Macassa Property, Ontario, Canada

Updated NI 43-101 Technical Report

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Report Addressed to Kirkland Lake Gold Ltd.

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Important Notice

This Technical Report has been prepared as a National Instrument 43-101 Technical Report, as prescribed in Canadian Securities Administrators' National Instrument 43-101, Standards of Disclosure for Mineral Projects (NI 43-101) for Kirkland Lake Gold Ltd. ("Kirkland Lake Gold" or the "Company"). The data, information, estimates, conclusions and recommendations contained herein, as prepared and presented by the Authors, are consistent with: the information available at the time of preparation; the data supplied by outside sources, which has been verified by the authors as applicable; and the assumptions, conditions and qualifications set forth in this Technical Report.

Cautionary Note with Respect to Forward-Looking Information

Certain information and statements contained in this Technical Report are "forward looking" in nature. All information and statements in this report, other than statements of historical fact, that address events, results, outcomes or developments that Kirkland Lake Gold Ltd. and/or the Qualified Persons who authored this report expect to occur are "forward-looking statements". Forward looking statements are statements that are not historical facts and are generally, but not always, identified by the use of forward-looking terminology such as "plans", "expects", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates", "projects", "potential", "believes" or variations of such words and phrases or statements that certain actions, events or results "may", "could", "would", "should", "might" or "will be taken", "occur" or "be achieved" or the negative connotation of such terms.

Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause actual results, performance or achievements to be materially different from any of its future results, performance or achievements expressed or implied by forward-looking statements. These risks, uncertainties and other factors include, but are not limited to, assumptions and parameters underlying the life of mine update not being realized, a decrease in the future gold price, discrepancies between actual and estimated production, changes in costs (including labour, supplies, fuel and equipment), changes to tax rates, environmental compliance and changes in environmental legislation and regulation, exchange rate fluctuations, general economic conditions and other risks involved in the gold exploration and development industry, as well as those risk factors discussed in the Technical Report. Such forward-looking statements are also based on a number of assumptions which may prove to be incorrect, including, but not limited to, assumptions about the following: the availability of financing for exploration and development activities; operating and capital costs; the Company's ability to attract and retain skilled staff; sensitivity to metal prices and other sensitivities; the supply and demand for, and the level and volatility of the price of gold; the supply and availability of consumables and services; the exchange rates of the Canadian dollar to the U.S. dollar; energy and fuel costs; the accuracy of reserve and resource estimates and the assumptions on which the reserve and resource estimates are based; market competition; ongoing relations with employees and impacted communities and general business and economic conditions. Accordingly, readers should not place undue reliance on forward-looking statements. The forward-looking statements contained herein are made as of the date hereof, or such other date or dates specified in such statements.

All forward-looking statements in this Technical 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. Kirkland Lake Gold Ltd. and the Qualified Persons who authored this report undertake no obligation to update publicly or otherwise revise any forward-looking statements contained herein whether as a result of new information or future events or otherwise, except as may be required by law.

Non-IFRS Financial Performance Measures

Kirkland Lake Gold has included a non-IFRS measure “total site costs”, “total site costs per ounce” and various unit costs in this Technical Report. The Company believes that these measures, in addition to conventional measures prepared in accordance with IFRS, provide investors an improved ability to evaluate the underlying performance of the Company. The non-IFRS measures are intended to provide additional information and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with IFRS. These measures do not have any standardized meaning prescribed under IFRS, and therefore may not be comparable to other issuers.

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1.0 SUMMARY

This National Instrument 43-101 Technical Report (Technical Report) was triggered by the disclosure from Kirkland Lake Gold Ltd. ("Company") of its Annual Information Form (AIF) for the year 2018 (section 4.2 (1) (f) of the Instrument).

This Technical Report has been prepared for Kirkland Lake Gold, the beneficial owner of the Macassa Mine. The Company is listed on the Toronto Stock Exchange under the ticker symbol "KL", the New York Exchange under the ticker symbol "KL" and the Australian Exchange under the ticker symbol "KLA". This Technical Report provides the Mineral Resource and Mineral Reserve (MRMR) estimates for the Macassa Mine that have resulted from ongoing exploration and resource definition drilling and as a result of ongoing mine design and evaluation during the period of January 1, 2018 to December 31, 2018.

The Macassa Mine is located in the Municipality of Kirkland Lake, Teck Township, District of Timiskaming, Ontario, Canada, at about 48°10' N Latitude and 80°02' W Longitude, approximately 600km north of Toronto.

The Macassa Mine has had numerous owners since operations started in 1933. Operations have been continuous except for a brief period, when they were suspended in 1999 due to the depressed gold price and the mine was allowed to flood in 2000. Underground mining restarted in 2002. Kirkland Lake Gold holds title to 258 mining claims in Teck and Lebel Townships that covers 3,724 hectares. There are 188 patented claims, 11 crown leases and 59 staked claims.

Over the last 10 years, the Macassa Mine production has been predominately from two production areas: the South Mine Complex (SMC) and the Main Break (MB). Mining first started in the MB and '04 Break, and in reference to production areas, the terms 04' Break and Main Break are currently used interchangeably at Macassa. The SMC, the most recent zone in terms of production history, located to the south of the MB and the '04 Break, reveals a different style of mineralization that includes wide sulphide systems instead of quartz vein mineralization as seen in the other zones. Tellurides appear to be more prevalent in the SMC (e.g. calaverite). Currently, the SMC accounts for approximately 80% of Macassa Mine's annual gold production.

The Kirkland Lake mining camp is located in the west portion of the Archean Abitibi greenstone belt of the Abitibi Sub-province that forms part of the Superior Province in the Precambrian Shield. The Macassa deposit is hosted within the Timiskaming Group of rocks, which is approximately 3.2km wide and stretches from Kenogami Lake (Ontario) to the Quebec border. Host rocks are predominantly conglomerates and sandstones, trachytic lava flows and pyroclastic tuffs trending N65°E and dipping steeply to the south in the Kirkland Lake area. Gold mineralization occurs preferentially in the syenites. The Kirkland Lake-Larder Lake Break, and its associated splay faults and fracture system, form a complex, major structural feature that can be traced from Matachewan (west of Kirkland Lake) to Louvicourt (Quebec). It passes through, or near, current and historical mining areas, such as: Larder Lake, Rouyn-Noranda, Cadillac, Malartic, Val d'Or and Louvicourt.

The Macassa Mine is hosted within a fault system located north of the main Kirkland Lake-Larder Lake Break, as individual fracture filled quartz veins from several centimetres to a few metres in thickness. Historical workings at Macassa indicate that gold was often associated with 1% to 3% pyrite and, sometimes, molybdenite or tellurides. Silver is found amalgamated with the gold and in tellurides. Pyrite and silicification does not always guarantee the presence of gold, but higher grade ore is almost always accompanied by increased percentages of pyrite and silica.

Macassa's exploration program is directed at expanding the potential of the SMC zones along strike (to the eastern boundary of the property) and dip, and continue to explore the Amalgamated Break Trend. Underground exploration plans for 2019 entail the utilization of seven to eight diamond drills for both exploration and definition drilling. Three of these drills are planned for underground exploration and one drill is planned for surface exploration.

Drillhole data is verified by Professional Geologists and consists of a wide variety of checks based upon the survey of drillhole collars and downhole surveys using north seeking gyro during the drilling of the holes. The drillhole trace is continually monitored by the geologists to ensure that the hole remains on track to intercept the target. Drillhole data is checked by the Database Analyst and the Senior Resource Geologist prior to the generation of the mineral resource estimate. Errors or suspect data are checked and corrected, or else excluded from the resource estimate. A list of excluded holes is kept on file and includes reasons for exclusion and notes on whether specific mineralized zones or the entire hole should be excluded.

The updated MRMR, as of December 31, 2018, are presented in Summary Table 1-1 and Summary Table 1-2, Mineral Resources and Mineral Reserves respectively.

Summary Table 1-1: Macassa Resources (exclusive of reserves), effective December 31, 2018.

Location	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)
Main/'04 Break	265	16.0	137	747	16.6	399	1,013	16.4	536	195	15.3	96
South Mine Complex	188	21.9	132	587	16.7	315	775	17.9	447	415	17.4	232
Grand Totals	453	18.4	268	1,335	16.6	714	1,787	17.1	982	610	16.7	328

Notes:

1. Mineral Resource estimates were prepared under the supervision of Qualified Persons B. Harwood, P.Geo (Principal Resource Geologist, Canadian Operations) and R. Glover, P.Geo (Macassa Chief Geologist).
2. Mineral Resource estimates were undertaken according to the Company's Policy for Mineral Reserve and Resources
3. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability
4. Mineral Resources were estimated at a block cut-off grade of 8.57 g/t
5. Mineral Resources are estimated using a long-term gold price of CAD$1,635/oz
6. A minimum mining width of 2.13m (7ft) and minimum mining height of 2.74m (9ft) was applied
7. A bulk density of 2.74 t/m^3 was used
8. Totals may not add exactly due to rounding
9. Polygonal estimates carried over from 2017 were removed for this resource update.
10. CIM definitions (2014) were followed in the calculation of Mineral Resources

Summary Table 1-2: Mineral Reserves at Macassa Mine (as of Dec 31, 2018).

Zone	Category	Tonnes (000's)	Grade (g/t)	Ounces (000's)
SMC	Proven	174	23.5	131
	Probable	2,420	22.6	1,750
MBZ	Proven	114	18.9	69
	Probable	481	19.0	294
Total	**Proven**	**290**	**21.5**	**200**
Total	**Probable**	**2,900**	**22.0**	**2,050**
TOTALS	**Proven + Probable**	**3,190**	**21.9**	**2,250**

Notes:

1. CIM definitions (2014) were followed in the estimation of Mineral Reserves.
2. Mineral Reserves estimates were prepared under the supervision of Qualified Person Mariana P. Harvey, P. Eng.
3. Mineral Reserves estimates were undertaken according to the Company's Policy for Mineral Reserve and Resources.
4. Cut-off grades were calculated for each stope, including the costs of: mining, milling, general and administration, royalties, capital expenditures and other modifying factors (e.g. dilution, mining extraction, mill recovery).
5. Mineral Reserves were estimated using a long-term gold price of US$1,230/oz and a currency exchange of US$1.00=CAD$1.33, with a resulting price gold of CAD$1,635.90/oz.
6. Totals may not add exactly due to rounding.

There are inherent uncertainties the estimation of mineral reserves and resources. Assumptions that are valid at the time of estimation may change significantly when new information becomes available. Changes in the forecast prices of commodities, exchange rates, production costs, or recovery rates as well as new drilling results may change the economic status of reserves and resources and require a reassessment.

There are currently three active mining areas in Macassa Mine: Main Break (MB), Lower North (LN) and New South (NS). The areas LN and NS are both part of the SMC. Access to the mining areas is through the #3 Shaft and connecting lateral development within the MB and SMC zones. The main mining methods include Underhand Cut and Fill (UCF), Long Hole (LH) stoping and Mechanized Overhand Cut and Fill (MCF). Paste fill is the main material used to backfill stopes, although unconsolidated rockfill is also used where possible. Material hoisted to surface via #3 Shaft, which has an average capacity of 2,200 tonnes per day.

Once the ore is hoisted to surface, it is then trucked to the crushing facilities. After crushing and grinding (95% passing, 45 microns), the ore is processed by conventional cyanide leaching with a carbon-in-pulp recovery system. The mill capacity is 2,000 tpd and average recovery is approximately 97%.

In 2018, the Company announced plans for the development of a new shaft, #4 Shaft, at the Macassa complex. The project is planned to be completed in two phases, with the Phase 1 project cost estimated as US$240M and the Phase 2 cost estimated as US$80M. The new shaft is an essential component in achieving Macassa Mine's Life of Mine (LOM) plan. #4 Shaft will be circular, concrete lined and 21.5ft in diameter. The shaft will have a main service cage, an auxiliary cage and two skips

The construction of a new tailings facility is currently underway. The design of the North Tailings Storage Facility (NTSF) incorporates the construction of one large and several smaller dam; the project schedule was laid out in two phases. Phase 1 was completed in 2018, in which two dams were constructed to an elevation of 328m. Phase 2 is scheduled to be finalized in 2019, and entails bringing both the 2018 dams and four others to an elevation of 332m.

Existing plans after the commissioning of #4 Shaft include a material expansion of current production. The #4 Shaft Project will be funded internally, and the investment was chosen based on both objective financial analysis parameters as well as the subjectively derived operational needs focused on risk reduction. The primary reasoning for the #4 Shaft Project is as follows:

- The new shaft is expected to support higher level of production and lower unit costs.
- The Net Present Value (NPV) of the project is expected to increase due to both the lower LOM operating costs as well as higher revenues gained earlier on in the project life.
- The new shaft will de-risk the operation, which currently relies on #3 Shaft for the hoisting of material to surface. #3 Shaft was developed in an unfavourable orientation in regards to principle stresses and has previously been exposed to damaging seismicity primarily due to the stope mining sequence nearby. Though the risk is being effectively managed through sound ground control practices, the addition of a new shaft in a favourable location and orientation will eliminate the risk of lost production and mine access from the possibility of #3 Shaft being damaged from seismic activity.
- Current ventilation inflow underground is constrained by the area of the existing #3 Shaft. The commissioning of the new shaft will allow for substantially higher inflow of air underground, improving the ventilation and general working conditions in the mine.
- The new shaft will support for more effective exploration towards the east of the South Mine Complex.

The Life of Mine pre-tax cash flows total $2.3B (undiscounted) with a corresponding pre-tax NPV of $1.7B at a 5% discount rate. A sensitivity analysis was performed on the financial model presented, and results indicate that the price of gold and grade have the greatest impact on NPV, with the operating costs and the capital costs having less fluctuation as the variation to the base is increased/decreased. All scenarios presented displayed a positive NPV despite variations, indicating a robust plan with a high pre-tax profit margin.

The 2016 business transaction between Kirkland Lake Gold Inc. (since changed to Kirkland Lake Gold Ltd.) and Newmarket Inc. provided additional opportunities to further develop the property, supported by an increase in capital expenditures. In the current gold price environment, the operation is expected to continue to generate significant free cash flows.

Main opportunities at the Macassa Mine are as follows:

- SMC mineralization remains open to the east, west and at depth. Diamond drilling continues to return high grade mineralization. In order to support the drilling requirements, the exploration drifts and associated drill bays must remain high priority development headings at the mine.
- Exploration development towards 3000 Level, east of #2 Shaft, that is designed to explore the ‘04 Break and Main Break could create the opportunity to reintroduce some of the historical mineral resources back into the global resource estimate.
- #4 Shaft is scheduled to be completed in the second quarter of 2022 (Phase 1) with a designed production (hoisting) rate of 4,400 short tons per day. Re-evaluating the resource cut-off grade economics using lower operating costs after the commissioning of the new shaft will likely be favourable to increasing mineral resources.

- In 2017, the operation transitioned from modified polygonal mineral resource estimates to block modelling. This transition is expected to optimize grade interpolation, determination of high grade capping levels, and aid with mine/mill reconciliation process. These processes continue to evolve.
- Improvements to the material handling process are likely to result in favourable impact on the mine operating costs.
- Upgrade of the ventilation system through either increased airflow or temperature reduction will have a favourable impact on the work environment temperature.
- Ongoing paste filling operations involve the delivery of paste using boreholes from surface to underground, into which cement trucks dump the paste in batches. Current plans are in progress to replace this process with continuous pouring directly from the pastefill plant, eliminating the need for cement trucks and speeding up cycle times underground.
- Extension of the life of tailings facilities will be possible through the commission of the thickened tails plant.
- In 2018, Macassa has started to implement tele-remote mucking in selected areas, leading to a decrease in cycle times and added process efficiencies. Along with continuing to expand the tele-remote implementation, Macassa Mine is also exploring further improvement opportunities by combining equipment automation (trucks) with tele-remote. When successfully implemented this process will enable material handling and movement in between shifts.

Main risks that could be present at the operation are as follows:

- Without the allocation of sufficient funding for exploration drilling and development, it would be difficult for future exploration programs to replenish depleted Mineral Resources and Reserves.
- Increased costs for skilled labour, power, fuel, reagents, trucking, etc. could lead to an increase in the cut-off grade and decrease the level of Mineral Resources and Mineral Reserves.
- Mechanical breakdown of critical equipment (hoist, conveyance, mill, etc.) or infrastructure could decrease or halt the production throughput at the mine.
- Production throughput relies on completing development activities as per the mining plan schedule. Lower development productivity than planned would likely affect the production profile of the current mining plan.
- #3 Shaft is currently the sole production shaft capable of moving materials to surface. The shaft is located in a seismically active area due to the historical mining and the active muck pass system in the MBZ located nearby. Damage to the #3 Shaft would directly impact production until the #4 Shaft is commissioned.
- The advancement of Battery Electric Vehicle technology is still its in early stages. There are inherent risks as the technology continues to evolve.

The following recommendations are provided:

- Continue exploration drilling will to test for the easterly and westerly strike extension of the South Mine Complex mineralization employing underground diamond drills on the 5300 Level.
- Complete technical studies to increase the airflow and reduce the work environment temperature and humidity.

- Technical work should be undertaken to assess infrastructure requirements for the continuous mining of the Macassa deposit.
- The application of Large Ore Deposit Exploration (LODE) program to assess camp scale opportunities.
- Related to the point above, interrogation of the newly created lithological model and the mine drillhole database as an exploration tool to assess future targeting opportunities.
- Sub-domaining of high grade areas, as well as refinement of caps to improve the model grade estimates as compared to production results.
- Continue to examine the Amalgamated Kirkland Break for mineralization potential. Numerous mineralized intercepts were intersected at variable depths which require follow-up.
- Assess mineral potential to the east and along the Main Break below the 5800 Level and to the east into Kirkland Minerals and Tech Hughes properties.
- Look at a refinery expansion and addition of certain components in the process plant to accommodate the planned increase in throughput.
- There is an opportunity to improve the turnaround times for the assaying of underground samples through the establishment of a centralized assay lab.

In the opinion of the Qualified Persons (QPs), the MRMR estimates truly reflect the mineralization that is currently known and were completed in accordance with the requirements of National Instrument 43-101.

2.0 INTRODUCTION

This Technical Report was triggered by the disclosure from Kirkland Lake Gold of its Annual Information Form (AIF) for the year 2018 (section 4.2 (1) (f) of the Instrument). The Technical Report was prepared by employees of the Company and under the supervision of Mariana Pinheiro Harvey, P. Eng., Robert Glover, P. Geo., Ben Harwood, P. Geo and William Tai, P. Eng. All four Qualified Persons (QPs) are not independent of Kirkland Lake Gold, as allowed under section 5.3 (3) of the Instrument.

Information was obtained through operation and technical work related to the Macassa Mine over the past few years.

All four QPs were employed for Kirkland Lake Gold throughout 2018, three of which work full time at Macassa Mine and Mill Complex.

The units of measures used in this report conform to the metric system. Unless stated otherwise, the Canadian Dollar is the currency used in this Technical Report. A list of abbreviations is displayed in Table 2-1 below.

Table 2-1: List of abbreviations.

Abbreviation	Unit or Term	Abbreviation	Unit or Term
$	Dollar	L	Liters
%	Percent	LOM	Life of Mine
<	Less than	m	Meter
>	Greater than	M	Million
°	Degree	m^3	Meters cubed
°C	Degree celsius	m^3/s	Meters cubed per second
000's	Thousands	masl	Meters above sea level
3D	Three dimensional	min	Minute (time)
Au	Gold	min, '	Minute (plan angle)
AZ	Azimuth	mm	Milimeter
B	Billion	MWh	Megawatt-hour
CAD$	Canadian Dollars	N	North
cfm	Cubic feet per minute	Na_2O	Sodium Oxide
DCF	Discounted cash flow	NPI	Net Profit Interest
DDH	Diamond Drill Hole	NPV	Net Present Value
E	East	NSR	Net Smelter Return
ft	Foot	oz	Troy ounces
g	Gram	R^2	Correlation coefficient
gal	Gallon	S	South
gpm	Gallons per minute	s	Second (time)
gpt	Grams per metric tonne	sec, "	Second (plane angle)
ha	Hectares	st	Short Tons
in	Inch	t	Metric Tonnes
k	Kilo	t/m^3	Tons per meter cubed
K_2O	Potassium oxide	US$	United States Dollars
km	Kilometer	V	Volts
kV	Kilo Volts	W	West
kW	Kilowatt	µm	Micro meters

3.0 RELIANCE ON OTHER EXPERTS

3.1 Reliance on Experts

This Report is based in part on internal company reports, maps, published government documents and public information, as listed in Section 27. Specialist input was sought from Kirkland Lake Gold employees towards environmental, legal, process, geology and financial matters to support the preparation of the Report. Information used to support this Report was also derived from previous technical reports on the Macassa Property.

The QPs relied on the following persons for the information and data described:

- Natasha Dombrowski, E.P., Environmental Superintendent, for Section 4.3, 4.4 and 20 in regards to updates on all available information on environmental, permitting, social or community factors related to the project.
- Keith Gorman, C.P.A, C.G.A, Controller, for Section 20 statement in regards to the reasonability of contracts terms with refiners and brokers.

3.2 Qualified Persons Participating in Report Write-up

The following persons participated in the write-up of this report:

- Mariana Pinheiro Harvey, P. Eng., Chief Engineer, Sections 1 to 6, 14, 15 and 17 to 27.
- William Tai, P. Eng., Mill Superintendent, Sections 1, 11, 12, 16, 25 and 26.
- Robert Glover, P. Geo., Chief Mine Geologist, Sections 6 to 11, 13 and 23 to 27.
- Ben Harwood, P. Geo., Principal Resource Geologist, Canadian Operations, Section 13.

The QPs have reviewed the report, including the technical aspects, and have deemed the information to be a true representation of the current status at Macassa Mine.

4.0 PROPERTY DESCRIPTION AND LOCATION

The following section was copied and updated from the previous Technical Report (Rocque and Cater, 2017).

4.1 Location

The Macassa Mine is in the Municipality of Kirkland Lake within Teck Township, District of Timiskaming, in the eastern part of Northern Ontario, Canada. Macassa is at approximately 48°10′ N Latitude and 80°02′ W Longitude at an elevation of approximately 305m (Figure 4-1).

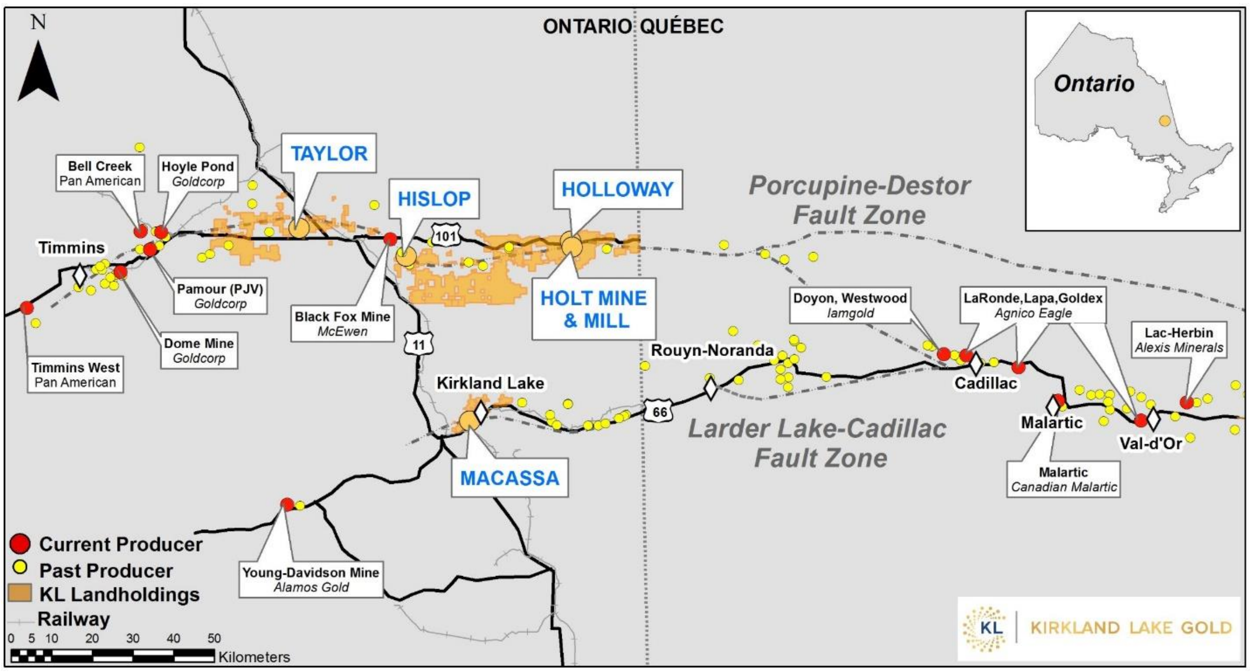

Figure 4-1: Macassa Property location map.

4.2 Mineral Tenure and Encumbrances

Kirkland Lake Gold holds title to 258 mining claims in Teck and Lebel Townships that covers 3,724 hectares. There are 188 patented claims, 11 crown leases and 59 staked claims. Macassa Mine is the only currently active operating mine within these property groups (Figure 4-2). Specifically, all the claims are located in eastern Teck Township and western Lebel Township. They cover the properties of Macassa Mine including the Tegren property at the west end of the mine strip. To the east of Macassa, the properties cover the past producing mines of Kirkland Minerals, Tech-Hughes, Lake Shore and Wright-Hargreaves. Of note, the Lebel claims are not contiguous with the main property. A list of all the claims is provided in Appendix A.

While the Company has carried out reviews of title to its mining claims and leases, this should not be construed as a guarantee that title to such interests will not be challenged or impugned. The mining claims and leases may be subject to prior unregistered agreements or transfers or native land claims, and title may be affected by undetected defects. The Company has had difficulty in registering ownership of certain titles in its own name due to the demise of the original vendors of such titles when owned by the Company's predecessors-in-title. Any material title defects would have a materially adverse effect on the Company, its business and results of operations.

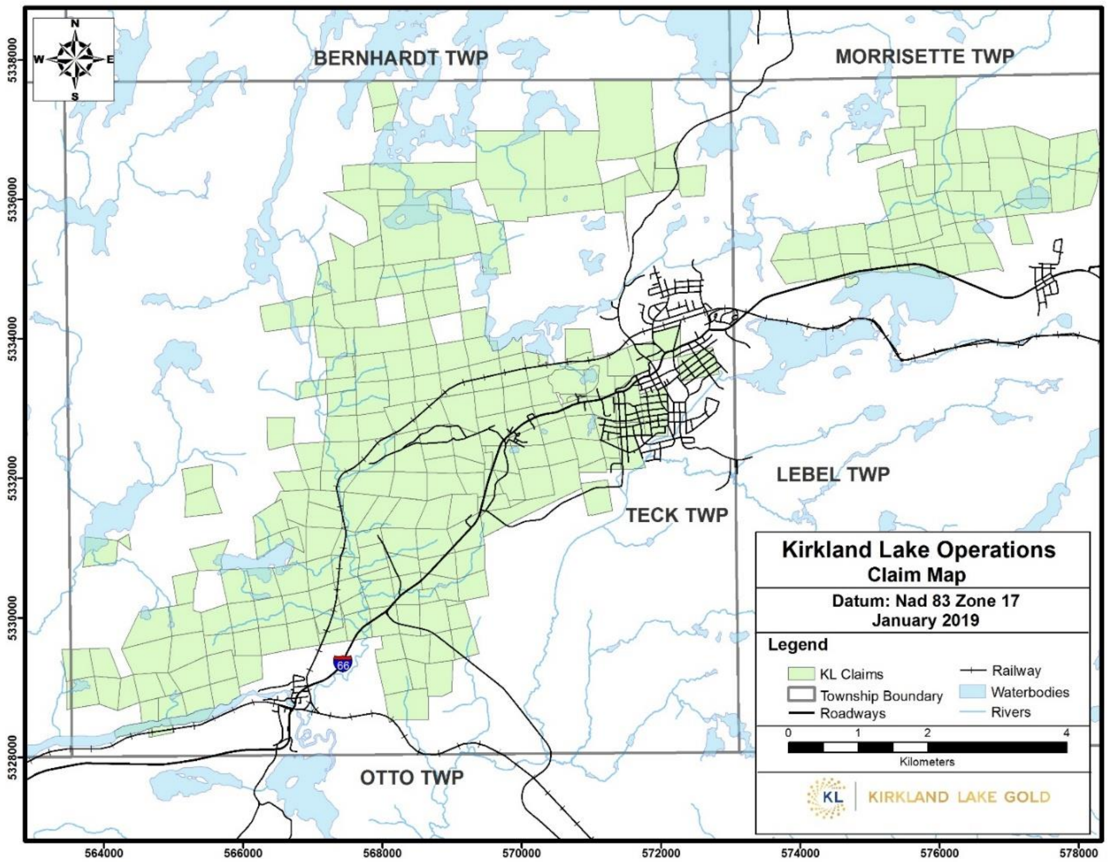

Figure 4-2: Claims Location Map.

There are 102 patented claims covering 1,369 ha that include mineral rights and surface rights. There are 61 patented claims covering 923 ha that hold the mineral rights only. These claims are surveyed and do not require assessment work to be done each year. There are 11 Crown Leases covering 306 ha that hold the mining rights only. These leases are surveyed and do not require assessment work each year. Taxes have to be paid on both the patented claims and the crown leases. In addition, there are 25 patented claims that hold only the surface rights and taxes are paid on them. There are 59 staked claims. These claims are not surveyed and require a minimum assessment work to be completed each year. In the second and all subsequent years, a minimum of $400 of assessment work per 16 hectares claim unit per year is to be reported until a lease is applied for. The work does not have to be done on each claim, it can be spread over adjacent claims and excess work in a year can be used for later years. Some claims will require the assessment work between 2018 and 2020. There are enough excess work credits to keep the claims in good standing for approximately another 10 years.

On March 28, 2012, Kirkland Lake Gold purchased the joint venture properties from Queenston Mining Inc. (now Canadian Malartic Corporation) and those properties are now owned 100% by the Company.

There remains conditions regarding further payments: in the event that production from these claims exceeds a threshold of 1,300,000 troy ounces of gold, the Company will pay Canadian Malartic Corporation $15 per ounce for the first 1,000,000 ounces produced above the threshold and will pay $20 per ounce for any ounces above a 2,300,000 threshold. The claims that are affected include: Morgan, HM (Hurd McCauley), Trudel, North AK, Hudson, Kirkland West, Gracie West and Axcell claims (refer to Appendix A).

Many of the claims have royalties due to the previous owners. These royalties are usually based on production or the Net Smelter Return (NSR) from the sale of the metal production. They apply to one or more claims and vary depending on the agreement reached when purchasing the claims. A plan showing the individual boundaries and notes related to the royalty agreements are displayed in Figure 4-1 and Table 4-1, respectively.

On October 31, 2013 the Company and Franco-Nevada completed a royalty transaction. Franco-Nevada paid US$50 million for a 2.5% NSR on the production from all of Kirkland Lake Gold's properties. This royalty is in addition to any existing royalties. Kirkland Lake Gold bought back 1% of the NSR at the end of 2016 for US$36 million. The obligation to Franco-Nevada currently stands at 1.5% NSR.

Kirkland Lake Gold has also entered into a 0.5% NSR royalty agreement with certain First Nation communities that are part of the Impact Benefit Agreement (IBA).

Table 4-1: Summary of Macassa Mine royalties.

Note	Item
1	SIS: 1.5% NSR
2	Mallpacks Development: 1.5% NSR
3	Condie, 2% NSR
4	Sparks Gold Mines 1% Net Proceeds
5	KGI 1/4 share, A. H. Seguian to 2/4 share, Thomas Wood to 1/4 share
6	Thompson/Pollock (Millyard) 5% NPI
7	Boisvert $3000 annual, $0.25/ ton mille, 20% NPI to Franco-Nevada, minimum $10,000 annual
8	Robert Price, $8/t if Au price > US$1000 per ounce
9	KGI 450/500 share, WP St.Charles 25/500 share, JW McFadden 11/500 shar, J Cowan 7/500 share
10	Davis (Wilroy) Royalty, $1.50/t (Still to be transferred from Barrick.
11	Carl Gerber/Gord St.Jean $8/t if Au price > CDN$1000 per ounce
12	Gracie, $10000 when mining occurs, Franco-Nevada, 2% NPR, $10000 annual minimum, part of St. Joseph royalty
13	KGI 2/3 interest, John McIvor 1/3 interest,
14	Town of KL, 3% NSR
15	Dyment/Kidston, 1.5% NSR
16	Condie: $4/t milled
17	Franco-Nevada, 3% NSR if Au price > US$1000
18	Arthur Lillico, 47.5% interest, John McB, 5% interest
19	Franco-Nevada, 2% NSR, Forbes Estate, 4.75% NPR, Mike Leary, 3.75% NPR, J. Forbes, 1.5% NPR
20	Franco-Nevada, 2% NSR, Premier Exploration, 3.5% NPR, Ron Crichton, 0.8% NPR, Mike Leary, 2.2% NPR
21	Axcell, 2% NSR
22	100% Ownership, Trudel, 2% NSR, Buyback 50% for CDN$1,000,000
23	1.5%-3% NSR, Advance Royalty of $50,000 per year, commencing Feb/2011
24	100% Ownership, Sandstrom Gold, 2% NSR, Hurd/McCauley, 1% NSR
25	Alamos (previously Aurico Gold), 2% NSR
26	Daniel Belshaw, 2%
27	Franco-Nevada, 2% NSR, Michael Leary, 0.33% NSR, Ron Crichton, 0.12% NSR, James Forbes, 0.16% NSR. In the event
28	the claim execeeds $1.3M oz, Canadian Malarctic receives $15/oz, $20/oz above 2.3M oz.
29	Franco-Nevada, 1.5% NSR (previously 2.5%, buy back of 1% from FN in 2016)
30	Estate of Ernie Deloye, 5% Mine Value (~20% metals recovered), capped at CDN$250,000
31	Todd Morgan, $50,000 minimum annual royalty, sliding scale, 1.5% NSR to 3% NSR based on Au price
32	0.5% NSR for First Nations (in IBA) on all production

4.3 Permit Status

All environmental permits and approvals are in good standing with the appropriate regulatory bodies. Amendments are performed in compliance with appropriate legislation. Further detail is available in Section 19.

4.4 Environmental Liability and Other Potential Risks

In the QPs opinion, there are no significant factors or risks that may affect access, title or the right or ability of the Company to perform work on the Macassa Property.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The following section copied and updated from the previous Technical Report (Rocque and Cater, 2017).

5.1 Climate, Topography and Physiography

Climatic conditions are typical for the central Canadian Shield, with short, mild summers and long, cold winters. Mean temperatures range from -15°C in January to 18°C in July. Mean annual precipitation throughout the region averages 764mm, including average snowfalls of 219 cm.

The area is primarily covered by forest (spruce and poplar are the main essences), swamps and lakes, with relatively modest relief. Rock outcrops surrounded by glacial till are common, but the till is generally not very thick (up to 46m in some locations). The area around the mine sits at approximately 305m above sea level (masl).

5.2 Means of Access to the Property

The Macassa Mine is at the west end of the community of Kirkland Lake. The Mine is adjacent to Highway 66 just east of Highway 11. Kirkland Lake is approximately 600km by road north of Toronto. The area is serviced by railway and bus. Although there is a small airport in Kirkland Lake there are no scheduled commercial flights from southern Ontario.

Surface amenities are secured behind fenced and gated facilities. The security service is company-owned; all personnel and visitors are required to sign in and out of the facilities (or use an access card provided by the Company). Employee and visitor parking areas are provided outside the gated facilities.

5.3 Infrastructure and Local Resources

Kirkland Lake (approximately 8,000 inhabitants) has been a mining community since the Tough-Oakes Burnside Mine (later called the Toburn) started in 1914. As a result, an experienced mining work force, as well as mining services, equipment and infrastructure are readily available.

With the mining complex located on the edge of the Town of Kirkland Lake, it is a part of the community landscape, and operational and environmental considerations are of vital importance. The Company is committed to supporting the community, not just through its operational standards and performance, but also socially and culturally. Kirkland Lake Gold is an active member of the community and contributor to community events, and maintains an open dialogue with community leadership.

Kirkland Lake Gold does not anticipate opposition from the local communities to continued operation of the Macassa Mine.

The Company has an agreement with First Nations who have treaty and aboriginal rights which they assert within the operations area of the mine. The agreement provides a framework for strengthened collaboration in the development and operations of the mine and outlines tangible benefits for the First Nations, including skills training and employment, opportunities for business development and contracting, and a framework for issues resolution, regulatory permitting and the Company's future financial contributions. Kirkland Lake Gold has a continual dialogue with First Nations.

To the extent relevant to the mineral project, it is the opinion of the QPs that the surface rights, the availability and sources of power, water, mining personnel, potential tailings storage areas, potential waste disposal areas and processing plant site are sufficient to continue the operations of the Macassa Mine.

6.0 HISTORY

The following sections are copied (and updated) from the previous Technical Report (Rocque and Cater, 2017).

6.1 Property Prior Ownership

The Kirkland Lake mining camp has been a prolific gold producer since mining started in 1914. The Macassa Mine and the four former producers that the Company now owns have produced approximately 23 million ounces of gold since 1917. The production from these five mines accounts for about 90% of the total camp production.

The Macassa Mine started in 1933. The first shaft was sunk in the Main Break zone in the late 1920's to a depth of 152m; however, sufficient gold was not located and operations were halted. In 1931, the Macassa Property was entered via underground access at the east end of the property from the adjacent Kirkland Minerals Mine from the 2475 Level. This entry was successful in finding gold and in October 1933 the first mill on the property began processing the ore at a rate of 181 stpd. The milling rate was increased to 386 stpd in 1949 and to 476 stpd in 1956. In August 1988, a new mill was built that could process up to 544 stpd of ore and 680 stpd of tailings (reclaimed). By 1996, modifications had increased mill capacity to 816 stpd of ore and 907 stpd of tailings. When mining was suspended in 1999, mill capacity was near 1,361 stpd of ore.

In 1986, #3 Shaft was sunk from surface to a depth of 2,233m. At that time, this was the deepest single lift shaft in the western hemisphere and is currently the primary access into the mine. Previous to #3 Shaft, the operations were accessed by #1 Shaft, #2 Shaft and two winzes, #1 and #2 Winzes. #2 Shaft is currently used as a second egress for the operation.

Starting in 1988 and until October 1999, the tailings from the Lake Shore Mine were processed at Macassa. These tailings were recovered by either dry mining or by dredging.

Rock burst activity was quite common in the deeper sections of the mines in the Kirkland Lake camp. In April 1997 a rock burst damaged the #3 Shaft at the 5800 Level at Macassa Mine. This occurrence forced work stoppages; otherwise, the mine would have operated continuously since 1933. The rock burst on April 1997 limited mining to above the 5025 Level. The restriction was modified in October 1998, allowing mining down to the 5300 Level.

Operations were suspended in 1999 due to the declining price of gold, with the workings allowed to flood in 2000.

Macassa Mines Ltd. was incorporated in 1926 and evolved through a succession of mergers to become Lac Minerals Ltd. in 1982. The merger consolidated the properties of the Little Long Lac group into one entity and the Macassa Mine and the other Kirkland Lake properties were included. Lac Minerals was acquired by Barrick Gold Corporation in August 1994 and Barrick offered a number of Lac Minerals' mineral properties for sale. After a short period of operation by Barrick the property was sold to Kinross Gold Corporation in May 1995. Foxpoint Resources purchased the Kirkland Lake properties from Kinross in December 2001 for $5 million and the assumption of $2 million in reclamation bond obligations related to the closure plan for the properties. Foxpoint changed its name to Kirkland Lake Gold Inc. in October 2002. Following the recent business transaction with Newmarket Gold Inc. in 2016, the new company is now called Kirkland Lake Gold Ltd.

6.2 Historical Mineral Resources and Mineral Reserves

Historical Mineral Resources were calculated annually by the geological personnel at the mine, using a modified polygonal method. Mineral Resources and Reserves were audited annually by an external consultant. The methodology and parameters have remained consistent over the years. The mineral resource estimation process has since transitioned to a block modelling method for developing the 2017 year-end Mineral Resources and Mineral Reserves onwards.

6.3 Exploration and Development Work

Upon purchasing the assets in 2001, initial exploration efforts concentrated on surface drilling on the former Wright Hargreaves, Lakeshore, Teck Hughes and Kirkland Minerals properties. As the Macassa #3 Shaft was de-watered, underground exploration at Macassa was phased in, beginning in 2002. This culminated in the discovery of the SMC in 2005. From that point to 2010, all exploration drilling was underground at Macassa. In 2010, surface exploration programs were re-implemented in conjunction with underground exploration at Macassa and continued through 2017. Exploration drilling programs in 2018 were focused underground at Macassa while a camp-wide initiative to compile and interpret current and historical data was being carried out to aid in the generation of regional exploration targets. Underground development at Macassa to facilitate exploration includes drifting and drill bay excavations on various levels. The focus in 2018 was from 5300 Level to explore the eastward and westward extent of the SMC.

6.4 Historical Production from the Property

From 1933 to 2018, Macassa produced approximately 5.2 million ounces of gold from 11.7 million short tons of ore at an average head grade of 0.45 opt (Table 6-1).

Table 6-1: Historical production (1933 to 2018).

Decade of Production	Tons (000s)	Grade (oz/st)
1930's	564	0.49
1940's	1,087	0.45
1950's	1,440	0.40
1960's	1,290	0.48
1970's	943	0.56
1980's	1,314	0.49
1990's	1,294	0.46
2000's	859	0.36
2010's (to date)	2,902	0.42
Total	11,693	0.45
Period of Production	**Tons (000s)**	**Grade (oz/st)**
2010-2014	1,325	0.35
2015	370	0.43
2016	365	0.46
2017	451	0.44
2018	391	0.63
Total	2,902	0.45

7.0 GEOLOGICAL SETTINGS AND MINERALIZATION

7.1 Regional Geology

The Kirkland Lake mining camp is located in the west portion of the Archean Abitibi greenstone belt of the Abitibi Subprovince that forms part of the Superior Province in the Precambrian Shield.

In the Kirkland Lake area, the Abitibi Subprovince is composed of komatiitic, tholeiitic and calc-alkaline volcanic rocks, turbidite-dominated sedimentary lithologies, locally distributed alkaline metavolcanic rocks and associated fluvial sedimentary formations. These successions have been intruded by tonalite, trondhjemite and granodiorite batholiths.

Large scale structures and tectonic fabrics are distributed in domains with rock foliations generally paralleling the regional faults, intrusive contacts and domain boundaries. The regional shear zones, folding and steep reverse faults post-date the batholith emplacement. Metamorphism of the Abitibi rocks is generally very low greenschist facies, however upper greenschist to hornblende facies may be attained in metamorphic aureoles surrounding intrusions.

7.2 Local and Property Geology

7.2.1 Local Geology

The Timiskaming Group of rocks is the main feature in the area. This group forms part of a complex synclinorium that is flanked unconformably on the north and south by the mafic to felsic, massive to pillow volcanic rocks of the Kinojevis and Blake River groups. The Timiskaming Group is up to 3,200m thick and extends for about 64km from Kenogami Lake in the west to the Quebec border. In the Kirkland Lake area, the Timiskaming is predominantly conglomerates and sandstones, trachytic lava flows and pyroclastic tuffs. The Timiskaming trends N65°E and dips steeply south at Kirkland Lake. Immediately east of Kirkland Lake, the formations are warped to an east-southeast direction, then return to an east-northeast direction at Larder Lake, and continue this way to the Quebec border.

The Timiskaming sediments are intruded by fractionated alkalic rocks, which include augite syenite, feldspathic syenite and syenite porphyry in the form of dykes and sills. Alkali stocks have intruded the Timiskaming Group and the supracrustal assemblage along the south margin of the synclinorium. Matachewan diabase dykes trending north-east cut all rocks in the area (Figure 7-1).

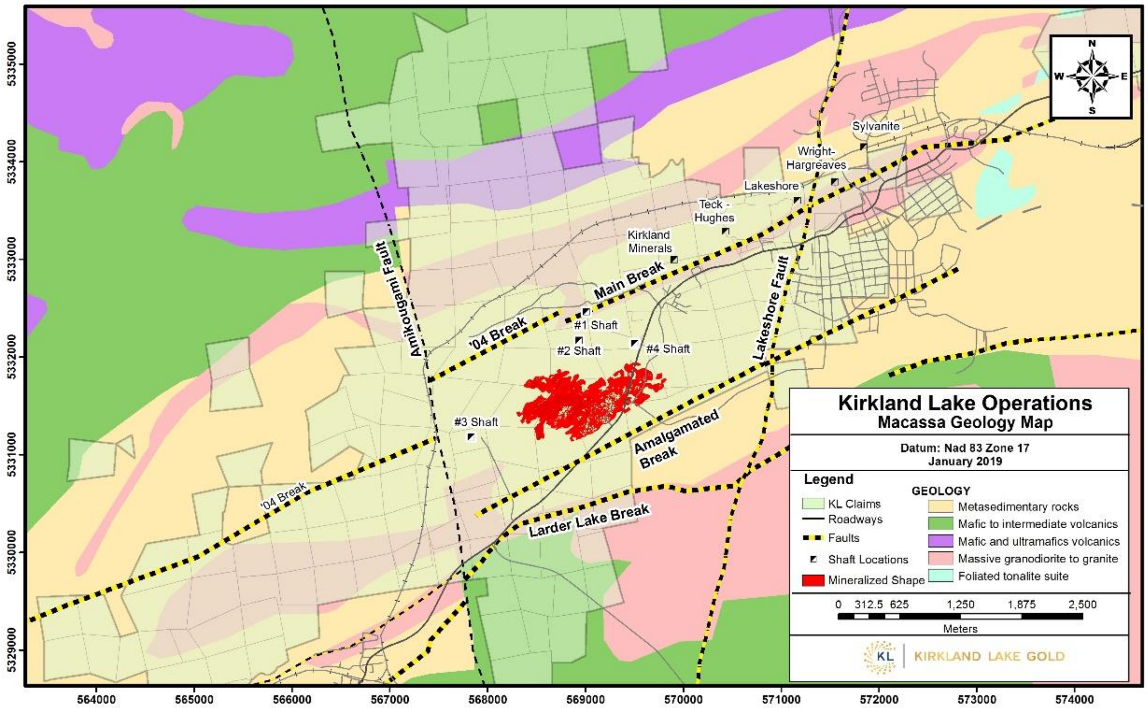

Figure 7-1: Regional geological setting – Macassa Mine Complex.

The Kirkland Lake-Larder Lake Break and its associated splay faults and fracture system, form a complex, major structural feature, which transects and follows the trend of the Timiskaming Group at Kirkland Lake. This break can be traced for about 320km from Matachewan west of Kirkland Lake all the way to the Grenville Front east of Louvicourt, Quebec. In addition to Kirkland Lake, it passes through or near the important mining areas of Larder Lake, Rouyn-Noranda, Cadillac, Malartic, Val d'Or and Louvicourt. Numerous gold occurrences and gold mines are spatially related to this regional structure.

The fault or break system that hosts the Kirkland Lake gold deposits is north of the main Kirkland Lake-Larder Lake Break. Polyphase deformation has affected the Timiskaming rocks at Kirkland Lake. The fold axis and structural plunges, including gold ore shoots.

7.2.2 Macassa Property Geology

At the Macassa Mine, the Timiskaming tuffs, conglomerates and syenites are encountered. The felsic syenites are the preferential hosts of the gold mineralization in the #1 and #2 Shaft areas. The basic syenites are the preferential hosts for gold in the bottom half and the tuffs in the upper portion of #3 Shaft area.

The Timiskaming age sediments are composed of pebble conglomerates, greywackes and finer inter-bedded wackes. Adjacent to and interlayered with these sediments are varied pyroclastic/lithic and volcanic ash tuffs. Both the sediments and volcanic rock are commonly found on the north and south flanks of the elongated intrusive composite stock.

Augite or basic syenite is the oldest and most wide-spread of the intrusive types. Situated within this intrusive, there is a westerly plunging pipe-like mass of felsic syenite, which enters the east end of the Macassa Property at the 1300 foot sublevel elevation on the hanging wall side of the Main Break. Both the basic and felsic syenites are intruded by syenite porphyry. The porphyry unit exhibits sharply defined intrusive contacts while conforming closely to the strike and dip of the regional formations. This composite stock dips steeply to the south and widens with depth.

The three main components of the syenitic stock and related dykes are: augite syenite, felsic syenite, and syenite porphyry. These intrusive rocks are host to an important part of the ore at the Macassa Mine Complex. North-south striking diabase dykes are known to intrude all sediments and intrusives as well as post-dating the ore forming structural breaks.

The Kirkland Lake Gold Deposit occurs in, and peripheral to a composite, multi-phase syenite stock that intrudes east-northeast trending clastic sedimentary rocks and alkaline tuff of the Timiskaming assemblage. Gold mineralization is associated with the Kirkland Lake Fault System, a probable early syn-metamorphic, northeast-trending, and steeply southeast dipping reverse fault network that includes the '04, Main, North, and South breaks, and which is localized along the northeast-trending syenite complex hosting the deposit. Gold mineralization in the South Mine Complex area occurs in a complex interconnected network of narrow, east to northeast trending, moderate southeast to south dipping mineralized shear zones and auriferous alteration. (Rhys, 2006/2008).

8.0 DEPOSIT TYPE

8.1 Mineralization

The gold mineralization at Macassa is located along the breaks and subordinate splays as individual fracture fill quartz veins, from several centimetres to a few meters thick. Veins may be of single, sheeted, brecciated or stacked morphology. Several generations of quartz deposition are evident from colour and textural variability and quartz veins are generally fractured. Also found are sulphide rich (pyrite) zones.

The presence of a fault splay is often a prerequisite for gold deposition. Broader zones of mineralized, brecciated and fragmented quartz are found in the footwall and hanging wall of major faults.

Gold is usually accompanied by 1% to 3% pyrite and sometimes is associated with molybdenite and/or tellurides of lead, gold, gold-silver, silver, nickel and mercury (altaite, calaverite, petzite, hessite, melanite, coloradoite). Silver is present amalgamated with the gold and in the minerals petzite and hessite.

The presence of pyrite and silicification does not guarantee gold; however, higher grade gold is generally accompanied by increased percentages of pyrite and silica.

Hematization or bleaching with carbonatization and silicification are common alterations of the wall rocks. Sericitization is a more local feature. The alteration has enriched the rocks in K_2O and depleted them in Na_2O.

The new discoveries in the South Mine Complex (SMC) generally are of a different style of mineralization with wide sulphide systems rather than the quartz vein mineralization that is found in the Main Break complex. Tellurides appear to be more prevalent in the SMC, compared to the historical mineralized systems, in particular the occurrence of the gold telluride mineral calaverite. These new, wide, hydrothermally altered zones could represent a new plumbing system for a southern mineralized part of the Camp parallel to the Main Break, fed by a deep porphyry body. The gold mineralization is found in carbonate altered conglomerate, tuff and porphyry, mineralized with up to 10% disseminated pyrite. Quartz veining and silicification when hosted within the porphyry may also characterize the SMC.

Panterra Geoservices (Rhys 2017) has proposed a new conceptual mineralizing model for the ’04/Main Break and SMC zones. Figure 8-1 represents a schematic alteration cross section (looking east) showing different alteration styles along the shear zone/fault network that is host to ore in the Macassa Mine. Here the Amalgamated Break is interpreted as the main structure off which the ‘04 Break, SMC and AK zone splay and link between. Reduced, sericite-carbonate-chlorite alteration is developed extensively along the Amalgamated Break in association with largely barren, white quartz veins and may feed into the subsidiary faults. Fluids originally flowing along the Amalgamated Break may have fed into splaying structures such as the ‘04 Break and SMC. Most ore deposition has occurred in areas where carbonate-pyrite alteration is interspersed with more oxidized reddish-orange tinted alteration assemblages that occur more distally to the feeder structures, and regional magnetite-biotite-amphibole assemblages are altered to K-feldspar-hematite carbonate. The Amalgamated and ‘04 Break are interpreted to merge near the -9000 foot elevation (depth from surface) in the #3 Shaft area.

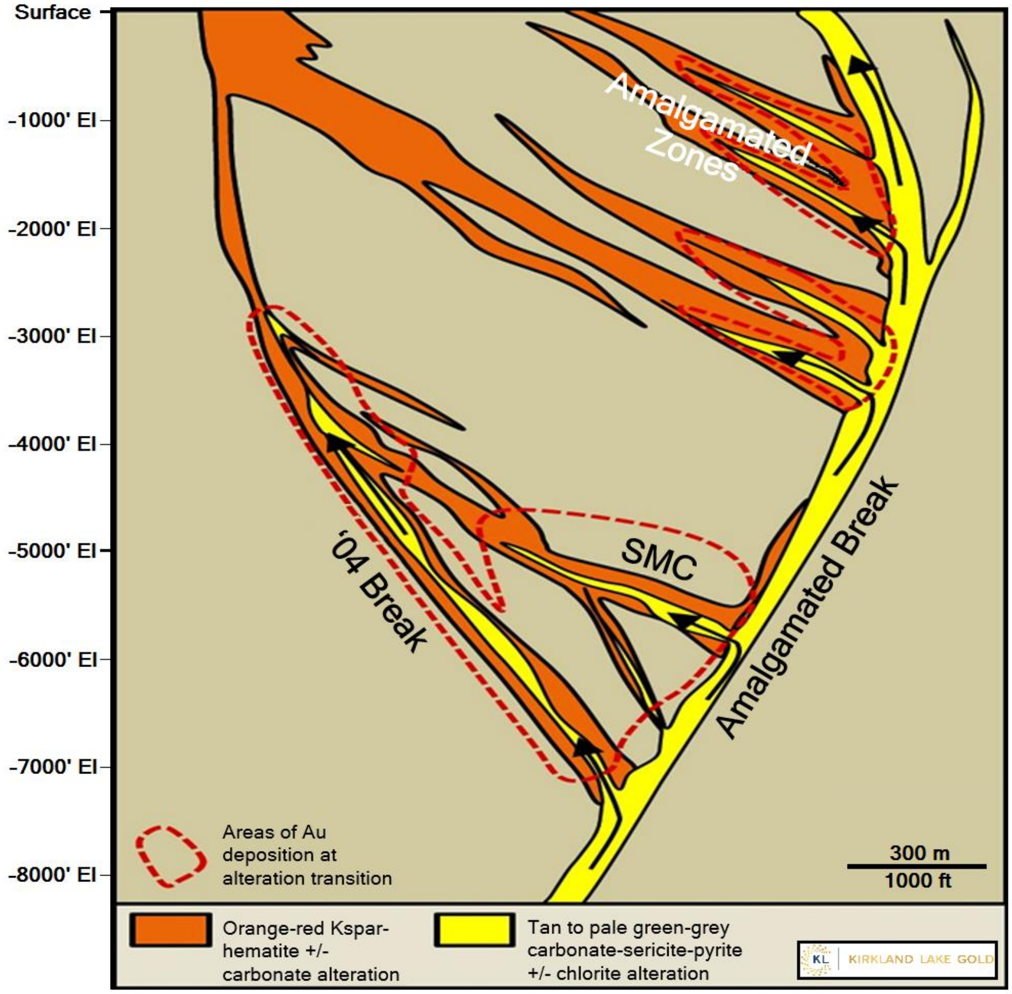

Figure 8-1 Alteration and Structural patterns at the Macassa Mine looking east (Rhys 2017).

8.2 Gold Zones

The gold mineralization at Macassa is found along breaks or faults, in veins as quartz filled fractures, as breccias and as sulphide (pyrite) zones. There are several of these breaks currently identified, they are named: ‘04, ‘05, No.6, Kirkland Lake Main and the Kirkland Lake North and South branches. The breaks trend about N60°E and dip steeply, 70° to 80° to the south, keeping with the Timiskaming trend.

At Macassa, the Main Break has been mined from 396m to the 1,706m and has been considered the most important zone in the eastern part of the mine. The ‘04 Break is in the western part of the property and was the main producing break at Macassa. It has been mined by ramp above the 3400 Level (1,036m) to about the 3000 Level elevation (945m) and extended up to the 884m elevation by diamond drilling. The ‘04 Break has been mined to the bottom of the mine at the 7000 Level (2,134m) and there is potential for the mineralization to continue deeper. The ‘04 Break is located about 185m north of the Main Break and connects to it by sigmoidal cross structures. The ‘04 Break is a thrust, or reverse, fault striking N65°E and dipping 80° to the south.

The ‘05 Break is located approximately 425m north of the ‘04 Break. It splays into north and south branches to the east. The South Branch, about 365m north of the ‘04 Break, appears to correlate with the Narrows Break that extends to the east across the rest of the camp.

The gold mineralization trend in the Kirkland Lake camp conforms to the 60° westerly plunge of the syenite intrusions. Locally, the plunge of the gold mineralization depends on the intersection of the host splay structures and can be quite different from the camp trend.

In addition to the mineral trends that have been historically productive, the Company has located significant mineralization in a number of zones to the south of these breaks. The Upper D Zone strikes N28°E and dips 40° to the east. All the other zones are included in the area now called the SMC. The strike and dip of the zones in the SMC vary. The Lower D Zone strike varies from N05°E to N30°E and has a dip of 70-80°; the orientation has been confirmed through mining. It is possible that there is more than one mineralized structure/alteration halo giving the appearance of one steeply dipping structure. The Lower D North zones strike NE and dip 30-45° southeast. The other SMC zones strike N60°E, generally parallel to the main Kirkland Lake structures with varying dips from 20-60° south. The SMC, as defined to date, appears to merge with and be terminated by the ‘04 Break between the 4700 and 4900 Levels. The shallow dipping eastern portion of the SMC appears to be terminated in the down-dip component by the Amalgamated Break, close to the -5900 foot elevation. The relative position of these zones is shown in (Figure 8-1).

Several strong north easterly trending cross-faults offset the mine host rocks and mineralized zones with displacement usually to the south (dextral) and up on the west side. Major cross faults are the Lakeshore Cross Fault near the east end, the Tegren in the centre and the Amikougami Creek at the west end of the mine. The major gold bearing zones have not been found west of the Amikougami Creek Fault.

9.0 EXPLORATION

Kirkland Lake Gold has carried out extensive surface and underground exploration programs throughout their holdings in the Kirkland Lake Area (Figure 9-1).

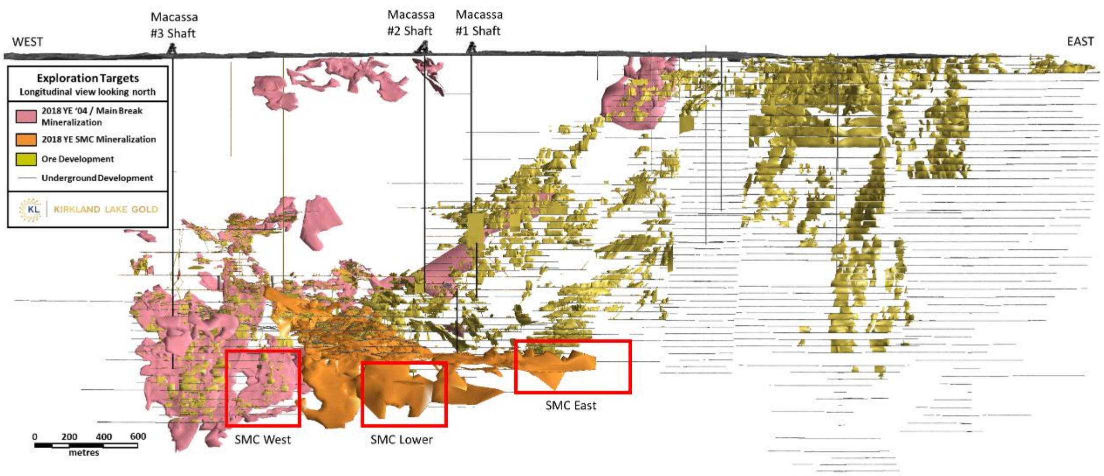

Figure 9-1: Exploration targets at the Macassa Mine (longitudinal view).

The current exploration programs are focused on extending known zones of mineralization and testing for new discoveries in order to increase the level of Mineral Resources and Mineral Reserves in support of future organic growth. Widely spaced surface drilling in 2017 east of the Macassa Property was carried out to test the extension of the SMC. The surface program produced a number of intercepts, for which follow up drilling was completed from underground in 2018. The drill holes in the underground program generally have shorter hole lengths as compared to surface, allowing higher precision required for resource definition.

Development headings are actively driven to establish and optimize drill platform locations. Currently, the majority of underground exploration drilling is carried out from the 5305 Exploration Drift.

The exploration program was successful finding the “D” Zone and the south zones that are now referred to as the South Mine Complex. These zones are now part of the mineral resource and mineral reserve estimates.

The Company has also explored for near surface mineralized zones associated with the Amalgamated Break Trend. A lower grade resource has been identified within 300m below surface, for which near surface mining opportunities are currently being explored.

Kirkland Lake Gold is committed to continual exploration on its land holdings. Recent successful drilling results are encouraging for further expansion of the Mineral Resources and Mineral Reserves by continuing exploration.

9.1 Macassa Surface Exploration

There was no surface diamond drilling program in 2018 at the Macassa Property. The focus was shifted to complete a more regional compilation and interpretation of available historical data to generate potential outbound target areas and guide future exploration programs.

9.2 Macassa Underground Exploration

In 2018, the 5300 Level exploration drift was advanced 379m to the east with the excavation of one new diamond drill platform to facilitate testing the SMC to the east. The 5300 Level was also advanced 370m to the west with the excavation of one new diamond drill platform to facilitate testing the SMC to the west. The west diamond drill platform was completed in late December and drilling activities will be carried out in 2019. East and west advancement of the 5300 Level exploration drift will continue in 2019. In 2018, approximately 66km of underground exploration drilling were completed utilizing three drills. Of that total, 55km tested the SMC, including the Lower SMC and East SMC. 9km were completed to test the Main Break below the -6000 foot elevation near the Kirkland Minerals property boundary to the east. The remaining 2km were dedicated to exploring south of the Amalgamated Break.

Previous surface drilling west of +5000 Geology Grid Easting (local to Macassa) has provided intersections, likely related to the SMC, to warrant the continued advancement of the 5300 Level exploration drift to the east. Using the 5300 Level exploration drift, the platform will be ideally suited to test both the SMC and mineralized systems related to the Main Break. Drill holes from the 5300 Level generally do not exceed 1km in length and average less than 500m in length.

Since 2005, approximately 569km of underground exploration drilling have been completed at the Macassa Mine, exclusive of surface and definition drilling. The majority of this exploration has been focused on the SMC.

9.2.1 South Mine Complex

The South Mine Complex has been the most significant new discovery for Macassa Mine, displaying different characteristics when compared to the historically mined main zones at Macassa. Some of the systems within the complex have larger widths and higher grades than the main zones. The strike of these is generally parallel to the main structures, while displaying a flatter dip ranging between 20° and 60°.The initial indication of these structures was highlighted in a press release on July 11, 2005. Kirkland Lake Gold reported an intersection of 90.4ft assaying 2.3 ounces of gold (uncut, width recognized as not a true width) from Drill Hole 50-627 on what is now recognized as the New South Zone. Exploration of these zones is ongoing, with further expansion anticipated. The location of the New South Zone relative to the other zones can be seen in plan view, Figure 9-2 and in Long Section, Figure 9-3.

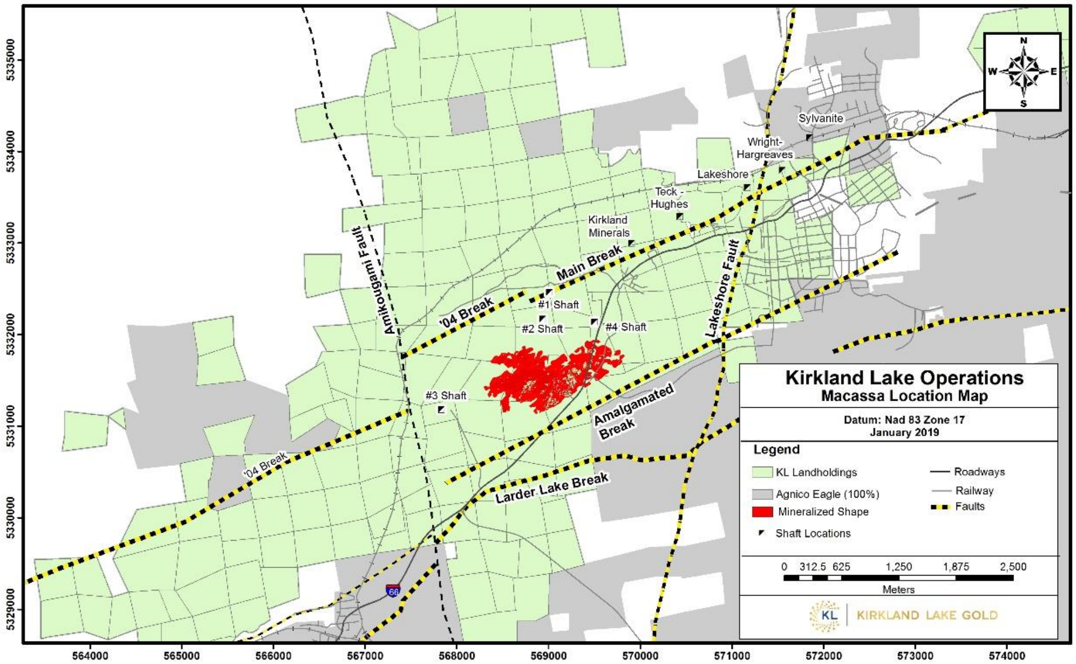

Figure 9-2: Plan view of the Macassa Mine Complex.

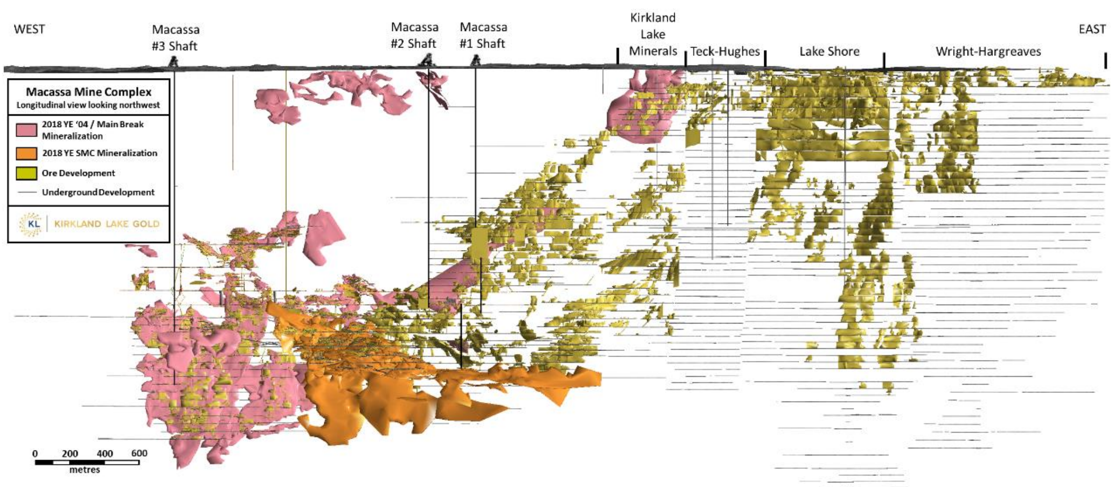

Figure 9-3: Longitudinal section of the Macassa Mine Complex.

These new, wide, hydrothermally altered zones likely represent a new plumbing system for a southern mineralized part of the camp parallel to the Main Break, fed by a deep porphyry body.

The location of some of the latest South Zone intersections can be seen in Figure 9-4.

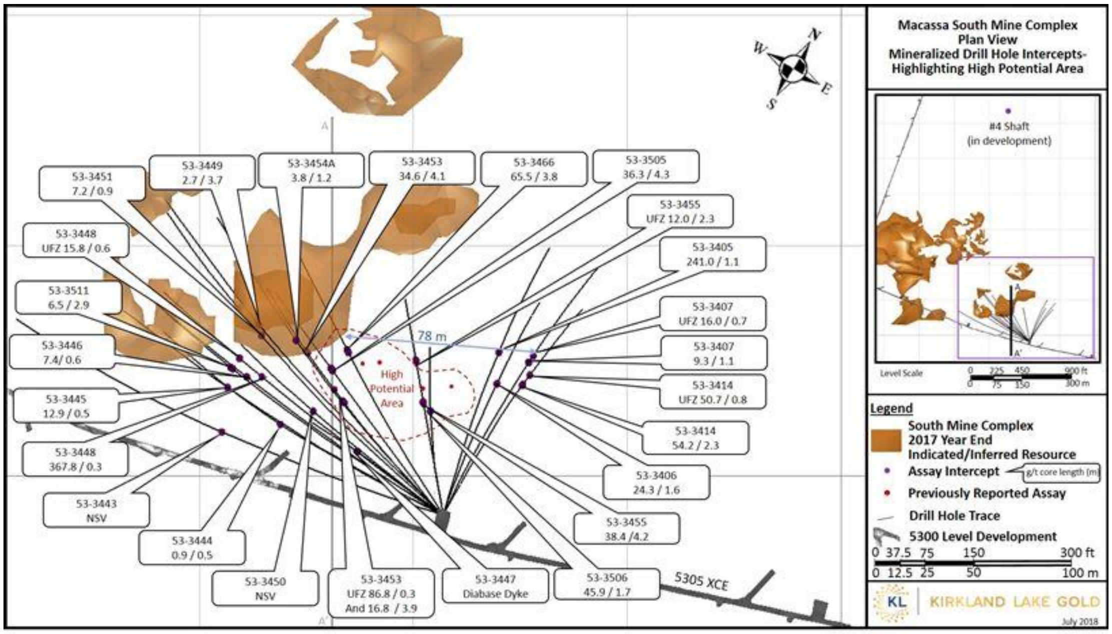

Figure 9-4: Detailed plan view of underground drillhole intersections.

The Company's exploration program is directed at expanding the potential of these zones along strike and dip through diamond drilling. Underground development will be designed to optimize drill platform locations.

9.2.2 ABM and Amalgamated Zones

The ABM and the Amalgamated Break Trend Zones (Amalgamated) have been recognised for some time. The ABM Zone is partially located under the Macassa's tailings pond. The Amalgamated Zone is generally located on the South Claims that were part of the Queenston Joint Venture but are now 100% owned by Kirkland Lake Gold.

The economic potential of these near surface zones becomes higher with increasing gold price, drilling has been carried out over the last few years to delineate resources from surface down to 300m in depth.

10.0 DRILLING

Kirkland Lake Gold contracts out all diamond drilling on surface and underground. The diamond drilling provides whole core recovery generally in NQ diameter for surface drilling and AQ or BQ diameter for underground drilling programs. AQ diameter core is utilized in definition drilling only.

The core is boxed by the contractor and carried to the shaft by the drill contractor or Macassa personnel. The drill core is transported by personnel to the Macassa core shack for logging and sampling.

In 2018, a total of eight diamond drills were used on the Macassa Property. Three drills were used for underground exploration, the remainder for underground definition.

Underground drilling plans for 2019 entail the utilization of seven to eight diamond drills for both exploration and definition drilling.

The 2019 underground exploration budget includes 90,000m of diamond drilling utilizing three drills. The programs are primarily designed to test the east and west extension of the SMC as well as the SMC at depth with additional targets on the ‘04/Main and Amalgamated Breaks. Surface exploration plans for 2019 include 4,000m of diamond drilling utilizing one drill to test regional target areas.

The mineralization on the property follows the east-west strike of the Main Break, which also dips steeply to the south. The South Mine Complex follows the same strike but the various lenses may dip shallow or steeply. Drilling in the area best intersects the zone when drilling from the south towards the north.

All underground drillhole collars and lines are digitally surveyed before and after to accurately locate the holes. Surveys are completed down the holes near the collar and at 30m increments to track any changes. There are minimal variations to the movement of the drillhole trace, but factors such as rock quality and fabric may affect the direction.

Underground drillholes are planned with an expected target depth in mind. After the target is reached, the drillhole planner also adds an extra buffer zone to increase the confidence in intercepting the zone. When the end of the hole depth is reached, the drilling contractor ends the hole and moves on to the next usually without confirmation from the Geology department. On surface, drillholes are confirmed by the geologist before stopping to commence a new hole.

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Sampling Methods

Diamond drill core samples, chip samples and muck samples are all used at Macassa for grade control. Only the core samples and the chip samples are used for resource determination. Diamond drilling is used to explore the extensions of the zones, to find new zones from underground and to provide sample data between the mine levels for resource determinations. The recovered drill core is logged and sampled by a geologist employed by the Company in Macassa's facility at the mine site. The core is oriented and marked for sampling by the geologist. Individual samples are between 0.3m to 1.0m in length. For all exploration core, the intervals selected for sampling are tagged and cut in half using a diamond saw, by a designated core splitter employed by the Company. One half of the split core is retained in the core box and stored in a designated area on site for further consideration. The other half is placed in properly marked sample bags with the identifying tag for shipment to an outside assaying facility. For all definition core, the intervals selected for sampling are whole bagged and sent to either the Macassa Laboratory or an outside assaying facility. The collars of all diamond drill holes are surveyed and the holes are downhole surveyed using by north-seeking gyros.

The chip samples are obtained underground by a geologist or by a trained sampler. Each new exposure of the zones on the walls or face is sampled in all of the workings. Sample intervals are marked across the face and walls in channels recording the length, rock type and features of the sample. The sample intervals are set so that the individual veins and the waste sections within the veins are sampled separately. The wall rocks at the sides of the veins are sampled separately from the veins. The sample length for chips samples range between 0.3m and 1.0m in length. The samples are tagged and placed in appropriately marked bags and transported to the Macassa Laboratory. The samples are marked and located using the survey markers for control. After the ore is blasted, the mining crew and occasionally the mine geologists will obtain muck samples. It is practice at Macassa Mine to take one random grab sample from the muck for every 10 short tons of muck (ore or potential ore). Muck and chip sampling of both development and stope ore is carried out for mining control and reconciliation purposes.

All chip and muck samples are tagged and placed in appropriately marked sample bags and then transported to the Macassa Laboratory. At the lab, they are reduced in size by riffling before being treated by the standard assay procedures.

11.2 Results

Assay results are reported to the Database Analyst who verifies the data ensuring all quality control protocols are in compliance with expectations before entering the data into the database.

11.3 QA/QC Comparative Assay Laboratory Program

Kirkland Lake Gold engages in industry standard practices to re-test mineralized pulps at a second commercial lab for a check on the quality of the primary assay results. Approximately 5% of the mineralized exploration samples that go directly to a commercial lab are sent to another commercial lab for verification.

Samples were selected from the 2018 drilling campaign by considering pulps that grade above 6.86 g/t. Check assays were chosen from all laboratories used during the 2018 drill program and were sent to either Swastika Laboratories or Polymet Labs. Ideally, values returned by the umpire laboratory would be equivalent to the primary laboratory causing them to fall on an “X=Y” line, i.e. results from both labs are equal, when plotted on a primary laboratory versus umpire lab plot.

11.3.1 Check Assays for Swastika Laboratories

A total of 207 check assays were chosen from Swastika Laboratories results and sent to Polymet Labs for analysis. Figure 11-1 shows a simple scatter plot of Swastika versus Polymet on a logarithmic scale. Figure 11-2 shows the same scatter plot on a linear scale with a comparison of the line of best fit for the data and the ideal model where X=Y. The data illustrates a good correlation with the X=Y line with a correlation coefficient “R^2” of 0.97. The relative percent difference plot (Figure 11-3) shows an even distribution of values on either side of the X=Y line with no major outliers, suggesting that results are not biased high or low by either lab. Table 11-1 shows a summary of the relative percent difference values for the three grade ranges and multiple percentage envelopes. For samples greater than ten times the detection limit, Swastika showed acceptable accuracy with 83% of the sample pairs reporting within 25% of each other.

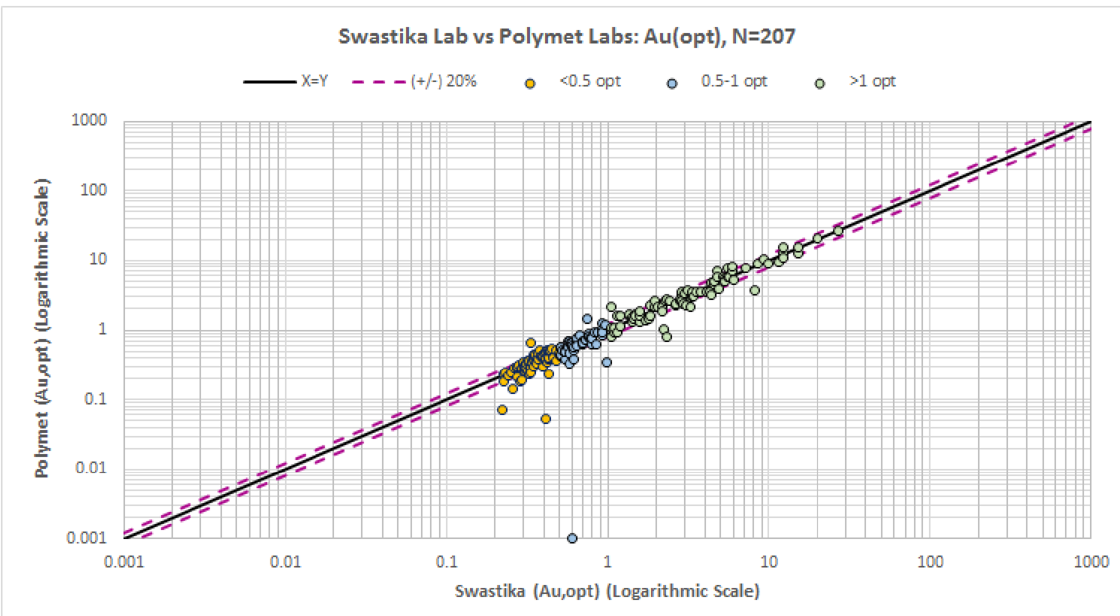

Figure 11-1: Logarithmic scatter plot for Swastika Lab check assays.

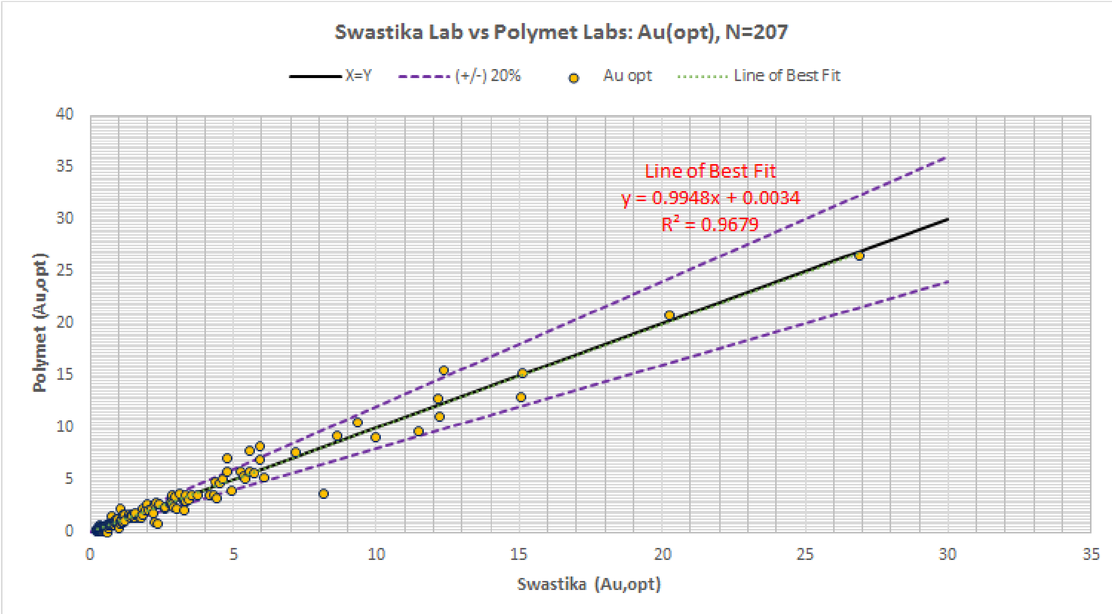

Figure 11-2: Linear scatter plot of Swastika Lab check assays.

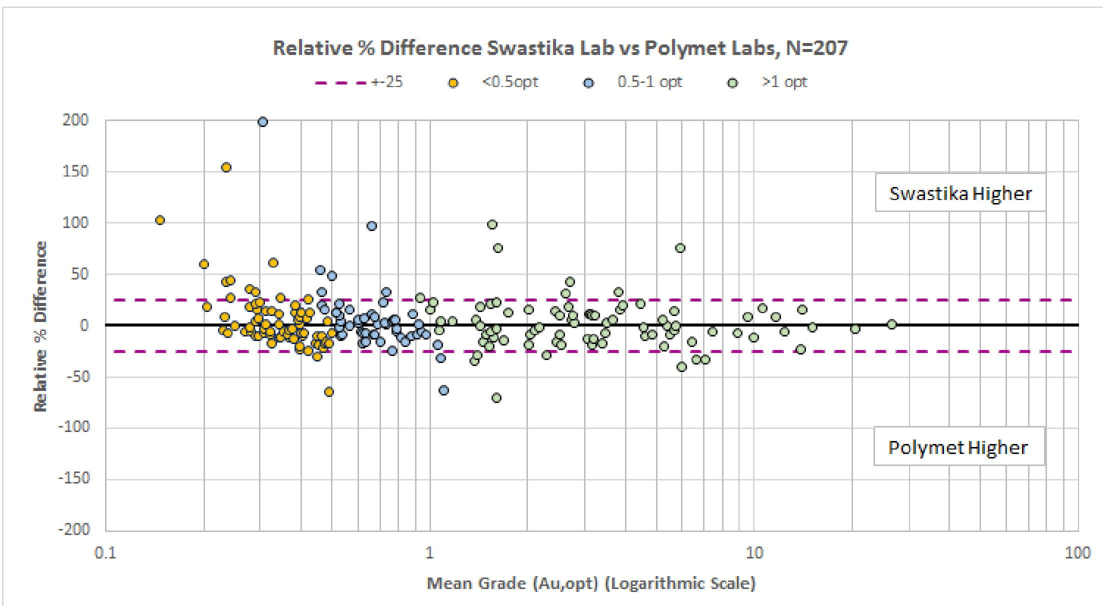

Figure 11-3: Relative percent difference plot for Swastika check assays.

Table 11-1: Swastika check assay summary.

		% of Sample Pairs Reporting Within				
Grade Range	**Count**	**+/5%**	**+/10%**	**+/-20%**	**+/-25%**	**Outliers**
< 0.5 opt	72	15%	43%	75%	82%	1
0.5-1 opt	52	19%	52%	79%	85%	1
> 1 opt	83	19%	42%	77%	83%	0
Total No Samples:	207	18%	45%	77%	83%	2

11.3.2 Check Assays for Macassa Lab

A total of 487 check assays were chosen from Macassa Lab results and sent to Polymet Labs for analysis. Figure 11-4 shows a simple scatter plot of Macassa versus Polymet on a logarithmic scale. Figure 11-5 shows the same scatter plot on a linear scale with a comparison of the line of best fit for the data and the ideal model where X=Y. The data illustrates a good correlation with the X=Y line with a R^2 of 0.98. The relative percent difference plot (Figure 11-6) shows a reasonable distribution of values on either side of the X=Y line with minor outliers, suggesting that results are not biased high or low by either lab. Table 11-2 shows a summary of the relative percent difference values for the three grade ranges and multiple percentage envelopes. Macassa has room for improvement for accuracy with 78% of the sample pairs reporting within 25% and is in the process of developing plan to improve the accuracy.

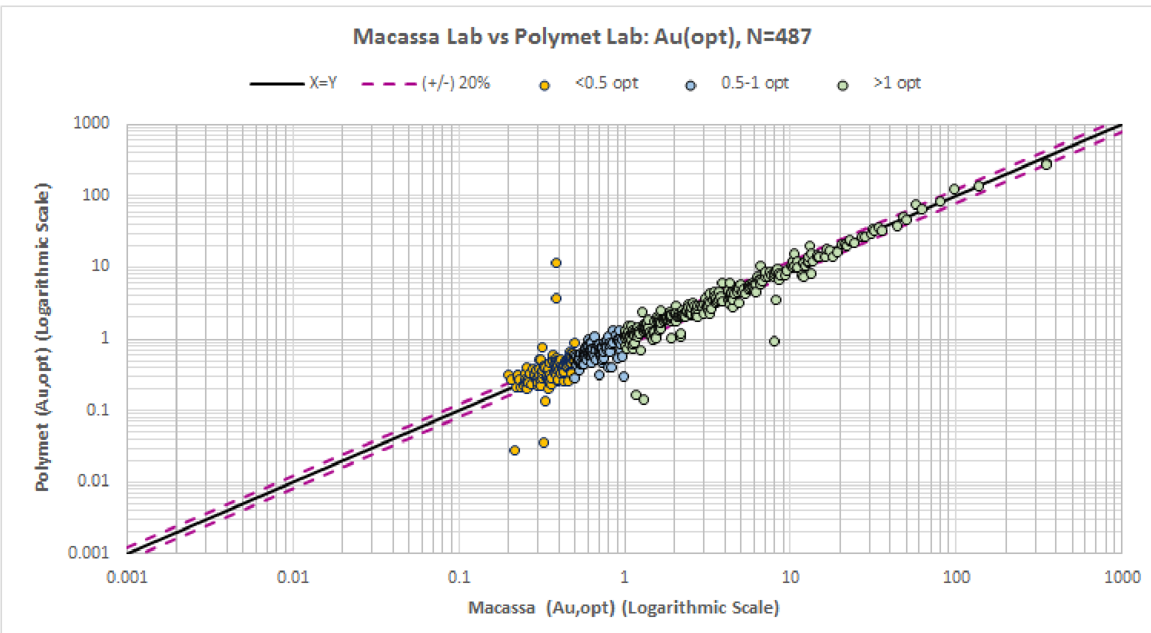

Figure 11-4: Logarithmic scatter plots for Macassa Lab check assays.

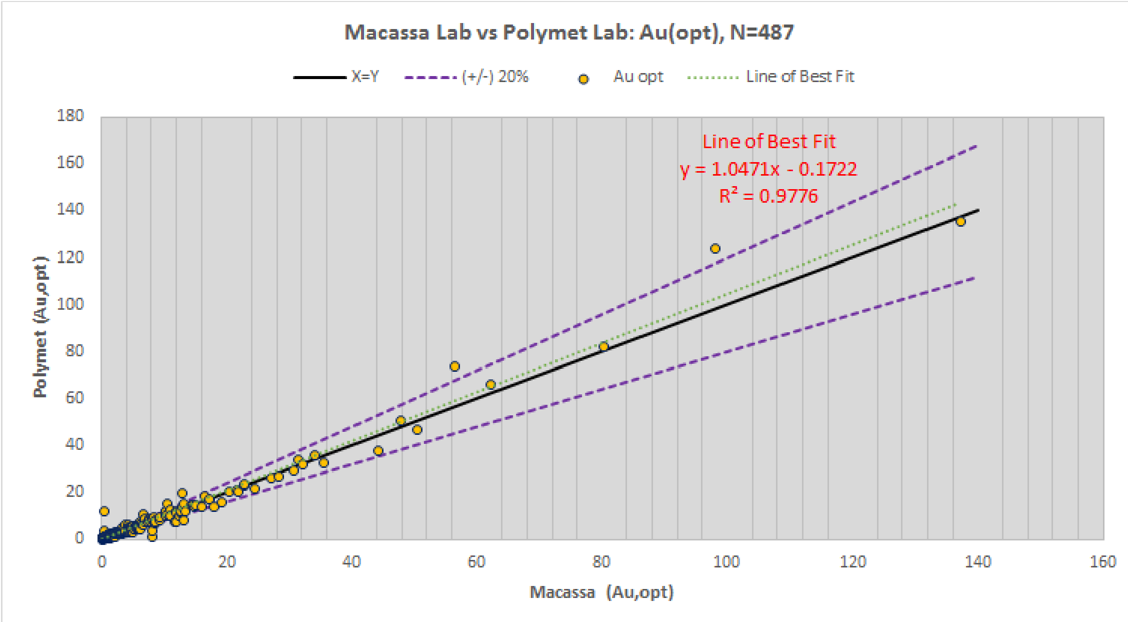

Figure 11-5: Linear Scatter plots for Macassa Lab check assays.

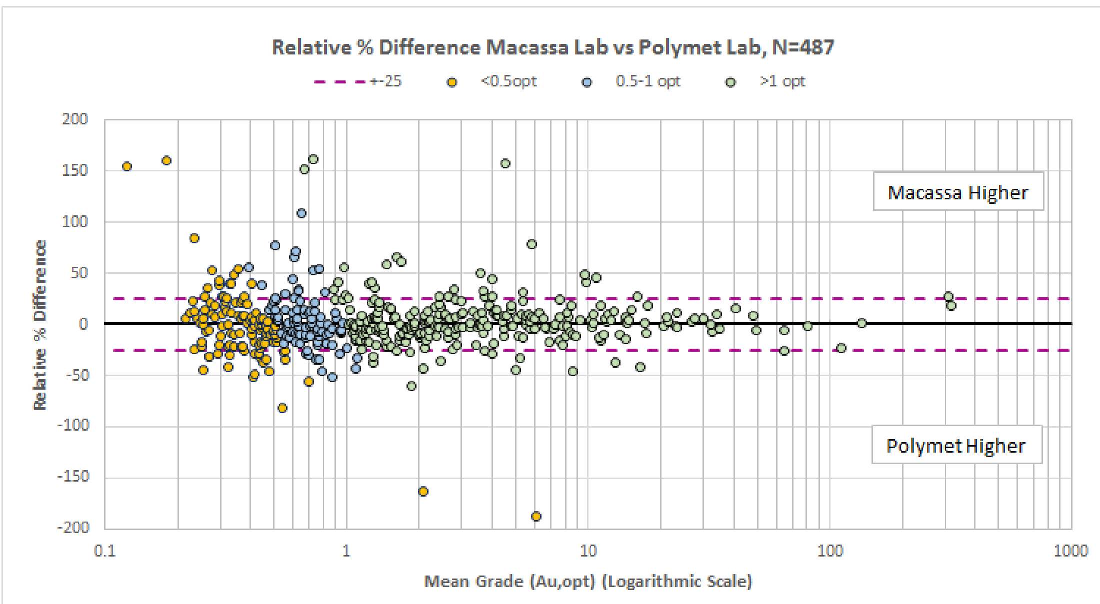

Figure 11-6: Relative percent difference plot for Macassa Lab check assays.

Table 11-2: Macassa lab check assay summary.

		% of Sample Pairs Reporting Within				
Grade Range	Count	+/5%	-+/10%	+/-20%	+/-25%	Outliers
< 0.5 opt	122	16%	35%	57%	69%	4
0.5-1 opt	94	19%	43%	67%	73%	0
> 1 opt	271	28%	54%	78%	84%	3
Total No Samples:	487	23%	47%	70%	78%	4

11.3.3 Check Assays for Polymet Labs

A total of 128 check assays were chosen from Polymet Labs and sent to Swastika Laboratories for analysis. Figure 11-7 shows a simple scatter plot of Polymet versus Swastika on a logarithmic scale. Figure 11-8 shows the same scatter plot on a linear scale with a comparison of the line of best fit for the data and the ideal model where X=Y. The data illustrates a good correlation with the X=Y model with a R^2 of 0.98. The relative percent difference plot (Figure 11-9) shows an even distribution of values on either side of the X=Y line with no major outliers suggesting that results are not biased high or low by either laboratory. Table 11-3 shows a summary of the relative percent difference values for the three grade ranges and multiple percentage envelopes. Polymet Labs showed good accuracy with 97% of the sample pairs reporting within 25%.

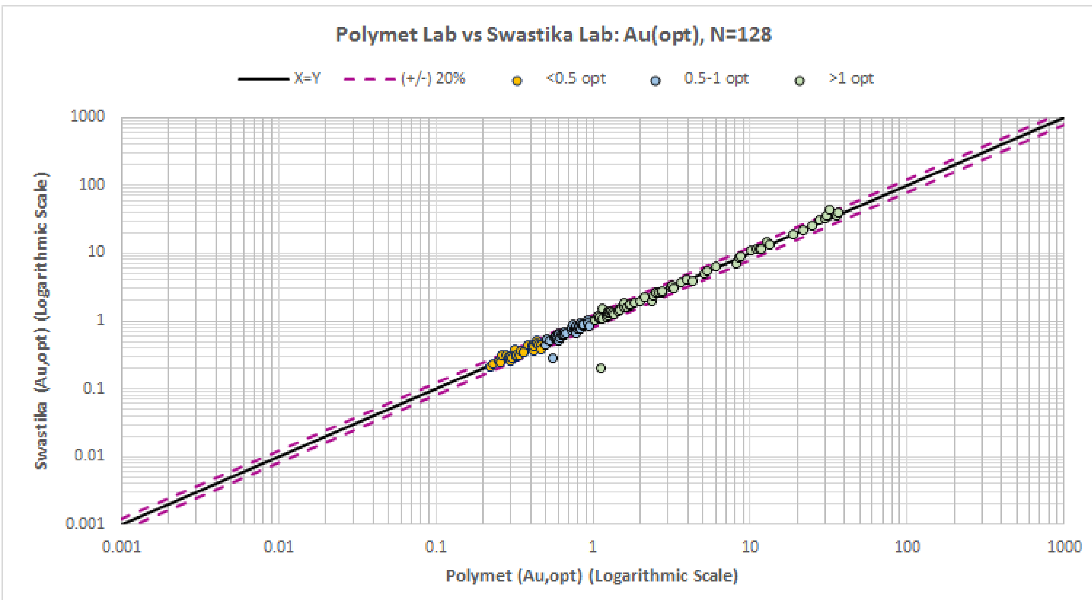

Figure 11-7: Logarithmic scatter plot for Polymet Labs check assays.

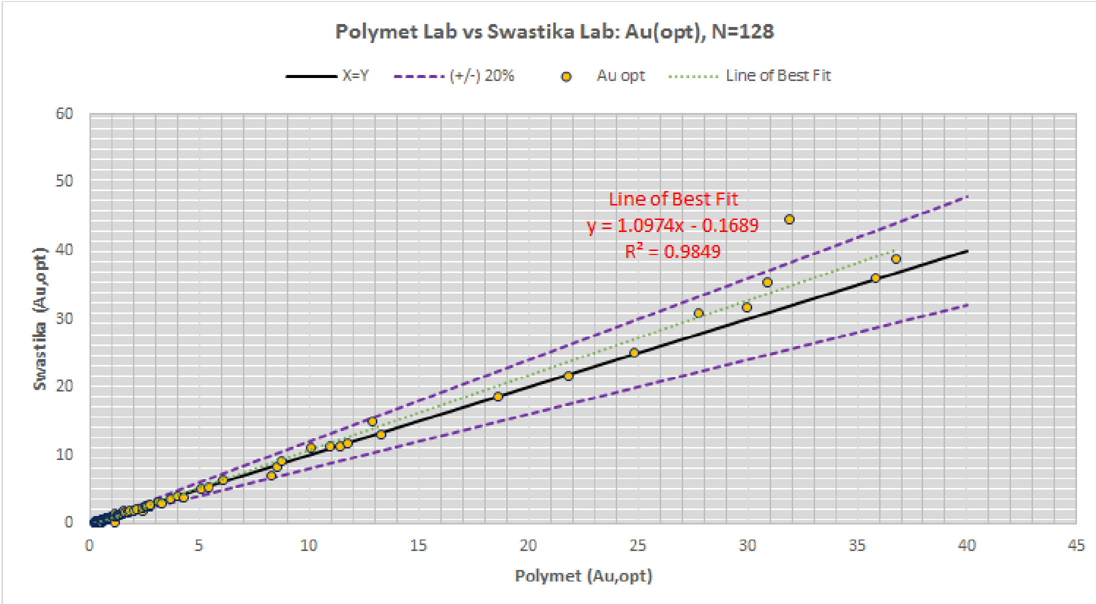

Figure 11-8: Linear scatter plot for Polymet Labs check assays.

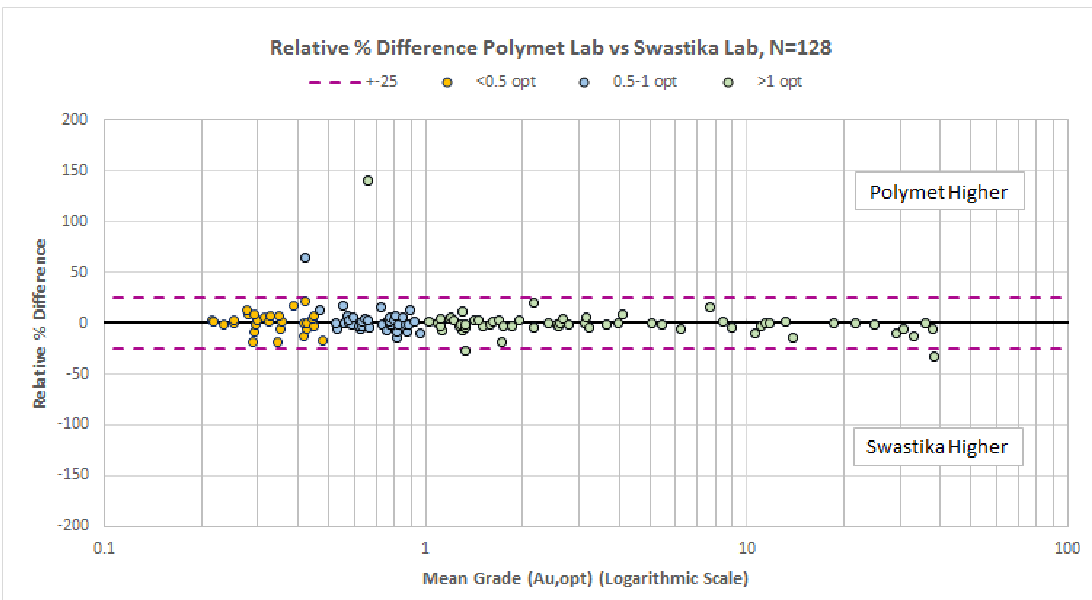

Figure 11-9: Relative percent difference plot for Polymet Lab check assays.

Table 11-3: Summary of Polymet Labs check assays.

		% of Sample Pairs Reporting Within				
Grade Range	Count	+/5%	+/10%	+/-20%	+/-25%	Outliers
< 0.5 opt	29	45%	76%	97%	100%	0
0.5-1 opt	38	55%	84%	97%	97%	0
> 1 opt	61	69%	84%	95%	95%	1
Total No Samples:	128	59%	82%	96%	97%	1

11.3.4 Check Assay Summary

The check assay duplicates show adequate accuracy for the three major labs used in 2018, as seen in Table 11-4. For all samples used, Swastika had 83% of the pairs reporting within 25% of each other, Macassa had 78% of the pairs reporting within 25% of each other and Polymet had the best accuracy with 97% of the pairs reporting within 25% of each other.

Table 11-4: Check assay summary for all labs.

Original Lab to Umpire Lab	Detection Limit (opt)	Analyte	Method	Total # of Pairs	% of Sample Pairs Reporting Within			
					+/-5%	+/-10%	+/-20%	+/-25%
Swastika to Polymet	0.001	Au	FA-GRAV	207	18%	45%	77%	83%
Macassa to Polymet	0.01	Au	FA-GRAV	487	23%	47%	70%	78%
Polymet to Swastika	0.001	Au	FA-GRAV	128	59%	82%	96%	97%

11.4 Macassa Assay Method

The Macassa Mine has an assay laboratory associated with the milling complex. This laboratory assays all of the mill samples, bullion and mine samples (which include chips, mucks and definition drill core). Due to a large amount of samples produced, a small portion of definition drill core was sent to Polymet Labs (Cobalt, ON). The exploration samples from the drilling programs are sent to the Swastika Laboratory (Swastika, ON) for analysis.

At the Macassa Laboratory, the prepping procedure for samples is as follows:

- Sample is crushed to 70-75% passing 10 mesh;
- Riffle split to a 200-250g sample;
- Pulverized with 85% passing 200 mesh screens.
- The pulverizer and crusher are cleaned by compressed air after each sample.
- Waste core is run through the crusher after every high grade sample.
- Silica sand is pulverized after every high grade sample

The Macassa Laboratory follows industry standard protocols for sample preparation and assaying. The lab inserts QA /QC standard samples, barren samples and a duplicate with each batch to test that proper procedure is being followed for quality control. QA/QC is tracked daily on a spreadsheet.

Normal fire assay procedures are employed, using 1 assay ton for core or ½ assay ton for the other mine samples. There are procedures in place for repeating the fusion if the button is too small or too large. A random duplicate sample, blank sample and a certified reference material sample is added to each group.

Polymet Labs is accredited to the International Organization for Standardization (ISO) 9001:2015 by the Standards Council of Canada (SCC). Their prepping procedure for samples is as follows:

- Sample is crushed with >80% passing 10 mesh (1680 µm).
- Riffle split to a 200g sample.
- Pulverized with >90% passing 150 mesh (105 µm) screens.

- The pulverizer and crusher are cleaned by compressed air after each sample.
- Waste core is run through the crusher after every high grade sample.
- Silica sand is pulverized after every high grade sample.
- All Au assays are analyzed by lead fusion fire assay with gravimetric finish performed on 29.16g sample.

Swastika Laboratories is accredited to ISO/IEC 17025:2005 by Canadian Association for Laboratory Accreditation Inc (CALA). Their prepping procedure for samples is as follows:

- Drying of samples is done at 80°C in a forced air circulation system.
- Sample is dry crushed with >80% passing 10 mesh (1700 µm) using low chrome steel jaw plates.
- Riffle split to a 300g sample.
- Pulverized with >90% passing 150 mesh (107 µm) screens using low chrome steel bowl sets.
- The pulverizer and crusher are cleaned by compressed air after each sample.
- Waste core is run through the crusher after every high grade sample.
- Silica sand is pulverized after every high grade sample.
- Au is analyzed by lead fusion fire assay followed by Microwave Plasma-Atomic Emission Spectrometer (MP-AES) finish on 29.17g sample. Au assays > 8.57 g/t are also analyzed by lead fusion fire assay with gravimetric finish performed on 29.17g sample.

11.5 Assay Laboratory Site Audits

In December 2015, an assay laboratory audit was conducted by Analytical Solutions Ltd. of the Macassa Laboratory (Analytical Solutions Ltd., 2015). Recommendations from the audit concluded that the Macassa Laboratory is in a challenging location with limited space to operate, no digital data management and tight turnaround time requirements. Based on the available quality control data, the laboratory team produces good quality gold fire assays suitable for most mine applications. The gold is generally described as less than 25 microns (with particles up to 5mm possible) so that pulps are relatively homogeneous, and assays are repeatable.

There are several improvements recently implemented and currently planned for the laboratory:

- Purchase of 3 terminator crushers/built-in rotary splitters, installed in 2018.
- Purchase of an Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) and a new Atomic Absorption Spectrometry (AAS) instrument to replace 1 AAS slated for use at Effluent Treatment Plant planned, budgeted for 2019.
- Implementation of a Laboratory Information Management System (LIMS) in 2018.

Quarterly visits to the Macassa Assay Lab in 2018 were completed by the Chief Mine Geologist and Sr. Production Geologist to assess the lab's internal quality control, monitor environmental practices and discuss turnaround time and logistics. In November 2018, the Database Analyst and the Chief Mine Geologist conducted a routine laboratory visit to Polymet Labs to assess the lab's internal quality control, monitor environmental practices and discuss turnaround time and logistics. In January 2019, the Database Analyst and the Chief Exploration Geologist conducted a similar laboratory visit to Swastika Laboratories. No cause for concern was found at either of the labs. Macassa Geologists will be conducting routine visits to all labs to document any changes in key personnel, equipment or analytical methods.

In the QP's opinion, the procedures, policies and protocols for the sampling, sample preparation, analytical/assaying techniques and security systems are proper and adequate at the Macassa Mine.

11.6 Accuracy as Determined by Blank and Reference Materials

Certified Reference Materials (CRMs) are inserted into the sample stream to measure the trueness or accuracy of the analytical method used by the laboratory. Control charts plotted by analysis date versus laboratory result are routinely produced to monitor any biases or drift in the data over time that may be due to issues in lab analysis or preparation practices. Gold reference materials were purchased from Analytical Solutions Ltd. (ASL) and prepared by Ore Research and Exploration (ORE). A summary of the number of reference materials submitted to each lab is presented in Table 11-5.

Table 11-5: Summary of reference material by laboratory

LAB	OREAS 214	OREAS 256	OREAS 229	OREAS 257	TOTAL RM	Blanks
Swastika	815		144		**959**	233
Macassa		399		245	**644**	737
Polymet		176		76	**252**	170
Grand Total	**815**	**575**	**144**	**321**	**1855**	**1140**

Swastika Laboratories performed well throughout the year with 100% of the measured values falling within the accepted three standard deviations of the expected value. There is a very slight tendency to underestimate, but not enough to raise concern. The control charts produced for Swastika are overall consistent and show no reason for concern. The data obtained from Macassa's laboratory display values broadly, but evenly dispersed, with adequate accuracies of 90% of their measured values falling within three standard deviations of their true value. Polymet showed a tendency to slightly overestimate reference materials over the analysis period, but not enough to raise concern. Polymet showed adequate accuracies of 96% of their measured values falling within three standard deviations of their true value. Outliers are suspected errors in recording the correct reference material sample in the database. A summary of the reference material results from 2018 is shown on Table 11-6.

Table 11-6: Reference material results summary.

Assay Laboratory	Reference Material	Number Used	Expected Values		Observed Values 2018					
			Mean (oz/t)	Std Dev (oz/t)	Mean (oz/t)	Outliers Excluded	Within 1 SD	Within 2 SD	Within 3 SD	Failed (Outside 3SD)
Swastika	OREAS 214	813	0.088	0.002	0.088	2	81%	99%	100%	0%
	OREAS 229	138	0.353	0.006	0.351	6	75%	100%	100%	0%
Macassa	OREAS 256	271	0.223	0.007	0.224	13	54%	79%	93%	7%
	OREAS 257	208	0.414	0.008	0.414	37	47%	73%	86%	14%
Polymet	OREAS 256	87	0.223	0.007	0.227	1	57%	91%	100%	0%
	OREAS 257	72	0.414	0.008	0.418	4	46%	74%	90%	10%

Blank material is used to monitor contamination caused when sample preparation equipment is not cleaned properly after a mineralized sample. Macassa blanks consists of drill core of matching size composed of unmineralized basic syenite from previously drilled holes in the area. One blank material is inserted after a sample with the potential for moderate to high grade gold. Due to the high grade nature of the Macassa deposit, and only adding blanks after high grade samples, the Swastika and Polymet results showed minor contamination above 10 times the detection limit, but not enough to raise concern. Macassa Assay Lab showed adequate results of 97% within acceptable ranges due to their higher detection limit.

Blank materials inserted into the sample stream did not suggest any contamination during sample preparation or analyses. A summary of the blank results from 2018 is shown on Table 11-7.

Table 11-7: Blank results summary.

Assay Laboratory	Number Used	Expected Value (oz/t)	Observed Values 2018			
			Mean (oz/t)	10x Detection Limit	Within Accepted	Above Accepted
Swastika	226	0.001	0.011	0.01	81%	19%
Macassa	716	0.010	0.014	0.1	97%	3%
Polymet	165	0.001	0.007	0.01	87%	13%

11.7 Data Verification

Drillhole data is verified by Professional Geologists and consists of a wide variety of checks based upon the survey and pick-up of drillhole collars, downhole surveys using north seeking gyro tools during the drilling of the holes. The drillhole trace is continually monitored by the Geologists to insure that the hole remains on track to intercept the target.

Drillhole data is checked by the Database Analyst and the Senior Resource Geologist prior to generating the mineral resource estimate. Errors or suspect date are checked and corrected, or else excluded from the resource estimate. A list of excluded holes is kept on file and includes reasons for exclusion and whether specific mineralized zones or the entire hole should be excluded.

In the QP’s opinion, the procedures, policies and protocols for drilling verification are proper and appropriate at the Macassa Mine. The sampling, handling and assaying methods used at Macassa are consistent with good exploration and operational practices.

12.0 MINERAL PROCESSING AND METALLURGICAL TESTING

It should be noted that the apparent increased telluride content that was observed in the SMC zones indicated that modifications to the processing may be required to keep the high gold recovery that has traditionally been experienced at Macassa; to that effect, cyanidation is taking place at the grinding stage.

Assumptions used for mill recovery are based on a grade-recovery curve that has been developed over the years; this grade-recovery curve is updated yearly. The 2018 milling recovery data is shown in Figure 12-1.

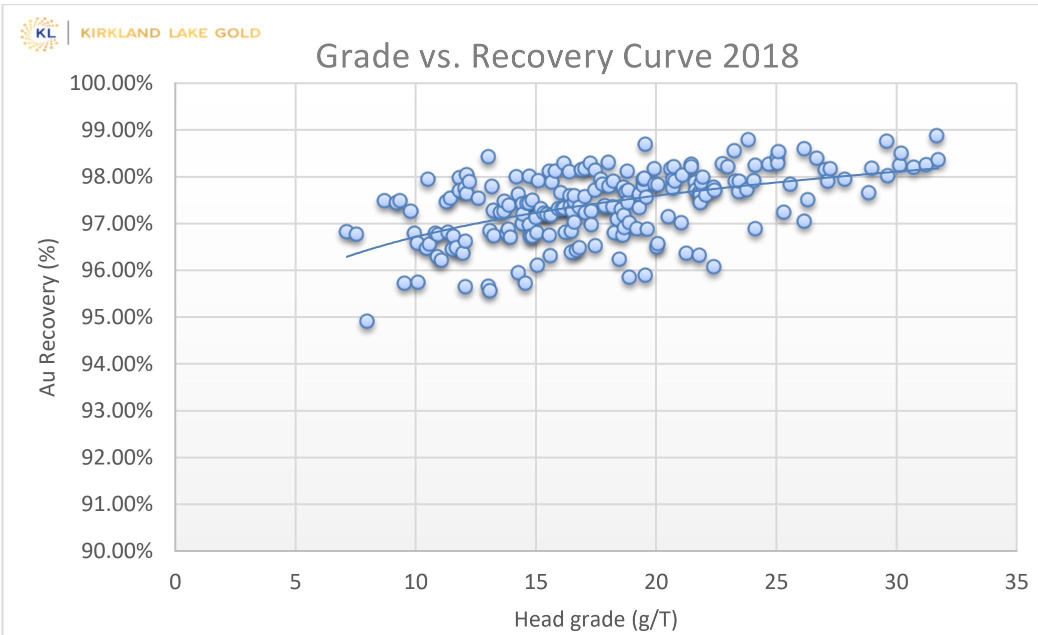

Figure 12-1: Grade vs. Recovery curve.

In the QP's opinion, there are no processing factors or deleterious elements that could have a significant effect on potential economic extraction.

13.0 MINERAL RESOURCE ESTIMATES

The Mineral Resources effective as of December 31, 2018 are summarized in Table 13-1. All Mineral Resources are exclusive of the Mineral Reserves. Note that values recorded in Table 13-1 are in metric tonnes and grams per tonne (g/t). All other units in Section 13 are imperial, the operating units of the Macassa Mine; grades are in ounces per short ton (oz/st) and distances are in feet. The block models used to determine the resources were developed in Datamine using criteria explained in sub-sections that follow.

Table 13-1: Macassa Resources (exclusive of reserves), effective December 31, 2018.

Location	Measured			Indicated			Measured + Indicated			Inferred		
	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)	Tonnes (000's)	Grade (g/t)	Gold Ozs (000's)
Main/'04 Break	265	16.0	137	747	16.6	399	1,013	16.4	536	195	15.3	96
South Mine Complex	188	21.9	132	587	16.7	315	775	17.9	447	415	17.4	232
Grand Totals	453	18.4	268	1,335	16.6	714	1,787	17.1	982	610	16.7	328

Notes:

1. Mineral Resource estimates were prepared under the supervision of Qualified Persons B. Harwood, P.Geo (Principal Resource Geologist, Canadian Operations) and R. Glover, P.Geo (Macassa Chief Geologist).
2. Mineral Resource estimates were undertaken according to the Company's Policy for Mineral Reserve and Resources
3. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability
4. Mineral Resources were estimated at a block cut-off grade of 8.57g/t
5. Mineral Resources are estimated using a long-term gold price of CAD$1,635/oz
6. A minimum mining width of 2.13m (7ft) and minimum mining height of 2.74m (9ft) was applied
7. A bulk density of 2.74 t/m^3 was used
8. Totals may not add exactly due to rounding
9. Polygonal estimates carried over from 2017 were removed for this resource update.
10. CIM definitions (2014) were followed in the calculation of Mineral Resources

13.1 Database

Macassa uses a SQL drillhole database managed through Datamine Fusion software with built in validation checks during data import/input. A number of other validation checks were performed during Exploratory Data Analysis (EDA) of the drillhole database. Underground chip sample data is stored digitally in AutoCAD files. Chip samples taken since November 2014 have been imported into an access database through software provided by Promine. Earlier samples have been added to the database through the same software and more are added regularly.

During 3D solid modelling, a number of diamond drillholes were flagged as unreliable and an exclusion list was generated for each zone. The reasons for exclusion varied, but the most common issues encountered were poor confidence in the collar location, downhole survey or sampling. The exclusion list contains a list of holes for exclusion by specific domains/zones and exclusion of entire drillholes. Notes were created stating the reasoning behind each exclusion. Holes were left in the drillhole database but excluded prior to generating domain raw sample and composite files.

Some legacy problems were encountered in the drillhole database. In most cases these issues were resolved, but a few diamond drillholes were excluded where issues could not be fixed. Each sample file was examined to look for excessively short or long samples, Au grades less than 0 oz/st, unrealistically high grades, or large numbers of "single integer" grades. For example, several samples had grades of exactly 15 oz/st and 999 oz/st.

The sources of these errors were identified and resolved, and if not, the holes were excluded from the estimate.

In some historic mining areas a number of holes targeting distant mineralization were collared in close proximity to an existing zone, so that a large number of pierce points were located within a small area. In some cases only a selection of those drillholes were sampled. This resulted in drillholes that had trace grades assigned incorrectly; the area was mineralized but deliberately not sampled. Those samples were identified and excluded from the estimate for the unsampled zone.

13.2 Geological Interpretation and 3D Solid Modelling

3D domains were first modelled in 2016 using Datamine Software's Studio EM/RM packages, for the purpose of transitioning towards block model resource estimates. 3D wireframes were created for the South Mine Complex and Main Break/04 Break (MB/04B) areas. The wireframes followed structurally controlled mineralized lenses. In the Main Break/04 Break the lenses are typically associated with quartz veins and breccias (see Section 7). In the SMC the structures are often associated with broader sulfide mineralization, quartz molybdenum fractures and breccias, quartz flooded stringers and multiple phases of telluride mineralization. In many cases the structures have been validated by underground exposure. In 2018 the wireframes were updated to incorporate new drilling and recently digitized underground production samples (chip samples). The 3D solids were organized into domains with common orientation and each wireframe was assigned a zone code.

The 3D solids were initially created to follow broad low grade structures, and mineralization was not always consistent within the solids. For the 2018 MRMR update, areas of weak and narrow mineralization were removed from the solids. When the shapes were first created, production data was not always available, so the wireframes have been updated to correctly incorporate underground mapping and production sampling, where applicable.

Table 13-2 shows the total number of domains and zones within each domain. A total of 239 wireframes were created in 5 SMC domains and 12 Main Break/04 Break domains. A 3D perspective view of the Macassa resource shapes is shown in Figure 13-1.

During EDA multiple grade populations were identified within the domains. The domains and zones will be reviewed in 2019 to see if improvements can be made by sub-domaining consistently high grade areas.

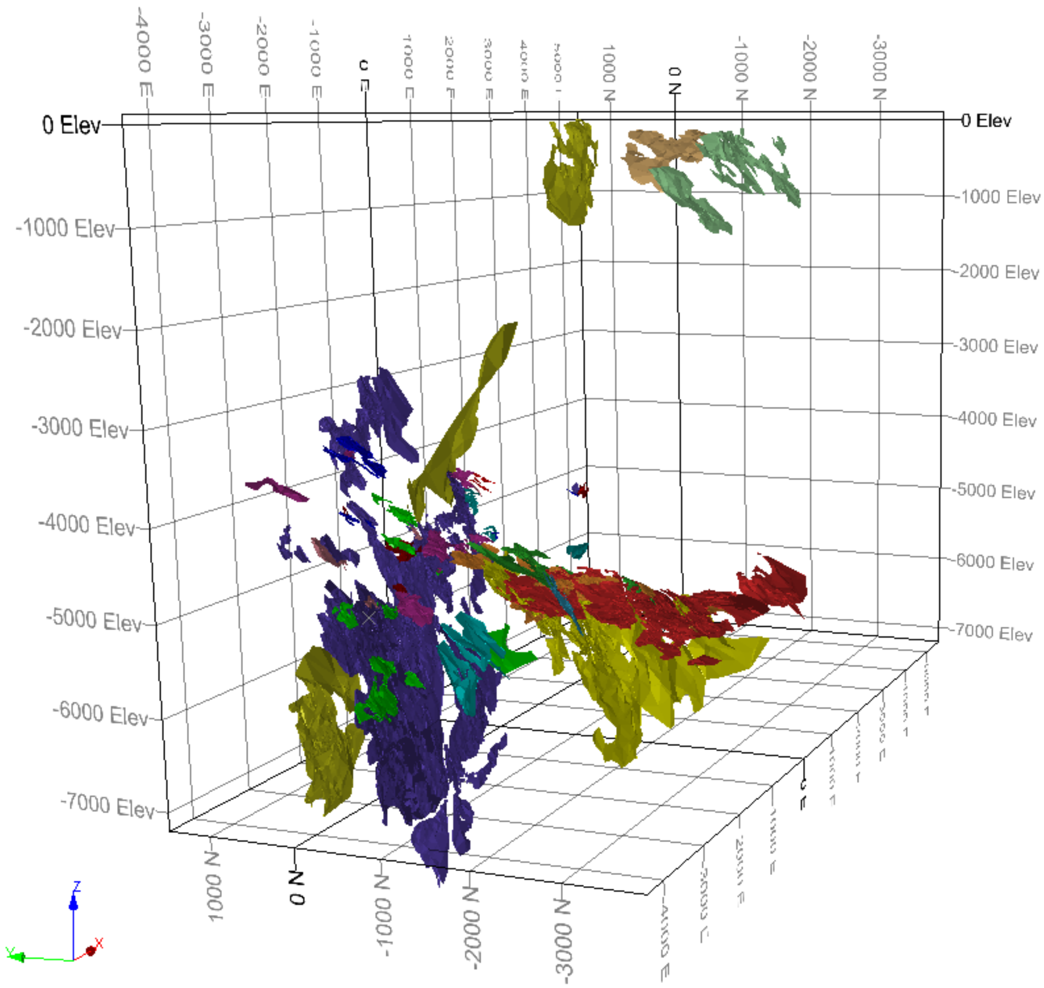

Figure 13-1: 3D perspective of the Macassa domains.

Notes:
The wireframes were generated in the Macassa geology grid, displayed.
The grid is oriented such that the MB/04B strikes approximately east-west.
Distances are in feet, view is looking grid northeast.

Table 13-2: Summary of the number of zones with reported resources for the 5 SMC and 12 MB/04B domains.

SMC Domain	Number of Zones	MB/04B Domain	Number of Zones
1	37	101	41
2	23	102	13
3	22	102.1	14
4	7	103	8
5	10	103.1	6
		104	8
		104.1	3
		105	6
		106	3
		107	9
		108	3
		109	9
Total	**99**	**Total**	**123**

Notes:
Block models for a total of 239 zones were created; of those 222 had resources reported.
Remnant resources for 6 MB/04B zones were removed because they were almost completely mined out.
11 others from both SMC and MB/04B were classified entirely as Mineral Inventory, usually due to low grades.

13.3 Density Data

The density traditionally used in the camp was 2.67 t/m^3. There have been a number of studies that suggest that the traditional density number was too low and consequently gave an understated tonnage. The difference in the tonnage estimate is approximately 2.5% between the density used in the past and the current density being used.

In 2007, 95 samples were used to measure the density of the SMC zones. These samples confirmed that the density used for the Lower D Zone was realistic. The other SMC zones varied and it appears that the 2.74 t/m^3 used overall at Macassa is reasonable. The tonnage difference between 2.74 t/m^3 and 2.78 t/m^3 is less than 2%. Additional density studies are planned for 2019.

13.4 Capping of High Gold Grades

Macassa is well known as one of the highest grade gold mines in the world. As such, capping is a critical part of the resource estimation process. In previous modified polygonal estimates MB/04B composites were capped at 3.5 oz/st, with some of the higher grade SMC zones capped at up to 9.3 oz/st. For the 2018 MRMR estimate, the raw assay statistics of each of the 239 zones were reviewed and suitable caps were chosen for each of the zones. Capping values for the DDH and Chip samples were selected independently. A sample log-probability plot is shown for the New South Zone (SMC zone 1-0) in Figure 13-2. Summary statistics for the raw assays for SMC domain 1 and the 5 largest zones within the domain are included in Table 13-3.

Initial caps were selected based on a moderately conservative geostatistical analysis. Those capping parameters resulted in good correlation with the input sample data from model validation using the Snowden Supervisor software module. However, using those capping parameters a reconciliation test resulted in a moderate underestimation of ounces vs. production from Q1-Q3, 2018. The models were rerun using a higher set of caps for the final estimates. Table 13-4 shows an example of the caps used for 14 zones from the MB/04B Domain 101.

The higher set of caps resulted in an underestimation of ounces of approximately 5% from January to November 2018 (Table 13-5). December 2018 production results were above the predicted grade estimate, this consequently resulted in an underestimation of ounces in the mill by 11.5% for the entire 2018 year. Sub-domaining of high grade areas, as well as refinement of caps is planned to improve the model grade estimates as compared to production results.

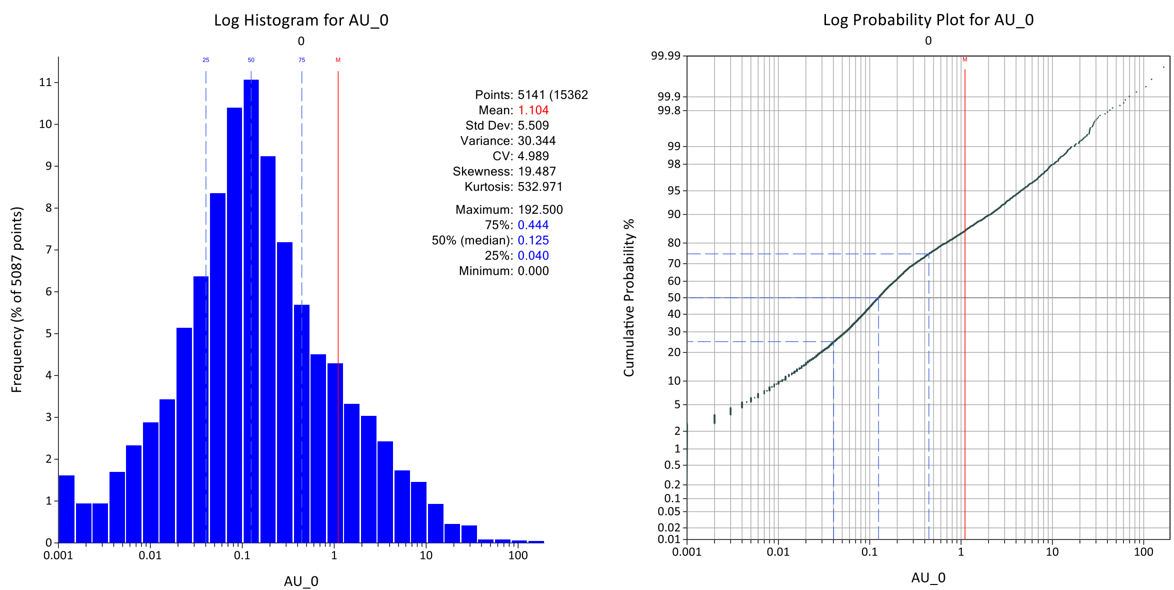

Figure 13-2: Sample Log-histogram and Log-Probability Plots for New South.

Notes:

This is a sample for the 5141 DDH samples in Zone 1-0.
Grades are in ounces per short ton.
In this case final capping was applied at 30 oz/st.
The initial cap of 20 oz/st reconciled low vs. 2018 production.

Table 13-3: Example of raw Au (oz/st) assay statistics for SMC Domain 1, including details for the 5 largest zones in the SMC.

	All Zones	0	1	13	27	31
Samples	9461	4286	937	2571	1110	557
Minimum	0	0	0	0	0	0
Maximum	256.3	256.3	45.4	119.3	220	27.3
Mean	1.15	1.37	0.79	1.13	0.91	0.59
Standard deviation	5.97	6.44	3.18	5.63	7.69	2.02
CV	5.21	4.71	4.01	5	8.42	3.42
Variance	35.64	41.5	10.13	31.7	59.1	4.09
Skewness	22.5	23.44	8.64	13	24.08	8.5
50%	0.15	0.18	0.1	0.12	0.15	0.14
60%	0.21	0.28	0.15	0.18	0.2	0.19
70%	0.35	0.49	0.21	0.26	0.31	0.26
80%	0.72	1.05	0.43	0.5	0.56	0.45
90%	2.02	2.79	1.26	1.67	1.25	1.18
95%	4.57	5.85	3.44	4.3	2.41	2.09
97.5%	8.79	10.55	5.66	9.52	4.59	4.04
99%	17.99	20.74	15.71	19.63	10.23	7.81

Table 13-4: Example of capping parameters for 14 zones of Domain 101.

ZONE	DDH Cap (oz/st)	Chip Cap (oz/st)
1	7	2.5
1.1	3	-
3	12	20
3.1	10	8
4	21	8
7	4	2
8	1.5	-
10	4	2.9
16	2.5	-
22	4	1.5
24	3	1
26	2	2.5
28	1	1
29	6.5	7
30.4	1.5	1.5

Table 13-5: Ounce reconciliation for the 2018 updated block models vs. Macassa Mill head ounces.

	Original Caps		Revised Caps	
	2018 Ounces	% Difference vs. Mill Head Ounces	2018 Ounces	% Difference vs. Mill Head Ounces
OK Estimate (Jan-Nov)	202,317	6.8%	207,095	4.6%
ID^3 Estimate (Jan-Nov)	200,147	7.8%	205,974	5.1%
Mill Head Ounces (Jan-Nov)	217,138		217,138	
OK Estimate (Full Year)	Not Calculated		217,932	11.5%
Mill Head Ounces (Full Year)			246,228	

Notes:

The top 3 rows are January - November, 2018, the 2 bottom rows are for the full year.

The OK estimate using revised capping levels was the only test done for the full year, as final model decisions had been made when the mill data became available.

13.5 Compositing

Raw samples were composited to a nominal length of two feet. Composite lengths were normalized through the zone to create equal length composites with no remnant on the downhole edge of the zone. Tolerances of half of the composite length were allowed. 2ft was chosen as the composite length because it is double the most commonly occurring sample length in the SMC and MB/04B datasets, and long enough to prevent splitting of most longer samples. Longer composites were also tested, but due to the extremely narrow nature of many of the Macassa Mineralized zones, a significant number of samples did not composite using longer lengths (e.g. 3ft).

Poorly drilled areas are sometimes mined at Macassa. Consequently, previous resource estimates used chip samples in the resource estimates, allowing measured and indicated resources to be defined around mined areas where DDH data would not have permitted inclusion in those categories. To maintain consistency with previous estimates, face chip data was also used in the current resource estimate. However, to reduce the weight of face chips relative to diamond drillholes, they were composited to 3ft lengths, using the same length normalization as the drillhole samples. In some historic mining areas, the only face chip data available had already been composited across the face (typically between 6ft to 9ft lengths). These composites were split to conform to the 3ft nominal composite length.

Missing samples were assigned a trace grade of 0.0001 oz/st. As mentioned in the database section, some areas were deliberately not sampled in areas where a large number of drillholes pierced a zone in a small area (targeting more distant mineralization). Those samples were excluded from the composites whenever they were identified.

Capping was applied to the composited data, not to the raw assays. Sample summary statistics of the raw assays vs. capped composites are shown in Table 13-6 for SMC Domain 1.

In the past, the resources at Macassa have been reported to a minimum mining width. In order to maintain consistency with past modified polygonal estimates the same reporting was used for this estimate. The minimum horizontal mining width (HMW) for steeply dipping zones is 7ft; this has been increased from 6ft in previously reported Macassa Resources. For shallowly dipping zones, a 9ft vertical mining height (VMH) was used. A set of dilution block models were created outside the main mineralized zone that brought the full thickness of the model to the appropriate minimum mining dimension. Composites were created to estimate grades into those cells by selecting and compositing DDH and chip samples within 4ft of the mineralized shape.

Anywhere one mineralized zone terminated or crossed another, the "zone" composites were removed from the dilution composite file. This prevented inclusion of high grades that were assigned to another zone/domain.

Table 13-6: Summary statistics for DDH and chip raw assays, uncapped composites and capped composites (oz/st) for all zones in SMC Domain 1.

Statistic	Samples	Min.	Max.	Mean	St. Dev.	CV	Variance	Skewness	50%	90%	95%	97.50%
Raw Assays	15362	0	220	0.89	4.96	5.56	24.61	20.53	0.098	1.36	3.36	7.00
Uncapped Composites	14805	0	220	0.71	3.60	5.08	12.99	25.29	0.095	1.25	2.85	5.51
Capped Composites	14805	0	30	0.62	2.10	3.39	4.41	7.90	0.095	1.25	2.80	5.41

13.6 Variography

Variograms were created for the capped composites, both with and without chip data included in the sample file. In most cases, the chip data increased the short range variability of the data, but had very little effect on the overall range. The final variograms were created using only DDH data as the combined datasets tended to create noisier variograms, but in each case the combined data was reviewed and the short range variability was taken into consideration when modelling the structures. Figure 13-3 shows a sample of the final variograms that were created for the SMC Domain 1. Models were fitted to the data to try and fit the short range structure and overall range as accurately as possible. Variogram parameters are listed in Table 13-7. Domains not listed in Table 13-7 had poorly defined variograms and estimates for those zones did not use Ordinary Kriging (OK). Where possible, omni-variograms were generated to help guide primary search range decisions.

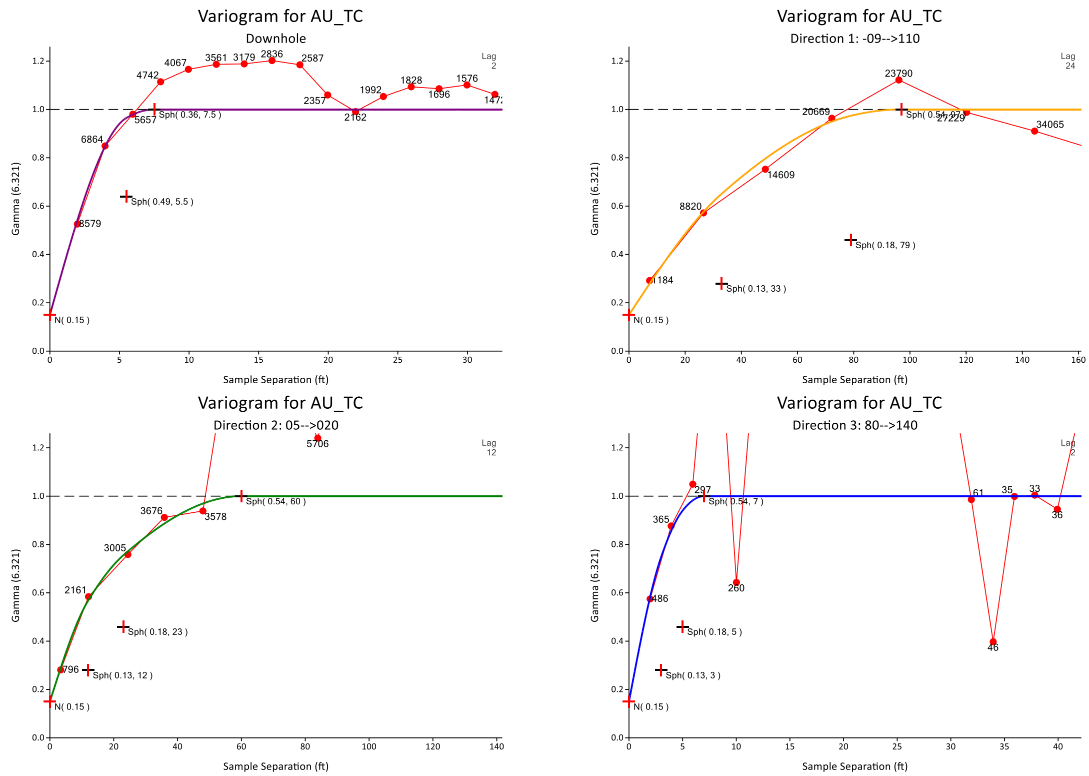

Figure 13-3: Variograms for SMC Domain 1, showing the data and fit models.

Table 13-7: Variogram parameters

Domain	Z Rot1	Y Rot	Z Rot2	Nugget	D1 Range	D2 Range	D3 Range	ST1 Partial	D1 Range	D2 Range	D3 Range	ST2 Partial	D1 Range	D2 Range	D3 Range	ST3 Partial
1	140	10	-120	0.15	33	12	3	0.13	79	23	5	0.18	97	60	7	0.54
2	170	40	170	0.15	12	51	5	0.28	55	60	29	0.57	-	-	-	-
3	170	55	-140	0.18	21	21	21	0.5	43	89	22	0.18	76	103	23	0.14
4	160	20	180	0.1	85	60	12	0.9	-	-	-	-	-	-	-	-
5	150	55	90	0.23	104	67	10	0.77	-	-	-	-	-	-	-	-
101	170	70	135	0.2	48	45	14	0.32	127	143	15	0.48	-	-	-	-
102	170	50	90	0.12	46	32	14	0.05	145	57	15	0.83	-	-	-	-
102.1	170	30	170	0.1	29	27	4	0.4	200	62	10	0.5	-	-	-	-
103.1	150	30	180	0.16	13	71	15	0.19	115	72	16	0.65	-	-	-	-

Notes:

SMC (Domains 1-5) and MB/04B (Domains 101-103.1) domains shown where variograms could be modelled.

Ranges are in feet, rotation in angular degrees.

13.7 Block Models

13.7.1 Domaining

The Macassa block model estimates were created in two sets. The first set was for the 5 domains comprising the SMC. The second was the 12 domains comprising the MB/04B. The domains were created according to their orientation, with some subdivisions made based on grade populations or large geographic differences. Subdividing by orientation allowed for variography to be completed by domain, with the same search and estimation parameters used for all zones in the domain. The domain shapes were reviewed by the Macassa Senior Resource Geologist, the Macassa Chief Geologist and the Principal Resource Geologist (Canadian Operations).

In the SMC, Domain 1 consisted of shallow dipping lenses, generally dipping between 0-30^{o} southeast to south, using the mine geology grid. Domain 2 dipped moderately to the south (30-45^{o}). Domain 3 dipped more steeply south (45-80^{o}). Domain 4 dipped moderately to the southeast (30-45^{o}). Domain 5 dipped steeply to the southeast (45-70^{o}).

In the MB/'04B, Domains 101, 102, 104, 105, 107 and 108 all dipped steeply south, typically approximately 70^{o}. Domains 102.1, 103.1, 104.1 dipped shallowly to the south (approximately 30^{o}). Domain 106 dipped moderately to the east (approximately 45^{o}). Domain 109 dipped moderately to the southeast (approximately 45^{o}).

13.7.2 Block Model Parameters

The Macassa block models were created in Datamine Software's Studio RM package. Baseline block size and other estimation parameters were selected based on the kriging neighbourhood analysis (KNA) functions in Snowden Supervisor. All of the zones in the SMC and MB/04B domains were modelled using prototypes local to the zone, with 9ft by 9ft by 9ft parent blocks. Each parent block was allowed to subcell down to 1ft by 1ft by 0.5ft. Estimation and classification were completed using the local prototypes, then the individual zones were merged into a single prototype for the SMC, and one of 3 prototypes for the MB/04B. Domains 105 and 106 were on their own prototype, domain 107 on another, all the remaining MB/04B domains were on the third. This was to account for the large spacing between some of the domains on the '04 Break structure. Parameters for the 4 main prototypes have been included in 13-8. Combination of the individual zone models allowed any overlapping cells to be correctly resolved, and simplified evaluation of final resource grades.

As mentioned in the compositing section, past resources at Macassa were reported to a minimum mining width. A method was devised that created "dilution" model cells outside the in-situ mineralized zone, based on the appropriate minimum mining dimension of the zone. For shallow dipping zones, the minimum vertical mining dimension was 9ft, and for steeply dipping zones, the minimum horizontal mining dimension was 7ft. Cells were added to the outside of the shape to bring the total height or width up to the minimum mining dimension. The grades were estimated separately into the dilution models using hard boundaries, then combined with the in-situ models after estimation.

Table 13-8: Prototype dimensions for the SMC and MB/04B.

Prototype	X-Origin	Y-Origin	Z-Origin	# Cells X	# Cells Y	# Cells Z
SMC	-2410	-3060	-7160	720	320	320
04 Main	-5140	-2220	-7670	737	328	598
Dom 105-106	-2660	-3960	-1240	427	295	143
Dom 107	-3920	70	-7220	1067	162	811

13.7.3 Search Parameters

Almost all of the Macassa domains were structurally controlled lenses that had some degree of change of orientation. The Studio RM "Dynamic Anisotropy" method was used to vary the search ellipsoid orientation to follow the average dip and dip direction of the wireframe.

The search parameters for the MB/04B and SMC are included in Table 13-9 and Table 13-10, respectively. The searches were designed based on KNA and using variogram ranges, typically using a primary search where the variogram model range reached approximately 80% of the sill. Where variograms could not be generated, primary search ranges similar to the other domains were used. The estimates used three search passes to fill as many of the cells in the model as possible. Cells not meeting the distance or minimum sample requirements of the third search pass were assigned zero grade. Cells with estimated grades that were outside the nominal distances to samples were not classified as resources. However, the grades were retained in a "Mineral Inventory" category as a guide to future drilling.

Several sets of search parameters were tested, and the set of parameters that most closely matched the drilling data was tested in a reconciliation study. Parameter selection was based on model validation in Snowden Supervisor and visually in Studio RM.

Table 13-9: Search parameters and estimation methods for all MB/04B domains. For all domains, the maximum number of samples per hole was 5.

Domain	Estimation Method	Primary Search		Secondary Search		Tertiary Search	
		Dimension (ft)	Min/Max	Factor	Min/Max	Factor	Min/Max
101	OK	50x60x8	6/12	2	6/16	4	6/20
102	OK	65x35x8	6/12	2	6/16	4	6/16
102.1	OK	70x35x20	6/12	2	6/16	4	6/16
103	ID^2	45x45x8	6/12	2	6/16	4	6/16
103.1	ID^2	60x40x8	6/12	2	6/16	4	6/16
104	ID^2	45x45x8	6/12	2	6/16	4	6/16
104.1	ID^2	45x45x8	6/12	2	6/16	4	6/16
105	ID^2	45x45x8	6/12	2	6/16	4	6/16
106	ID^2	45x45x8	6/12	2	6/16	4	6/16
107	ID^2	70x60x8	6/12	2	6/16	4	6/16
108	ID^2	45x45x8	6/12	2	6/16	4	6/16
109	ID^2	45x45x8	6/12	2	6/16	4	6/16

Table 13-10: Search parameters and estimation methods for all SMC domains. For all domains, the maximum number of samples per hole was 5.

Domain	Estimation Method	Primary Search		Secondary Search		Tertiary Search	
		Dimension (ft)	Min/Max	Factor	Min/Max	Factor	Min/Max
1	OK	50x40x8	6/12	2	6/16	4	6/20
2	OK	30x35x8	6/12	2	6/16	4	6/20
3	OK	45x45x8	6/12	2	6/16	4	6/20
4	OK	50x35x8	6/12	2	6/16	4	6/16
5	OK	60x40x8	6/12	2	6/16	4	6/16

13.7.4 Estimation Parameters and Model Outputs

All final estimates for all SMC and some MB/04B domains used Ordinary Kriging. The remaining zones used ID^2 (Table 13-9 and Table 13-10). ID^3 and Nearest Neighbor estimates were also completed for all domains and reviewed during model validation.

In addition to the grade fields, several other parameters were output or calculated. The estimate variance, search pass number and the number of samples used to estimate each parent cell were output. The distance to the closest sample, the weighted average distance to samples (weighted by kriging weight) and number of boreholes per estimated cell were also calculated for each parent cell.

13.7.5 Model Validation

Block models were checked first by loading them into Studio RM and reviewing them in 3D, cross-section and plan views (e.g.Figure 13-4). The model grades, interpolation distances, search orientations and calculated parameters were checked.

The models were then loaded into Snowden Supervisor along with the composite file used to estimate the grades. Declustering weights were applied to all composite data for model validation. SWATH plots were created to examine the spatial distribution of sample grades vs. the model grade estimates. SWATH plots compared both naïve and declustered sample data to the block model. Figure 13-5 shows an example of the cross-strike SWATH plot of the New South Zone (1-0).

Figure 13-6 is a log-histogram of sample grade vs. model grade for SMC zone 1-0, showing the OK and ID^2 estimates. Both estimates reproduced the declustered mean within 1%.

Once a good set of parameters had been validated using the input sample data, a reconciliation test was done using January-November production in 2018 (see Section 13.4). Surveyed voids were evaluated using the model, and compared to mill head ounces for the same time period. It was found that the model reconciled about 7% too low, so the capping parameters were increased for most zones, and some other minor search adjustments were made. The modified parameters brought the ounce reconciliation to approximately 4.5%, with the model still underestimating ounces. A late re-test including December production increased the gap to 11.5%, primarily from over-performance in December. Additional work is required to improve reconciliation. It is recommended that capping parameters and the possibility of high-grade sub-domaining be reviewed in 2019.

In addition to internal model validation by Macassa staff, SGS Geostats Canada Inc. (SGS) completed an independent audit of the 2018 resources, up to the stage of creating classified block models. Model depletion and the final resources were not reviewed. The audit included a review of the raw and composited samples, capping, variography, search parameters, and a check-estimate of SMC Domain 1. On completion of their study, SGS encountered no major errors and inconsistencies, and several recommendations from the audit were incorporated into the final resource estimates.

All final resource estimates for SMC and MB/04B domains used Ordinary Kriging (OK) or Inverse Distance Squared (ID^2) and were validated using ID^3 and Nearest Neighbour estimates. The OK and ID^2 grade interpolation methods used are appropriate for this type of gold deposit with this density of data.

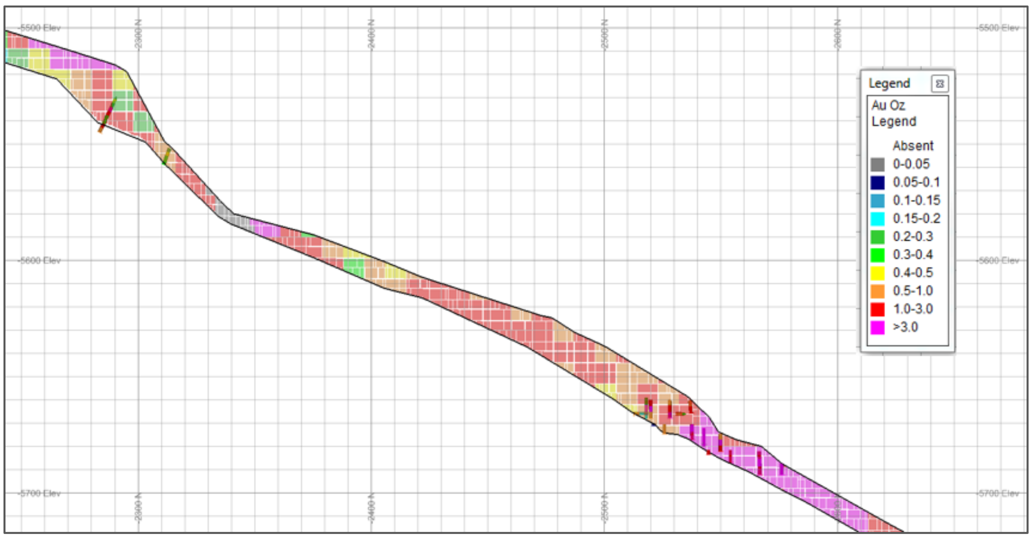

Figure 13-4: Cross section looking east (Mine Geology Grid, section -80E) of the New South Zone.

Notes:

The in-situ model and composites for samples and chips are shown using the same grade legend, in ounces per short ton (oz/st).

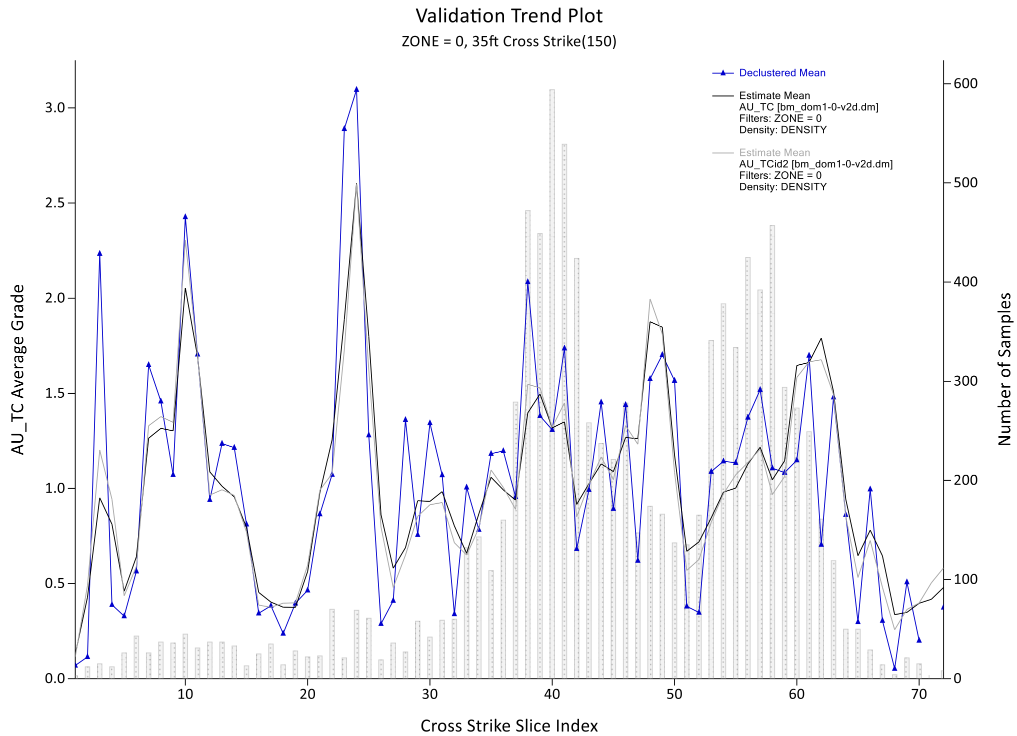

Figure 13-5: Cross-strike SWATH plot for the New South Zone (1-0).

Notes:

Only declustered grades are shown (blue) to reduce graph clutter.
The black line is the OK estimate, the gray line is the ID^2 estimate.
Slices are 35 feet.
The grey bars represent the numbers of samples in each slice.

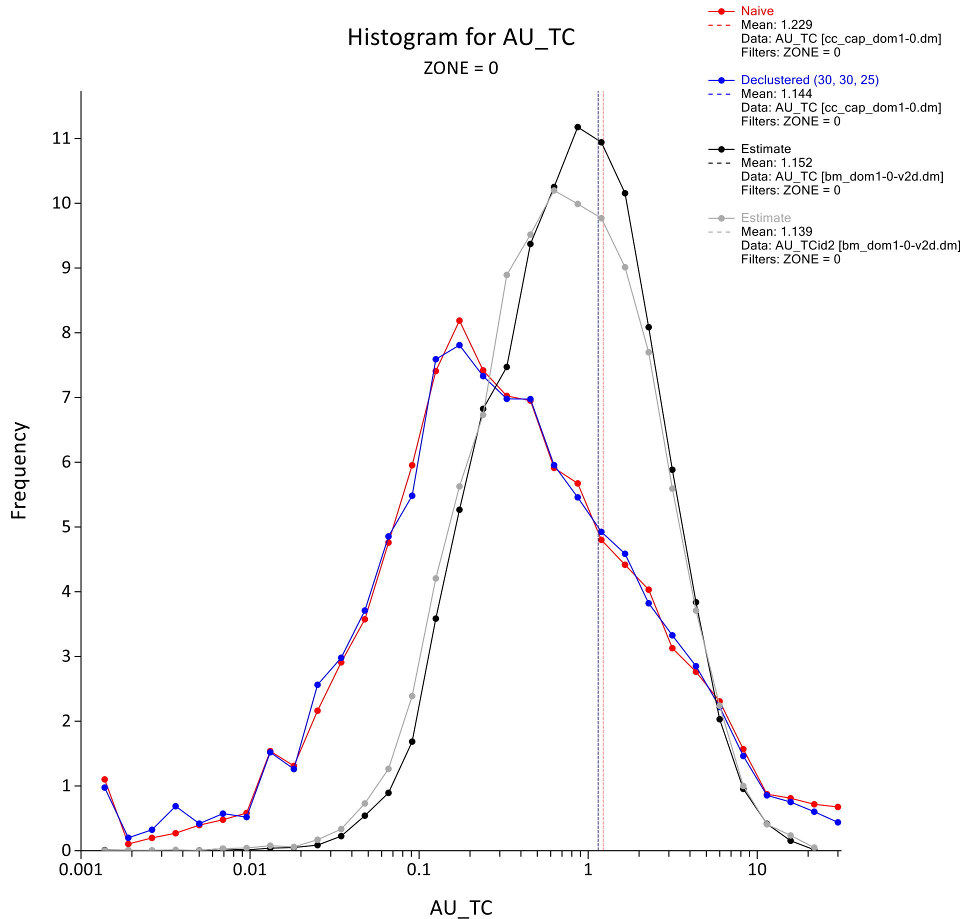

Figure 13-6: Log-histogram for the SMC New South Zone (1-0).

Notes:
Grades for naive and declustered samples and the OK and ID^2 estimates are shown.
The colour legend is the same as in the SWATH plots above.

13.8 Resource Classification

The models were classified as measured, indicated or inferred as outlined by CIM Definition Standards (May 2014), based on a number of qualifying factors. The resoure classification is primarily based on the distance to development, diamond drilling or chip sampling. For previous modified polygonal resources, ranges for measured resources were 30ft from development, 50ft from the nearest drillhole (or development) for indicated, and 100ft from the nearest drillhole for inferred. The ranges were kept consistent for the present classification. However, rather than use the distance to the closest sample, the weighted average distance to all informing samples was used as the primary classification criteria. Weighting used the same weights as were used in the grade estimate (kriging weights or inverse distance squared).

Measured resources were categorized by first drawing strings around areas within 30ft of development, then adjusted based on the average distance to samples and other criteria discussed below. Indicated resources were defined using an average distance of approximately 50ft to 70ft, as that distance typically corresponded well to the indicated boundary for the 2016 polygonal resource. Shapes were smoothed to allow incorporation of slightly longer ranges when other qualifying criteria added confidence to the estimate. Small, isolated blocks of indicated resources were avoided when they were in areas far from existing development. Inferred resources were classified as having an average distance between 70ft and 120ft to samples.

A number of other qualifying criteria were examined prior to finalizing category perimeters. Blocks in all resource categories required at least 2 separate drillholes to generate estimated grades; however, 3 or more drillholes were usually required for measured and indicated resources. For measured and indicated resources, drill density usually allowed the maximum number of samples to be reached. The number of drillholes and samples used to estimate each cell were plotted in Studio RM and the perimeters were adjusted based on that data.

The subcelled block models were classified with the in-situ and dilution cells together. Once classified, the grades were averaged through the appropriate mining height or width, to create a single grade. This allowed reporting of the final resources where grades exceeded the cutoff over the appropriate minimum mining dimension.

The in-situ (undiluted) models were provided to engineering for stope planning and design, as the resolution in the high grade mineralized domains facilitated mine planning. However, dilution grades were included when evaluating tons and grade in stopes.

Mined voids and reserves were depleted from the block model by coding model cells, then applying filters to the output results. In addition, exclusion perimeters were generated for mining remnants around voids. The remnants typically consisted of unmineable rinds of mineralization next to voids or mining pillars. These typically occur when there are small differences between the ore encountered underground and the modelled 3D shape. A second set of perimeters were generated that excluded reserve remnants and isolated grade blocks from the resource. The final resource was reported exclusive of mining, reserves, isolated grade blocks and sterilized remnants.

In the QP’s opinion, there are no known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors that could materially affect the mineral resource estimate.

14.0 MINERAL RESERVES ESTIMATE

The Mineral Reserves estimate is based on Macassa Mine's measured and indicated Mineral Resources. For these, mining plans were developed, in which specific mining methods were applied and required development was planned as per practices outlined in Section 15.0.

Areas of uncertainty that may impact the Mineral Reserve estimate includes the price of gold and exchange rate assumptions used, geological complexity and unforeseen geomechanical constraints.

The Mineral Reserves effective as of December 31, 2018 are summarized in Table 14-1.

Table 14-1: Mineral Reserves for the Macassa Mine (as of Dec 31, 2018).

Zone	Category	Tonnes (000's)	Grade (g/t)	Ounces (000's)
SMC	Proven	174	23.5	131
	Probable	2,420	22.6	1,750
MBZ	Proven	114	18.9	69
	Probable	481	19.0	294
Total	**Proven**	**290**	**21.5**	**200**
Total	**Probable**	**2,900**	**22.0**	**2,050**
TOTALS	**Proven + Probable**	**3,190**	**21.9**	**2,250**

Notes
1. CIM definitions (2014) were followed in the estimation of Mineral Reserves.
2. Mineral Reserves estimates were prepared under the supervision of Qualified Person Mariana P. Harvey, P. Eng.
3. Mineral Reserves estimates were undertaken according to the Company's Policy for Mineral Reserve and Resources.
4. Cut-off grades were calculated for each stope, including the costs of: mining, milling, general and administration, royalties, capital expenditures and other modifying factors (e.g. dilution, mining extraction, mill recovery).
5. Mineral Reserves were estimated using a long-term gold price of US$1,230/oz and a currency exchange of US$1.00=CAD$1.33, with a resulting price gold of CAD$1,635.90/oz.
6. Totals may not add exactly due to rounding.

To develop the reserves, the economic feasibility of each stope was determined, inclusive of all mining, milling, general administration, royalties and sustaining capital expenditures. Appropriate modifying factors were applied, such as dilution and recovery (mining extraction), based on the mining method. Further details in regards to mining methods can be found in Section 15.0. The economic viability of the measured and indicated resources converted into reserves was determined by Macassa Mine's engineering department.

Note that in reference to production areas, the terms 04' Break and Main Break are currently used interchangeably at Macassa.

In the QP's opinion, there are no known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors that could affect materially the mineral reserves estimate.

14.1.1 Mining Dilution and Recovery

Two sources of dilution have been considered in the Mineral Reserves estimate: internal (In-Situ) dilution and external dilution. Internal dilution includes low grade material and/or waste rock that will be mined along (not able to be segregated) with the ore. Internal dilution is included in the mining shapes created. External dilution includes material outside the designed mining shape that overbreaks or sloughs and is mucked and delivered to the mill. Cut and Fill stopes (MCF or UCF) are planned with 0% external dilution, and internal dilution varies depending on the geometry of the mineralized structure and mineable shape design. For Longhole (LH) Stopes, an external dilution of 0.6m is applied to the designed mining shape, and the internal dilution will also vary depending on the mineralized structure geometry within the Longhole Stope design.

An extraction (mining) recovery factor is applied to all reserve shapes. This factor is applied to account for material that is planned to be mined, but not able to be recovered due to various causes. This factor is specific to each mining method, as recoverability in non-entry methods is generally lower. The extraction recovery applied to all Cut and Fill reserve shapes was set at 95%, and set at 90% for all Longhole Stopes.

15.0 MINING METHODS

15.1 Overview

There are currently three active mining areas in Macassa Mine: Main Break (MB), Lower North (LN) and New South (NS). The areas LN and NS are both part of the SMC. The mine design plan for the Life of Mine is shown in Figure 15-1, in which the three active mining areas are outlined, as well as the 05 Narrows, currently scheduled to be mined in the last year of the LOM.

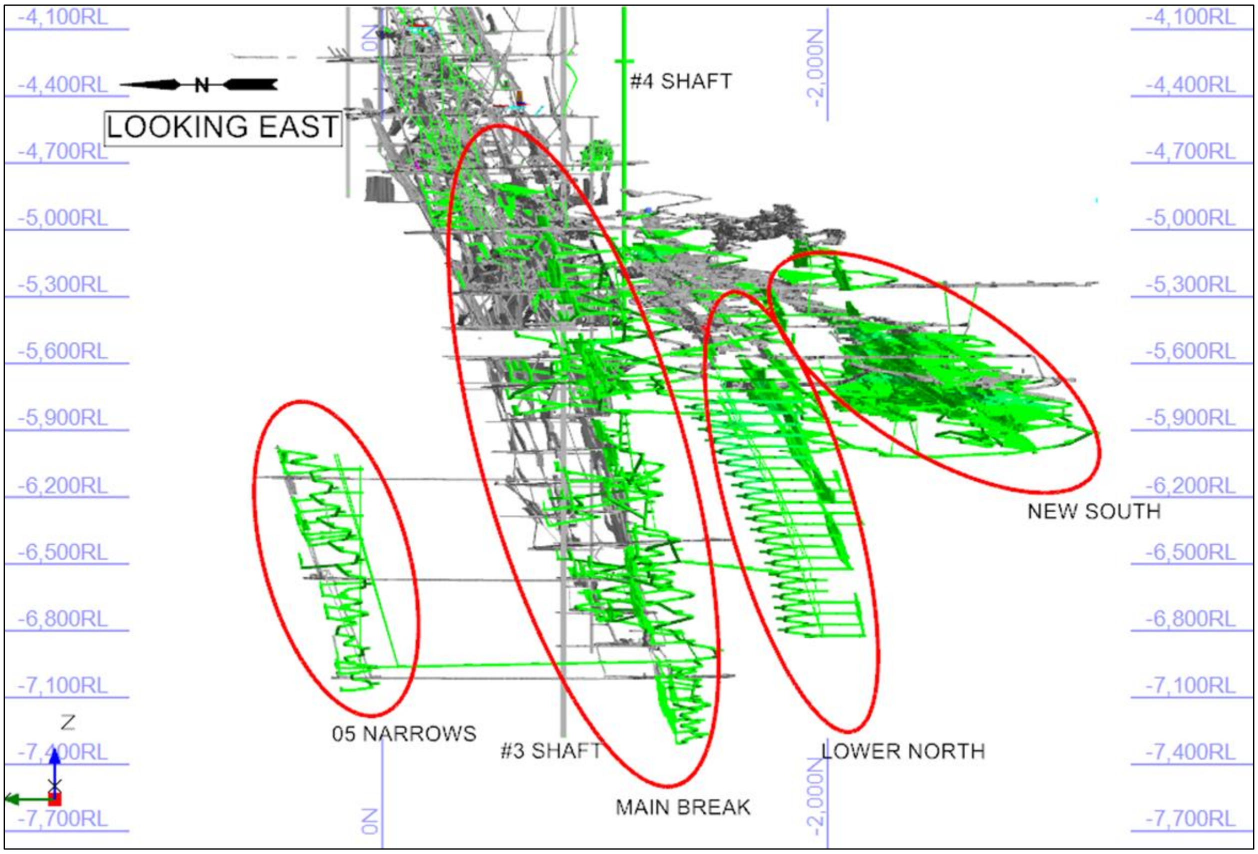

Figure 15-1: LOM mine design plan looking east.

15.2 Design Criteria

Mine design is an ongoing, dynamic process due to the complex nature of the ore zones and geological structures. When a new mining area is to be developed, factors such as the lithologies and geological structures in that area are taken into consideration, as well as the effect of mining on local stresses and any potential for seismic activity.

The mine design philosophy for all future stopes at Macassa includes control criteria to reduce the risk of elevated local stresses or damage caused by adversely oriented geological structures.

15.3 Mining Shapes

Mineral resources are modelled by geology as per the process described in Section 13.0. Once finalized, the block models and wireframes for structurally controlled mineralized lenses are provided to the engineering personnel, who use them to design feasible stope mining shapes.

The predominant methods of mining at Macassa Mine are Underhand and Overhand Cut and Fill (UCF, MCF) and Longhole (LH) mining. The mining shapes created by the engineering department personnel take into account any geometric or practical design constraints applicable to the selected mining method, as well as mining practices specific to the area.

The mining shapes are interrogated using a mine planning software in which the tonnage and grade of the material contained within the shapes are determined. Once interrogated, based on the mining method and general mine area, external mining dilution and a mining extraction (recovery) factor may be applied to estimate the stope production figures.

The economic viability of each resulting stope area is assessed independently and only the ones that return a positive cash flow (and application of appropriate modifying factors) are included in the mineral reserves statement.

15.4 Mining Methods

The selection of mining method depends on several factors including ore geometry, grade and the need for locations to deposit waste fill. There are also several geomechanical considerations, such as structure and stresses, which impact the mining method selection.

Most new stopes in shallowly dipping zones are mined using overhand or underhand cut and fill, with mechanized or drift and fill techniques. Mining can proceed up dip or down dip from the sill cut.

Longhole stopes are typically planned in areas with more steeply dipping ore structures (~ 45° or steeper), or in areas where higher seismicity is expected in order to minimize worker exposure (non-entry mining method).

15.4.1 Underhand Cut and Fill (UCF)

When the ore extends below the sill cut with generally flatly dipping characteristics, a UCF method is considered. The term used for the access cross-cutting the initial UCF stope elevation is a sub-drift. Cuts below are typically accessed by an attack bench (ATB), the term given to development driven at a negative angle (benching down) on an existing sub-drift access. Figure 15-2 shows the general layout of a UCF stope, and illustrates the downwards progression of the mining sequence. Ore is drilled using a jumbo drill or longtom, and advance varies based on equipment and conditions. The muck is removed from the stope using a Load-Haul-Dump (LHD) via the ATB and dumped into a local ore pass system or is re-handled until it reaches the loading pocket and hoisted to surface. The LHD can also dump directly to an ore car for rail tramming to the ore pass system. The maximum cut width for a UCF stope is generally 7.6m (25ft).

When a cut is completed, another may be mined adjacent to it at the same elevation, once it has been pastefilled and the appropriate curing time has been reached. Once all cuts and panels at a specific elevation have been completed and backfilled, the one below is mined by benching down in the ATB to reach the next planned floor elevation, or by developing a new access.

UCF is considered more favourable in seismically active ground when compared to MCF, since it provides a back of engineered paste, and stresses concentrate in the direction of advance at the floor of the cut.

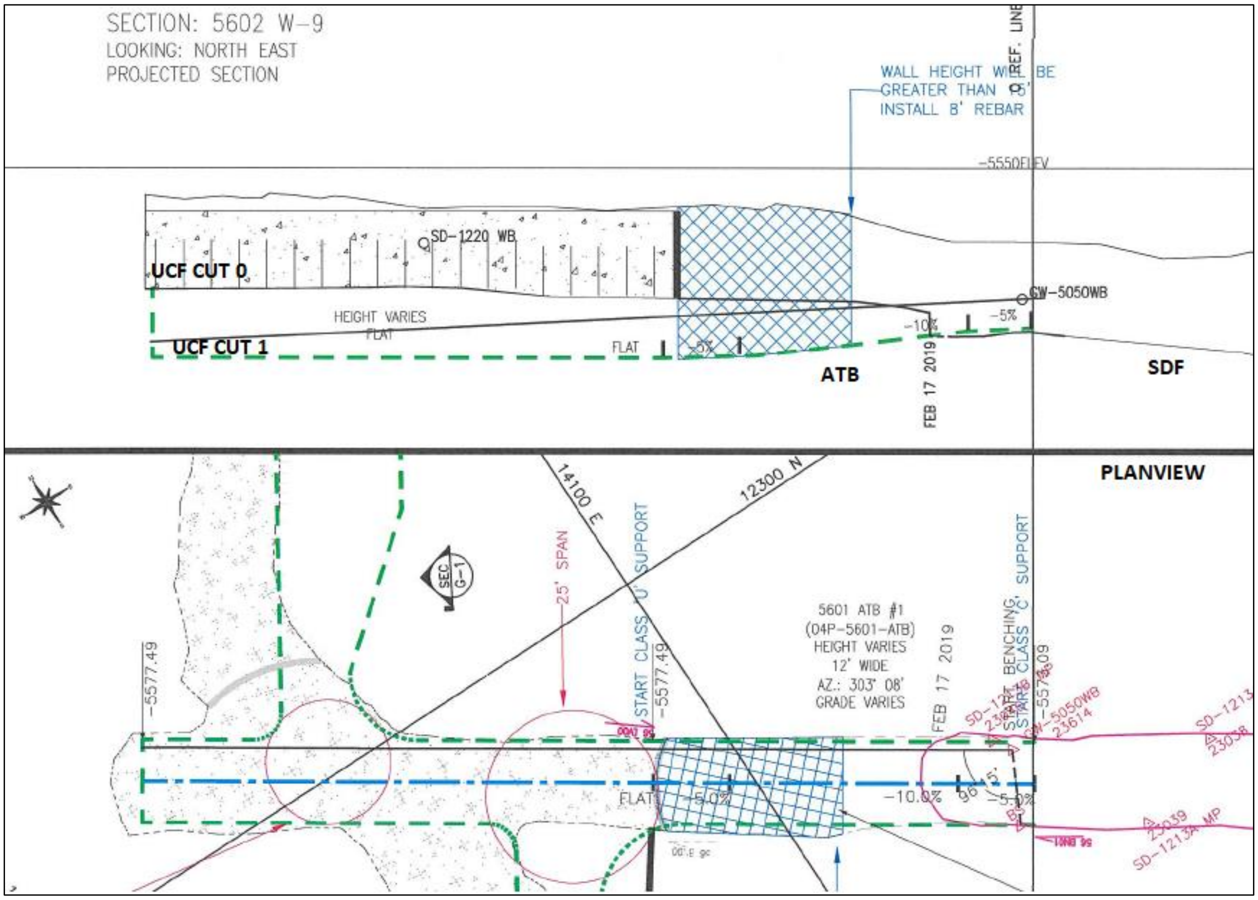

Figure 15-2: UCF stoping diagram.

15.4.2 Mechanized Overhand Cut and Fill (MCF)

When the ore extends above the sill cut with generally flatly dipping characteristics, a MCF method is considered. The term used for the access cross-cutting the initial MCF stope elevation is also a sub-drift. Cuts above would be generally accessed by an attack drift (ATK), the term given to development driven at a positive angle (taking the back down) on an existing sub-drift access. Figure 15-3 shows the general layout of a MCF stope, and illustrates the upwards progression of the mining sequence. In this development process, the material blasted from the back is left and used as a ramp to access the next cut. Ore is drilled using a jumbo drill or longtom, and advance varies based on equipment and conditions. The muck is removed from the stope using a LHD via the ATK and dumped into a local ore pass or is re-handled until it reaches a loading pocket and hoisted to surface. The LHD can also dump directly to an ore car for rail tramming to the ore pass system. The maximum cut width for a MCF stope is generally 7.6m (25ft).

When a cut is completed, waste material can be used as backfill prior to pastefilling the stope. A fill wall is then built, and pastefill is poured. The next cut is mined above or alongside the current cut, depending on the ore configuration and the mining sequence.

This method is considered less favourable in seismically active ground when compared to underhand cut and fill, since stresses tend to concentrate in the direction of advance in the footwall location at the back of the cut.

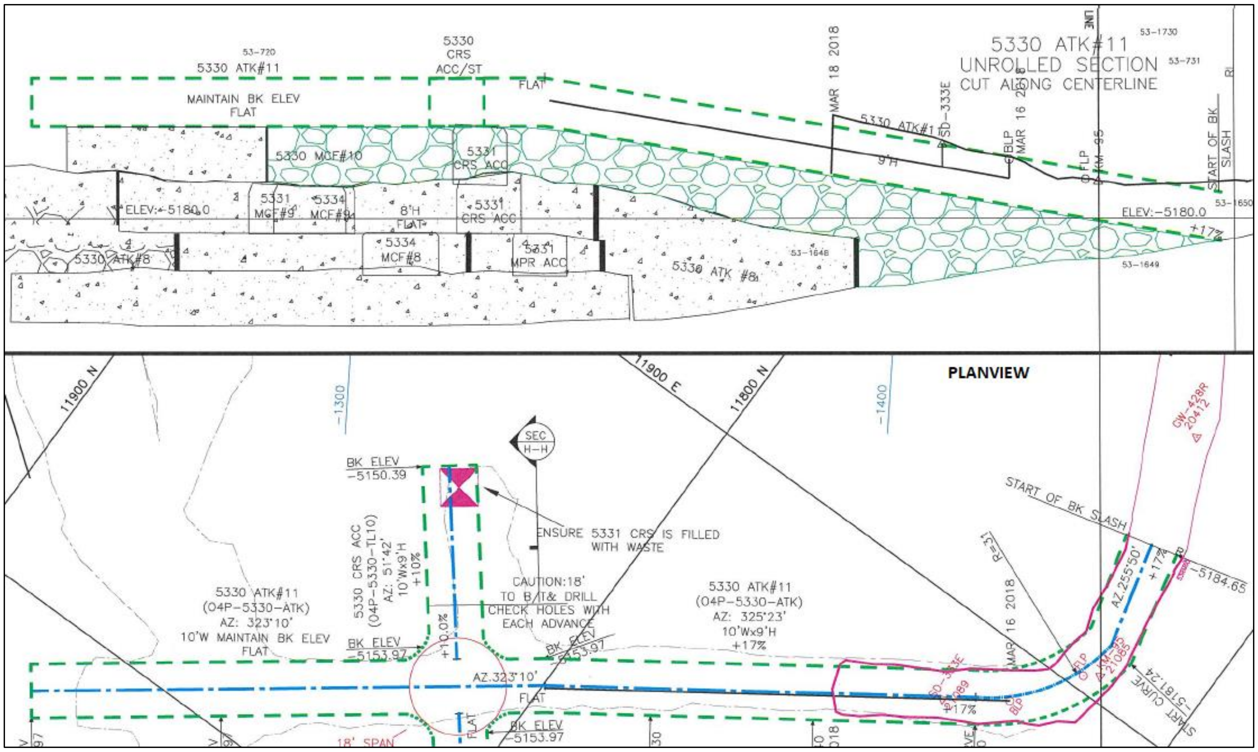

Figure 15-3: MCF stoping diagram.

15.4.3 Longhole Stoping (LH)

Longhole (LH) stoping is the primary mining method for steeply dipping structures and for the recovery of ore sill pillars. Mining of LH stopes involves the development of a drilling horizon, mucking horizon (for up-holes the mucking and drilling horizon are the same) and drawpoints depending on the geometry of ore or seismicity expected. LH stopes are taken with either up-holes or down-holes, depending on the available access, sequence and drilling limitations. Holes are drilled from the drilling horizon, currently with air drills. Stope geometries as well as blasting patterns vary based on the geology, stope dimensions and stresses, and are assessed on a case by case basis.

Generally, a drop or inverse raise is drilled and blasted first in order to establish a void, and the remaining drilled rings of the LH stope blasted towards it. Blast sizes vary depending on structure, stresses, geology and location in order to ensure risks are minimized. Once blasted, the ore is mucked through designated access points, and brow markers are set up at a minimum of 4.5m (15ft) back from the actual stope brow to indicate the no-go zone.

Design criteria for LH stopes include areas with ore dipping at 45˚ or greater and a consistent grade above cut-off.

15.5 Geomechanical Considerations

All newly opened ground is supported before personnel is permitted to enter the area. A one hole/one bolt policy is followed when installing initial primary ground support. This means that one hole is drilled and then the bolt is installed, there is no pre-drilling of holes. Standard support is installed up to the working face and within 1 meter of the sill. Ground control may approve installation to within 1.5 meters where conditions permit. All working faces are supported, and screen covers the face above 3 meters.

The ground support standard policy as Macassa Mine is a dynamic document, updated and reviewed as required. The minimum support standards for backs in rock are based on the calculation of safety factors in a two-dimensional analysis where two joints dipping at 45^{o} in opposite directions form a wedge. It is recommended to have a minimum Factor of Safety (FOS) of 1.2 for short-term headings and 1.5 for long-term headings, although it may be planned higher. The Unwedge™ software package is used for three-dimensional analysis.

There are 5 types of ground support classes at Macassa Mine. Generally as a rule-of-thumb, the length of the longest ground support will be at least one third of the back or wall span. The support classes are as follows:

A – Overhand cut and fill drift and fill and short-term development headings.

C - Long-term development headings.

D - Both short-term and long-term rock-burst prone headings.

U – Underhand Cut and Fill stopes or development headings under paste.

R - Conventional raise development headings.

Within each class (except Class U where mining occurs beneath engineered backfill), the support types and patterns vary depending on the span of the tunnel. These support classes require bolts to be installed on a 1.2m by 1.2m Dice Five Pattern. There is variation on the type of support elements used from class to class, and the length of support from span to span.

The minimum ground support standards are actively reviewed by Engineering and Production departments and is printed on the back of mine plans and survey prints.

Installation procedures for ground support are available in the internal database and filed with the both the Ground Control and Health and Safety departments.

Highlights of the ground control program at Macassa Mine include:

- Year-round 24/7 on-call coverage.
- Seismicity monitored by both the ground control department and security personnel for 24-7 monitoring coverage. The ESG monitoring system also sends automated alerts to the on-call phone.
- Post-blast seismicity reports every 12 hours highlighting locations of large events and areas with restricted entry.
- Bi-weekly reports on mid to long-term seismic hazard using Mine Seismicity Risk Analysis Program – mXrap™.
- Regular underground inspections and audits including timely follow-up and communication of ground occurrences.

- Official communication of deficiencies in ground support and corrective actions required using ground control directives.
- Numerical stress modelling conducted on a regular basis by ground control staff.
- Annual ground control reviews by qualified consultants (Mercer, R. and Pakalnis, R., 2018)

Geomechanical risk is mitigated strategically (e.g. mine design and methods) whenever possible. Examples of strategic risk mitigation at Macassa Mine include avoiding diminishing pillars, mining underhand cut-and-fill, and using non-entry mining methods (i.e. longhole) whenever possible. When additional risk mitigation is required, tactical measures such as enhanced ground support, seismic re-entry protocols, and mechanized equipment are used and communicated to the operations department.

All driving layouts are reviewed by ground control personnel and the mine design team before being issued to ensure that all pertinent ground support instructions are included. A statement of known ground conditions such as historic seismicity and areas of adverse ground condition known from previous mining is often included.

15.6 Mine Access and Development

The mine is currently accessed from surface through #3 Shaft. #2 Shaft provides egress access down to 4250 and 4500 Levels. #3 Shaft extends to a depth of 2,226m below surface, but is only accessible to approximately 15m below 5725 Level (approximately 1,745m depth). The main levels were driven from the shaft at intervals ranging from 38m to 131m. Levels are named for their approximate depth (in feet) below surface. The main operating levels for #3 Shaft are 3400, 3800, 4250 , 4500, 4750, 4900, 5025, 5150, 5300, and Loading Pockets on 5150 and 5725 levels. 5450 Level shaft station has been paste filled and there is no access to that level from #3 Shaft, although there is access to 5450 Level from the 5737 Bored Access Raise (BAR). The Main Break 5600 Level is not a currently active production level. #3 Shaft is not used below the 5725 Level loading pocket due internal damage caused by a rock burst in 1997, and that area of the mine remains flooded below 5725 Level for the time being.

The South Mine Complex is accessed directly from 4900 Level and connects to the MBZ through two cross cuts extending approximately 457m south-east from the Main Break, one each on 5025 and 5300 Levels. The main haulage ramp extends from #3 Shaft at 4900 Level to below the SMC at the equivalent of 5725 Level, with an ore pass and waste pass just below 4900 Level. Current capital development plans for the main ramp that accesses the Lower North (LN) area (SMC footwall) is to extend it to the –6800 elevation.

Over 122km in lateral and vertical development are currently scheduled in the LOM inclusive of resource conversion. Of the total number, approximately 44% is planned capital and 56% operating development. Development requirements for the resource conversion inclusive LOM are shown in Table 15-1.

Table 15-1: LOM Development requirements.

	LOM
Operating Development (m)	53,593
Capital Development (m)	68,698
Total (m)	122,291

15.7 Life of Mine Plan

Two life of mine schedules were completed, one inclusive of full resource conversion, for which an economic analysis was also completed in Section 22.0.

The LOM without resource conversion extends to the year 2025 based on mining the current stated 2018 reserves, as well as additional measured and indicated resources determined to be economic after the commissioning of #4 Shaft, and is shown in Table 15-2. These additional stopes were developed through the same methodology as described earlier in the Mining Methods section, but using the new unit costs improvements projected post #4 Shaft implementation for the economic analysis. This LOM plan was fully modelled (using 3D planning software) and is presented in Figure 15-4.

Table 15-2: LOM Production physicals with reserves and economic resources.

2019 LOM (no resource)	Total	Average
Tonnes (000's)	3,377	482
Grade (g/t)	21.3	21.3
Ounces Mined (000's)	2,314	331
Mill Recovery	97.7%	97.7%
Ounces Recovered (000's)	2,260	323

The LOM inclusive of resource conversion extends to 2027, and is presented in Table 15-3. The resources were converted using conversion factors of 75% for measured and indicated, and 50% for inferred resources, along with recovery estimates for cut and fill and longhole stoping as presented in Section 14.1.1. Over the next three years, the mine is planned to average 366,000 tonnes per year at a head grade of 21.5 g/t. #4 Shaft is planned to be completed in 2022, after which the production rates will double to an average of 722,000 tonnes per year. The last year is planned be at a lower production level to mine out the remaining material. A diagram of the mine plan is presented in Figure 15-4. Note that the diagram shows Phase 1 of the #4 Shaft.

Table 15-3: LOM production physicals with full resource conversion.

2019 LOM- Resource	Total	Average
Tonnes (000's)	5,022	558
Grade (g/t)	19.0	19.0
Ounces Mined (000's)	3,072	341
Mill Recovery	97.6%	97.6%
Ounces Recovered (000's)	2,998	333

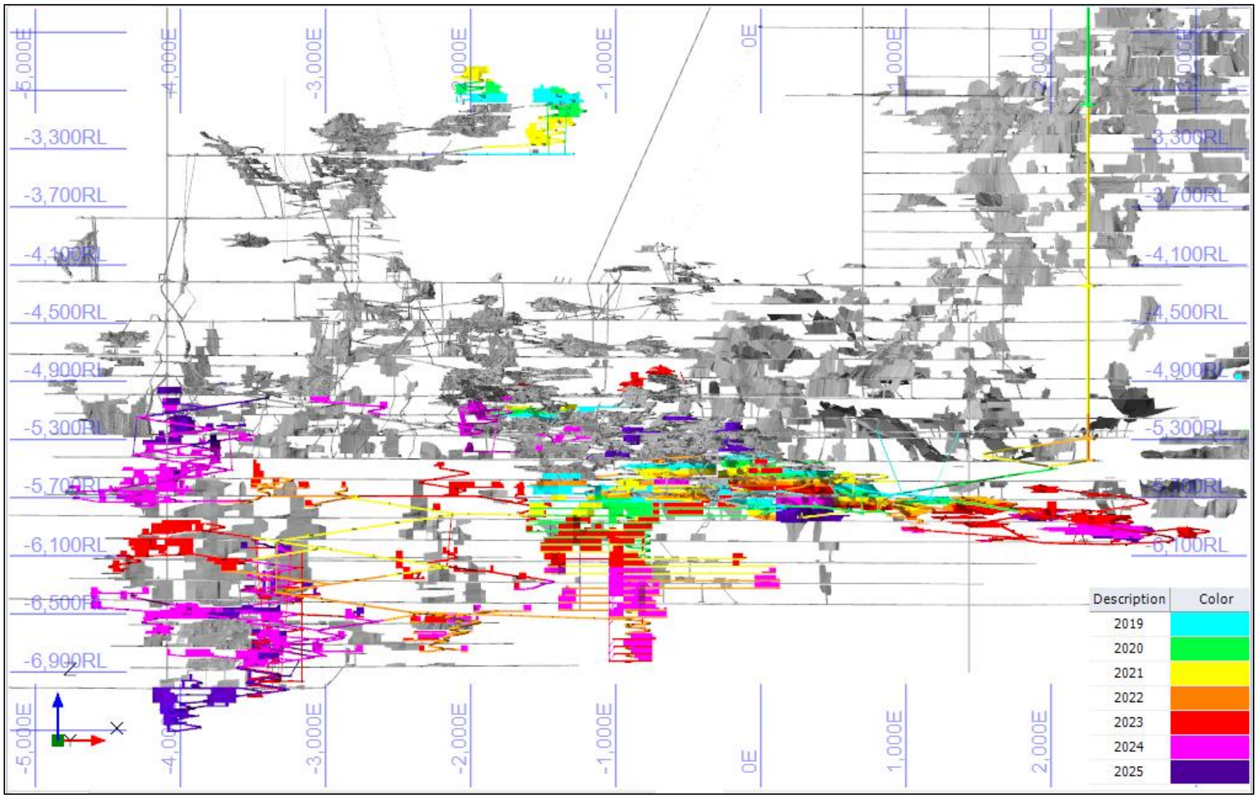

Figure 15-4: LOM mine design year over year looking north.

15.8 Capital Development

Capital development planned in the Life of Mine includes both lateral and vertical development required as infrastructure and access to the planned stoping areas. Development rates were used as per currently budgeted performance. Development quantities for the life of mine have been based on the 3D LOM mine design up until the resource conversion, after which annual averages were used. Drift sizes vary depending on the mining area and purpose of development. All development from the last two years of production has been allocated as operating in the LOM. Details of total capital development for the LOM are listed in Table 15-4.

Table 15-4: Capital development (LOM inclusive of resource conversion).

Capital Development	LOM
Lateral (m)	62,390
Vertical (m)	6,308
Total (m)	68,698

15.9 Operating Development

Operating development for the LOM has been based on the 3D mine design, up until the resource conversion, after which annual averages were used. This includes the short-term development generally used to reach a stoping area that will not have any long-term infrastructure or require long-term access. Drift sizes vary depending in the mining area and purpose of development. All development from the last two years of production have been allocated as operating in the LOM, but are not shown in the table breakdown below. Details of the LOM operating development are listed in Table 15-5.

Table 15-5: Operating development (LOM inclusive of resource conversion).

Operating Development	LOM
Lateral (m)	53,593
Vertical (m)	-
Total (m)	53,593

15.10 Equipment

The list of major mobile equipment is shown in Table 15-6 (updated as of February 2019). The various sizes of LHDs, single/double boom jumbos and longtoms are the primary development and production units at the Macassa Mine. Battery and diesel trucks and locomotives with four tonne rail cars are used for muck movement to the shaft.

Macassa Mine has been on the forefront in the use of Battery Electric Vehicles (BEVs) and was the first mine in Ontario to implement BEVs as the standard for the LHD and truck fleet. Kirkland Lake Gold has partnerships with battery equipment manufacturers to develop and design BEVs, as opposed to retrofitting diesel powered equipment. Macassa Mine will continue to replace its fleet of underground diesel equipment with BEVs as required.

Additional equipment includes ventilation fans, pumps, rock-breakers and bolters. The LOM schedule includes equipment changes to support the plan. Capital has been budgeted for equipment additions, replacements and rebuilds.

The Company will be proposing a Second Life Battery Program that may provide the benefits of reducing the dependency of energy on the grid and find a use for the spent batteries from the current operations and avoid disposal. Reduction of energy demand from the grid has benefits in lowering the peak on the grid and reduce environmental impact by re-using batteries that can be served in a secondary application when no longer serviceable in the primary applications in the equipment on site.

Table 15-6: Major mobile equipment as of February 2019.

Equipment #	Equipment Description	Engine Type	Equipment #	Equipment Description	Engine Type
LHD 135	EJC 61D RES 1 1/4 YRD.68 HP	DIESEL	P631	MAN CARRIERE RTV X900	DIESEL
LHD 137	LH 203 SANDVIK 2/YRD 80 HP	DIESEL	P635	MAN CARRIERE RTV X900	DIESEL
LHD 138	LH 203 SANDVIK 2/YRD 80 HP	DIESEL	P636	MAN CARRIERE RTV X900	DIESEL
LHR 139	LH 203 SANDVIK 2/YRD 80 HP	DIESEL	P637	MAN CARRIERE RTV X900	DIESEL
LHD 141	LH 202 SANDVIK 1.5/YRD. 68HP	DIESEL	P638	MAN CARRIERE RTV X900	DIESEL
LHD 143	LH 202 SANDVIK 1.5/YRD. 68HP	DIESEL	P639	MAN CARRIERE RTV X900	DIESEL
LHD 146	LH 202B SANDVIK 1.5/YRD.	ELEC.	P640	MAN CARRIERE RTV X900	DIESEL
LHD 150	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P641	MAN CARRIERE RTV X900	DIESEL
LHD 152	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P642	MAN CARRIERE RTV X1140	DIESEL
LHD 155	EJC 61D RDH 1 1/4 YRD.68HP	DIESEL	P643	MAN CARRIERE RTV X1140	DIESEL
LHD 161	LH203D SANDVIK 2/YRD 80 HP	DIESEL	P644	MAN CARRIERE RTV X1140	DIESEL
LHD 162	LH203D SANDVIK 2/YRD 80 HP	DIESEL	P645	MAN CARRIERE RTV X1140	DIESEL
LHD 163	LH203D SANDVIK 2/YRD 80 HP	DIESEL	P646	MAN CARRIERE RTV X1140	DIESEL
LHD 164	LH203D SANDVIK 2/YRD 80 HP	DIESEL	P647	MAN CARRIERE RTV X1140	DIESEL
LHD 165	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P648	MAN CARRIERE RTV X900	DIESEL
LHD 166	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P649	MAN CARRIERE RTV X900	DIESEL
LHD 167	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P701	MAN CARRIERE RTV X1140	DIESEL
LHD 168	EB 300 BATTERY 3 YRD. RDH	BATT.OP	P702	MAN CARRIERE RTV X1140	DIESEL
LHD 169	EB 300 BATTERY 3 YRD. RDH	BATT.OP	DD-03	KUBOTA EXCAV. KX41H	DIESEL
LHD 170	EB 300 BATTERY 3 YRD. RDH	BATT.OP	DD-05	KUBOTA EXCAV. K008 3	DIESEL
LHD 171	EB 300 BATTERY 3 YRD. RDH	BATT.OP	DD-06	KUBOTA EXCAV. K008 3	DIESEL
LHD 172	EB 300 BATTERY 3 YRD. RDH	BATT.OP	DD-07	KUBOTA EXCAV. K008 3	DIESEL
LHD 173	ST2G BATTERY 2 YRD A/C	BATT.OP	DD-08	KUBOTA EXCAV. K008 3	DIESEL
LHD 174	ST2G BATTERY 2 YRD A/C	BATT.OP	DD-09	KUBOTA EXCAV. K008 3	DIESEL
LHD 175	ST7 BATTERY 3.5 YRD. A/C	BATT.OP	DD-10	KUBOTA EXCAV. K008 3	DIESEL
LHD 176	ST2G BATTERY 2 YRD A/C	BATT.OP	DD-11	KUBOTA EXCAV. K008 3	DIESEL
LHD 177	ST2G BATTERY 2 YRD A/C	BATT.OP	RB-01	KUBOTA KX612 ON R/B	DIESEL
LHD 178	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FOR410	MLT 625 MANITOU 4900 STATION	DIESEL
LHD 179	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FOR413	MLT 625 MANITOU CONSTRUCTION	DIESEL
LHD 180	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	BTV1	CASSETTEMASTER 500R	DIESEL
LHD 181	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	MB-01	MACLEAN BOLTER	DIESEL
LHD 182	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	G200	CAT 120G GRADER	DIESEL
LHD 184	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FMC-001	3-MAN PERSONNEL CARRIER NV100A	DIESEL
LHD 185	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FMC-002	10-MAN PERSONNEL CARRIER MC100F	DIESEL
LHD 186	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FMC-002	10-MAN PERSONNEL CARRIER MC100F	DIESEL
LHD 187	LH 202 SANDVIK 1.5/YRD. 71HP	DIESEL	FMC-003	10-MAN PERSONNEL CARRIER MC100F	DIESEL
LHD 188	LHD 153 ARTISAN 1.5/YRD	BATT.OP	FMC-003	10-MAN PERSONNEL CARRIER MC100F	DIESEL
LHD 189	LHD 153 ARTISAN 1.5/YRD	BATT.OP	FMC-004	3 MAN & MAT. TRANSPORT / P/C MC 100 w/HIAB BOOM	DIESEL
LHD 190	ST7 BATTERY 3.5 YRD. A/C	BATT.OP	FMC-004	3 MAN & MAT. TRANSPORT / P/C MC 100 w/HIAB BOOM	DIESEL
LHD 191	EST1030 6YD A/C	ELEC.	FMC-005	9 MAN & MAT. TRANSPORT / P/C MC 100	DIESEL
LHD 192	ST2G 2 YRD A/C	DIESEL	FMC-005	9 MAN & MAT. TRANSPORT / P/C MC 100	DIESEL
LHD 193	LHD A4 ARTISAN 1.5/YRD	BATT.OP	FMC-006	3 MAN & MAT. TRANSPORT / MILLER TRIPLE-4ce	DIESEL
LHD 194	LHD A4 ARTISAN 1.5/YRD	BATT.OP	DW-01	BOBCAT 2000 WELDER 18 HP	DIESEL
LHD 197	ST7 BATTERY 3.5 YRD. A/C	BATT.OP	DW-02	BOBCAT 250 WELDER 16 HP	DIESEL
LHD 198	ST7 BATTERY 3.5 YRD. A/C	BATT.OP	DW-03	BOBCAT 250 WELDER 16 HP	DIESEL
LHD 199	ST7 BATTERY 3.5 YRD. A/C	BATT.OP	DW-04	BOBCAT 250 WELDER 16 HP	DIESEL
JUM 002	ATLAS COPCO BT1D BOOMER	DIESEL/ELECT.	DW-05	BOBCAT 250 WELDER 16 HP	DIESEL
JUM 003	ATLAS COPCO T1D BOOMER	DIESEL/ELECT.	DW-06	BOBCAT 250 WELDER 16 HP	DIESEL
JUM 004	ATLAS COPCO 282 BOOMER 2 boom	DIESEL/ELECT.	DW-07	BIG BLUE 300 PRO WELDER16 HP	DIESEL
JUM 005	ATLAS COPCO T1D BOOMER	DIESEL/ELECT.	DW-08	BIG BLUE 300 PRO WELDER 16 HP	DIESEL
JUM 006	ATLAS COPCO T1D BOOMER	DIESEL/ELECT.	DW-09	BIG BLUE 300 PRO WELDER 16 HP	DIESEL
JUM 007	SANDVIK DD321	DIESEL/ELECT.	TRK-206	BEMT-2010 BATTERY TRUCK. A/C	BATT.OP
JUM 008	ATLAS COPCO T1D BOOMER	DIESEL/ELECT.	TRK-207	BEMT-2010 BATTERY TRUCK. A/C	BATT.OP
BH-01	MCLEAN BLOCKHOLER 147 HP	DIESEL	TRK-208	BEMT-2010 BATTERY TRUCK. A/C	BATT.OP
SL03	SCISSOR LIFT (LIFTMASTER)	RDH	TRK-210	BEMT-2010 BATTERY TRUCK. A/C	BATT.OP
SL04	SCISSOR LIFT (LIFTMASTER)	RDH	TRK-211	BEMT-2010 BATTERY TRUCK. A/C	BATT.OP
SL05	SCISSOR LIFT (SLX4100)	WALDEN	TRK-212	Z40 ARTISAN	BATT.OP
P611	MAN CARRIERE UPC	DIESEL	TRK-213	MT436LP DIESEL TRUCK. A/C	DIESEL
P623	MAN CARRIERE RTV X900	DIESEL	TRK-214	Z40 ARTISAN	BATT.OP
			TRK-215	Z40 ARTISAN	BATT.OP

16.0 RECOVERY METHODS

17.0 PROJECT INFRASTRUCTURE

17.1 Process Plant

Currently, ore is delivered to the plant using dump trucks. The ore is crushed down to 11mm at a maximum throughput rate of 80 tph and then ground to 40-45 microns; cyanide is added at the grinding stage. It is then delivered to two pre-oxidation tanks before being pumped to the thickener. The overflow reports to the carbon columns (where over 75% of the gold is recovered) and the underflow to the leach circuit. Leaching takes place in seven tanks with a retention time of 100 hours. The ore is crushed down to 11mm at a maximum throughput rate of 80 tph and then ground to 40-45 microns; cyanide is added at the grinding stage. It is then delivered to two pre-oxidation tanks before being pumped to the thickener. The overflow reports to the carbon columns (where over 75% of the gold is recovered) and the underflow to the leach circuit. Leaching takes place in seven tanks during a retention time of 100 hours. The carbon-in-pulp circuit (CIP) consists of six tanks. Following electrowinning, the concentrate is melted in an induction furnace to produce doré grading 85% to 88% gold and 8% to 10% silver. The capacity of the plant is 2,000 tpd. A schematic of the flow chart is presented in Figure 17-1.

The company's mill was built in 1986 at a capacity of 725 tpd. Modifications over the years increased the throughput capacity to 2,000 tpd in 2013.

Details of the crushing and grinding circuit are displayed in Table 17-1.

Table 17-1: Details of the crushing and grinding circuit.

	Manufacturer	Size	hp	kW
Jaw Crusher	Birdsboro	36" x 28"	150	112
Secondary Cone Crusher	Symons	4.25' dia.	150	112
Tertiary Cone Crusher	Metso HP 4	4.0' dia.	400	298
Primary Ball Mill	Sanland	15' x 20'	3000	2237
Secondary Ball Mill	Allis Chalmers	12' x 16'	1600	1193
Tertiary Ball Mill #1	Allis Chalmers	10.5' x 13'	800	597
Tertiary Ball Mill #2	Allis Chalmers	10.5' x 13'	800	597

In the QP's opinion, there are no processing factors or deleterious elements that could have a significant effect on potential economic extraction at the Macassa Mine.

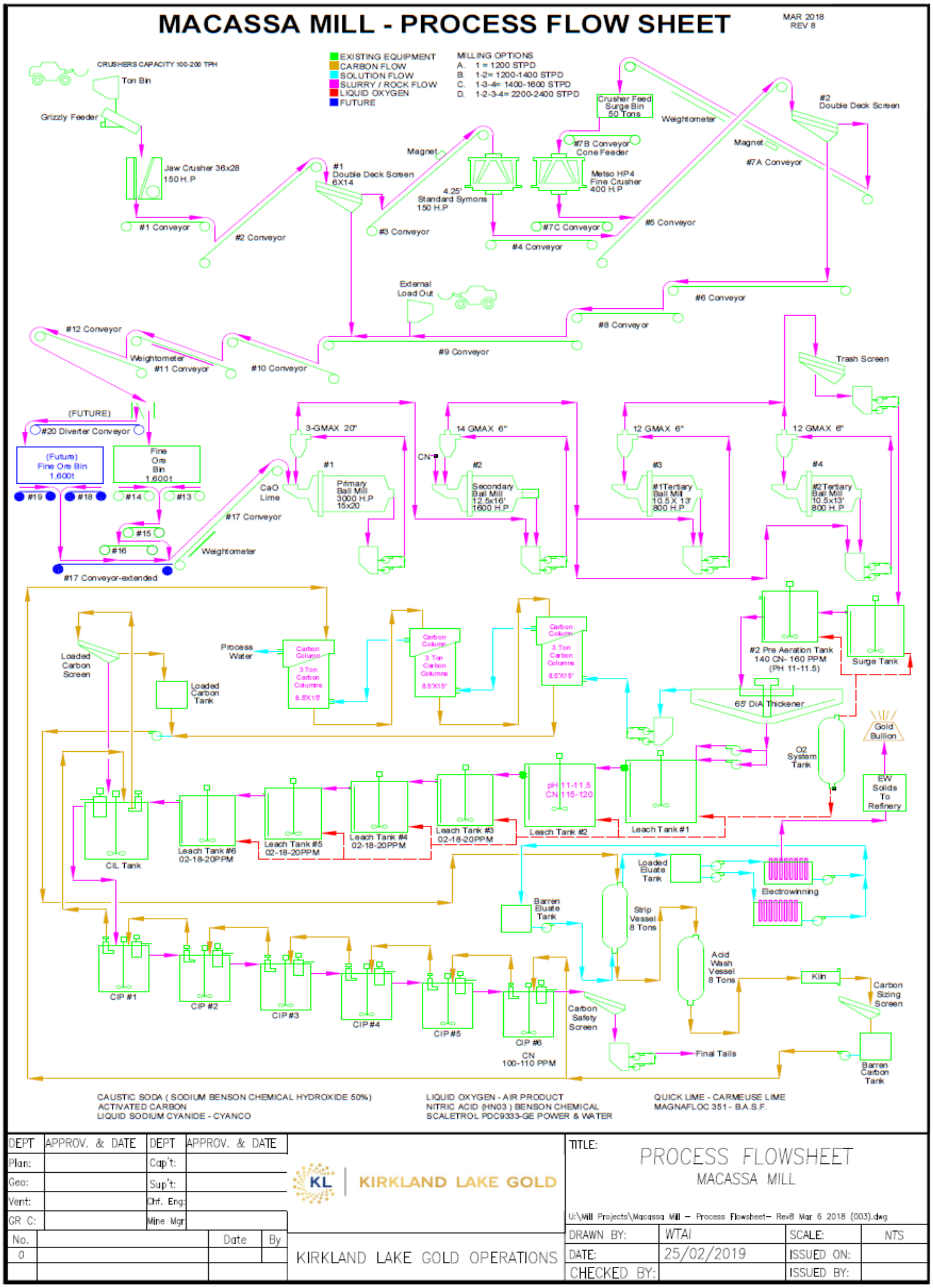

Figure 17-1: Process flow sheet.

17.2 Surface Buildings

Macassa has two shafts from surface that provide access to the mine, #2 and #3 Shafts. A third shaft, #1 Shaft, has been decommissioned, but is still used to exhaust air from the mine. A fourth shaft (Elliott Shaft) has been sealed, as per the filed closure plan. The office and dry complex, surface maintenance facilities and warehousing are located by #3 Shaft. The mill, refinery and assay lab are located in close proximity to #1 Shaft. The general surface layout is shown in Figure 17-2.

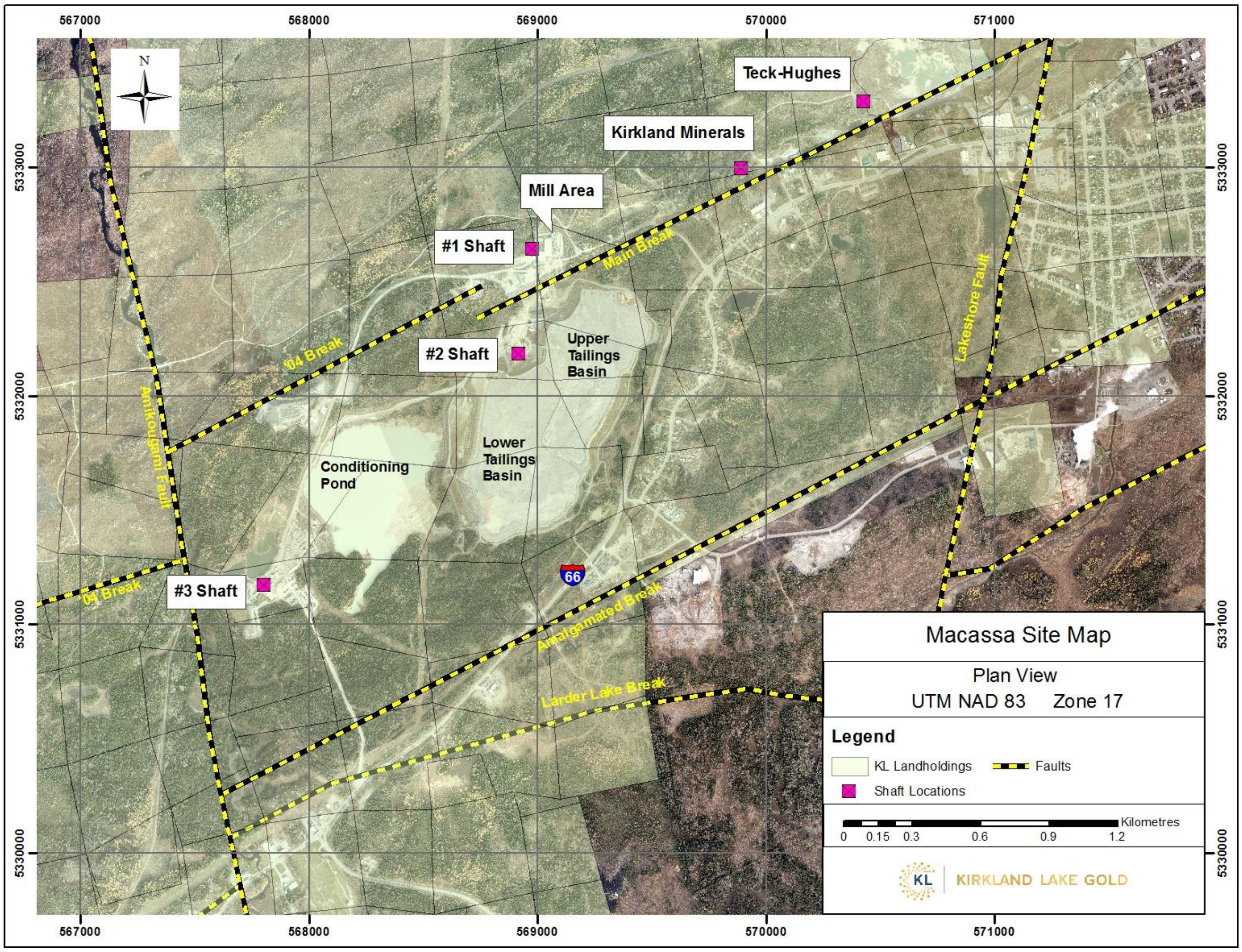

Figure 17-2: Macassa Property surface general arrangement.

17.3 Ore Transportation

The ore is transported approximately 1.3km from #3 Shaft to the Mill in triaxle dump trucks, rated at approximately 27 tonnes.

17.4 Power

Power to the site is supplied by HydroOne via the K4 115kV and G3K 44 kV transmission lines. The power is stepped down on site to 5kV for distribution via three 10 MVA transformers (one located at the mill complex and two located at the #3 Shaft mine complex).

Power is distributed underground via three 500 MCM 5kV feeder cables going down #3 Shaft, one 4/0 15kV feeder cable going down #3 Shaft and one 500 MCM 5kV feeder cable going down #2 Shaft. In the event of power loss, a 2 MVA diesel powered generator onsite provides power to operate the #3 Shaft service hoist and power to the surface compressors to provide limited compressed air underground.

Distribution of the power underground is provided by a combination of 4,160V and 13,800V feeders which power underground substations located throughout the mine that step the power down to 600V to power loads such as fans, pumps, loaders, etc.

17.5 Underground Mine Dewatering and Fresh Water Requirements

17.5.1 Fresh Water

Process water for mining activity comes primarily from the abandoned eastern workings of the historic mines, controlled via a bulkhead located on 4250 Level. The water is pumped from the bulkhead to a pumping station at 4250 Level at #3 Shaft station. Water for the underground operational needs is supplied by a series of water boxes which control the water pressure and distribute the water underground from pump stations at 4250 Level #3 Shaft and 3000 Level #3 Shaft. The current system and equipment is adequate for the mine's requirements.

17.5.2 Dewatering

Dewatering the mine is accomplished by a series of pumping lift stations located at: 1275, 3000, and 4250 Levels. Each pump station consists of two multistage Carver pumps capable of pumping a combined maximum of 4.5 m^3/min. The water reports to the 4250 pumping station from the bulkhead at the east of 4250 Level and the #3 Shaft bottom pump which is pumped up the shaft from a lift station at 5725 Level.

Total mine discharge averages between 2,000 m^3/day and 8,000 m^3/day depending on the time of year.

17.6 Compressed Air

The underground operation is fed by two surface compressed air plants. The main plant located at 3 shaft is capable of delivering 16,000 cfm to the underground workings via a 10 inch airline in the shaft. The auxiliary plant located at #2 shaft is capable of delivering 3,500 cfm to the underground workings via a 6 inch airline in the shaft.

The combined plant capacity of 19,500 cfm is delivered by the following compressors (quantity and power rating) listed in Table 17-2 below.

Table 17-2: List of Macassa Mine compressors.

Location	Quantity	Power Rating (hp)
#2 Shaft	1	400
	1	300
	2	200
#3 Shaft	2	800
	2	700
	2	300
	2	200

The total installed electrical load for the compressors is 5,100hp. The compressed air plant capacity is sufficient to meet operational demands, however on occasion, during peak flows in lower regions of the SMC zone ramps, the pressure drop resulting from friction losses in the distribution network can result in operational challenges. To address this issue work is ongoing to increase the distribution capacity (via a secondary path) to ensure stable pressure independent of flow rates during peak demand periods.

Compressed air is required underground to power pneumatic equipment and activities including:

- Jacklegs and stopers.
- Pneumatic explosive loaders.
- Pneumatic longhole drills.
- Refuge station ventilation (pressurization).
- Pneumatic cylinders for door controls.
- Pneumatic dewatering pumps.
- Pneumatic tools.

17.7 Underground Mine Ventilation

The Macassa Mine site uses a predominately pull system to ventilate the underground workings. There are seven vent-boosting sites on five different levels in the mine positioned near the exhaust system. These fans combined pull a total of approximately 150 m^3/s. These fans pull air down #3 Shaft, across the levels and ramps and then pushes the air to surface through Macassa #2 Shaft, Macassa #1 Shaft, and old mine workings (Macassa, Kirkland Lake Minerals, Teck Hughes and Lakeshore workings) representing 28%, 14% and 58% of the total air volume respectively. The primary ventilation system is shown in Figure 17-3.

During the winter months the air is heated with two 4.1 MWh propane heaters located at the entrance of #3 Shaft Ramp Portal on the west side of the shaft. There are two 2.1m diameter, 259 kW fans on Variable Frequency Drives (VFD), capable of pushing up to 200 m^3/s into the portal. The portal ramp meets the shaft at the 125 Level. These two fans only provide heated air to the shaft and into the #3 headframe as required/needed. A redundant fan and heater system attached to the headframe has been refurbished and made operational for use when required.

To improve the overall ventilation system efficiency and to provide increased ventilation to new mining areas, new ventilation raises will be driven in 2019. A connection will also be made between ramps in the SMC.

The mine has completed the second phase of engineering for the mine ventilation cooling system design. With the lower SMC mining horizon getting deeper, the need to cool air to improve the general working conditions is being anticipated. Planning for a refrigeration plant is ongoing.

The mine is now designing and developing new intake and new exhaust routes, which will limit the need to exhaust air through the old workings. The design will incorporate new exhaust raises that will connect the lower mining zones directly to surface. This is part of the plan to increase production at the Macassa Mine. Development work to access raise locations in the upper regions of the mine will be completed in 2019.

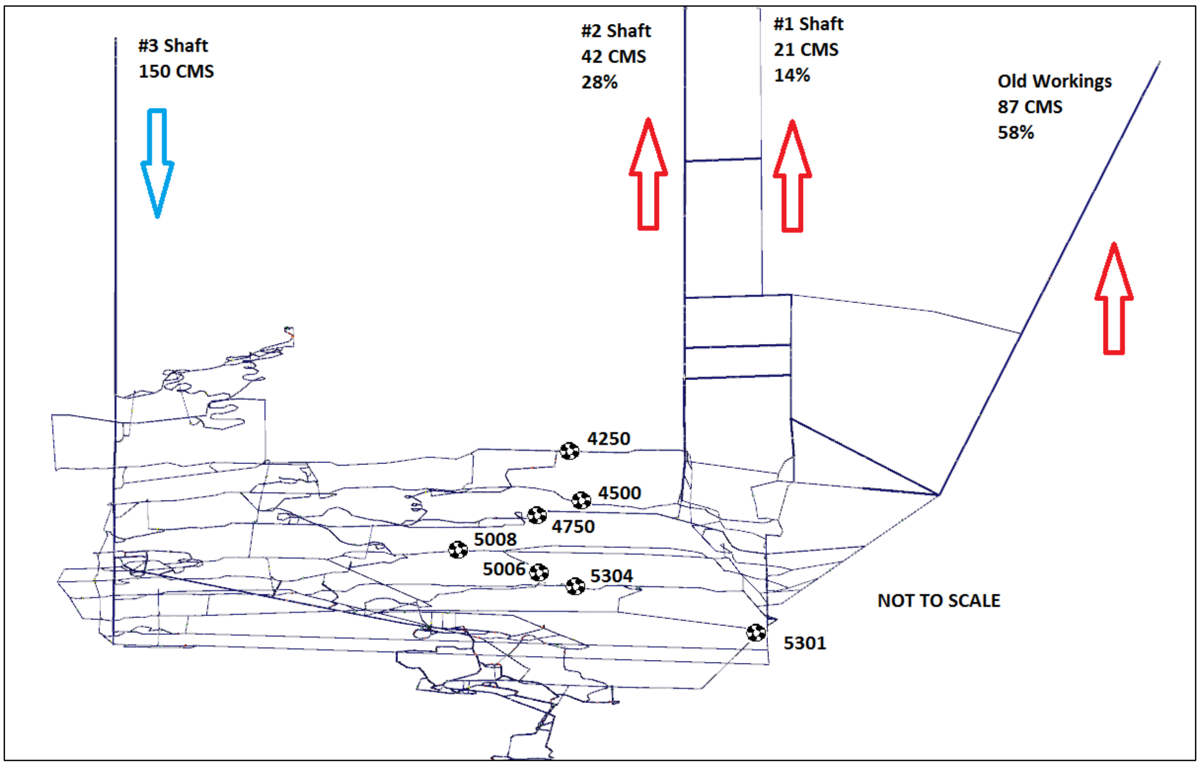

Figure 17-3: Primary ventilation system.

17.8 Underground Material Handling

The ore and waste material generated in the MBZ is drawn from chutes or loaded directly by LHD vehicles into railcars and trammed on the main levels to the ore and waste passes located near #3 Shaft. The ore and waste material generated in the SMC zone below 5300 Level is drawn from chutes or loaded directly by LHDs into haul trucks and trucked up the main ramp to the ore and waste passes located at the top of the 5056 ramp near #3 Shaft. All the ore from both the MBZ and SMC report to the 5150 Level loading pocket. The waste generated from 5025 Level and above reports to the 5725 Level loading pocket while all the waste mined below 5025 Level currently reports to the 5150 Level loading pocket.

17.9 Communications, Controls and Monitoring

There is an 11-channel leaky feeder communication system for underground services throughout the mine and three channels on surface operating over two licensed frequencies for a total of 14 channels. One dedicated channel services the #3 Shaft conveyances for slack rope control.

The dial phone system consists of four call gateways underground, 46 Voice over Internet Protocol phones (VoIP), and 34 analog phones.

Each battery charge bay, as well as most of the refuge stations, are equipped with a computer that can be used for communications such as Skype and e-mail.

Each shaft station and refuge station are equipped with sound power phones for communication to the shifters' wicket, deck house and hoistroom.

Each truck operating in the main haulage ramp is configured with a remote telemetry system that allows tracking of the fleet and the ability to download critical information as to the equipment status (e.g. battery charge level, payload, cycles etc.). In 2019 this system is expanding to allow for tracking of the Jumbos (e.g. rounds drills, vehicle health, etc.).

There are carbon monoxide monitoring instruments installed at key locations along the air exhaust pathway which communicates via single-mode fiber optics to surface allowing for monitoring of the gas levels underground. There are also Methane monitoring instruments installed at each loading pocket which is monitored from surface.

Each boosting fan underground responsible for ventilation airflow is monitored and communicates to surface via the fiber optic backbone. This includes the status of the fan (on/off), current, frequency, etc.

Each dewatering pump underground is monitored via a programmable logic controller (PLC) and communicate to surface via the fiber optic backbone. This includes the status of the pump (on/off), vibration, flow, etc.

The mine will be implementing a control room in 2019 to monitor all underground systems from one central location (carbon monoxide, vehicle telemetry, dewatering, ventilation etc.). Also scheduled for 2019 is the implementation of an autonomous truck that will operate between shifts on the main haulage ramp.

18.0 FUTURE INFRASTRUCTURE

There are several new projects underway at the Macassa Property, the main of which include the development of #4 Shaft, along with all the shaft support facilities/services and a new tailings facility. Figure 18-1 shows the location of these projects with respect to the existing Macassa Property surface infrastructure.

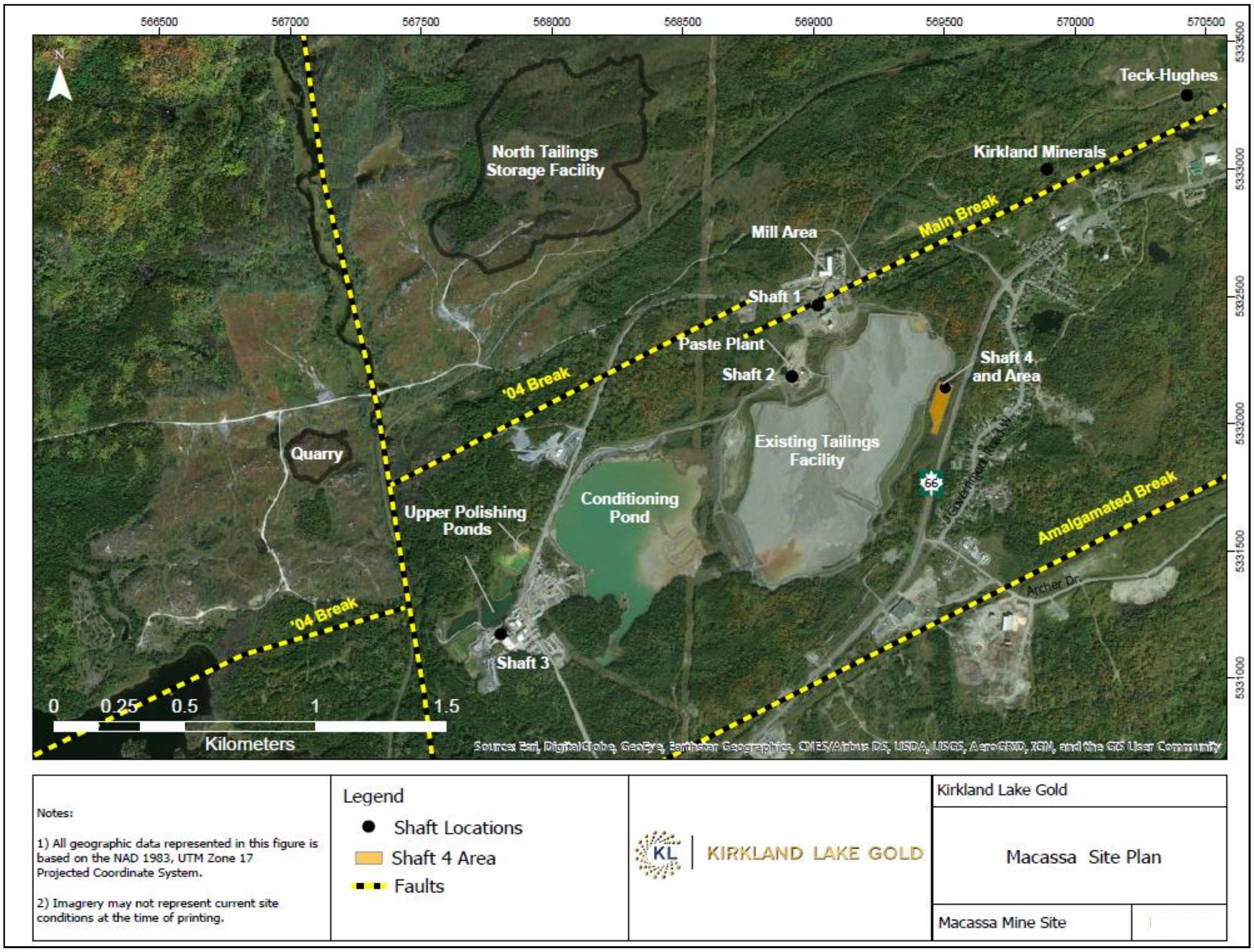

Figure 18-1: Plan view of Macassa property.

18.1 #4 Shaft

In 2018, the Company announced plans to develop a new shaft, #4 Shaft, at the Macassa complex. The project is projected to be completed in two phases, with the Phase 1 project cost estimated as US$240M and the Phase 2 cost estimated as US$80M. The new shaft is an essential component in achieving Macassa Mine's LOM plan. The location is in close proximity to the existing Macassa Mill. The new shaft allows mine operations to be streamlined and upgraded, including better personnel and material/supply movement and an increase in ventilation airflows. Figure 18-2 shows the #4 Shaft area plans.

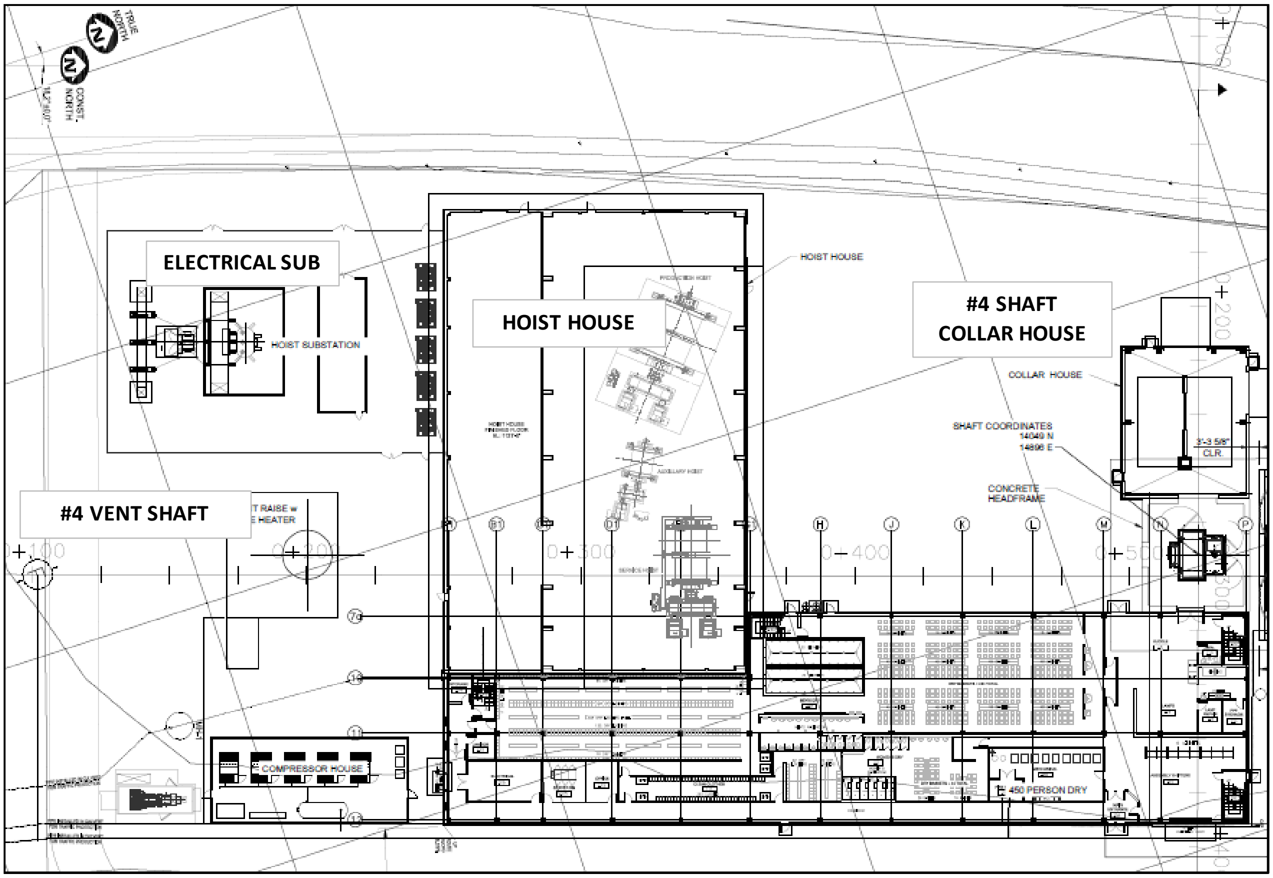

Figure 18-2: Detailed plan of #4 Shaft area.

18.1.1 Initial Shaft and Shaft Facilities Design

The key design components are highlighted as follows:

- The shaft is located approximately 2,000ft south-east of the Macassa Mill and located adjacent to Highway 66. Refer to Figure 18-1.
- #4 Shaft is circular, concrete-lined and 21.5ft in diameter. The shaft will have a main service cage, an auxiliary cage and two skips. Refer to Figure 18-3, which shows the shaft compartments and pipe, electrical and communication services locations.
- #4 Shaft Phase 2 includes development to an ultimate depth of 7,000ft below collar.
- A designed production (hoisting) rate of 4,400 short tons per day.
- Surface plant to include a hoist house, headframe and dry facility.
- There will be three hoists. A double drum Blair hoist for the service cage, a double drum production hoist and a single drum auxiliary hoist. There will be two, 750 short tons bins on surface for the ore/waste loadout.

- A ventilation shaft will be excavated in close proximity to #4 Shaft. It will be circular and 18ft in diameter. The shaft walls will be supported and shotcreted.
- A drift will connect the shaft with the vent shaft at the 160ft Level. This drift will house two ventilation fans (in parallel), which will eliminate fan related noise on surface. A heater house will be located on the surface collar. The new vent shaft, in combination with the other planned ventilation changes, will eliminate the ventilation system as a bottleneck to any production increase during the LOM.
- The shaft will be positioned between the Main Break and the SMC Zones.

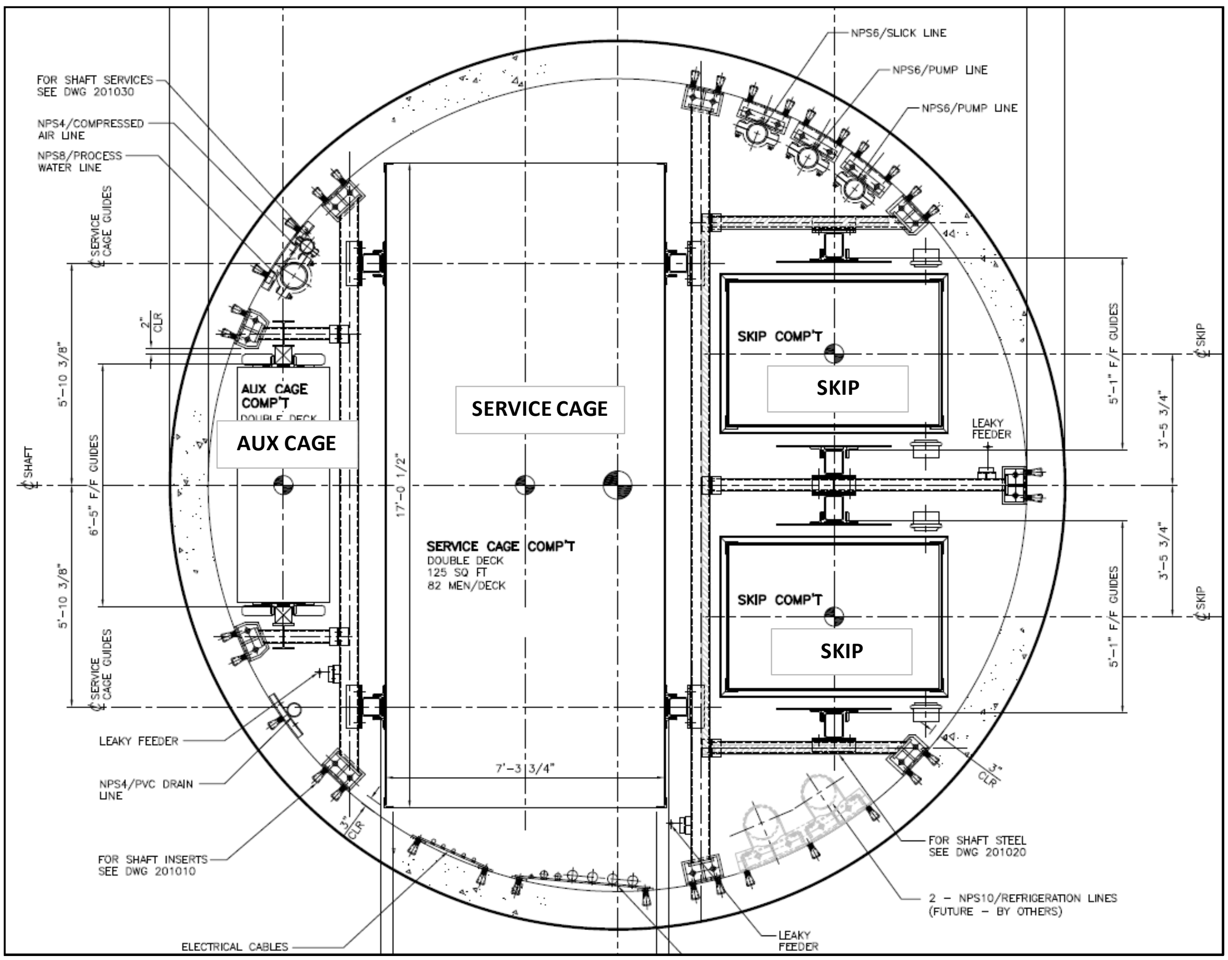

Figure 18-3: Typical shaft cross section.

18.1.2 Project Schedule

The shaft will be developed in phases, with the work having started in the second quarter of 2018. Phase 1 involves sinking to the 5700 Level, with development of a loading pocket at 5450 Level. The new shaft is expected to be operational by the end of the second quarter of 2022. Phase 2 is planned to start after the completion of Phase 1, and will include the sinking of an additional 1,300ft and installation of a loading pocket on 6900 Level. Phase 2 completion is estimated at the end of 2023.

Phase 1 will include:

- Construction of surface plant including hoist buildings, compressor house, headframe, vent raise and collar house.
- Sinking to 160ft below the collar, installing sinking equipment.
- Sinking to a depth of 5700ft below the collar and excavation of 5 shaft stations.
- Setup and installation of the Loading Pocket at 5450 Level including two 1000 short tons bins, rock breaker, grizzly, truck dump, loadout and conveyor.

18.1.3 Project Work Completed as of December 2018

By the end of 2018, the following project work was completed:

- The key project team personnel were hired.
- The site was leveled to grade, including the shaft and shaft support facilities.
- #4 Shaft was collared to a depth of 160ft below surface.
- The #4 ventilation shaft was sunk to its final depth, approximately 160ft below surface.
- The connection drift/airway between #4 Shaft and the #4 ventilation shaft was started.
- The headframe structure was installed (slip-formed concrete).
- The sinking and shaft equipping staging were lowered into the shaft.
- The foundation work for the hoist house and hoists were completed.
- The project support facilities were established at site and offsite.
- Long lead-time and critical items were procured.

18.2 North Tailings Storage Facility

The design of the North Tailings Storage Facility (NTSF) incorporates the construction of one large and several smaller dams; the NTSF project schedule was laid out in two phases. Phase 1 was completed in 2018, in which two dams were constructed to an elevation of 328m. Phase 2 is scheduled to be finalized in 2019, and entails bringing both the 2018 dams and four others to an elevation of 332m. The new facility is located northwest of the existing process plant (as shown in Figure 18-1) and will have a footpring of 65ha, with a total volume capacity of approximately 1.8M cubic metres. Work is ongoing to ensure sufficient tailings capacity for the LOM. Construction of a thickened tails plant is underway beside the new NTSF with expected completion in Q4 2019. This would extend the working life of the new facility.

18.3 Ventilation Raises

Twin ventilation raises are planned to surface and will connect from 5450 Level in the SMC. They will be in the range of 3.0m to 3.7m in diameter and driven by raise bore. These raises are currently planned to be used to exhaust air from Macassa, in order to accommodate higher airflow through the mine, necessary for increased production. Combined, they will be able to move up to 250 m^3/s of air. The raises will be driven in two stages, using 3400 Level as an intermediate level. Development to the location of the raises on 3400 Level is ongoing and will continue through 2019. They are planned for completion in conjunction with the implementation of #4 Shaft in 2022.

18.4 Pastefill System

Work is being carried out to determine future requirements for the pastefill system, which may include increasing the current plant capacity to match increased production levels and additional surface pastefill holes for delivery underground.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market for the Product

The QP has reviewed Kirkland Lake Gold contracts with refiners, or brokers and is satisfied that the contracts reflect industry norms and reasonable market terms for selling Macassa's gold production.

19.2 Material Contracts

The material contracts at Macassa are:

- Underground diamond drilling (Boart Longyear)
- Explosive supplier (Dyno Nobel)
- Propane supplier (Superior Propane)
- Contract Development miners (Redpath)
- Ground Support (DSI)
- Diesel (Canada Clean Fuels)
- Electrical Power (HydroOne, IESO)
- Gold delivery to the refiners (Brinks)
- Cyanide (Cyanco)
- Mill Liners (Metso)

The QP has reviewed the Company contracts and is satisfied that the contracts reflect industry norms.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Studies

In 2017, the process of permitting a new North Tailings Storage Facility (NTSF) began, with a number of environmental related studies being completed to support this endeavour. In 2018 the critical path included submission of the related permit and approval applications to support the construction of the facility. A new quarry was also permitted and commissioned in 2018 to supply the construction material for the facility. A new Permit to Take Water was approved in order to supply water for both construction activities on the site, as well as dust control. A discussion around the status of permit and approval related to the NTSF can be found below.

In addition to the NTSF, construction has begun to support the new shaft project. The majority of the activity to date has been to prepare the site for construction/sinking, which required a number of low-risk operational permits (primarily through the municipality) to support these types of activities. In addition, the shaft project will be commissioning a concrete batch plant to support ongoing concrete work. This source was modelled and included in the site-wide quantification for air emissions and noise, and has been approved through the Limited Operational Flexibility (LOF) function of the ECA Air. A Permit to Take Water was also received for the shaft project to provide additional water for construction activities and dust control.

2019 will see the submission of amended operational permits and approvals which include both the NTSF and new shaft projects.

Outside of these initiatives, ongoing environmental studies at the operations level include the Progressive Rehabilitation program (will be discussed in greater detail below), other regulatory-driven projects as required.

20.2 Waste and Tailings Disposal, Site Monitoring and Water Management

Construction began in 2018 for the NTSF, which will ultimately replace the Macassa Tailings Storage Facility (TSF). Construction will be completed in two phases, and the facility will be ready to receive tailings by the end of 2019. The Macassa TSF is currently the only active tailings storage facility at the Macassa Mine, and has been in operation for approximately the past 70 years.

To begin the decommissioning process, the Macassa TSF is undergoing a buttressing program that will not only improve the factor of safety for the dams, but also will achieve the appropriate closure sloping. The buttressing program is also being completed in a staged approach, and will be complete by the end of 2019.

Currently, the slurry material that leaves the mill is deposited into the Macassa TSF, which is approximately 53 hectares and consists of an Upper and Lower Basin. As part of the water management strategy at the Macassa Mine, the solids settle into the TSF, and the supernatant decants into a Conditioning Pond, where it is held. Conditioning Pond effluent has two main destinations: it is either reclaimed and pumped to the Mill and used for processing, or it is treated through an effluent treatment plant where it is discharged into a series of four settling ponds and ultimately is released through the Final Discharge location into the receiving water body, Amikougami Creek.

The NTSF supernatant will be reporting to the present water management system; supernatant will be pumped from the new location to the current Conditioning Pond, where it will follow the same circuit. In addition, the NTSF will received thickened tailings instead of conventional slurry material.

There are various monitoring and inspection programs that occur both on and off-site to support and improve the tailings and water management strategies. Compliance monitoring includes surface and ground water characterization monitoring, air quality monitoring (metals and fugitive dust), storm water drainage monitoring, freeboard inspections, as well as visual inspections of the TSF done by multiple departments. A third party Dam Safety Inspection (DSI) is completed annually at the Macassa TSF, as well as at the Kirkland Minerals TSF, which is an inactive facility which the Company is responsible for maintaining. Dam Safety Reviews (DSR) are completed on the Macassa TSF, as it is the only active facility at Macassa Mine. An appropriate DSI and DSR inspection schedule will be implemented for the NTSF when it is operational.

Upon closure, the Macassa TSF will be in its final closure configuration as per the filed Closure Plan Amendment. An amended Closure Plan has recently been submitted, however the final closure concept has not changed. The facility will be in active closure, therefore inspections and monitoring will still be ongoing. Water quality monitoring and treatment is expected to occur for the first two to three years post-closure while steady state conditions are being reached. The ongoing buttressing program will largely bring the dams to their closure slopes, therefore re-sloping will likely not be as complex as originally anticipated. Breaching of some dams will be required, at which point re-vegetation will occur.

20.3 Permitting

In terms of project permitting requirements, the significant permit applications and amendments have been submitted to support the NTSF project. For the new shaft project, the main focus for permitting has been to acquire any required permits for construction only. The focus will shift to the longer-lead operational permits in 2019 to support full-scale operations. As discussed above, a Closure Plan Amendment was submitted in 2018 to support both the NTSF as well as the shaft project, and to include smaller material changes at the operations level. Review of said amendment continued with the ENDM.

Outside of the CPA, the Macassa Mine has all of its required permits and applications for operations. Additional permit submissions and applications are mostly dependent on changes and/or projects occurring at the site level, therefore these are initiated as required. At this stage, there are no known requirements to post performance or reclamation bonds for the Macassa Mine. See Table 20-1 below, for a list of permits and approvals.

Table 20-1: List of Macassa Mine environmental permits and approvals.

Permit Type	Number	Status	Issue Date	Expiry
Closure Plan Amendment	N/A	Submitted - Review ongoing	3/28/2013	N/A
Environmental Compliance Approval - Industrial Sewage	6702-B64JKA	Active	11/02/2018	N/A
Environmental Compliance Approval - Air	9758-A5BPZV	Active	07/08/2016	N/A
Environmental Compliance Approval - Municipal Sewage	2736-AP6Q8X	Active	7/21/2017	N/A
Permit To Take Water - #3 shaft Dewatering	6674-8UZQUC	Active	06/07/2012	06/07/2022
Permit To Take Water - Lakeshore Pond Dewatering	3085-842GTX	PTTW application submission underway	3/31/2010	11/02/2019
Permit To Take Water - Amikougami 1 & Amikougami 2	2646-B5TMVA	Active	11/01/2018	10/31/2019
Permit To Take Water - TW1 & TW2	8001-B4WLT3	Active	12/03/2018	10/31/2019

20.4 Social and Community Impact

Kirkland Lake Gold strives to establish and maintain positive relationships with Aboriginal communities through ongoing engagement and communication, and has entered into an agreement with certain communities that have asserted treaty and aboriginal rights within the operations area of the mine. The agreement provides a framework for strengthened collaboration in the development and operations of the mine, issue resolution and regulatory permitting, and outlines tangible benefits for the Aboriginal communities, including direct financial support, skills training and employment, and opportunities for business development and contracting. In addition, Kirkland Lake Gold engages with Aboriginal communities in connection with permitting applications and ongoing projects.

The Company also maintains an open and transparent relationship with the local community and members of the public. Some examples of which include regularly hosting Community Open Houses and distributing information flyers to neighbouring residents to communicate project updates and share relevant information.

20.5 Mine Closure Requirements

A Closure Plan Amendment for the Macassa Mine and its three contiguous historical properties (Kirkland Minerals, Teck Hughes and Lakeshore) was submitted to the Ministry of Energy, Northern Development and Mines (ENDM) in January 2018. The amendment was required to capture the NTSF, new shaft as well as additional infrastructure on site. The CPA is amended at least every five years, to reflect any significant site changes as well as associated changes to the Financial Assurance estimates. It is important to note that one additional historical property, Wright-Hargreaves, is not included within the Closure Plan boundary. As such, this property and its legacy concerns (shafts, adits, stopes, etc.) are remediated annually as part of the Progressive Rehabilitation requirements defined in O.Reg 240/00. Because of this, there is no Financial Assurance posted to remediate any hazards within the Wright Hargreaves property.

The Company completes rehabilitation measures of legacy mine hazards annually both within the Closure Plan boundary and on the Wright-Hargreaves property. Each mine hazard has been included in a register, which has formed the basis of the schedule for remediation. Also, a request for credit will be sent to the ENDM at the same 5-year frequency described above to accurately reflect any credit required to be reflected on the Financial Assurance package as mine hazards are rehabilitated.

The Financial Assurance held with the ENDM is in the form of surety bonds and it has been increased in the most recent Closure Plan Amendment to the amount of $12M. This amount includes the NTSF and new shaft.

21.0 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

21.1.1 Basis of Estimate

Capital cost estimates are based on historical costs at the Macassa Mine, costs included in the 2018 and 2019 Budget or budgetary quotations from suppliers in the industry. All costs shown are in Canadian Dollars. The production physicals used for the analyses performed in this section are from the life of mine schedule inclusive of resource conversion, as discussed in Section 15.7.

21.1.2 Cost Estimate

Over the LOM, annual capital expenditures for Macassa Mine are estimated to average $68M per year, excluding #4 Shaft costs. The sustaining capital portion averages $54M per year, while the growth capital averages $14M per year, excluding #4 Shaft costs. The estimated capital costs are summarized in Table 21-1, and do not include exploration spending. Averages shown on the table below for sustaining and growth capital costs do not include the final two project year, for which all capital has been allocated into operating costs. #4 Shaft average annual costs shown on Table 21-1 represent the average from 2019 to 2022.

Table 21-1: LOM capital cost estimates with yearly average (No capitalization in last two years).

Capital Spending (Millions)	Total	Average
Sustaining	$ 379	$ 54
Growth	$ 97	$ 14
Growth - #4 Shaft	$ 341	$ 68

Sustaining capital is defined as capital required to maintain current operations at existing levels. Growth capital is defined as capital expenditures for major growth projects or enhancement capital for significant infrastructure improvements at existing operations.

LOM sustaining capital costs total $379M and include costs for development, infrastructure, pastefill, construction, equipment purchases/rebuilds and allocation of indirect costs required to support ongoing mining. Sustaining capital costs include $168M for development and $18M for twin ventilation raises to surface.

LOM growth capital costs total $438M and include $14M for a thickened tails facility, $18M for a new crushing facility, $21M for a new pastefill plant, $27M for the expansion and reinforcement of the tailings dams and additional lifts, and $341M #4 Shaft costs between the years 2019 to 2023 for Phases 1 and 2.

Exploration spend was estimated using the 2019 budget numbers. These are presented on Table 21-2. A total of $154M has been allocated for growth exploration costs over the LOM; the average shown on the table below do not include the final two LOM years, as those do not contain an allocation for exploration costs.

Table 21-2: LOM exploration spend estimates (yearly average shown).

Exploration Spend (Millions)	Total	Average
Surface	$ 9	$ 1
Underground	$ 77	$ 11
Development	$ 68	$ 8
Total	$ 154	$ 21

21.2 Operating Costs

21.2.1 Basis for Estimate

The operating costs were developed based on the yearly budget and previous historical operating costs at Macassa. For the LOM period from 2019 to 2021, before the commissioning of #4 Shaft, costs remain relatively constant. Once commissioned, #4 Shaft will contribute to lowering the unit costs, while production is anticipated to double over the same period. The increase in production ore tonnage will not translate to a significant increase in manpower or equipment as the new shaft location will allow for reduced haulage, increased mechanization and operational efficiencies. The operating cost reduction estimate is based on site experience and a comprehensive review by Macassa Mine management. The production physicals used for the analyses performed in this section are from the life of mine schedule inclusive of resource conversion, as discussed in Section 15.7.

21.2.2 Cost Estimate

Annual LOM operating costs for the Macassa Mine are estimated to average $388/t before the completion of #4 Shaft, and is estimated to range between $242/t to $312/t after #4 Shaft is commissioned. The Mine unit costs before #4 Shaft commissioning average $302/t, and range between $183/t to $207/t after commissioning, with the Mill unit costs ranging from $35/t to $52/t over the life of mine. Calculated unit costs are shown in the Economic Analysis section, on Table 22-3, along with the pre-tax LOM cashflow. Operating costs are shown on Table 21-3 for the LOM.

Table 21-3: LOM operating cost Estimates (yearly average shown).

Operating Costs (Millions)	Total	Average
Operating Expenditures	$ 1,489	$ 165
Mine	$ 1,110	$ 123
Mill	$ 196	$ 22
Site Administration	$ 130	$ 14
Royalties	$ 187	$ 21

Mine operating expenditures include direct and indirect operating costs related to Macassa Mine. Allocated mining costs include mining, engineering, and geology. General and administrative costs include surface/plant, administration, environmental, and shared services. Mine operating costs also include the allocation of closure costs over the LOM.

21.3 Development Cost Estimates

21.3.1 Lateral Development Costs

Development quantities for the life of mine economics have been based on the 3D LOM mine design, up until the resource conversion, after which annual averages were used. The estimated unit cost for ramp and lateral development has been developed from both budgeted numbers as well as post #4 Shaft estimated unit cost efficiencies. Unit costs efficiencies expected for development were driven primarily from estimates made through detailed assessments required manpower, supervision and productivities post #4 Shaft.

21.3.2 Vertical Development Costs

Development quantities for the life of mine economics have been based on the 3D LOM mine design, as well as yearly average estimates. The raisebore costs have been added to the budget as per vendor estimate. These estimated costs were developed based on historical and budgeted estimates. Vertical raise development includes all vertical development to support the mine design (ventilation raises, muck passes and egresses). Longer raises are expected to be completed by mining contractors using either Alimak or Raise Boring methods. No efficiencies were assumed for raising post #4 Shaft implementation.

22.0 ECONOMIC ANALYSIS

The results of the economic analysis represent forward-looking information that is subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

Net Present Value (NPV) was chosen as the primary parameter for financial evaluation and comparison, as opposed to the Internal Rate of Return (IRR). This is because the NPV allows for comparison of cashflow between project options, versus the IRR. The IRR would not allow for a direct project comparison, since the calculated return on investment in the base case scenario is magnified by the exclusion of the initial capital investment in the calculations.

Macassa Mine is currently in production, but existing plans include a material expansion of current production after the commissioning of #4 Shaft in 2022. The #4 Shaft project is ongoing, as per plans described in Section 18.1. This project will be funded internally, and the investment was chosen based on both objective financial analysis parameters as well as the subjectively derived operational needs focused on risk reduction. The primary reasoning for the #4 Shaft Project is as follows:

- The new shaft will support a higher level of production and lower unit costs.
- The NPV of the project is expected to increase due to both the lower LOM operating costs as well as higher revenues gained earlier on in the project life.
- The new shaft will de-risk the operation, which currently relies on #3 Shaft. #3 Shaft was developed in an unfavourable orientation in regards to principle stresses and has previously been exposed to damaging seismicity primarily due to the mining sequence nearby. Though the risk is being effectively managed through sound ground control practices, the addition of a new shaft in a favourable location and orientation will eliminate it.
- Current ventilation inflow underground is constrained by the cross-section area of the existing #3 Shaft. The commissioning of the new shaft will allow for substantially higher inflow of air underground, improving the ventilation and general working conditions in the mine.
- The new shaft will also allow for more effective exploration to the east of the South Mine Complex.

The economic analysis was completed as follows:

- Using the Mineral Reserves as stated in the 2018 MRMR (as of December 31, 2018) as well as re-evaluated measured and indicated resources that were determined to be economic with the estimates for improved unit costs post #4 Shaft completion. The converted mineral resources (as per Section 15.7) were also included.
- Using operating costs based on the Macassa Mine Budget, which is based on actual costs as tracked throughout the working year, and historical costs.
- Using capital costs based on the Macassa Mine Budget, which were based on historical costs and budgetary quotations from suppliers in the industry.

Each production area was evaluated to confirm that the gross revenue generated will support the operating and direct capital costs required. Annual cashflow projections were estimated over the life of mine based on the estimated capital and operating expenditures and gold sales revenue.

22.1 Mine Production Statistics

Production physicals were determined from the life of mine schedule inclusive of resource conversion, as described in Section 15.7 are summarized in Table 22-1 below.

Table 22-1: LOM production physicals (yearly average shown).

2019 LOM- Resource	Total	Average
Tonnes (000's)	5,022	558
Grade (g/t)	19.0	19.0
Ounces Mined (000's)	3,072	341
Mill Recovery	97.6%	97.6%
Ounces Recovered (000's)	2,998	333

Over the LOM, gold production will range from 245,000 ounces per year to 508,000 ounces per year, averaging 333,000 ounces per year. After completion of #4 Shaft, the production is expected to increase to over 400,000 ounces per year.

22.2 Milling Recovery

The milling recovery used to generate the revenue streams in the LOM schedule is based on the grade versus recovery curve generated from 2018 milling recovery data, as shown in Section 12.0. The average milling recovery over the Life of Mine is 97.6%.

22.3 Royalties

Macassa Mine has a royalty obligation to Franco-Nevada of 1.5% NSR as well as a royalty agreement of 0.5% NSR with certain First Nation communities from the sale of the metal production. There are also various other royalties associated with the different mining claims due to previous owners, broken down in Table 4-1: Summary of Macassa Mine royalties. These were taken into account in the LOM, and associated royalty payments were determined on a yearly basis. The summary of the LOM royalties is shown below in Table 22-2.

Table 22-2: LOM royalty summary (yearly average shown).

Royalties (Millions)	Total	Average
Franco-Nevada	$ 89	$ 10
First Nations	$ 25	$ 3
Mining Claims	$ 73	$ 8
Total	$ 187	$ 21

22.4 Taxes

Applicable taxes include a combined tax rate of Federal and Provincial Taxes of 25% as well as the Ontario Mining Tax of 10%. The financial models were analysed on a pre-tax scenario.

22.5 Principal Assumptions

The economic assumptions used for the 2019 year are as per the 2019 budget, as follows:

- Price of gold of US$1,218.75
- Currency exchange rate of US$1.00=CAD$1.33
- Production tonnes based on the 2019 budget, with an average #3 Shaft hoisting capacity 2,000 tonnes per day.

The economic assumptions for the remaining years of the LOM are as follows:

- Price of gold of US$1,230
- Currency exchange rate of US$1.00=CAD$1.33
- Average #3 Shaft hoisting capacity 2,000 tonnes per day and average #4 Shaft hoisting capacity of 4,000 tonnes per day.
- No escalation of consumable unit costs was considered.

As listed previously, the resource conversion factors used were 75% for measured and indicated, and 50% for inferred. These converted resource estimates are used in the physicals from years 2025 to 2027 in the LOM inclusive of resource conversion.

The Company's profitability and long-term viability depend, in large part, upon the market price of gold. Market price fluctuations of gold could adversely affect the profitability of the Company's operations and lead to impairments and write downs of mineral properties. Metal prices fluctuate widely and are affected by numerous factors beyond the Company's control, including: global and regional supply and demand for industrial products containing metals generally; and global or regional political or economic conditions

22.6 Net Present Value and Cash Costs

The LOM pre-tax cash flows total $2.3B (undiscounted) with a corresponding pre-tax NPV of $1.7B at a 5% discount rate. The following table, Table 22-3, highlights the LOM undiscounted pre-tax cashflow.

The Cash Costs per ounce sold (ounces mined are assumed to be the ounces sold) range from $345/oz to $700/oz (US$260/oz to US$525/oz) over the LOM, averaging $525/oz (US$390). Over the 9-year LOM, the All-In Sustaining Costs (AISC) ranges from $500/oz to $900/oz (US$375/oz to US$675/oz), averaging $715/oz (US$540/oz).

Table 22-3: Macassa Mine LOM undiscounted pre-tax cashflow.

Kirkland Lake Gold Macassa Mine
2019 Life of Mine

OPERATIONS SUMMARY		Total		Annual Average
Tonnes		5,021,870		557,986
Grade (g/t)		19.0		31.1
Ounces Mined		3,071,912		557,986
Mill Recovery		97.6%		59.7%
Ounces Poured		2,997,896		333,100
Operating days per year				365
Average Daily Mining Rate (tpd)				1,528
Gold Price				1,635
REVENUE (000s)	**$**	**4,901,659**	**$**	**544,629**
Operating Costs (incl. inventory change)	$	1,486,862	$	165,207
Operating Expenditures	$	1,489,427	$	165,492
Mine		*1,110,082*		*123,342*
Mill		*195,874*		*21,764*
Allocation of Capital (last 2 years)		*53,274*		*5,919*
Site Administration		*130,197*		*14,466*
Royalties		186,559		20,729
Operating Margin	**$**	**3,228,239**	**$**	**358,693**
Capital Spending	$	835,964	$	92,885
Sustaining		*378,889*		*54,127*
Growth		*97,402*		*13,915*
Growth - #4 Shaft		*359,673*		*51,382*
Total Operations Spending	**$**	**2,511,951**	**$**	**279,106**
Advances Against Capital	**$**	**(18,932)**	**$**	**(2,104)**
Cash Flow From Operations	**$**	**2,408,641**	**$**	**267,627**
Exploration Spending	$	154,425	$	17,158
Surface		*9,323*		*1,332*
Underground		*76,652*		*10,950*
Allocation to Growth Capital		*68,450*		*9,779*
Care and maintenance		-		-
Tails Rehabilitation	$	2,532	$	362
Cash Flow Generated (Used)	**$**	**2,251,685**	**$**	**250,187**

UNIT COSTS		
Per tonne ($/tonne)		
Mine (per tonne drawn)	$	235
Mill (per tonne milled)	$	41
Site Admin (avg mine and milled tonne)	$	28
Operating Cost (avg mine and milled tonne)	$	313
Per Ounce (CAD $/ounce sold)		
Cash Cost (per ounce sold)	$	522
AISC	$	714
Per Ounce (US $/ounce sold)		
Cash Cost (per ounce sold)	$	392
AISC	$	537

22.6.1 Sensitivity Analysis

A sensitivity analysis was performed on the financial model presented. The pre-tax NPV was determined at discount rates of 0%, 5% and 10% against variations of +/-20% applied to the price of gold, grade, operating expenses and capital expenses. Results showing the variation in pre-tax net cashflow are presented in Table 22-4.

Results indicate that of the four variables assessed, the price of gold and grade have the greatest impact, with the operating costs and the capital costs having less fluctuation as the variation to the base is increased/decreased. All scenarios presented had a positive NPV despite variations, indicating a robust plan with a high pre-tax profit margin.

Table 22-4: Macassa pre-tax financial sensitivity analysis.

Sensitivity	NPV @ 0% (Millions)	NPV @ 5% (Millions)	NPV @ 10% (Millions)
Change in POG			
+20%	$3,232	$2,458	$1,912
+10%	$2,742	$2,076	$1,607
Base Case	$2,252	$1,694	$1,302
-10%	$1,762	$1,311	$997
-20%	$1,271	$929	$692
Change in OPEX			
+20%	$1,954	$1,461	$1,116
+10%	$2,103	$1,577	$1,209
Base Case	$2,252	$1,694	$1,302
-10%	$2,401	$1,810	$1,395
-20%	$2,550	$1,926	$1,488
Change in CAPEX			
+20%	$2,088	$1,554	$1,181
+10%	$2,170	$1,624	$1,242
Base Case	$2,252	$1,694	$1,302
-10%	$2,333	$1,763	$1,362
-20%	$2,415	$1,833	$1,423
Change in Grade			
+20%	$3,232	$2,458	$1,912
+10%	$2,742	$2,076	$1,607
Base Case	$2,252	$1,694	$1,302
-10%	$1,762	$1,311	$997
-20%	$1,271	$929	$692

22.7 Payback

The payback period was calculated including #4 Shaft capital expenses for both project phases. All calculations were evaluated on a pre-tax basis, and the payback was calculated undiscounted. A simple base case was developed, using current 2019 production rates, corresponding unit costs, and depletion of 2018 Reserves and converted Resources. The difference in cashflow between the LOM and the base case was tabulated annually in order to develop the cumulative cashflow. Payback calculations were completed from 2018 onwards. The analysis indicates that full project payback is expected early 2024.

23.0 ADJACENT PROPERTIES

There are no adjacent properties that influence the Mineral Resources and Mineral Reserves at Macassa.

There are no adjacent properties that Macassa relies upon for the operation of the mine and mill complex.

24.0 OTHER RELEVANT DATA AND INFORMATION

There is no additional data or information on the Macassa Property, beyond the #4 Shaft disclosure above, known to the QPs at the effective date of the report that, if undisclosed, would make this NI 43-101 Technical Report misleading or more understandable.

25.0 INTERPRETATION AND CONCLUSIONS

25.1 General

Production activities at the Macassa Mine started in 1933. After a brief shut down due to low gold prices in the early 2000's, the mine re-opened and continues to produce gold from high grade ore.

The recent business transaction (2016) between Kirkland Lake Gold Inc. and Newmarket Inc. provided additional opportunities to further develop the Property supported by an increase in capital expenditures. In the current gold price environment, the operation is expected to continue to generate significant free cash flows that will benefit the Company's shareholders.

25.2 Opportunities

Opportunities at the Macassa Mine are as follows:

- SMC mineralization remains open to the east, west and at depth. Diamond drilling continues to return high grade mineralization. In order to support the drilling requirements, the exploration drifts and associated drill bays must remain high priority development headings at the mine.
- Exploration development towards 3000 Level, east of #2 Shaft, that is designed to explore the '04 Break and Main Break could create the opportunity to reintroduce some of the historical mineral resources back into the global resource estimate.
- #4 Shaft is scheduled to be completed in the second quarter of 2022 (Phase 1) with a designed production (hoisting) rate of 4,400 short tons per day. Re-evaluating the resource cut-off grade economics using lower operating costs after the commissioning of the new shaft will likely be favourable to increasing mineral resources.
- In 2017, the operation transitioned from modified polygonal mineral resource estimates to block modelling. This transition is expected to optimize grade interpolation, determination of high grade capping levels, and aid with mine/mill reconciliation process. These processes continue to evolve.
- Improvements to the material handling process are likely to result in favourable impact on the mine operating costs.
- Upgrade of the ventilation system through either increased airflow or temperature reduction will have a favourable impact on the work environment temperature.
- Ongoing paste filling operations involve the delivery of paste using boreholes from surface to underground, into which cement trucks dump the paste in batches. Current plans are in progress to replace this process with continuous pouring directly from the pastefill plant, eliminating the need for cement trucks and speeding up cycle times underground.
- Extension of the life of tailings facilities will be possible through the commission of the thickened tails plant.
- In 2018, Macassa has started to implement tele-remote mucking in selected areas, leading to a decrease in cycle times and added process efficiencies. Along with continuing to expand the tele-remote implementation, Macassa Mine is also exploring further improvement opportunities by combining equipment automation (trucks) with tele-remote. When successfully implemented this process will enable material handling and movement in between shifts.

25.3 Risks

Risks that could be present at the operation are summarized as follows:

- Without the allocation of sufficient funding for exploration drilling and development, it would be difficult for future exploration programs to replenish depleted Mineral Resources and Reserves.
- Increased costs for skilled labour, power, fuel, reagents, trucking, etc. could lead to an increase in the cut-off grade and decrease the level of Mineral Resources and Mineral Reserves.
- Mechanical breakdown of critical equipment (hoist, conveyance, mill, etc.) or infrastructure could decrease or halt the production throughput at the mine.
- Production throughput relies on completing development activities as per the mining plan schedule. Lower development productivity than planned would likely affect the production profile of the current mining plan.
- #3 Shaft is currently the sole production shaft capable of moving materials to surface. The shaft is located in a seismically active area due to the historical mining and the active muck pass system in the MBZ located nearby. Damage to the #3 Shaft would directly impact production until the #4 Shaft is commissioned.
- The advancement of Battery Electric Vehicle technology is still in its early stages. There are inherent risks as the technology continues to evolve.

In the QPs opinion, there are no reasonably foreseen inputs from risks and uncertainties identified in the technical report that could affect the project’s continued economic viability.

26.0 RECOMMENDATIONS

A number of recommendations arising from the Technical Report are found below:

- Continue exploration drilling will to test for the easterly and westerly strike extension of the South Mine Complex mineralization employing underground diamond drills on the 5300 Level.
- Complete technical studies to increase the airflow and reduce the work environment temperature and humidity.
- Technical work should be undertaken to assess infrastructure requirements for the continuous mining of the Macassa deposit.
- The application of Large Ore Deposit Exploration (LODE) program to assess camp scale opportunities.
- Related to the point above, interrogation of the newly created lithological model and the mine drillhole database as an exploration tool to assess future targeting opportunities.
- Sub-domaining of high grade areas, as well as refinement of caps to improve the model grade estimates as compared to production results.
- Continue to examine the Amalgamated Kirkland Break for mineralization potential. Numerous mineralized intercepts were intersected at variable depths which require follow-up.
- Assess mineral potential to the east and along the Main Break below the 5800 Level and to the east into Kirkland Minerals and Tech Hughes properties.
- Look at a refinery expansion and addition of certain components in the process plant to accommodate the planned increase in throughput.
- There is an opportunity to improve the turnaround times for the assaying of underground samples through the establishment of a centralized assay lab.

27.0 REFERENCES

Analytical Solutions Ltd., 2015: A Review of the Macassa Mine Laboratory Operations. Prepared for Kirkland Lake Gold, dated December 19, 2015.

Ayer, J.A., Amelin, Y., Kamo, S.L., Ketchum, J.W.F., Kwok, K. and Trowell, N. 2002: Evolution of the southern Abitibi greenstone belt based on U-Pb chronology: autochthonous volcanic construction followed by plutonism, regional deformation and sedimentation; Precambrian Research, v. 115, pp. 63-95.

Dupéré, Maxime and Leroux, D., (SGS Geostats) 2017: Macassa SMC Gold Deposit Mineral Resource Verification. Internal report prepared for Kirkland Lake Gold June 2017.

Mercer, R. and Pakalnis, R., 2018: Kirkland Lake Gold Ltd. Ground Control Review. Internal report prepared for Kirkland Lake Gold, dated Aug 2018.

Rhys, D., (Panterra Geoservices Inc.) 2006: Summary of June-July, 2006 structural work at the Macassa Mine. Internal report prepared for Kirkland Lake Gold, dated August 19, 2006.

Rhys, D., (Panterra Geoservices Inc.) 2008: Geological observations from the October, 2008 site visit to South Mine Complex of the Macassa Mine. Internal report prepared for Kirkland Lake Gold, dated December 29, 2008.

Rhys, D., (Panterra Geoservices Inc.) 2017: Comments regarding drillhole observations of deep and lateral structural targets, Macassa Mine and region. Internal report prepared for Kirkland Lake Gold, dated January 15, 2017.

Rocque, P., Carter, D., 2017: NI 43-101 Technical Report "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report", dated March 28, 2017.

SGS Geostats, 2018: SMC and Main/04 Break Gold Zones, Macassa Deposit, Cursory Validation of the Updated Deposit Mineral Resource Estimate. Internal report prepared for Kirkland Lake Gold, dated March 3, 2018.

28.0 SIGNATURE PAGE AND DATE

The undersigned prepared this Technical Report titled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report". The effective date of this Technical Report is December 31, 2018 and the disclosure date is April 1st, 2019.

Signed,

"signed and sealed"

Mariana Pinheiro Harvey, P. Eng.	April 1st, 2019	Kirkland Lake Gold Ltd. Macassa Mine Complex 1350 Government Road West 200 Bay Street, Suite 3120 Kirkland Lake, Ontario, Canada P2N 3J1

"signed and sealed"

Robert Glover, P. Geo.	April 1st, 2019	Kirkland Lake Gold Ltd. Macassa Mine Complex 1350 Government Road West 200 Bay Street, Suite 3120 Kirkland Lake, Ontario, Canada P2N 3J1

"signed and sealed"

William Tai, P. Eng.	April 1st, 2019	Kirkland Lake Gold Ltd. Macassa Mine Complex 1350 Government Road West 200 Bay Street, Suite 3120 Kirkland Lake, Ontario, Canada P2N 3J1

"signed and sealed"

Ben Harwood, P. Eng.	April 1st, 2019	Kirkland Lake Gold Ltd. Exploration Office 489 Macdougall Street, Box 209 Matheson, Ontario, P0K 1N0 Canada

CERTIFICATE OF QUALIFIED PERSON

I, Mariana Pinheiro Harvey, P. Eng.; as an author of this report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report" dated effective December 31, 2018 prepared for Kirkland Lake Gold Ltd. (the "Issuer") do hereby certify that:

1. I am the Chief Engineer, Macassa Mine Complex of Kirkland Lake Gold Ltd., located at 1350 Government Road West, Kirkland Lake, Ontario, P2N 3J1, Canada.
2. This certificate applies to the Technical Report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report", dated effective December 31, 2018 (the "Technical Report").
3. I graduated with a Bachelor of Applied Science degree (Hons) in Mineral Engineering in 2012 from the University of Toronto, Toronto, Ontario.
4. I have practiced my profession continuously since 2012 and have worked in the mining industry for different companies with increasing levels of responsibilities. I have direct experience in engineering and operations in underground mining environments.
5. I am a member of Professional Engineers Ontario (Membership No. 100188887).
6. I am directly accountable for the Mineral Reserve estimate for the Macassa Mine. I have provided constant feedback and oversight throughout the development of the Mineral Reserve Estimate and have reviewed all supporting documentation.
7. I am familiar with National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("NI 43-101") and by reason of education, experience and professional registration I fulfill the requirements of a "qualified person" as defined in NI 43-101.
8. I am responsible for the preparation of Sections 1, 2, 3, 4, 5, 6, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 and 27 of the Technical Report.
9. I am not independent of the Issuer as described in Section 1.5 of NI 43-101, as I am an employee of the Issuer. Independence is not required under Section 5.3 (3) of NI 43-101.
10. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and this Technical Report has been prepared in compliance with these instruments and forms.
11. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated in Kirkland Lake, Ontario this 1st day of April, 2019.

"Signed and Sealed"

Mariana Pinheiro Harvey, P.Eng.
Chief Engineer, Macassa Mine

CERTIFICATE OF QUALIFIED PERSON

I, Robert Glover, P.Geo, as an author of this report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report" dated effective December 31, 2018 prepared for Kirkland Lake Gold Ltd. (the "Issuer") do hereby certify that:

1. I am the Chief Mine Geologist, Macassa Mine Complex of Kirkland Lake Gold Ltd., located at 1350 Government Road West, Kirkland Lake, Ontario, P2N 3J1, Canada.
2. This certificate applies to the Technical Report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report", dated effective December 31, 2018 (the "Technical Report").
3. I graduated in Geological Engineering Technology in 1999 with a Diploma from Fleming College, Lindsay, Ontario.
4. I have held senior positions at Macassa Mine for 14 years directly involved with exploration and production geology. I have been responsible for the collection and management of geological data to generating a resource estimate.
5. I have practiced my profession continuously since 2003.
6. I am a member of the Association of Professional Geoscientists of Ontario (Membership No. 2803).
7. I am directly accountable for the Mineral Resource Estimate for the Macassa Mine. I have provided constant feedback and oversight throughout the development of the Mineral Resource Estimate and have reviewed all supporting documentation.
8. I am familiar with National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("NI 43-101") and by reason of education, experience and professional registration I fulfill the requirements of a "qualified person" as defined in NI 43-101.
9. I am responsible for the preparation of Sections 1, 6 to 11, 13, and 23 to 27 of the Technical Report.
10. I am not independent of the Issuer as described in Section 1.5 of NI 43-101, as I am an employee of the Issuer. Independence is not required under Section 5.3 (3) of NI 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and this Technical Report has been prepared in compliance with these instruments and forms.
12. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated in Kirkland Lake, Ontario this 1st day of April, 2019.

"Signed and Sealed"

Robert Glover, P. Geo.
Chief Geologist, Macassa Mine

CERTIFICATE OF QUALIFIED PERSON

I, William Tai, P. Eng., as an author of this report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report" dated effective December 31, 2018 prepared for Kirkland Lake Gold Ltd. (the "Issuer") do hereby certify that:

1. I am the Mill Superintendent, Macassa Mine Complex of Kirkland Lake Gold Ltd., located at 1350 Government Road West, Kirkland Lake, Ontario, P2N 3J1, Canada.
2. This certificate applies to the Technical Report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report", dated effective December 31, 2018 (the "Technical Report").
3. I graduated with a Bachelor of Applied Science degree in Mineral Engineering (B.A.Sc.) in 2000 from the Lassonde Mineral Engineering Program at the University of Toronto.
4. I have been directly involved in mill, assay and surface design/operations of base metal & gold mines. I have been accountable/responsible for the metallurgical, mill, assay and/or surface departments at four plants.
5. I have practiced my profession continuously since 2000.
6. I am a member of Professional Engineers Ontario (Membership No. 100075730).
7. I am directly accountable for the Metallurgical, Assay and Surface performance of the Macassa Mill.
8. I am familiar with National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("NI 43-101") and by reason of education, experience and professional registration I fulfill the requirements of a "qualified person" as defined in NI 43-101.
9. I am responsible for the preparation of Sections 1, 11, 12, 16, 25 and 26 of the Technical Report.
10. I am not independent of the Issuer as described in Section 1.5 of NI 43-101, as I am an employee of the Issuer. Independence is not required under Section 5.3 (3) of NI 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and this Technical Report has been prepared in compliance with these instruments and forms.
12. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated in Kirkland Lake, Ontario this 1st day of April, 2019.

"Signed and Sealed"

William Tai, P.Eng.
Mill Superintendent, Macassa Mill

CERTIFICATE OF QUALIFIED PERSON

I, Ben Harwood, P.Geo, as an author of this report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report" dated effective December 31, 2018 prepared for Kirkland Lake Gold Ltd. (the "Issuer") do hereby certify that:

1. I am the Principal Resource Geologist, Canadian Operations, of Kirkland Lake Gold Ltd., located at 1350 Government Road West, Kirkland Lake, Ontario, P2N 3J1, Canada.
2. This certificate applies to the Technical Report entitled "Macassa Property, Ontario, Canada, Updated NI 43-101 Technical Report", dated effective December 31, 2018 (the "Technical Report").
3. I graduated with a Bachelor of Science Degree in Geology (B.Sc. Geology) in 2005 from The University of Western Ontario, London, Ontario. I went on to graduate with a Master of Science Degree in Geology (M.Sc. Geology) in 2010 from the University of Western Ontario, London, Ontario.
4. I have been directly involved in resource estimation of gold deposits for seven years. I have overseen the resource estimates of five active gold mines.
5. I have practiced my profession continuously since 2010.
6. I am a member of the Association of Professional Geoscientists of Ontario (Membership No. 2334).
7. I am directly accountable for the Mineral Resource Estimate for the Macassa Mine. I have provided constant feedback and oversight throughout the development of the Mineral Resource Estimate and have reviewed all supporting documentation.
8. I am familiar with National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("NI 43-101") and by reason of education, experience and professional registration I fulfill the requirements of a "qualified person" as defined in NI 43-101.
9. I am responsible for the preparation of the Summary and Section 13 of the Technical Report.
10. I am not independent of the Issuer as described in Section 1.5 of NI 43-101, as I am an employee of the Issuer. Independence is not required under Section 5.3 (3) of NI 43-101.
11. I have read NI 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Reports, and Companion Policy 43-101CP and this Technical Report has been prepared in compliance with these instruments and forms.
12. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the parts of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated in Kirkland Lake, Ontario this 1st day of April, 2019.

"Signed and Sealed"

Ben Harwood, P. Geo.
Principal Resource Geologist (Canadian Operations)

Appendix A: Macassa Claims List

Kirkland Lake Gold holds title to 258 mining claims in Teck and Lebel Townships that covers 3,724 hectares. There are 187 patented claims, 11 crown leases and 59 staked claims. Macassa Mine is the only currently active operating mine within these property groups. Specifically, all the claims are located in eastern Teck Township and western Lebel Township. They cover the properties of Macassa Mine including the Tegren property at the west end of the mine strip. To the east of Macassa, the properties cover the past producing mines of Kirkland Minerals, Tech-Hughes, Lake Shore and Wright-Hargreaves. Of note, the Lebel claims are not contiguous with the main property. A list of all the claims is provided in Table A1.

Table A1: List of Macassa Claims

Property	*Claim Type*	*Lease Number*	*Claim Number*	*Alternate Number*	*Comments*
Lebel Twp. Property	Patent		L-2257		MR & SR
	Patent		L-2430		MR & SR
	Patent		L-2447		MR & SR
	Patent		L-2448		MR & SR
	Patent		L-2450		MR & SR
	Patent		L-2452		MR & Part SR
	Patent		L-2459		MR & SR
	Patent		L-2469		MR & SR
	Patent		L-2676		MR
	Patent		L-2677		MR & part SR
	Patent		L-2790		MR & part SR (SRO pending severance & transfer to McCombe)
	Patent		L-2791		MR & part SR (SRO pending severance & transfer to McCombe)
	Patent		L-2807		MR & Part SR (SRO pending severance & transfer to McCombe)
	Patent		L-2808		MR & SR
	Patent		L-2886		MR & SR
	Patent		L-2900		MR & SR
	Patent		L-2901		MR & SR
	Patent		L-2988		MR & SR
	Patent		L-3009		MR & SR
	Patent		L-3010		MR & SR
	Patent		L-3011		MR & SR
	Patent		L-5940		MR & Part SR
	Patent		L-7798		MR & SR
	Patent		L-7799		MR & SR
	Patent		L-8819		MR & SR
	Patent		L-8820		MR & SR
	Patent		L-8821		MR & SR
	Patent		L-8822		MR & SR

Table A1: List of Macassa Claims

Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Patent		L-8823		MR & SR
	Patent		L-8824		MR & SR
	Patent		L-16514		MR & SR
	Patent		L-16515		MR & SR
	Patent		L-20176		MR & SR
	Patent		L-2851		MR Mining rights only as part of a property swap with The Land Store
	Staked Claim		L-893443		MR - STAKED
	Staked Claim		L-1014631		MR - STAKED
	Staked Claim		L-1014632		MR - STAKED
	Staked Claim		L-1014633		MR - STAKED
	Staked Claim		L-1014634		MR - STAKED
	Staked Claim		L-1014644		MR - STAKED
	Staked Claim		L-1014645		MR - STAKED
	Staked Claim		L-1221678		MR - STAKED
	Staked Claim		L-1221680		MR - STAKED
	Staked Claim		L-1221778		MR - STAKED
	Staked Claim		L-1221779		MR - STAKED
Wright Hargreaves	Patent		T.C. 708	L-1830	MRO
			T.C. 708	L-1830	SR
			T.C. 708	L-1830	SR
	Patent		T.C. 709	L-1829	MRO
			T.C. 709	L-1829	PT. SRO (L-1829)
	Patent		T.C. 710	L-2103	MRO. Part SR
			T.C. 710	L-2103	PT SR
	Patent		T.C. 711	L-1831	MRO (RECORDED AS L-1831)
			T.C. 711	L-1831	PT. SRO
Teck Hughes	Patent		L-1824		MR
			1824		SRO

Table A1: List of Macassa Claims

Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Patent		L-1825		MR
			1825		PT SR
	Patent		L-2242		PT. SRO
			L-2242		SRO
			L-2242		PT SR
			L-2242		PT SR
			L-2242		PT SR
	Patent		L-16625		MR
			16625		PT SR
	Patent		L-16626		MR
			16626		PT SR
			16626		PT SR
	Patent		L-16624		MR
			16624		SRO
Kirkland Minerals	Patent		L-2643		MR
	Patent		L-1236		MR
			1236		PT SR
	Patent		L-1238		MR
			1238		PT SR
	Patent		L-1239		MR
			1239		SR
	Patent		L-1240		MR
			1240		PT SR
	Patent		L-1643		MRO
	Patent		L-1850		MR/SR?
			1850		SR
Lake Shore Property	Patent		1223		PT. SRO
	Patent		1340		PT. SRO

Table A1: List of Macassa Claims

Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Patent		1342		PT. SRO
	Patent		1343		PT. SRO
	Patent		1432		SRO
	Patent		L-1557		MRO
	Patent		L-1557		PT SR
	Patent		L-1557		PT SR
	Patent		L-1557		PT SR
	Patent		1748		SRO
	Patent		1754		PT. SRO, Guarantee Trust
	Patent		L-2243		MR & PT. SR
	Patent		L-2605		MR & PT. SR
	Patent		L-2606		MRO
			L-2606		PT. SRO
			L-2606		PT. SRO
			L-2606		PT SR
			L-2606		PT SR
	Patent		L-2645		MR & PT. SR
			L-2645		PT SR
			L-2645		PT SR
	Patent		2967		SRO
	Patent		3018	L-5040	SRO
	Patent		3019	L-5041	SRO
	Patent		3034		SRO
	Patent		L-3601		MRO
			L-3601		PT SR
			L-3601		PT SR
	Patent		6013		SRO
	Patent		6804		SRO
	Patent		6805		SRO

Table A1: List of Macassa Claims

Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Patent		7811		SRO
	Patent		8128		SRO, PT. OF
	Patent		8880		SRO
	Patent		9107		SRO
	Patent		9467		PT. SRO
	Patent		9468		PT. SRO
	Patent		9821		SRO
	Patent		9822		SRO
	Patent		11384		SRO
	Patent		L-16633		MRO
	Patent		L-16634		MRO
	Patent		L-16635		MRO
			16635		PT SR
			16635		PR SR
	Patent		L-16726		MR & SR
Newfield transfer	Patent		L-2604		MRO
	Patent		L-2644		MR
	Patent		L-2755		MR
	Patent		L-2771		MR
	Patent		L-2788		MR
	Patent		L-2823		
	Patent		L-7408	L-2823	License of Ocupation # 897, mining rights covered by L-2823
	Patent		L-2848		MR
Spark Gold	Crown Lease	107737	L342832		MR
			L342833		
			L342834		
			L342855		
			L342856		

Table A1: List of Macassa Claims

Property	***Claim Type***	***Lease Number***	***Claim Number***	***Alternate Number***	***Comments***
			L342857		
Macassa Mine	Patent		HR 546	L-2930	MR, SR 1/4 INT MR& SR to Township of Teck
	Patent		HR 547	L-2931	MR, SR 1/4 INT MR& SR to Township of Teck
	Patent		HR 548	L-2929	MR, SR 1/4 INT MR& SR to Township of Teck
	Patent		HR 732	L-3907	MRO (RECORDED AS L-3907, SR Town of Kirkland Lake)
	Patent		HS 1166	L-6219	MR & SR (6219) - Registered to Barrick Gold
	Patent		HS 1171	L-5343	MRO
	Patent		L-1224		PT. SRO, Claim To Be Transferred From Barrick
			1224		PT SR
	Patent		L-1225		MR+SRO
	Patent		HR1426		PT. SRO-MR, Claim To Be Transferred From Barrick
			HR1426		PT SR
	Patent		L-1525		MR SR
	Patent		L-1616		MR & SR
	Patent		L-1617		MR & PT. SR
	Patent		L-2634		MR, PRT SR
	Patent		L-2635		MRO, SR Betty Blaauw, S1/2) Chad and Linda Wallace(N 1/2)
	Patent		L-2636	HR 759	MR , SR Town of Kirkland Lake
	Patent		L-2637	HR 373	MR , SR Town of Kirkland Lake
	Patent		L-2638		MR , SR Town of Kirkland Lake
	Patent		L-2639		MR
	Patent		L-2640	HR 770	MR & PT. SR
	Patent		L-2641	HR 769	MRO, Claim Transferred From Barrick in 2007
	Patent		L-2642	HR 768	MR & SR
	Patent		L-2762		MR
	Patent		L-2763		MR
	Patent		L-2764		MR
	Patent		L-2830		MR & PT. SR
	Patent		L-2831		MR & PT. SR, 450/500 INT to Township of Teck

Table A1: List of Macassa Claims

Property	***Claim Type***	***Lease Number***	***Claim Number***	***Alternate Number***	***Comments***
	Patent		L-2837		MR & SR
	Patent		L-2838		MR & SR
	Patent		L-2947		MRO
	Patent		L-2948		MRO
	Patent		L-3044		MR & PT. SR
	Patent		L-3468		MRO
	Patent		L-4185		MR & SR
	Patent		L-4186		MR & SR
	Patent		L-4755		MRO - F.J. Davis, J.F. Davis, Estate of Edwin Davis
	Patent		L-5045		MR
	Patent		L-5049		MR
	Patent		L-5362		MR
	Patent		5362		SR
	Patent		L-5688		MRO
	Patent		L-5689		PT MR
	Patent		L-5692		MRO
			5692		SRO
	Patent		L-5693		MRO
			5693		MRO
	Patent		L-5926		MRO
	Patent		L-5927		MRO
	Patent		L-5928		MRO
	Patent		L-5929		MRO
	Patent		L-5967		MR SR 2/3 INT to Township of Teck
	Patent		L-5980		MR SR 2/3 INT to Township of Teck
	Patent		L-6432		MR& SRO, Claim To Be Transferred From Barrick
	Patent		L-8628		MRO
			8628		MRO
	Patent		L-8629		MRO

Table A1: List of Macassa Claims

Property	***Claim Type***	***Lease Number***	***Claim Number***	***Alternate Number***	***Comments***
	Patent		8629		SR
	Patent		HR 781		MRO (RECORDED AS L-12612), SR Town of Kirkland Lake
	Patent		L-16478		MRO
	Patent		26123		SRO
	Patent		26125		SRO
	Crown Lease	108855	L-545717	HR 597	MRO (SRO Town of Kirkland Lake)
	Crown Lease	107749	L-620179	HR 1167	Amalgamated Claim
	Crown Lease	108854	L-856962	HR 734	MRO, (SR Town of Kirkland Lake)
	Crown Lease	108856	L-859820	HR 733	MR
	Crown Lease	107006	L-842970	HR 598	MR SR Town of Kirkland Lake)
Kirkland West	Lease	108499	L-496561		100% ownership in 2012
	Lease	108499	L-496562		
	Lease	108499	L-496563		
	Patent		L-1385		
	Patent		L-16480		
	Patent		L-16477		
	Patent		L-7711		
	Patent		L-6822	HS 1154	
	Patent		L-16513	HR 1422	
	Patent		L-16514	HR 1423	
	Patent		L-16515	HR 1424	
	Patent		L-16543	HR 1421	
	Patent		L-16546	HR 1428	
	Patent		L-16507	HR 1156	
	Patent		L-16509	HR 1427	
	Patent		L-16510	HR 1425	
	Patent		L-16511	HR 1164	
	Patent		L-16512	HR 1165	
Gracie West	Patent		L-16680		PRT MR

Table A1: List of Macassa Claims

Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Patent		L-4230		MRO
	Patent		L-4869		MRO
	Patent		L-6842		MRO
	Patent		L-6843		MRO
	Patent		L-6863		MRO
	Patent		L-9809		MRO
	Patent		L-9810		MR, 190/400 interest.
	Patent		L-9811		MRO
	Patent		L-9812		MRO
	Patent		L-9813		MRO
	Patent		L-9814		MRO
	Patent		L-16614		PRT MR
	Lease	108637	L-476845		SR&MR
	Lease	108636	L-476846		MRO
			L-476847		MRO
	Staked		L-892088		STAKED, MRO, transferred all interest to KGI Sept. 2012
	Staked		L-927914		STAKED, MRO, transferred all interest to KGI Sept. 2012
	Staked		L-927927		STAKED, MRO, transferred all interest to KGI Sept. 2012
	Staked		L-927921		STAKED, MRO, transferred all interest to KGI Sept. 2012
	Staked		L-892085		STAKED, MRO, transferred all interest to KGI Sept. 2012
	Staked Claim		L-4240384		STAKED, MRO, transferred all interest to KGI Sept. 2012
Gracie West (Axcell)	Patent		L-5873		MRO
Trudel	Patent		L-5433		MRO
Morgan	Patent		L-5686		MRO, MTO To Transfer Mining Rights Under Highway
	Patent		L-5687		NW Fraction of claim
	Patent		L-6687		MRO, MTO To Transfer Mining Rights Under Highway
	Patent		L-6768		MRO, MTO To Transfer Mining Rights Under Highway
Hurd/Mistango/ McCauley	Lease	107773	L-225112		MRO (10.182 Ha)

Table A1: List of Macassa Claims

Property	***Claim Type***	***Lease Number***	***Claim Number***	***Alternate Number***	***Comments***
Hudson	Patent		L-2672		MRO
	Patent		L-2757		MRO
	RSC		RSC270		MRO
	RSC		RSC271		MRO
	Patent		L-1404		MRO
	Patent		L-2566		MRO
	Patent		L-2553		MRO
	Patent		L-1403		MRO
North Amalgamated	Part of Lease	109285	Lease CLM 328		
			491182		
			491650		
			491662		
			500057		
			571358		
			524843		
Macassa Exploration	Staked Claim		L-859695		MR
	Staked Claim		L-983045		MR
	Staked Claim		L-1045619		MR
	Staked Claim		L-1045623		MR
	Staked Claim		L-1049049		MR
	Staked Claim		L-4210208		MR
	Staked Claim		L-1213913		MR
	Staked Claim		L-1213914		MR
	Staked Claim		L-1214100		MR,
	Staked Claim		L-1214365		MR
	Staked Claim		L-1214366		MR
	Staked Claim		L-1214367		MR
	Staked Claim		L-1214368		MR

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Property	Claim Type	Lease Number	Claim Number	Alternate Number	Comments
	Staked Claim		L-1214369		MR
	Staked Claim		L-1214370		MR
	Staked Claim		L-1214371		MR
	Staked Claim		L-1214372		MR
	Staked Claim		L-1214373		MR
	Staked Claim		L-1214374		MR
	Staked Claim		L-1217446		MR
	Staked Claim		L-1217447		MR
	Staked Claim		L-1217448		MR
	Staked Claim		L-1217450		MR
	Staked Claim		L-1217451		MR
	Staked Claim		L-1217452		MR
	Staked Claim		L-1217455		MR
	Staked Claim		L-1217479		MR
	Staked Claim		L-1217759		MR
	Staked Claim		L-1219980		MR
	Staked Claim		L-1219981		MR
	Staked Claim		L-3011230		MR
	Staked Claim		L-1221710		MR, SR Crown/Town of Kirkland Lake, USA-Teck Gold Mines
	Staked Claim		L-1222104		MR
	Staked Claim		L-1222105		MR
	Staked Claim		L-4245807		MRO
	Staked Claim		L-4252740		MRO
	Staked Claim		L-4252741		MRO
	Staked Claim		L-4277249		MRO, staked in 2014
	Staked Claim		L-4277250		MRO, staked in 2014
	Staked Claim		L-4270898		MRO, staked in 2016
	Staked Claim		L-4285814		MRO, staked in 2017
	Staked Claim		L-4285006		MRO, staked in 2017

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