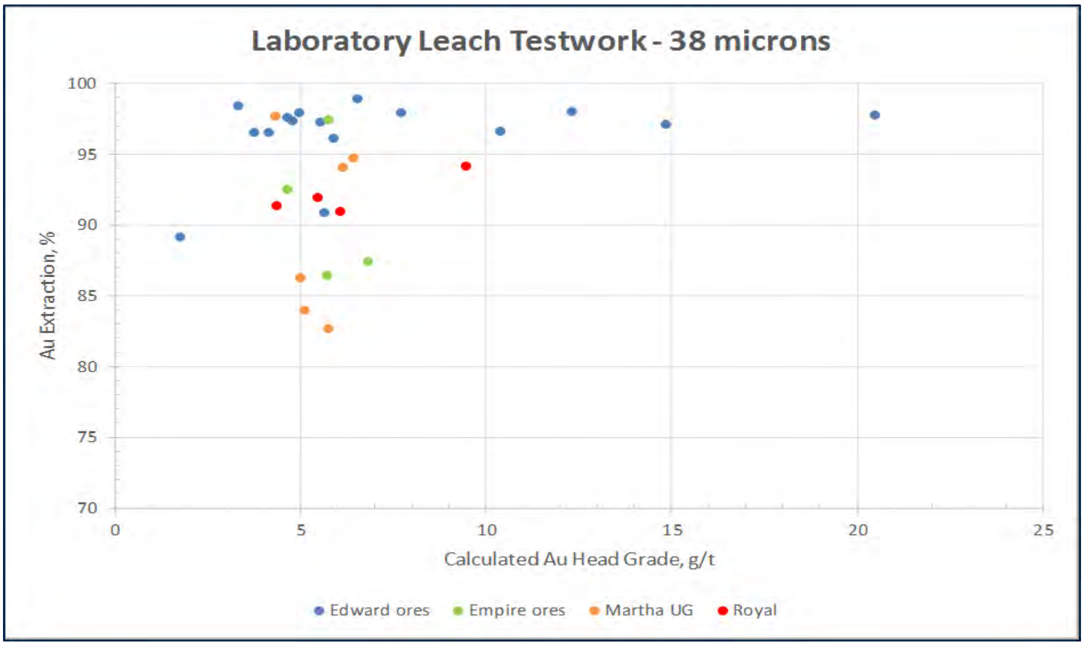
<u>Mineral Resource Estimate</u>

- OceanaGold has estimated the Mineral Resource using the Deswik® Stope Optimiser (SO).
- The Mineral Resource is reported within the SO shapes above the 2.5 g/t cut-off grade. No unclassified material contained within the SO shapes is reported.
- Nominal stope dimensions of 15m high by 15m in length were selected for the SO.
- Stope widths vary, depending on the thickness of the mineralisation. A minimum mining width of 0.5 m was used and 0.5m of dilution was applied to both the footwall and hangingwall resulting in a minimum stope width of 1.5m.
- A maximum stope width of 15m was used with a minimum pillar width between stopes of 8m.
- The method of specifying the strike and dip angles for the initial stope-seed-shapes in SO was to apply a stope control surface wireframe over the full extent of the orebody where stope shapes are to be generated.
- All shapes within 50m of the surface topography were excluded from the estimate. Figure 3.7 and Figure 3.8 present the SO shapes.

Criteria	Commentary
	Figure 3.7: WKP Mineral Resource Long Section  ***Figure 3.8: WKP Mineral Resource Plan View***  Mining Recovery and Dilution • No mining recovery or dilution were applied to the Mineral Resource estimate.
Metallurgical factors or assumptions	**Martha Underground Project** • Prior to 2018 metallurgical test work has been completed on 30 composite samples of mineral resource intercepts from Edward (18), Martha (9), Welcome (1) and Empire East (2). Twenty-three samples were submitted to the Newmont Inverness testing facility. Six samples representing the Edward vein were submitted to Ammtec Laboratory in Perth, Western Australia. Samples were mostly submitted both as quarter core and as jaw crush reject material (95% <7mm), if both were available. • In 2019 a further 18 composites were tested from intercepts were submitted to AMML Laboratories in Australia for testing direct leach performance. • Figure 3.9 shows gold extraction (recovery) for the historical and 2019 samples tested at a grind size of 38 microns against calculated gold feed grades. These results show a

Criteria	Commentary
	range of recoveries from 89% to 99% for the Edward samples, 83% to 98% for Martha samples, 86% to 97% for Empire, and 91% to 94% for Royal samples. • Project work and metallurgical testing have shown Martha underground mineral resources to be amenable for processing via the existing Waihi treatment plant flow-sheet and achieve practicable throughput rates, reagent and consumable consumption and process recovery. • A metallurgical recovery of 94% been used for the Mineral Resource cut-off calculation.

Figure 3.9: Laboratory Leach Testwork Chart



Martha Open Pit

- Martha open pit metallurgical recovery of gold is estimated at 90% and silver recovery is estimated at 63% based on the process plant performance and reconciliations over the last 30 years of operation extracting similar veins.

Gladstone Open Pit

- Laboratory scale test work has been conducted on the drill hole samples obtained for the Gladstone Mineral Resource. The key focus of the metallurgical work has been to derive gold recovery, throughput rates, reagent consumption and to confirm the suitability of current Plant configuration. This test work has shown the Gladstone mineral resource to be amenable for processing via the existing Waihi treatment plant flow-sheet. Recovery is shown to vary with the weathering extent of the Gladstone resource.
- The weathered domain achieves higher recoveries than the primary un-weathered domain. Separate recovery relationships have been determined for the weathered and un-weathered domains. A small separate metallurgical domain characterised by the hydrothermal breccia host rock was also identified.
- A grind size of P_{80} of 90 microns has been selected, as plant operating experience has shown that this is equivalent to a laboratory gold recovery at a P_{80} of 75 microns. The gold and arsenic relationship identified in Correnso resource is not observed in the Gladstone Resource. The statistically significant drivers of recovery within the Gladstone resource are weathering and gold head grade.
- The recovery estimate from the test work is calculated at a P_{80} of 75 microns

Criteria	Commentary

- Weathered: Recovery % = 100 * (0.902 – (0.049 / Head Grade Au))
- Un-weathered: Recovery % = 100 * (0.85 – (0.452 / Head Grade Au))
- Hydrothermal Breccia: Recovery % = 74%

- This relationship predicts an average recovery for the Gladstone Resource of 71% based on the average Mineral Resource grade of 1.5 g/t Au.

WKP

- During 2017 and 2018 a series of ten composite samples were generated from drill core obtained from the WKP EG vein across the long section and at varying depths in several test programs.
- A further 6 composites were generated from additional drilling and tested during 2019 from both the EG Vein and EG FW Vein.
- Twelve of these composites represent material in the main EG vein with the other four testing the adjacent footwall and hanging wall structures.
- The composite samples were subjected to a standard suite of tests to characterise the recovery of gold from the samples via conventional mineral processing flowsheets similar to that employed at the Waihi process plant.
- Testing on the composites was completed by ALS Metallurgy in Perth, Australia and included:
  - Head assay and screen fire assay,
  - Gravity gold recovery at 106 pm grind size,
  - Cyanide leach of both gravity concentrate and gravity tails, and
  - Sulphide flotation and leaching of flotation products.
- The average gold recovery from leaching on the main EG Vein samples (composites 1,2,3,7,8,9 &10) averages 90.7% and suggests the majority of the EG Vein material can be regarded as free milling. The lower recovery experienced in composites 4 and 6 may be attributable to the higher sulphur feed grade and likely partially refractory locked in sulphides. Table 3-4 presents the testwork recoveries for each composite tested

Table 3-4: Metallurgical Testwork Samples and Recoveries

Composite No	Zone	Head Grade (Au g/t)	Grind Size P80 (pm)	Total recovery (%)
1	EG Vein	7.96	106	95.5
2	EG Vein	28.70	53	89.5
3	EG Vein	9.78	53	89.3
4	EG FW Vein	5.08	53	66.4
5	EG FW Vein	4.46	53	80.9
6	EG Vein	3.78	106	68.8
7	EG Vein	5.35	106	91.2
8	EG Vein	6.65	106	95.8
9	EG Vein	5.72	106	84.3
10	EG Vein	7.58	106	89.1
11	EG Vein	50.6	53	92.6
12	EG Vein	19.4	53	94.7

Criteria	Commentary
	<table><tr><td>13</td><td>EG FW Vein</td><td>13.1</td><td>53</td><td>86.1</td></tr><tr><td>14</td><td>EG Vein</td><td>17.7</td><td>53</td><td>96.2</td></tr><tr><td>15</td><td>EG FW Vein</td><td>62.8</td><td>53</td><td>93.4</td></tr><tr><td>16</td><td>EG Vein</td><td>22.6</td><td>53</td><td>94.6</td></tr></table> • Preliminary flotation testing at a P80 of 106 -µm was completed on eight of the composite samples. The recoveries were not an improvement on the direct leach results and insufficient gold was recovered to the flotation concentrate to consider the flotation tailings a discard stream. • The 2019 composites examined the effect of grind size on overall recovery with average recovery increasing to 94.3% at a 38 µm grind vs a recovery of 92.9% at 53 µm size in the laboratory. The test work completed to date supports the adoption of a direct leach flowsheet for gold recovery at a primary grind size of 38 µm and an expected recovery of 90% or higher is a reasonable assumption given that optimisation work has not yet been completed. Plant operating experience has shown that an equivalent laboratory gold recovery at a P80 of 38 microns is equivalent to a grind size P80 of 53 microns in the plant. • 90% recovery has been adopted for the cut-off grade calculation.
Environmental factors or assumptions	• The Waihi operation holds the necessary permits, consents, certificates, licences and agreements required to conduct its current operations, and to construct and operate the Correnso underground, the Martha open pit and the Martha underground. **<u>Martha Underground</u>** • During 2017 and 2018, environmental studies were conducted by independent consultants to support resource consenting. Studies have included air quality, water quality and ecology, noise, blast vibration effects, traffic, potential for subsidence, ground settlement in response to dewatering, property values, de-watering, and geochemistry of tailings, waste and groundwater. • The Hauraki District Council and Waikato Regional Councils have issued resource consents for Martha underground. The conditions impose restrictions on blasting magnitudes and firing times, mine design, geotechnical monitoring, dewatering and surface stability. **<u>Martha Open Pit</u>** • Martha open pit project environmental studies have commenced, environmental factors are assumed to be in line with those previously experienced on site. • Studies have assumed that the rehabilitation of the Martha pit will be to form a recreational lake with rehabilitated surfaces above lake level. **<u>Gladstone Open Pit</u>** • Gladstone project environmental studies have commenced, environmental factors are assumed to be in line with those previously experienced on site. **<u>WKP</u>** • Baseline monitoring and surveys are currently underway by experienced and qualified third-parties. The assessment will include terrestrial and aquatic biodiversity.
Bulk density	• Oxidation and rock hardness wireframe surfaces / solids based on sectional interpretation of diamond drilling data, with modification based on the current geology model, are used as the basis for assigning density.

Criteria	Commentary
	• Dry bulk densities for all deposits have been estimated using a water displacement method modified from NZS 4402: 1986, which is considered appropriate for competent half-core (Lipton, 2001). The method involves weighing the sample before and after a series of steps, which include oven-drying a drill core sample, filling surface pores with modelling clay, coating the entire sample with wax and immersing it in water. Vein intercepts were relogged and assigned to several identified geological classes based on the physical properties that are considered most likely to affect density, including porosity, clay content, oxidation, sulphide content, vein percent and vein texture. Analysis of the data shows a relatively uniform range of density values within each geological class. Porosity, clay content and oxidation contribute to lower density values, while sulphide content contributes to higher density values. Dry bulk densities were determined for 247 samples of Correnso drill core, including representative vein and wall rock material from mineralized intercepts over a downhole depth range of 182.2m to 519.35m, corresponding to approximately 1000mRL to 750mRL. Geological classes were identified based on logged physical characteristics and each main geological class is represented by SG measurements from at least 30 drill core samples. An overall mean value of 2.52g/cm^3 was obtained for all 247 density values. There is a slight increase in density with depth which corresponds to increasing base metal sulphide content. There is no relationship between the density and the Au grade. • The default density used for the Correnso Resource model is 2.5 g/cm^3. • Gladstone densities range from 2.0 to 2.5 g/cm3, densities are assigned based on geologic unit. **<u>Martha Underground Resources</u>** • Martha Underground density (sg) assignment is based on a density assessment completed in 2018. Density samples are routinely collected during logging of diamond drill core. Specific Gravity is automatically calculated using the formula: SG= W(air) /(W(air)-W(water)), where W(air) =weight of sample in air and W(water) =weight of sample in water.

Domain	Sample Count	Mean SG	Standard Deviation
Quartz Andesite	1,361	2.52	0.15
Quartz Vein	634	2.53	0.09
High Base Metal content logged	426	2.56	0.08
Global Average	2,156	2.50	0.16

- The specific gravity of the Quartz Andesite and vein structures in the Martha Underground are influenced by several different factors. The Quartz Andesite is affected by reduced level when it is exposed to the surface weathering profile mainly seen in UW surface drill holes. At depth the rocks density can be affected by the degree of hydrothermal alteration, exposure to higher alteration often results in lower rock density, the unit has a clear upper limit of less than 2.8 grams per cubic/cm. Quartz veining density is influenced less by surface weathering in the Martha Underground but by weathering due to historic workings. Other influencing factors are base metal mineralization, clay content, calcite content and overprinting.
- In assigning density within the Mineral Resource estimate, historic stope fill is assigned a density of 1.8. Collapse zones associated with the Milking Cow subsidence zone has been assigned a density of 1.9.
- WKP density measurements are routinely collected during logging of diamond drill core. A field in the AcQuire database is setup to automatically calculate the specific gravity (SG) from these density measurements using the formula: SG= W(air) /(W(air)-W(water)), where W(air) =weight of sample in air and W(water) =weight of sample in water.

Criteria	Commentary
	(see table below)

Domain	Sample Count	Mean SG
Waste Rock	156	2.45
Vein	79	2.54
Global Average	235	2.50

Classification

Martha Resources

- The resource classification is based on an assessment of average drilling density.
- Confidence category is defined by average drill hole spacing, the ranges employed in classification of the Martha underground Mineral Resource are consistent with the ranges used in classification of other vein zones previously mined within the larger Waihi operation.
- There is significant experience in mining and assessing the continuity of mineralisation with the veins for Martha and the adjacent deposits, the vein style mineralisation has a strong visual control and is well understood and has demonstrated continuity over significant ranges.
- An estimation run utilizing a maximum of three drill holes with a single sample per drill hole was undertaken storing the average distance to the three drill holes used to estimate the block. This forms the basis for the drill hole spacing and therefore the confidence categorisation.

Table 3-5: Average Drill hole spacing required for Martha resource classification

Confidence category	Vein Zones Average distance to 3 closest holes	Stope backfill
Measured	N/A	N/A
Indicated	0 to 40 m	N/A
Inferred	40 to 60 m	N/A

- Mine fill within the historic stopes is not classified as Mineral Resource.
- The resource estimate outlined in this document appropriately reflects the Competent Person's view of the deposit.

WKP

- The Mineral Resource classification is based on average drill hole spacing. The ranges employed in classification of the WKP scoping resource model are slightly greater than ranges used in classification of other vein zones currently being mined within the larger Waihi operation, based on the demonstrated continuity of the EG vein over approximately 1,000 metres along strike.
- Indicated Resource is defined using an average distance to the three closest drill holes of 50 metres. Only the EG vein has been considered for classification as Indicated Resource. The Mineral Resource classification is shown in Table 3-6.

Table 3-6: Average Drill hole spacing required for WKP resource classification

Confidence Category	EG Vein Average distance to 3 closest holes	All Other Veins Average distance to 3 closest holes
Measured	N/A	N/A
Indicated	0 to 50 m	N/A
Inferred	50 to 70 m	0 to 60 m

Criteria	Commentary
	• There is significant local experience in mining and assessing the continuity of epithermal mineralisation with the nearby veining in Waihi. The vein style mineralisation present at WKP is similar to Waihi, it also has a strong visual control and a demonstrated continuity over significant ranges. • An estimation calculated using a maximum of three drill holes with a single sample per drill hole was undertaken storing the average distance to the three drill holes used to estimate the block. This forms the basis for the drill hole spacing and therefore the resource classification. • Polygons are developed based on the results of this estimation pass for coding into the block model for the higher confidence category zones to overcome spotty distribution of classification criteria. • The resource estimate outlined in this document appropriately reflects the Competent Person's view of the deposit.
Audits or reviews	• The models are regularly cross checked by OceanaGold employees that are familiar with the resource estimation practices employed on site. • OceanaGold Group Geologist - Tim O'Sullivan has undertaken a site review for the Martha underground Model. • Entech Pty Ltd has also undertaken an independent review of the Martha underground resource model. • SRK was engaged to undertake an independent assessment of an earlier WKP resource estimate and concluded that: o The conceptual geological model appears sound and consistent with the experience of nearby mineralisation and existing resources. o SRK found no issues with the integrity of the database. o SRK has no concerns with the QAQC. o Lode boundaries are based on a specifically defined combination of structure mineralisation and grade and the model appears to adhere well to this set of rules o SRK considers that the top-cuts employed in the estimate may be inconsistent and that the estimate may be conservative in grade (and ultimately gold metal content). o Grade estimation appears to be in the sub-blocks rather than the parent blocks, this is not good practice as support volumes are not consistent, however SRK does not consider this to be a material concern in the context of the current use of the model. o Resource classifications of Indicated and Inferred areas are considered appropriate. o The Resource model and drilling are at a relatively early stage and have been modelled, estimated and classified appropriately for the purpose of mining study. • The minor issues identified by SRK in the previous model have generally been rectified in the latest iteration of the model. • OceanaGold Group Geologist - Tim O'Sullivan undertook a peer review of the latest WKP Resource Model.
Discussion of relative accuracy/ confidence	<u>**WKP**</u> • In reviewing the nature of the WKP deposit it is considered appropriate to employ the same modelling and estimation work flows used for the Waihi deposits to estimate the

Criteria	Commentary
	insitu resource for this deposit. This opinion is formed based on the geologic knowledge and the detailed statistical evaluation of the data obtained through drilling. • Numerous methods have been used to validate the integrity of the WKP0219_USC resource model. The validation has included: o validation of the new data, o a review of the interpretation, including classification shapes, o a review of the methodology, o a review of the exploratory data analysis (EDA), including variography and search neighbourhoods, o global grade and tonnage comparisons with the previous model o a visual sectional validation of the block model with interpretation and drilling, and o Swath plots are generated using the Vulcan drift analysis tools. **Martha Underground Resource.** • Mining operations have not commenced on the Martha underground resource at this time so there is no reconciliation history on this deposit with which to validate the model. Notwithstanding though the grade estimate and modelling techniques in preparing this estimate are consistent with the techniques utilised in estimates for the Correnso project and other narrow vein epithermal vein systems in the Waihi district, many of which have been extensively mined and have reconciled well with production records at the time of mining

Section 4. Estimation and Reporting of Ore Reserves

Although no Ore Reserves have been estimated, Section 4 has been completed in order to summarize the mining assumptions used for the Scoping Study. The study results are positive for a number of scenarios and justify OceanaGold continuing to fund the project development and proceeding to PFS and FS level studies.

Cautionary Statement

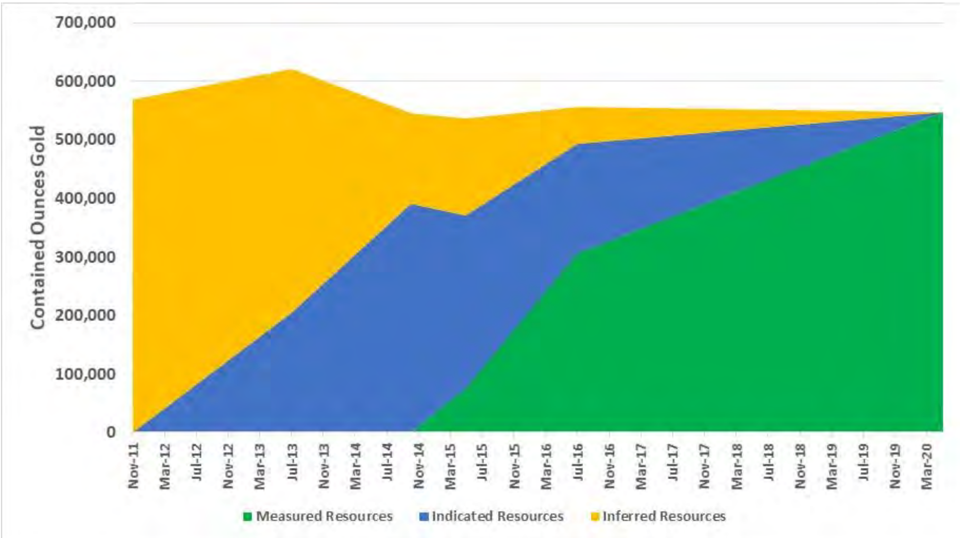
The project economics are based upon mining inventories comprised of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case.

Item	Criteria	Commentary
1	*Mineral Resource estimate used for assessment of potential Production Target*	• No Ore Reserves are estimated as part of the Waihi District Scoping Study. • For the purposes of this Scoping Study, the Mineral Resource Estimate (MRE) as published in the material summary above has been used. This estimate was prepared by a Competent Person in accordance with JORC Code, 2012 edition.
2	*Parties participating in the Scoping Study and site visits*	The following parties have provided input to this scoping Study: • The resource estimates were prepared under the supervision of Peter Church (OceanaGold).Trevor Maton (OceanaGold), supervised the mining study work and the compilation of the economic model. David Carr (OceanaGold) supervised the metallurgy and process design study work. • All parties except David Carr are based permanently on-site in Waihi. David Carr is based in the Brisbane OceanaGold office and has inspected the property several times throughout 2019.
3	*Study status*	• The type and level of study is a Scoping Study as defined in Section 38 of the JORC Code, 2012 Edition. • The Scoping Study has not been used to convert Mineral Resources to Ore Reserves. • The project is based upon mining inventories comprised of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case. **Reasonable Grounds for Inclusion of Inferred Resources** • OceanaGold consider Inferred Mineral Resources for the Waihi projects to carry lower risk than might be the case for development projects elsewhere. This is particularly the case for MUG and MOP5 where mining is centred on a set of mineralised lodes (the Martha, Welcome, Empire and Royal) that were mined historically underground

Item	Criteria	Commentary
		between 1879 and 1952 and then more recently by open pit methods from 1988 until 2015. The extensive mining history of the Waihi District has allowed OceanaGold to construct a substantive three-dimensional historical geological database as well as providing OceanaGold's Waihi technical team with significant open pit and underground operational experience. These factors allow the Waihi team to produce robust geological interpretations to support the resource estimates as well as modifying factors.

- The reliability of Inferred Resources is reflected in the high resource conversion rates of Inferred Resources during modern mining at Waihi. The Correnso mine, OceanaGold's most recently completed underground mine at Waihi is a particularly meaningful example because it tracks the resource progression from discovery right through to the completion of mining (see Figure 4-1). Correnso, which is not included in the PEA, was a new discovery and consequently the geological framework was less defined in the early stages of the exploration of this deposit. Notwithstanding this initial uncertainty, an Inferred Resource in excess of 500koz was defined in 2011 and development of this project commenced in 2014. Throughout the life cycle of the project there were no material resource write-downs and by the completion of mining of the deposit, the entirety of the initial Inferred Resource had been realised.

Figure 4-1: Resource Development History for the Correnso Underground Mine



- The resource development profile for MUG to date since 2016 is shown in Figure 4-2 below and reveals a rapid progression from unclassified mineralisation to Inferred Mineral Resources and subsequently to Indicated Mineral Resources[1]. This chart is significant in that it shows the veracity of the estimates, even prior to significant infill drilling. The high resource conversion rate reflects the extent to which MUG estimates are defined by the underlying geological interpretation. In the case of unclassified mineralisation[2], the geological models are commonly constructed on the basis of pre-1953 data with very limited subsequent diamond core drilling. As additional drilling is completed in these areas, improved local estimates result and

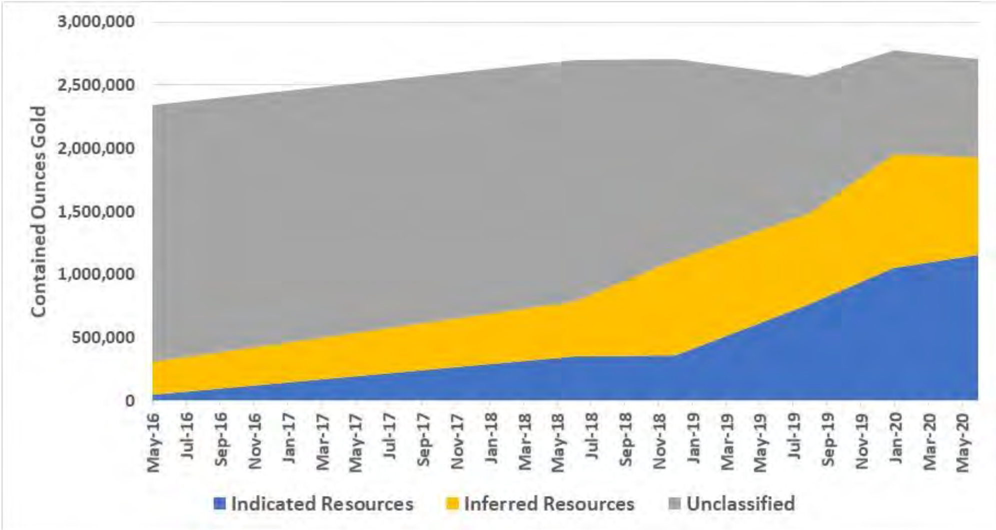
[1] Note that drilling specifically targeted to convert Inferred Resources to Indicated Resources only commenced in 2019 and is reflected in an upward inflection in conversion rate.

[2] For clarity, unclassified mineralisation is not a publicly recognised resource reporting category and was not used in the PEA. It is represented here graphically only to illustrate the importance of the underlying geological interpretation to support the resource estimates. A proportion of the unclassified mineralisation has previously been included in reported Exploration Targets after careful consideration. To-date infill drilling has confirmed the Exploration Target.

Item	Criteria	Commentary

the geological models are refined. At this stage they are converted to Inferred Mineral Resources with a large component of resource risk already reduced.

Figure 4-2: Resource Development History MUG



- The veracity of the geological interpretations underpinning Inferred Mineral Resources, the access to the substantive historical data, the experienced technical team at Waihi and the successful track record of resource conversion, mean that OceanaGold consider Inferred Mineral Resources at MUG and MOP5 (and adjacent Waihi projects) to carry lower risk than might be the case for development projects elsewhere.
- Additionally, the average drill hole spacing for MUG Inferred Resources is 48m which is 20% larger than the threshold of 40m required by OceanaGold for Indicated Resources. This does not reflect a large step change reduction in confidence as implied by the application of a binary (Indicated vs Inferred) Resource Classification scheme, particularly when the robust geological interpretation underpinning the estimates is considered.
- The modifying factors are well understood and are based on over 50 independent studies which have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 years comprising air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, Iwi, landscape, mine design, mine planning, noise, pit lake limnology, property values, pumphouse, social impact assessments, surface stability, tailings disposal, traffic, vibration, water management and, hydrogeology.
- OceanaGold and its predecessors, have extended the original permitted Martha Pit Project with Mineral Reserves of 0.7Moz, (extracted from 1988 to 1997) to extract 2.1Moz. (from 1988 to 2015) through ongoing conversion of Resources focused on the same vein zones. In addition, nearby underground Resources have been successfully converted to extract 1.1Moz. over the last fifteen years. With all of the considerations above, OceanaGold believe that there are reasonable grounds to include Inferred Resources for the purposes of mine scheduling and determining the mill feed.
- No Ore Reserves are estimated as part of the Waihi District Scoping Study. The study results are positive for a number of scenarios including the exclusion of all Inferred Resources from the mine schedule. The results justify OceanaGold continuing to

Item	Criteria	Commentary
		fund the project development and proceeding to PFS and FS level studies. **Cautionary Note:** The project economics are based upon mining inventories comprised of 51% Indicated Mineral Resources and 49% Inferred Mineral Resources. There is a low level of geological confidence associated with Inferred Mineral Resources, which are considered too geologically speculative to have economic considerations applied to them in order to be categorised as Mineral Reserves. There is no certainty that further drilling will convert Inferred Mineral Resources to Indicated Mineral Resources or that the economic forecast will be realised. Further drilling, evaluation and studies are required to provide any assurance of an economic development case. Modifying Factors are based on information currently available have been applied to the Scoping Study. • The projects included in the Waihi District comprise the following: o Martha Underground Mine (MUG); o Martha Open Pit phase 5 project (MOP5), the final cutback of the Martha Pit; o Gladstone Open Pit project (GOP); o Wharekirauponga Underground Project (WKP); and o Processing Plant. • Other key elements of the project include: o Upgrade and expansion of the Processing Plant; o Two additional lifts on Tailings Storage Facility (TSF) 1A, and one additional lift on TSF2. o TSF3, a new Tailings Storage Facility; o Further TSF capacity, which may include GOP as a new Tailings Storage Facility post mining, or additional raising of TSF1A; o A new rock stack, the Northern Rock Stack (NRS); and o Upgrade of the power supply to the operation.
4	*Cut-off parameters used in potential mine analysis*	• The following cut-off grades have been used for the Waihi District Scoping Study Production Targets: o MUG -virgin areas 2.4g/t. o MUG -remnant areas 2.9g/t to 3.3g/t. o GOP 0.5 g/t o MOP5 0.5g/t to 0.55g/t. o WKP 2.5g/t. • Cut-off grades (COGs), expressed as grams per tonne of gold (g/t Au) were determined by dividing the estimated operating cost per tonne of mill feed treated by the revenue per gram of gold produced. The following inputs were used to estimate revenue per gram of gold produced: o Gold price: NZD2,142 per troy ounce o Metallurgical recovery:71-97% by CIL treatment o NZ government royalty: 1-2% of revenue. o WKP third party royalty: 2% of revenue. • The following inputs were used to estimate operating cost per tonne of mill feed treated, for the potential open pit and underground mines: o Mining cost o Processing cost o Other royalty charges o General & administration costs

Item	Criteria	Commentary
5	*Mining factors or assumptions used in the Scoping Study*	**No conversion of the Mineral Resource to Ore Reserves**. Mill feed estimation: • <u>GOP & MOP5</u> MOP5 is a 40m to 80m wide cutback on the existing open pit, targeting the same lodes that were mined in the existing open pit. Mining in the existing open pit commenced in 1988 and ceased in 2015 due to a pit wall failure. Pit shells were optimised in Whittle using Indicated and Inferred classified blocks (There are no Measured classified blocks are in the resource models). Pit designs adequately consider geotechnical recommendations, mining widths and permanent and temporary haulage ramps. Geotechnical investigations and slope recommendations for MOP5 and GOP were provided by PSM. Further geotechnical investigation and assessment will be completed as the study work progresses. Open pit excavations will be mined by conventional open pit drill and blast methods, 190t excavator, front end loaders and 85t trucks. Geological drilling: Grade control drilling will be required as the pit advances to better define the mineralisation prior to mining. Some holes will be used as resource infill and to probe the areas with old voids in MOP5. This drilling will generally be RC located on the cut back benches. All Mineral Resource categories have been included in the mining study work. No mining losses were applied. It is considered that the resource estimation technique applied to the broad ore zones provides an adequate estimate of the run of mine (ROM) tonnes and grades. Reconciliation data from mining the Martha open pit supports this approach. Both Indicated and Inferred Mineral Resources were used in the possible production schedule used in the Scoping Study. Inferred resources account for 44% of the total pit resource ounces used in the production schedule. • <u>MUG & WKP</u> Current mining is heavily focused towards the capital development associated with establishing the MUG mining project and productivity levels have been increased significantly in recent months to support this new project. Geological characteristics and geotechnical conditions for MUG are very similar to those experienced in recent Waihi underground mines. Underground mining between 1879 and 1952 centred on the four main parallel lodes (the Martha, Welcome, Empire and Royal) as well as subsidiary lodes, providing a large historical database for the Company. The mining method is predominantly Modified Avoca.

Item	Criteria	Commentary
		Stopes were optimised using the Deswik Shape Optimiser using Indicated and Inferred classified blocks (There are no Measured classified blocks are in the resource models). In general mining areas at MUG are designed with either a 15m or 18m level spacing, floor to floor. This is primarily to limit blast vibration, but this also assists hanging wall and footwall stability. This is in line with previously mined areas and has proven to be successful and efficient. A 20m level spacing, floor to floor has been used for WKP. Stopes are designed with dilution on both the footwall and the hanging wall based on geotechnical assessment for the immediate mining area, which when applied with the stope recovery factors reconciles with previous performance of stopes in active mining areas. Stope recovery factors of 92% metal and 100% tonnes consider the difficulties associated with recovering all ore from a stope, particularly under remote control operations. Additionally, it allows for the potential loss of metal due to excess dilution burying ore and limiting recovering of all the ore. Geotechnical investigations and stope exposure recommendations for WKP were provided by SRK and for MUG by Entech, WKP and AMC. Further geotechnical investigation and assessment will be completed as the study work progresses. WKP and MUG will be mined by conventional drill and blast methods and truck haulage. Investigations are underway into battery / electric vehicles. Geological drilling: Grade control drilling will be required as the underground develops to better define the mineralisation prior to mining. Some holes will be used as resource infill and to probe the areas with old voids in MUG. Chip sampling of underground drives will also be employed. All Mineral Resource categories have been included in the mining study work. As MUG targets a mix of old workings and new lodes, a conservative approach was adopted for the Production Target which excluded all Mineral Resources within the previously heavily mined Martha veins or caved zones. This was undertaken in order to demonstrate the project is not reliant on all the resources defined to date within the MUG mine. Both Indicated and Inferred Mineral Resources were used in the possible production schedule used in the Scoping Study. Inferred resources account for 51% of the total underground resource ounces used in the production schedule. Infrastructure: The Scoping Study considers the provision of all necessary infrastructure to facilitate the mining activities proposed including mining, power, office and workshop infrastructure.
6	*Metallurgical factors or*	The metallurgical process at Waihi is well-tested and proven technology, having been in operation for 29 continuous years.

Item	Criteria	Commentary
	assumptions used in the Scoping Study	Mill feed is treated in a conventional semi autogenous ball mill crushing (SABC) grinding circuit followed by cyanide leaching of gold and silver in a hybrid carbon in leach (CIL) / carbon in pulp (CIP) circuit followed by elution, electro-winning and smelting. The current Processing Plant has a proven capacity to treat approximately 1.3 Mtpa of open pit feed from Martha, or up to 0.9 Mtpa of underground sourced feed. The plant will be upgraded to a capacity of 1.6 Mtpa, to accommodate feed from the four mining sources. A progressive upgrade and expansion is planned in two phases to achieve the mine plan requirements. Metallurgical test work and associated analytical procedures were performed by recognised testing facilities, and the tests performed were appropriate to the mineralisation type. Samples selected for testing were representative from a range of depths within the deposit of the various types and styles of mineralisation within the Waihi and WKP areas. Sufficient samples were taken so that tests were performed on adequate sample mass. Average recoveries have been assumed based on test work completed. These recoveries are appropriate to be used in support of Mineral Resource and Production Target estimation, based on the drill hole spacing and sample selection. Historical metallurgical results on the MOP5 deposit support an expected gold recovery assumption of 90% for treatment through the existing process plant flowsheet. Metallurgical recoveries of 94% for MUG, 90% for WKP and 71% for GOP have been estimated based on recent testwork results. Testwork will continue as part of future evaluation phases for these projects.
7	*Environmental*	The Waihi operation holds the necessary permits, consents, certificates, licences and agreements required to operate the Martha underground mine. Environmental data has been collected over the last 29 years of Waihi operations and baseline data was collected prior to the start of operations and reported in the original mining license application. Data is routinely collected for noise levels, blast vibration, air quality, and discharge water quality from various sources, ground settlement and ground water levels. Data collected in relation to hydrogeology, open pit and tailings storage facility, geotechnical engineering, geochemistry, closure and rehabilitation is peer reviewed on an annual basis by independent reviewers engaged by the Regional Council, District Council and central Government Over 50 independent studies have been undertaken with respect to the individual projects in the Waihi District Study over the last 9 year. These studies relate to air quality, aquatic biology, dewatering and settlement, economics, geochemistry, geotechnical, heritage, aboriginal heritage (iwi), landscape, mine design, metallurgy, noise, pit lake limnology, property values, pumphouse, social, surface stability, traffic, vibration, water management and hydrogeology.

Item	Criteria	Commentary
		The 29-year operational history since attainment of commercial production in 1988 has provided a good understanding of performance of the waste rock dumps and tailings storage facility. All waste produced from the underground mine is classified as potentially acid forming and is returned underground as stope backfill. Waste from the open pit is crushed and conveyed 2.0km from the open pit to the waste development load-out site where it is transported a further 1km to the Waste Development Area or stockpiled for future use. At the Waste Development Area, the waste is selectively placed in accordance with a quality control and geochemical control program to form a dam for the tailing's impoundment. All waste is compacted in accordance with strict design specifications.
8	*Infrastructure*	The Waihi District Project is located —140km SE of Auckland in the North Island of New Zealand and 60km NE of Tauranga. The project will utilise the facilities that have been in place since 1988 and were upgraded in the late 1990s. All infrastructure except for a CAF plant is in place for MUG. The project is expected to require the following infrastructure works: MOP5: Partial relocation / demolition of the existing workshop, wheel wash and other mobile plant facilities; and provision of new duplicated facilities; administration and ablution facilities / offices and fuel bowser; Relocation and upgrade of the crushing and conveying facility; Relocation of public roads, relocation or demolition of company owned buildings and relocation of the historic Cornish Pumphouse; and Partial diversion of the Empire Stream. GOP: A new crusher at the mill run-of-mine (ROM) area; A 15m to 20m wide haul road from the GOP to the NRS and Polishing Ponds Stockpile (PPS) including a bridge across the Ohinemuri River and the existing underpass below the overland conveyor; A new laydown to the north of the conveyor and cut to the 1120 mRL contour is proposed of 1.7 Ha which provides a services area for MUG; WKP: Establishment of a portal, access roads, earthworks and civils for the proposed mine surface facilities; Diversion drains, water treatment facilities, settling and collection ponds; Construction of a pad for temporarily stockpiling waste rock from the mine development; Laydown area for mining infrastructure and consumables; Security fencing and screening; Additional TSF capacity, which may include expansion of the current TSFs, a new TSF and conversion of GOP to a TSF; and Other supporting infrastructure, which may include a new rock stack, process plant

Item	Criteria	Commentary
		upgrades and power upgrades
9	*Capital and operating costs*	Capital and operating costs are well known from the 30 years of operations and have been appropriately applied to develop cut-off grades and inputs into economic analysis. The operating cost estimate has an expected accuracy range of ±30% and has been developed in NZD; The estimate includes the underground mining, open pit mining, processing and G&A operating costs derived from historical data and forward cost estimates; and the capital cost estimates have an expected accuracy of +30% that includes direct and indirect costs, owner's costs and contingency associated with mine and process facilities and on-site infrastructure. For capital cost estimation, engineering work, in the range of 5–10% of total engineering for the project, was carried out to support the estimate. Where possible costs were estimated from similar constructions at Waihi, sourced from Original Equipment Manufacturer (OEM) or otherwise factored, end-product units and physical dimensions methods were used to estimate costs. The main items included in the capital cost estimate include: • Underground mine development, pre-strip, equipment fleet (lease charges), infrastructure and services; • Process plant upgrade to 1.6 Mtpa with and supporting infrastructure and services; • TSFs including TSF1A and two raises, TSF3 and GOP TSF, and NRS; • On-site infrastructure (water treatment and distribution, electrical substation and distribution and other general facilities); • Pit rim works - relocation of public roads, relocation or demolition of buildings and monuments; • Off-site infrastructure (water and power supply, and new external access) for WKP; • Land acquisition and property divestment; and • Mine site rehabilitation. • There are no costs relating to deleterious elements. The following royalties are applicable to the project and have been allowed for in the Scoping Study: • The higher of 1% of net sale revenue or 5% accounting profit to the Crown, and • a WKP specific 2% third party payment.
10	*Revenue factors*	Metal prices used in the economic evaluation were US$1,500 per ounce for gold and US$18 per ounce for silver, fixed for the life of the mine. All costs at the Waihi operation are based in New Zealand Dollars. Costs have been converted using the following exchange rate USD 0.65: NZD 1.00 Silver credits are not included in the revenue factors but as a by-product cost offset. Charges for transportation, treatment and refining charges are based on operational history and in part based on existing contracts that are periodically reviewed and renewed.

Item	Criteria	Commentary
		Mine designs were undertaken for both the open pit and underground Production Targets. Diluted and recovered grades were calculated for all material being mined, which were in turn assessed against the relevant cut-off grades for determination of inclusion within the Production Target estimate. Head grades for material sent to the process plant directly correspond to mined grades calculated.
11	*Market assessment of gold price*	There is a transparent, quoted market for the sale of gold. Long-term market assessments are provided by a number of independent companies. There are no hedge contracts in respect of production from the Waihi operation.
13	*Economic evaluation*	Assumptions for economic analysis include: Processing plant production rate of 1.6 Mtpa; Gold Price of USD 1,500/oz, with a Spot Price scenario of USD 1,750/oz; Exchange Rate - NZD: USD 0.65; Metallurgical recovery assumptions of 94% for MUG, 90% for MOP5, 71% for GOP and 90% for WKP; Royalty payments include higher of 1% of net sale revenue or 5% accounting profit to the Crown, and a WKP specific 2% third party payment; and Revenue is recognised at the time of production. Discount 5% Corporate tax rate 28%. The study results are positive for a number of scenarios including the exclusion of all Inferred Resources from the mine schedule. Historically for Inferred Resources at Waihi, conversion rates approaching 100% are typical. The results justify OceanaGold continuing to fund the project development and proceeding to PFS and FS level studies.
14	*Social*	All proposed mining and infrastructure areas lie within a granted Mining Permit. The Waihi District projects have an established grouping of stakeholders and project affected people whom have been engaged via the various stakeholder engagement structures such as Iwi, resident groups, community-based organizations and local government. Prescribed Peer Review meetings held between OceanaGold, Hauraki District Council, Waikato Regional Council and the Ministry of Business and Innovation. The operation has already established complaints and grievance systems / procedures for the ongoing management of all project grievances. This procedure will be a key process by which any associated complaints and grievances that arise from the operations will be addressed. It is likely consents will be prescriptive in terms of stakeholder engagement with the Community and a Property Policy to support property values in the area. This requires the Company to provide funds to purchase properties above stopes and pay ex-gratia payments to property owners above mine development as well as maintaining a property purchase fund and funding for community projects. The consent caps the funding available for the property purchase fund.
15	*Other*	As the Waihi project area is a brownfields site with historical mining dating back to 1878, there are reasonable grounds to expect that Council approvals will be received upon completion of the hearings.

Item	Criteria	Commentary
		Consents and permits are in place for MUG while Mining Permits are in place for all other projects. OGC expects to lodge consents for GOP and MOP5 late this year when all supporting studies are complete. Land ownership in place for all activities in the PEA, including TSF and NRS, but excluding WKP which underlies Conservation land. There are currently no unresolved matters relating to a third party that would prohibit project development, should that be the decision resulting from completion of further study work
16	*Classification of Ore Reserves*	Not applicable as no Ore Reserves are being reported as the project is at Scoping Study level
17	*Ore Reserve audits or reviews*	Not applicable as no Ore Reserve estimate reported
18	*Discussion of relative accuracy / confidence*	**No Ore Reserve estimate has been completed as a result of the Scoping Study.** Metallurgical recoveries have been based on historical plant data. Costs have been estimated by independent consultants generally from budget quotations, factored estimates or cost data from similar operations/projects. Cost estimate accuracy for the Scoping Study is considered to be in the order of ±30%.